

PERFORMANCE OF FEW NEW PADDY DIFFERENT PADDY VARIETIES AT LATERITIC SOIL OF WEST BENGAL, INDIA

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Abstract: A trial was conducted in adopted villages of Rathindra Krishi Vigyan Kendra, Institute of Agriculture, Visva-Bharati, Sriniketan, Birbhum, West Bengal, India during rainy season of the year 2015 & 2016 under medium land situation. This lateritic soil was sandy loam in texture with acidic in nature (pH - 5.85) and lower organic carbon (0.39%), low phosphate (18 Kg P₂O₅/ha) and medium K content (172 Kg K₂O/ha). The trials were conducted with 3 treatments (3 varieties) and 7 replications with Randomized Block Design. Recommended package of practices for paddy cultivation were undertaken. Among the three varieties Pusa-44 (145 days) produced significantly more height (105.69), no. of effective tillers (15.43), panicle length (29.29 cm) and no. of grains per panicle (135.43) and fetched more B:C ratio (1.51) and may be recommended for replacement of old varieties of the localities with longer duration. Similarly, PNR-381 and Pusa Sugandh-5 also produced impressive results as per their duration.

Keywords: Paddy, varieties, duration, yield, B:C ratio.

INTRODUCTION

Rice is one of the most important staple food crop of the world. It is consumed by 2.7 billion people in their regular dietary intake. Rice is a high energy food with high biological value of protein. India ranks first globally in paddy area (43.86 mha) and stands next only to China in total paddy production (104.80 million tons) in 2014-15 (Anonymous, 2014-15). In India West Bengal ranks first from area, production and productivity points of view. Rice is cultivated in 18 districts of West Bengal. Out of which 4 districts are under high productivity group. Birbhum (2743 kg/ha) is one of them. In Birbhum, generally IR-36, MTU-1010 and MTU- 7029 (Lal Swarna) is being cultivated year after year. So, disease susceptibility has been occurring since last five years in these varieties which results yield deterioration. So, trial and demonstrations have been conducted to promote new varieties in this region. Here three varieties has been picked up for trial i.e. Pusa- 44, Pusa Sugandh- 5 and PNR- 381.

Pusa- 44 is a variety that evolved from IARI, Delhi. It is a cross of two rice variety IARI-5901-2 and IR-8. Various types of research work has been done with this variety. It is a long duration variety having average maturity duration of 170 days. (S.S. Malhi, 2002). It is well established in Bihar and Jharkhand. Whereas, B. Gangaiah from IARI, New Delhi reported that PNR- 381 is a early duration variety which is also a central released variety. It is well established in Bihar, Jharkhand and Uttar Pradesh. Pusa Sugandh 5 (Pusa 3A/ Haryana Basmati) is a semi dwarf, high yielding and aromatic basmati rice variety suitable for multiple cropping systems in North India. It has extra long grains and excellent cooking quality. It possesses tolerance to shattering while it is highly sensitive to reproductive stage salinity. It is resistant to gall midge, brown spot and moderately resistant to leaf folder and blast disease.

(shodhganga.inflibnet.ac.in/jspui/bitstream/10603/185914/6/06_chapter3.pdf). In this content Pandey et. al., 2014. tried to replace the old high yielding varieties like MTU 7029 with some other rice varieties in West Bengal. Pusa-44 may be used to replace MTU-7029 and Pusa Sugandh-5 and PNR-381 may be tried for replacement of old varieties.

MATERIAL AND METHODS

A field trial was carried out in farmers' field of nearby villages under Rathindra Krishi Vigyan Kendra, Institute of Agriculture, Visva-Bharati, Sriniketan, Birbhum, West Bengal, India situated at **23⁰39'** N latitude and **87⁰42'** E longitude with an average altitude of 58.90 m above mean sea level under sub-humid and semi-arid region of West Bengal during *rainy* season of the year 2015 and 2016 to study the growth, productivity and economics of three varieties i.e. Pusa- 44(145 days), Pusa Sugandh-5 (110 days), PNR-381 (120 days) in lateritic soil of West Bengal. The varieties were supplied by IARI, Pusa, Samastipur, Bihar, India. The experimental soil was sandy loam in texture, low level of organic carbon (0.39%) and phosphate content (18 Kg P₂O₅/ha), medium in available potash (172 Kg K₂O/ha) and slightly acidic in p^H (5.85). Sand, silt and clay percentage were 72.6, 17.8 and 9.6, respectively (calculated through Bouyoucos Hydrometer method). The experiment, consisted of three treatments each with seven replications, was laid out in randomized block design (RBD). The crops were sown on 18th July of both 2015 and 2016, respectively and raised with the recommended package of practices according to the duration of the varieties. The seed rate of rice was 45 kg ha⁻¹, with uniform row to row spacing of 20 cm and plant to plant spacing of 10 cm at a soil depth of 5.0 cm. The experimental data were analysed following the standard statistical methods (Panse and Sukhatme, 1985; Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Average Height

Among the three Rice varieties Pusa-44 (145 days) showed highest average height (105.69 cm). It was significantly higher than other two varieties. Further PNR-381 produced slightly more height than Pusa Sugandh-5 though it is at par. It might be due to more or less similar duration of PNR-381 (120 days) and Pusa Sugandh-5 (110 day) significantly (15.43).

Number of Effective Tillers

In case of effective tillers Pusa44 showed significantly highest number (15.43) followed by Pusa Sugandh-5 (13.00). However PNR-381 produced significantly lower effective tillers. Pusa-44 variety got more time for its vegetative growth to produce more tillers. Though due to varietal character Pusa Sugandh-5 produced slightly higher tillers than PNR-381, these two varieties were at par with each other.

Panicle Length

Among the three rice varieties Pusa-44 showed significantly highest panicle length (29.29 cm) followed by Pusa-381 (27.86 cm) and Pusa Sugandh-5 (25.64 cm). These may be due to varietal characters of the three varieties

Number of Grains per Panicle

In this case Pusa-44 resulted highest (135.43) number of grain per panicle followed by PNR-381 (127.29) and Pusa Sugandh- 5 (96.29). Among the three varieties Pusa-44 showed significantly higher result than other two varieties. This may be due to differential life span of the varieties. Longer duration paddy varieties produced better yield components than shorter duration varieties (Chaudhury et. al. 2008)

Test Weight

Among the three varieties Pusa Sugandh – 5 showed highest Test Weight (31.03) which was significantly higher than Pusa- 44 (24.51) and PNR- 381 (23.46). These are due to varietalk character regarding grain size and shape.

Average Yield

In case of average yield, Pusa- 44 resulted highest value (42.91q ha⁻¹) which was significantly higher than other two varieties i.e. PNR-381 (39.90 q ha⁻¹) and Pusa Sugandh – 5 (32 q ha⁻¹). It might be due to longer duration (140 day) than those of PNR-381 (120 days) and Pusa Sugandh-5 (110 days) and the yield was according to the other yield component discussed above. Lar et. al., (2007), found similar type of results in the variety Pusa Sugandh-5.

Economics of cultivation

The highest cost of cultivation was recorded in case of Pusa-44 followed by both PNR-381 and Pusa Sugandh-5. It depends upon the cost of various inputs used during their cultivation period. As Pusa-44 is a long duration variety, it requires more cost for management. Among the varieties Pusa-44 showed highest gross return followed by Pusa Sugandh-5 (₹. 66600/-) and PNR-381. It was due to their respective yield and sale price. Due to aromatic quality of Pusa Sugandh-5, it fetched more return than PNR-381. However, PNR-381 produced more yield than Pusa Sugandh-5. Highest net return was recorded in case of Pusa-44 followed by Pusa Sugandh-5 and PNR-381. It was calculated through subtracting their cost of cultivation from their respective gross return. Highest benefit cost ratio was recorded in case of Pusa-44 followed by Pusa Sugandh-5 and PNR-381. It was calculated according to the ratio of their gross return with their respective cost of cultivation.

Conclusion

From the above study it may be concluded that Pusa- 44 as a long duration variety (145 days) may be cultivated and fetched higher B:C ratio. It may be used to replace the old and randomly used long duration variety MTU-7029. Similarly, among the short duration variety, PNR- 381 (120 days) and Pusa Sugandh-5 (110 days) may be introduced instead of old varieties like IR-36, IR- 64, IET- 4786 etc.

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**Table 1. Growth attribute, Yield attribute and yield of three varieties
(Pooled data of 2 years i.e. 2015 &2016)**

Variety	Average Height (cm)	No. of Effective Tillers	Panicle Length (cm)	No. of Grains /panicle	Test Weight (g/1000 grain)	Average Yield (q/ha)
Pusa-44	105.69	15.43	29.24	135.43	24.51	52.91
PNR-381	89.37	11.86	27.86	127.29	23.46	40.35
Pusa Sugandh-5	85.27	13.00	25.64	96.29	31.03	37.00
CD (at 5%)	4.26	1.54	1.71	2.42	2.49	2.47
CV (%)	4.78	13.76	6.52	2.12	9.92	6.78

**Table 2. Economics of cultivation of three rice varieties
(Pooled data of 2 years i.e. 2015 &2016)**

Variety	Cost of Cultivation (₹)	Sale Price (₹./q.)	Gross Return (₹)	Net Return (₹)	Benefit : Cost Ratio (B:C)
Pusa-44	48932.00	1400.00	74074.00	25142.00	1.51
PNR-381	46750.00	1500.00	60525.00	13775.00	1.29
Pusa Sugandh-5	46750.00	1800.00	66600.00	19850.00	1.42