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Research Article

PERFORMANCE OF RICE HYBRID UNDER TARAI REGION OF DISTRICT LAKHIMPUR KHERI

BISEN P.K.*, VISHWAKARMA S.K., SUHAIL M. AND TRIPATHI N.K.
ICAR-Krishi Vigyan Kendra, Lakhimpur-Kheri, C.S.A. University of Agriculture & Technology, Kanpur, Uttar Pradesh 208002, India
*Corresponding Author: Email - bisen73@gmail.com

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Abstract: A study was conducted during Kharif season at Krishi Vigyan Kendra, Farm, Jamunabad, Lakhimpur-Kheri to evaluate the performance of different rice hybrids under tarai region of Uttar Pradesh. Findings indicated that among the 34 hybrids R03 has marked variation related to the no. of effective tillers per m^2, no. of grains per panicle, test weight (1000 grains weight), grain yield (quintal per hectare) as compared to other hybrids. This hybrid itself shows less sensitiveness to bacterial leaf blight, sheath blight, blast and shoot borer. Bacterial leaf blight (%) and blast (%) were observed highest with R 18, however, shoot borer infestation (dead heart %) has been observed highest in R 17. Germination test of 34 hybrids showed that R08 had highest germination percentage (96%) while, lowest were observed with R 11 and R 13. Observation regarding grain type revealed that amongst 34 hybrids, 13 hybrids are coarse grain type, 11 hybrids are of medium grain type and 10 hybrids of fine grain type.

Keywords: *Hybrid, Effective tillers, BLB, Blast*

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Introduction

Rice contributes around 43% to the total food grains production of 218 million tones. In India, rice occupies more than 28% of the rice area in the world and production is little more than 21%. Rice production has increased from 20.58 million tones (1950-51) to 95 m tones (2007-2008). The productivity has reached the level of 2107kg/ha from 668 kg/ha. But we are far behind in terms of productivity as compared to USA (5.4 ton/ha), Korea (4.3 ton/ha), China (4.2 ton/ha) and Vietnam (3.3 ton/ha). For feeding the increasing population demands of food grains like rice and the projections indicate that India needs 105 m tons of rice by 2011-12 and by 2020-21, it is expected to rise to 122 m tones. This level of production only be achieved with an annual growth rate of more than 2% Rao, (2008) [1]. Rice which is the staple food for three fourth of the Indian population, has become an item of commerce since last two decades. The transportation from subsistence agriculture to science driven intensive family has enhanced the production of many buffer stocks of food grains. Viraktamath and Rani, (2008)[2].
International Rice Research Institute has identified from thrust areas to achieve demands in rice production.

a. Drought tolerance for productive enhancement in unfavorable environments.
b. Development of rice plant to cope up with climate change.
c. Development of more productive and efficient rice plant.
d. Enhancing water productivity of rice plant.

In the area of varietal improvement to achieve higher field levels it is proposed to give additional thrust areas like increase in field potential of varieties/hybrid using both conventional and molecular breeding approaches, breeding for yield stability through enhancement of tolerance to biotic stresses and improving productivity of both basmati and short grain aromatic rice. In the irrigated and shallow low land areas, the major thrust will be on development of New Plant Type and Hybrid rice. Several public sector, private sector and NGOs are participating in the development of hybrid rice technology in India, in order to create more demand for hybrid rice, more and more no-farm and front-line demonstrations should be organised with promising rice hybrids in the farmers' fields in different target environments.

If we develop rice hybrids with higher magnitudes of heterosis, our cooking and eating quality and resistance to major pests and diseases get better. Hybrid technology will be economically viable in the years to come. In order to reduce the seed cost, seed yields should be increased to over two tones per hectare. Many seed production from public and private sector seed agencies, seed growers, progressive farmers and farm women have been trained in all aspects of seed production technology. India has the resources and the infrastructure to produce hybrid seeds in large volumes and should explore the possibilities of exploring hybrid seeds to different countries such as Bangladesh, Indonesia, Vietnam, Sri Lanka and Myanmar To meet the current challenges of non availability of labour, its increasing cost and water scarcity as well as to overcome stagnated production and low productivity researchers have to devise alternative production systems and genetic materials suitable for the same Khokhar and Sarial, (2016) [3]. Keeping these facts in view, the present investigation entitled "Performance of rice hybrid under tarai region of district Lakhimpur -Kheri" is designed.

Materials and Methods

The investigation was carried out during (Kharif) season at the K.V.K. Farm, Jamunabad, Lakhimpur- Kheri. The K.V.K. farm is situated at about 8 km. distance from Gola Railway Station in North East direction. Geographically it is lies between 27.6° and 28.6° N longitude, 80.34° and 81.3° east latitude in middle plains. Lakhimpur-Kheri is situated in the northern part of Uttar Pradesh and enjoys sub-tropical climate often subjected to extreme of weather conditions *i.e*., heat of summer and cold of winter with an average annual rainfall of 1240 mm. The daily maximum and minimum temperature during the year has a tendency to increase from March to June and to decrease from July to December and later drop rapidly with the minimum value in January. On an average 85 percent of the total rainfall is received during summer monsoon season *viz*. June to September. However, occasional mild showers occur during winter season.

Table-1 Performance of rice hybrid

Code	Germination (%)	Plant height (cm)	No. of effective tillers/sq mt	No of grains per panicle	Test wt (g)	Diseases and pest incidence				Yield (Q/ha)
						BLB (% infestation)	ShB (% infected tillers)	Blast (% infestation)	SB (%deadheart)	
R01	84.00	90.01	483.66	203.00	21.00	31.50	31.50	30.70	30.60	43.40
R02	80.00	109.30	683.66	215.00	24.60	23.60	25.30	25.30	26.20	54.30
R03	92.00	108.50	1200.00	304.00	27.20	20.00	22.00	23.20	23.20	65.60
R04	84.00	90.30	383.00	199.00	20.80	23.00	37.60	35.00	36.20	40.80
R05	78.00	98.20	383.66	190.66	20.00	33.00	38.90	36.20	39.20	40.70
R06	84.00	90.40	636.66	210.00	23.10	24.40	25.20	26.10	26.40	51.30
R07	86.00	92.50	600.33	208.00	23.00	25.10	25.50	26.10	26.30	48.00
R08	96.00	100.10	600.66	206.66	23.00	26.30	25.40	25.60	26.50	47.30
R09	91.00	105.20	550.66	204.00	23.20	29.80	30.10	30.00	29.00	46.30
R10	82.00	71.00	700.66	230.66	25.10	23.70	24.60	25.00	25.00	57.00
R11	68.00	106.10	766.33	231.33	25.20	23.80	24.60	25.00	25.10	57.30
R12	70.00	94.50	700.33	228.00	24.20	23.70	24.60	25.30	25.00	56.10
R13	68.00	90.70	660.00	208.33	23.60	23.70	24.80	25.50	25.00	50.10
R14	72.00	73.50	633.00	210.00	23.80	24.30	25.20	25.80	26.30	52.80
R15	74.00	90.50	400.66	201.00	22.50	31.50	31.50	30.70	30.60	43.40
R16	79.00	105.10	450.00	201.00	22.60	31.50	30.20	30.80	29.50	43.20
R17	78.00	110.20	300.66	190.00	20.80	35.00	39.00	40.10	42.30	38.20
R18	75.00	90.30	350.66	192.33	21.70	35.20	40.20	42.30	42.20	39.30
R19	82.00	72.70	560.80	206.00	22.80	28.30	26.80	27.00	27.00	46.70
R20	77.00	106.10	566.50	203.33	22.60	28.60	27.90	27.20	27.10	46.70
R21	94.00	105.00	600.33	208.00	23.00	25.20	25.40	26.40	26.40	48.90
R22	86.00	90.30	633.00	210.00	23.10	25.10	25.30	26.20	26.20	50.80
R23	80.00	105.10	516.00	204.00	22.10	29.80	30.10	30.00	29.80	46.10
R24	76.00	107.30	666.30	220.00	24.80	23.70	25.30	25.20	25.80	55.30
R25	92.00	106.50	1100.30	301.00	26.30	22.00	22.00	23.20	23.20	62.80
R26	78.00	107.20	883.66	250.33	25.50	23.40	24.80	25.10	25.20	58.00
R27	82.00	104.00	883.66	257.30	25.80	22.10	23.10	24.20	24.40	58.70
R28	84.00	101.60	510.70	205.20	23.00	29.80	30.00	30.00	28.90	46.30
R29	94.00	103.10	650.60	214.00	24.10	24.30	25.20	25.50	26.10	53.00
R30	80.00	99.70	666.00	214.00	24.00	24.30	25.30	25.40	26.10	53.20
R31	80.00	102.20	983.00	260.00	26.00	22.00	23.30	24.10	24.30	61.50
R32	94.00	110.60	466.30	200.00	21.90	31.50	31.20	28.70	27.60	43.20
R33	82.00	100.20	683.00	224.00	25.80	23.80	25.10	26.10	26.10	55.90
R34	94.00	108.10	800.00	232.00	25.20	23.50	24.60	25.00	25.00	57.60
CD (P=0.05)	13.2	15.57	483.00	40.13	4.5	30.4	11.15	14.7	17.8	17.3

Physical and chemical properties of experimental site

Soil Texture : Silty Clay Loam
Organic : 0.23%
pH : 7.51
Available N : 163.56 Kg/ha
Available P : 25 Kg/ha
Available K : 240 Kg/ha

Experimental Detail

a) No. of hybrids : 34
b) Plot Size : 5m X 4m = 20sq.m.
c) No. of replications : 3
d) Design : RBD
e) Spacing : 20 Cm X 10 Cm
f) Area of one variety : 20 X 3 = 60 sq. m.
g) Net total experimental area : 34 X 60 = 2040 sq. m.
h) Seed required @ 15Kg. /ha) : 90gm.

Fertilizer Application

A recommended dose of 150 Kg. N/ha, 80 Kg. P_2O_5, 60 Kg. K_2O/ha and 30 Kg. $ZnSO_4$/ha were applied to test crop. half of the nitrogen, full dose of phosphorus, potash and zinc sulphate were applied as basal application. The reminder half nitrogen splitted in two doses applied as top dressed.

Doses of fertilizer application : 150 Kg. N/ha, 80 Kg P_2O_5/ha
60 Kg K_2O/ha and 30 kg $ZnSO_4$/ha

a) Basal Application : 50%N+ full doses of P_2O_5 and K_2O + 30 Kg $ZnSO_4$/ha

b) Top dressing Remainder 50% N application (I) 25% at maximum tillering stage (II) 25% Booting Stage

Result and Discussion

Hybrid genotypes possessing heterosis resulting in vigorous root system, greater source and sink size and contributing to higher photosynthesis efficiency Ram, *et al.,* (2015)[4]. It has been observed that among the 34 hybrids, R08 has highest germination percentage because this hybrid was more viable as seen in germination test. As the tarai region has plenty of moisture resulted into luxuriant growth and ultimately influence yield and yield attributes of hybrids Rajput, , *et al.,* (2017)[5]. The growth and yield attributes in different hybrids differed significantly. the growth attributes like plant height was found maximum in R32, while R03 has the highest no. of effective tillers/sq m, no. of grains per panicle, test weight (g) and grain yield (q/ha) as compared to other hybrids. This may be attributed to high trilling ability, early vigourness and also less sensitiveness to bacterial leaf blight

and blast, however shoot borer infestation has been observed maximum with R17. These two hybrids were unable to tolerate or resist against the infestation of disease and pest as observed during trial. Observation regarding grain type revealed that amongst 34 hybrids, 13 hybrids were coarse again type (R02, R03, R11, R12, R21, R25, R26, R27, R29, R31, and R33); 11 hybrids medium grain type (R07, R10, R13, R14, R15, R19, R20, R23, R24, R30 and R34) and 10 hybrids fine grain type (R01, R04, R05, R08, R09, R16, R17, R18, R28 and R32).

Application of research: Location specific assessment of rice hybrids.

Research Category: Performance of rice hybrids

Abbreviations:
BLB: Bacterial leaf blight
RBD: Randomised block design

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***Chairperson of research: Dr P. K. Bisen**
University: C.S.A. University of Agriculture & Technology, Kanpur, Uttar Pradesh 208002, India
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