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Assessment of Rice (*Oryza sativa L.*) Hybrids on Growth and Yield under Agro-climatic Conditions of Prayagraj, U. P.

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

An area test become performed for the duration of An season of 2021 on the Crop Research Farm, Department of Agronomy, Sharif Agricultural Institute, Main, SHUTS (U.P.) to observe the assessment of rice (Oryza sativa L.) hybrids on growth, yield and economics below agro-climatic situations of Prayagraj, U.P. The test become finished to discover the overall performance of 10 hybrids, this specified in Randomized Block Design (RBD) & replicated thrice. The test locating discovered that rice hybrid UR-34 finished higher in comparison to different hybrids i.e. plant height (120.37 cm), tillers /hill (14.20 No.), dry weight (53.33 g/plant), grain yield (28.14 g/hill), grain yield (6.34 t/ha), straw yield (12.26 t/ha), harvest index (40. 63 %), have been observed extensively better than different hybrids respectively.

Keywords: Hybrid rice; varietal response; yield; (Oryza sativa L.).

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1. INTRODUCTION

The global name for rice is developing with the population growth, developing affluence, and changing dietary habits. The UN/FAO forecasts that worldwide food production will need to grow by over 40% by 2030 and 70% by 2050 (FAO, 2009). Thus, rice production in India similarly to in several special Asian international locations wants to be doubled by the year 2025 to meet the requirement of the developing population. India is the number one rice-growing international with an area of 43.79 million hectares, having a production of 112.90 1,000,000 tonnes, and a productivity of 2.572 t/ha (Directorate of Economics and Statistics 2017-2018). In Uttar Pradesh 5.9 million ha and production of 13.27 million tonnes with mean productivity of 2447 kg/ha and production of 14. sixty 3 million tonnes (Agriculture Statistics 2016). The nutrient contents of rice are 80 carbohydrates, 7-8% protein; the amino acid profile indicates that it's far rich in Glutamic acid and aspartic acid, best cereal protein is rich in lysine (3.8%), 3% fiber, iron 1.0 mg and Zinc 0.5 mg (Juliano et al., 1985). The contemporary worldwide population of 7. fifty 5 billion is expected to achieve 8.1 billion by 2025 and 9.6 billion by 2050 (Department of Economics and Social Affairs -2018). Globally, rice is cultivated now 159 million hectares with an annual production of spherical 748 million tonnes and not unusual place productivity of 4.6 tonnes/ha (FAO, 2016-2017). Rice production and productivity became appreciably advanced with the advent and cultivation of semi-dwarf, fertilizer responsive, and non-inns immoderate yielding kinds with inside the early seventies most important to the “Green Revolution”. The yield degree of immoderate yielding kinds is planting in today's year to meet the decision for of developing population and maintain this self-sufficiency the prevailing production degree wants to be progressed as an awful lot as a hundred and forty million tonnes thru 2025 which can be accomplished handiest thru developing the rice production thru over 2 million tonnes constant with year incoming decade. Hybrid rice technology has provided farmers with immoderate yields, saved land for agricultural diversification, and created rural employment opportunities. Among the limited options in hybrid technology is the handiest display technology currently available for stepping up rice production appreciably, therefore the advent of hybrids and popularization of their production technology is possible and without trouble, adaptable to reap adoptable targeted population. Systematic, goal-oriented, and time-certain research on hybrid rice in India began o in 1989 thru a rustic huge network assignment. The assignment became bolstered similarly with funding from the United Nations Development Programme, Asian Development Bank, and the World Bank.

2. MATERIALS AND METHODS

The take a look at having become finished in some unspecified time in the future of the Kharif season of 2021 at Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj (U.P.) it is located at 25024' 42" N latitude, 810 50' 56" E longitude and 98 m altitude above the mean sea level. This place is positioned on the right side of the river Yamuna by the side of Prayagraj Rewa Road about 5 km far from Prayagraj city. The soil samples had been gathered randomly from 0 to 15 cm depth from 5 spots of the experimental region surely in advance than the layout take a look at. A representative homogenous composite sample has become drawn by mixing a majority of those soil samples, which have become analyzed to determine the physicochemical houses of the soil. Chemical assessment of the soil at pre-take a look at the diploma of planting. Available phosphorous (22.5 kg/ha), available nitrogen (108.0 kg/ha), available potassium (280.0 kg/ha), herbal carbon (0.48 %), pH (7.2), EC (0.38 ds/m). The seeds had been provided thru UPCAR, Lucknow. The germinability has become checked in advance than sowing the nursery. Nursery sowing has become finished on 12th June 2021 and transplanting have become finished on 5th July 2021. They take a look at having become laid down in randomized block design (RBD) with 10 hybrids and 3 replications and to evaluate the hybrid rice beneath neath agro-climatic scenario in prayagraj, the variety provided thru UPCAR, Lucknow. Twenty days vintage seedlings had been transplanted to major regions conventionally at a spacing of 20 x 10 cm. The crop recommended dose has become fertilizer120-60-60 kg N-P-K/ha basal dose of fertilizer have become carried out surely in advance than final puddling, a Half dose of nitrogen and entire dose of phosphorus and potassium followed by topdressings. Irrigation has become scheduled at 6-8 days c program language period; however one-of-a-kind everyday cultural practices had been followed properly timed as; weeding at 30 DAT & 45 DAT. In the take, a look at biometric assertion had been recorded at 15 days c program language

period as lots as 90 DAT. Plant height of these plants had been measured from the ground level as lots because the collar joint of rice plant and Number of tillers have become counted from five random plants consistent with hills of the panicle. Moreover, grains from the harvest place (1.0 m2) had been dried in sun, wiped smooth, and weighed one by one from each plot for calculating the grain yield in tones/ha. Straw from harvest place (1.0 m2) has become dried in sun, bundled, tagged, and weighed one by one from each plot for calculating the straw yield in tones/ha. The harvest index has become calculated by the usage of a formula. The facts have become analyzed thru the method of assessment of variance as described by Gomez and Gomez (1984). The level of significance used in the n “F” test has become given at 5%.

3. RESULTS AND DISCUSSION

3.1 Growth Attributes

3.1.1 Plant height (cm)

Plant peak in the course of the duration of the boom has proven vast because of numerous hybrids supplied in Table 1. At ninety DAT the best plant peak changed into discovered in UR-32 (120.37 cm) which changed into extensively advanced over the relaxation of the hybrids besides UR 30 (118.29 cm) and UR- 31 (117. eighty four cm) is statistically at par with UR-32. The motive for maximum plant peak can be because of geneticthe make-up of the variety. Similar outcomes have additionally been said via way of means by Haque et al. [1].

3.1.2 Tillers/hill (No.)

The effects confirmed that tillers/hill changed into tons stimulated below diverse remedies at ninety DAT the best tillers/hill changed into discovered in UR-32 (14.20 tillers/hill) which changed into substantially advanced over-relaxation of the hybrids besides UR-31(13.26 tillers/hill) and UR-33 (13.33 tillers/hill). In all likelihood motive for excessive yielding types has excessive tillering capacity. Similar findings also are suggested with the aid of using Yadav et al, (2004).

3.1.3 Plant dry weight (g/plant)

The consequences provided in Table 1 approximately the evaluation of variance indicated that the dry weight became substantially ($P<0.05$) laid low with one-of-a-kind hybrids. At ninety DAT the substantially maximum dry weight became located in UR-32 (53.33 g/plant). However, UR-30 (52.seventy four g/plant), UR-35 (52.forty three g/plant) and UR-27 (51.sixty three g/plant) had been statistically at par with UR-32. In all likelihood cause for max dry depend accumulation relies upon the photosynthesis and respiratory rate, which sooner or later will increase the plant boom with appreciate to elevated plant height, leaf vicinity, tillers/hill, etc. Thus, the hybrid which attained the most boom, additionally gathered better dry depend comparable result have additionally been said with the aid of using Senthil Kumar, N. [2].

3.2 Yield Attributes

3.2.1 Test weight (g) /hill

The statistics confirmed that the appreciably maximum take a look at weight turned found in UR-32 (24.32 g). However, UR-26 (24.30 g) and UR-28 (23. 58 g) had been statistically at par with UR-32. The effects display that the adoption of 20 x 10 cm2 spacing for rice transplanting led to heavier crammed and wholesome grain better take a look at weight in hybrid (KHR-23). Similar effects had been additionally said via way of means by Haque et al, [3].

3.2.2 Grain yield (t/ha)

During the length of research, the facts confirmed the best grain yield become located in UR-32 (6.34 t/ha). However, UR-29 (6.14 t/ha) become statistically at par with UR-32. The extended yield attributes are probably because of extended boom and improvement parameters which in the long run ended in extended grain. These effects withinside the conformity with the paintings are accomplished through Vishwakarma (2015).

3.2.3 Straw yield (t/ha)

The outcomes are supplied in Table 2. And the very best straw yield/ha changed into determined in UR-32 (12.26 t/ha). However, UR-35 (11.23 t/ha), UR-28 (11.07 t/ha), in UR-26 (10.ninety t/ha) and in UR-29 (10.76 t/ha) have been statistically at par with UR-32. The findings with the aid of using [4] Indicate that the functionality of hybrid rice to make use of extra nitrogen thru the expression of higher increase delivered with the aid of using the useful impact on nutrient uptake and physiological increase boom the straw yield.

Table 1. Performance of rice hybrids on growth and yield attributes at 90 DAT

Hybrids	Plant height (cm)	Tillers/hill (No.)	Plant dry weight (g/plant)
UR-26	104.52	10.27	50.21
UR-27	110.34	12.33	51.63
UR-28	113.78	12.37	49.36
UR-29	105.21	12.07	50.76
UR-30	118.29	10.40	52.74
UR-31	117.84	13.26	49.21
UR-32	120.37	14.20	53.33
UR-33	116.60	13.33	48.43
UR-34	116.63	11.04	46.91
UR-35	107.58	12.00	52.43
F-test	S	S	S
SEm±	21.05	0.43	1.02
CD (P = 0.05)	3.01	1.43	2.54

Table 2. Performance of rice hyrids on yield attributes at harvest

Hybrids	Test weight (g)	Grain yield (t/ha)	Straw yield (t/ha)	Harvest index (%)
UR-26	23.58	5.43	10.9	33.25
UR-27	19.99	5.51	9.83	35.91
UR-28	24.3	5.49	11.07	33.15
UR-29	20.29	6.14	10.76	36.08
UR-30	22.61	4.25	10.23	29.76
UR-31	20.08	5.45	9.93	35.43
UR-32	24.32	6.34	12.26	36.33
UR-33	22.06	5.65	10.13	34.8
UR-34	22.67	5.56	10.03	33.51
UR-35	18.34	5.25	11.23	29.98
F-test	S	S	S	S
SEm±	0.24	0.12	0.3	0.89
CD (P = 0.05)	0.75	0.48	0.93	2.67

3.2.4 Harvest index (%)

The statistics confirmed the harvest index changed as determined in UR-32 (36.33 %). However, UR-29 (36.08 %), UR-27 (35.91 %), and UR-31 (35.43 %) have been statistically at par with UR-32. to mobilize and translocate the photosynthates to the sink. (Marri et al., 2005) discovered that harvest index negatively correlated with plant height, however definitely correlated with grain number/panicle, grain number/plant, percent spikelet fertility, and yield/plant in rice [5-7].

3.5 Summary

The test findings found that maximum plant height (120.37 cm), the quantity of tillers /hill (16.79 No.), plant dry weight (53.33 g/plant), have been recorded in UR-32, check weight (24.32 g), grain yield (6.34 t/ha), straw yield (12.26 t/ha), harvest index (36.33 %), recorded maximum in UR-32 [8-11].

4. CONCLUSION

The concluded test confirmed that rice hybrid UR-32 achieved higher in the majority of boom and yield attributes which became discovered to be extra productive [12]. Since the locating is primarily based totally on the studies executed in a single season. Further trials are hard to affirm extra particular results.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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