

Super fine rice variety Karjat 8 for low land areas of Maharashtra State

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ABSTRACT

The rice variety Karjat 8 (KJT-13-4-53-19-12) is a late duration, semi dwarf high yielding short slender grain fine rice variety. The culture evolved from the cross between Ratna/Hera//Karjat 4 through pedigree method of selection at Regional Agril. Research Station, Karjat. The variety exhibited 12.61, 28.05, and 18.63 per cent higher yield over the checks in station, state and adaptive trials, respectively. It showed excellent milling (72.1%), head rice recovery (70.5 %), intermediate Amylose content (24.41) and ASV (4) with translucent grains and excellent cooking qualities. It has been observed resistant to Neck blast and moderately resistant to bacterial blight, leaf blast. Also it has shown moderately resistance to Gall midge and tolerance to brown plant hopper and white backed plant hopper with an average yield of 3.5 to 4.0 t/ha. Therefore the rice variety Karjat 8 was release in Maharashtra state.

Key word : Karjat 8, Fine variety, Quality, Late duration, Resistant.

Introduction

The productivity of the rice in Maharashtra state is below national average and there is wide scope to enhance it. The introduction of high yielding rice varieties, adoption of improved low cost technology and diseases free varieties are the prominent remedies (D'cruz and Patil, 1996).

In the post green revolution period, grain quality has become the major breeding objective next to yield, in rice improvement programme. Unattractive grain characters and unsatisfactory cooking quality would affect the acceptance and spread of the modern rice varieties. Indian consumers normally prefer dry, flaky (non sticky) rice (Shobha Rani *et. al.* 2004). In recent years consumers preference and market price in domestic as well as international market are much in favour of quality rice (Dalvi *et.al.* 2004). Presently there is no super fine grained late duration rice variety released for commercial cultivation in

the state. There is a need of fine and late duration rice variety for *Kharif* season in Maharashtra state with higher grain yield and superior grain quality for low land area. Therefore, the efforts were made at Regional Agricultural Research Station, Karjat, Dist. Raigad.(MS) to develop high yielding, late duration, semidwarf rice variety with super fine grain and excellent cooking quality.

Materials and Methods

Rice variety Ratna was crossed with Heera and F_1 was crossed with donor parent Karjat 4 at breeding section of the Regional Agricultural Research Station, Karjat in the year 1995. The selections were made from the cross for fine grain, late duration and high yielding progenies from the segregating generations of above cross. Promising pure line KJT 13-4-53-19-12 was initially evaluated and further tested in various trials at station and multilocation co-

ordinated trials at various locations in the state and country. The culture was screened for resistance to various insect pests and diseases at endemic sites and quality parameters. The yield data of various trials were statistically analyzed according to Panse and Sukhatme (1967). Based on yield, quality and reactions to pest and disease at various test locations, Karjat-8 (KJT-13-4-53-19-12) rice variety was release in the state of Maharashtra for commercial cultivation.

Results and Discussion

The yield performance of Karjat-8 (IET-19407) rice variety in various trials conducted during 2002 to 2009, is presented in Table no.1 to 5. Karjat-8 (KJT-13-4-53-19-12) rice variety recorded 13.07 and 12.08 per cent increase in grain yield over check Mahsuri in Initial and Advance variety trials (station) during Kharif-2002 and 2003, respectively at Regional Agril. Research Station, Karjat (Anonymous, 2003, 2004). The variety showed 29.02 and 27.06 per cent increase in yield over check during Kharif 2004 and 2005 respectively in state co-ordinated trials conducted at nine locations in the Maharashtra state (Anonymous 2005a, 2006).

The above rice variety was evaluated in All India Coordinated Initial Variety Trial slender grain at 23

locations during Kharif- 2005 in the country. It showed an average increase of 6.45 per cent in grain yields over the check in AICRIP trials in Maharashtra state at 3 locations (Anonymous, 2005b). The variety recorded 17.31 and 19.94 per cent more grain yield over check in 29 and 16 Adaptive trials conducted on farmer's fields during Kharif-2007 and 2009. The field experiment on levels of nitrogen and spacing was conducted at Agriculture Research Station, Palghar during Kharif-2008. Karjat-8 rice variety showed significant and highest yield at 150 kg N/ha (5.07 t/ha) indicating responsive to cultural packages. The salient features of Karjat-8 rice variety recorded at the research station are presented in Table 1.

Karjat-8 is late in duration (140-145 days duration in Kharif), Semi dwarf (110-115 cm plant height), short slender kernel type (S.S.), average 1000 kernel weight of 11.96 g with an average grain yield of 3.5 to 4.0 t/ha. The variety is non-lodging and non-shattering type. (Table 6a). The milling and cooking qualities of Karjat-8 rice variety was estimated at the Directorate of Rice Research, Hyderabad during the year-2005. The variety Karjat-8 showed higher milling (72.1%) and head rice recovery (70.5%). The kernel length (4.97 mm), kernel breadth (1.56 mm), length : breadth ratio (3.18) and translucent kernel observed to be an inherited traits in this rice variety

Table 1. Grain yield performance of culture KJT-2-2-44-10 in Station Trial.

Name of the trial	Year	KJT 13-4-53-19-12	Mahsuri (Ch)	% Increase over check	S.E. \pm (Kg/ha)	C.D. at 5% (Kg/ha)
IVT	2002	4963	4389	13.07	135	383
AVT	2003	4145	3698	12.08	317	907
Average	4554	4044	12.61			

Table 2. Performance of KJT 13-4-53-19-12 (Karjat 8) in Maharashtra state coordinated trials during 2004 to 2005.

Name of the Trial	Year	No. of locations	Average yield (kg/ha)		Percent increase over
			Karjat 8	Karjat 4 (ch.)	
AVT (Mah) Quality2004		9	3440	2666	29.02
AVT (Mah) Quality2005		9	3498	2753	27.06

Table 3. Performance of KJT 13-4-53-19-12 (Karjat 8) in All India coordinated trials during 2005.

Name of the Trial	Year	No. of locations	Average yield (kg/ha)		Percent increase over
			Karjat 8	Local check	
IVT - SG	2005	23	3450	4343	-20.56
		4 (Region IV)	4669	4677	-0.04
		3 (Mah.state)	4452	4182	6.45

which contribute to higher milling and head rice recovery in Karjat-8 (Bhattacharya, 1980). Karjat-8 recorded an intermediate amylose content (24.41 %) indicating better cooking qualities of kernels (Anonymous, 2005). The variety showed Alkali spreading value (4.0). (Table 6b) In sensory evaluation for quality this culture showed excellent results (Table 6c.). The above observations indicate that the new variety Karjat-8 meets the requirements of millers and consumers for higher monetary returns to

farmers.

The rice variety Karjat-8 was screened for reaction to various diseases and insect pests at endemic locations in the state and country. The variety showed resistant to leaf folder and tolerant to brown plant hoppers, white backed plant hopper. While, it recorded resistant to neck blast and moderate resistance to bacterial leaf blight and leaf blast under endemic test locations (Anonymous, 2005c).

In view of higher yields, superior grain quality

Table 4. Performance of KJT 13-4-53-19-12 (Karjat 8) in Agronomical trial.

Name of the Trial	Year	No. of locations	Average yield (kg/ha)	Nitrogen level (kg/ha)
Agronomy	2008	1	4285	N 50
			4724	N 100
			5075	N 150

Table 5. Performance of KJT 13-4-53-19-12 (Karjat 8) in Adaptive trials on farmers field.

Name of the Trial	Year	No. of trials	Average yield (kg/ha)		Percent increase over
			Karjat 8	Check	
Adaptive trials on farmers field.	2007	29	3824	3257	17.31
	2009	16	4488	3748	19.94

Table 6a. Salient features of the rice variety Karjat 8 (KJT 13-4-53-19-12)

Sr. No.	Character	Particulars
1.	Pedigree	Ratna/Heera//Karjat 4
2.	Days to 50 per cent flowering	110 to 115 days
3.	Days to maturity	140 to 145 days
4.	Plant height (cm)	110 to 115
5.	Reaction to lodging	Non lodging
6.	Shattering	Non-shattering
7.	Kernel Length (mm)	4.97
8.	Kernel Breadth (mm)	1.56
9.	Length and Breadth ratio	3.18
10.	Grain type	Short Slender
11.	Panicle length (cm)	22.0
12.	No. of Spikelets per panicle	195 – 210
13.	Test weight (gm)	11.96
14.	Scent	Absent
15.	Average grain yield (t/ha)	3.5 – 4.0
16.	Potential yields (t/ha)	5.0 – 6.0
17.	Milling (%)	72.1
18.	Head Rice Recovery (%)	70.5
Reaction to disease and Insect pests		
19.	Bacterial leaf blight	Moderately resistant
20.	Leaf blast	Moderately resistant
21.	Neck blast	Resistant
22.	Brown plant hopper	Tolerant
23.	Whitebacked Plant Hopper	Tolerant

Table 6b. Grain quality characteristics of KJT 13-4-53-19-12 (IET 19407) analyzed at DRR, Hyderabad during Kharif 2005.

Sr. No.	Characteristic	KJT 13-4-53-19-12 (IET 19407)	Karjat 4
1.	Milling (%)	72.1	73.96
2.	Head Rice Recovery (%)	70.5	70
3.	Kernel Length (mm)	4.07	4.87
4.	Kernel Breadth (mm)	1.56	1.6
5.	Length/Breadth	3.18	3.04
6.	Grain Chalkiness	A	A
7.	Volume Expansion Ratio	5.4	3.7
8.	Water Uptake	175	295
9.	Kernel Length After Cooking (mm)	8	8.7
10.	Elongation Ratio	1.61	1.66
11.	Alkali Spreading Value	4	6.0
12.	Amylose Content	24.41	20.45
13.	Gel Consistency	48	50
14.	Grain Type	SS	SS

Table 6c. Sensory evaluation of KJT 13-4-53-19-12 (KJT- 8) rice variety :

Characters	KJT 13-4-53-19-12	Check
Appearance	(5.0) White	(5.0) White
Cohesiveness	(4.0) Partially separated	(4.0) Partially separated
Tenderness on Touching	(5.0) Soft	(5.0) Soft
Tenderness on Chewing	(5.0) Soft	(5.0) Soft
Taste	(4.0) Good	(4.0) Good
Aroma	(1.0) Absent	(1.0) Absent
Elongation	(2.0) Moderate	(2.0) Moderate
Overall acceptability	(3.0) Good	(3.0) Good

and field tolerance to major insect pests and diseases, the rice variety Karjat-8 (IET-19407) is recommended for release by joint Agresco 2010 for commercial cultivation in the state of Maharashtra. (Anonymous, 2010). It will meet the requirement of farmers and consumers in the state.

References

- Anonymous, 2003. Agril. Botany, forestry and Bio-technology, Sub-Committee Report, Dr. BSKKV, Dapoli, (M.S.) 2003. pp. 30-31.
- Anonymous, 2004. Agril. Botany, forestry and Bio-technology, Sub-Committee Report, Dr. BSKKV, Dapoli, (M.S.) 2004. pp. 44.
- Anonymous, 2005(a). Maharashtra State Rice Workshop Report, 2005 pp. 45.
- Anonymous, 2005(b). Annual Progress Report, Directorate of Rice Research, Hyderabad. Vol.1. Var. Imp. : 1.321-1.328.
- Anonymous, 2005(c). Directorate of Rice Research, Hyderabad, Screening Nurseries Report 2005, Entomology pp 98-117, Pathology pp 157-170.
- Anonymous, 2006. Maharashtra State Rice Workshop Report, 2006 pp. 39.
- Anonymous, 2010. Release proposal of Karjat-8, presented during Joint Agresco, 2010 held on 31-2th June, 2010 at Dr. B. S. K. K. V., Dapoli.
- Bhattacharya, K. R. 1980. Breakage of rice during milling: A review. *Tropical Science*. 22 : 255-276.
- Dalvi, V. V., B. V. Ingale, N. D. Jambhale and B. B. Jadhav, 2004. Quality Rice production for export. Paper presented in Zonal conference on Hybrid Rice; problems and prospects for increasing rice production and its quality, Dr. B.S. K.K. V., Dapoli,
- D. Cruz R. and J. A. Patil 1966. Evaluation of new varieties the task of the plant breeder. *Poona Agric. Coll. Magazine*. 56: 3-20.
- Panse, V. G. and P. V. Sukhatme. 1967. *Statistical Methods for Agricultural Workers*. ICAR. Publ. New Delhi (India).
- Shobha Rani, N., B. Mishra, G.S.V. Prasad and V. Ravindra Babu, 2004. Research Efforts towards development of Basmati and quality rice. Paper presented in *National Seminar on Export of Quality Rice*. pp. 31-59.