

**Table 2. Distinguishing morphological characters Manhar, Uttar Pradesh, India.**

Character	Particulars
Height	88 cm
Seedling vigor	Good
Lodging	Resistant
Plant type	Dwarf, ideal
Leaf sheath	Green
Tillering	Good (14 tillers/plant)
Position of flag leaf	Erect
Photoperiod sensitivity	Photoperiod insensitive
Panicle length	21 cm
Apiculus	Green
Duration	120 d from seed to seed
No. of grains/panicle	165
1,000 grain weight	19.9 g
Grain type	Long slender
Cooking quality	Good

Manhar yielded consistently more than Saket 4 and Prasad in kharif Varietal Trials-Early, Standard Varietal Trials-Early, and All India Coordinated trials throughout Uttar Pradesh (Table 1). Manhar yielded 17% higher than Saket 4 and 8% higher than Prasad. With optimum agronomic management, it yielded 6 t/ha at Pantnagar in 1983.

Manhar is moderately resistant to bacterial leaf blight and has field tolerance to whitebacked planthopper. Its grain is long and slender with good cooking quality. Table 2 gives distinguishing morphological characteristics. *ℒ*

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### HPU8020, a promising mutant rice

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HPU8020 was isolated 1973 from Bala, an early-maturing rice that was treated with 20 Kr gamma rays. HPU8020 matures 10-13 d later than Bala. Unlike Bala, it has synchronous tillering and anthocyanin pigmentation at the plant base.

HPU8020 has significantly greater plant height, panicles/plant, panicle length, panicle weight, and 1,000-grain weight, and yields more than Bala (Table 1). Although it matures later, it has

**Table 1. Agronomic and quality characteristics of HPU8020 and parent variety Bala, Himachal Pradesh, India.**

Characteristic	Bala	HPU8020
Plant height (cm)	71.8	74.8
Panicles/plant (no.)	5	8
Panicle length (cm)	19	20
Panicle weight (g)	2.8	3
Spikelets/panicle	142	155
1000-grain wt (g)	21	22
Sterility (%)	17	14
Yield/plant (g)	12	17
Plant efficiency (yield/plant per d)	0.12	0.14
Panicle density		9.46
Grain length:breadth		2.02
Protein (%)		7.26
Chlorophyll content at flowering (mg/g fresh wt)		1.24
Chlorophyll a:b		0.74
Leaf area index		1.09

**Table 2. Grain yield of HPU8020 in Himachal Pradesh, India, 1976-80.**

Year	HP118020		IR579 (check)	
	Yield (t/ha)	Sites (no.)	Yield (t/ha)	Sites (no.)
1976	4.3	5	3.9	5
1977	4.7	10	4.4	10
1978	4.9	7	4.3	4
1979	4.4	4	3.0	4
1980	5.8	4	4.9	4
Mean	4.8		4.2	

**Table 3. Grain yield of HPU8020 in All India Coordinated trials.**

Year	Sites (no.)	Yield (t/ha)	
		HPU8020 (IET5878)	Cauvery
<i>Direct seeded rainfed trials</i>			
1978	16	3.3	2.9
1979	14	3.3	2.9
1980	30	3.2	2.8
1981	17	2.4	2.3
<i>Transplanted experiments</i>			
1978	6	3.5	3.2
1979	8	5.0	4.8
1980	13	3.9	3.6
1981	17	4.1	3.7

higher plant efficiency than its parent. HPU8020 has short, bold grains like Bala, with 7.26% protein content.

In yield trials from 1976 to 1980 at altitudes below 900 m in Himachal Pradesh, HPU8020 yielded an average 4.8 t/ha; 14% more than IR579, a high yielding semidwarf (Table 2). HPU8020 (IET5878) was evaluated throughout

India in the All India Coordinated Rice Trials from 1978 to 1981. In direct-seeded rainfed conditions. HPU8020 yielded an average 3.1 t/ha, 13% more than Cauvery, the check variety (Table 3). It yielded highest. 7.3 t/ha, at Sabour in 1979. HPU8020 flowers in 84 d, vs 77 for Cauvery.

In transplanted trials, HPU8020 yielded an average 4.1 t/ha, 10%, more than Cauvery (Table 3). It yielded highest. 8 t/ha. at Bikaner in 1979, compared to 7 t/ha for Cauvery. In transplanted experiments, HPU8020 flowered in 88 d, vs 83 d for Cauvery.

HPU8020 has strong blast resistance and resistance to gall midge, stem borer, and green leafhopper.

It has been released for general cultivation in Pondicherry, India, and identified for All India Coordinated Rice Improvement Program minikit trials in south and southeast India in rabi. It has been nominated for release for general cultivation in low altitude areas of Himachal Pradesh. *ℒ*

### Ethyl methane sulfonate (EMS) induced rice mutants

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Randhunipagal is a tall (150 cm), aromatic, indica rice with 150-160 d maturity. We exposed unhusked

**Effects of EMS on some characters of selected M<sub>2</sub> plants, Chinsurah, India.**

Selection	Duration (d)	Height (cm)	Panicle no.	Panicle length (cm)	Grain size		Grain shape (L:B)	1000-grain wt (g)	Aroma
					Length (mm)	Breadth (mm)			
Control	152	156	8	24	6.0	2.2	2.7	13.0	Present
CNM-RDP-42	120	100	8	16	5.5	2.8	2.0	12.5	Present
CNM-RDP-39	118	134	9	26	7.4	2.7	2.7	18.1	Present
CNM-RDP-41	136	133	6	24	7.2	2.5	2.9	16.0	Absent
CNM-RDP-46	124	19	7	20	7.8	2.5	3.1	16.5	Absent
CNM-RDP-48	139	133	6	24	7.5	2.5	3.0	16.5	Absent
CNM-RDP-35	134	100	7	21	8.8	3.0	2.6	22.3	Present
CNM-RDP-36	119	85	9	23	9.5	2.8	3.3	25.1	Absent
CNM-RDP-38	124	114	8	26	8.9	2.8	3.1	22.4	Absent
CNM-RDP-37	123	134	10	24	9.5	2.7	3.4	19.8	Present
CNM-RDP-40	120	110	9	26	8.9	2.1	4.2	15.1	Absent
CNM-RDP-43	120	103	8	26	9.3	2.0	4.5	17.6	Absent
CNM-RDP-49	137	138	6	26	9.2	2.1	4.3	17.0	Absent
CNM-RDP-50	127	81	11	21	8.9	2.2	3.9	17.5	Present

Randhuniपाल seeds to EMS at 0.25, 0.50, 0.75, and 1% concentrations for 24 h to cause mutation and develop a dwarf, aromatic, long-slender grained line, and to quantify optimum EMS dosage for this purpose.

The M<sub>1</sub> was grown in 1977 kharif and the M<sub>2</sub> in 1978. Mutation rate was

highest at 0.25% concentration, followed by 0.50%. None of the M<sub>1</sub> produced seeds at EMS concentrations higher than 0.50%. This may be caused by mutagenic effects at higher doses that involve many genes and lead to spikelet sterility and plant death.

Morphological and grain type mutants

were studied in the M<sub>2</sub>. All mutants matured earlier than the control. Plant height, panicle number and length, grain size and shape, and grain weight differed substantially from those of the control (see table). Some nonaromatic mutants were obtained. Largest variation was in grain shape and weight. *ℒ*

**IR36 for rainfed conditions in Madhya Pradesh, India**

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IR36 is a semidwarf rice with long, slender, translucent grains and good

cooking quality. It matures in 120 d and is tolerant of gall midge and bacterial leaf blight.

In Madhya Pradesh, 80% of rice is grown in rainfed fields. IR36 performed well in multilocation tests (see table), and has become popular in areas where rainfall begins the 3d wk of Jun and continues through mid-Sep. *ℒ*

**Promising new rice varieties for late kharif in the Cauvery Command Area, Karnataka, India**

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Low temperatures during reproductive phase and stem borer incidence limit late kharif (Sep) rice in the Cauvery Command Area. In 1983, the All India Coordinated Rice Improvement Project at Mandya identified several short-duration, high yielding, stem borer

**Grain yield of IR36 in rainfed areas of Madhya Pradesh.**

Variety	Grain yield <sup>a</sup> (t/ha)						Mean
	Raipur	Jabalpur	Waraseoni	Bagwai	Rewa	Jagdulpur	
<i>1978</i>							
IR36	4.3	4.0	5.4*	4.2*	6.2*	-	4.8
Rasi	3.4	3.7	4.5	3.4	4.9	-	4.0
Ratna	3.5	3.8	4.5	3.8	4.9	-	4.1
<i>1980</i>							
IR36	0.6	2.4	4.1*	-	3.8	-	2.7
Abha	0.9	2.2	3.3	-	3.3	-	2.5
<i>1982</i>							
IR36	3.2	3.4	3.7	3.7	2.3	5.0	3.5
Anupama	2.9	3.7	3.5	4.0	3.4	4.7	3.7
<i>1983</i>							
IR36	2.9*	2.1	-	2.9	3.1*	-	-
Anupama	3.0	3.1	-	2.1	2.7	-	-
Deepti	2.1	2.8	-	3.1	2.6	-	-

<sup>a</sup> The asterisk (\*) means that IR36 was superior to Ratna in 1978, to Abha in 1980, and to Deepti in 1983.

**Performance of stem borer-resistant, late kharif varieties, Karnataka, India.**

Variety	Days to 50% flowering	Grain yield (t/ha)	Whiteheads (%)
IET7633	109	3.2	10
IET7614	102	3.0	7
IET7261	102	2.8	8
IET7617	85	1.4	30
Mangala	94	2.3	18
CD (0.05)	-	11.7	7