

Table 1. Yield and yield components of Kalar Harsall at 3 levels of nitrogen under deepwater (130-cm) conditions.

Yield and yield components	Nitrogen level ^a (g/pot)			CV (%)
	2	4	6	
Total grain wt (g)	13 a	25 b	30 c	10.7
Panicles (no.)	14 a	18 ab	23 b	16.6
Spikelets (no./panicle)	51 a	73 b	68 b	12.9
Panicle wt (g)	18 a	32 b	39 c	7.3
Total dry wt (g)	109 a	175 b	213 c	3.2

^aIn a row, means followed by a common letter are not significantly different at 1% level.

in water when the plants were grown with low basal N (Table 2).

For profitable returns, fertilization of deepwater rice fields should be based on initial nutrient status of the soils, rainfall, onset and magnitude of floods, and

the nutrient content of floodwaters. A moderate dose of basal N should equip the plant with morphophysiological features that lead to a higher survival rate and hence, increased yields in excess-water stress. ■

Table 2. Effect of topdressing with 40 ppm nitrogen 2 weeks after treatment on Kalar Harsall grown with low nitrogen level in steel drums. IRRI, 1980.

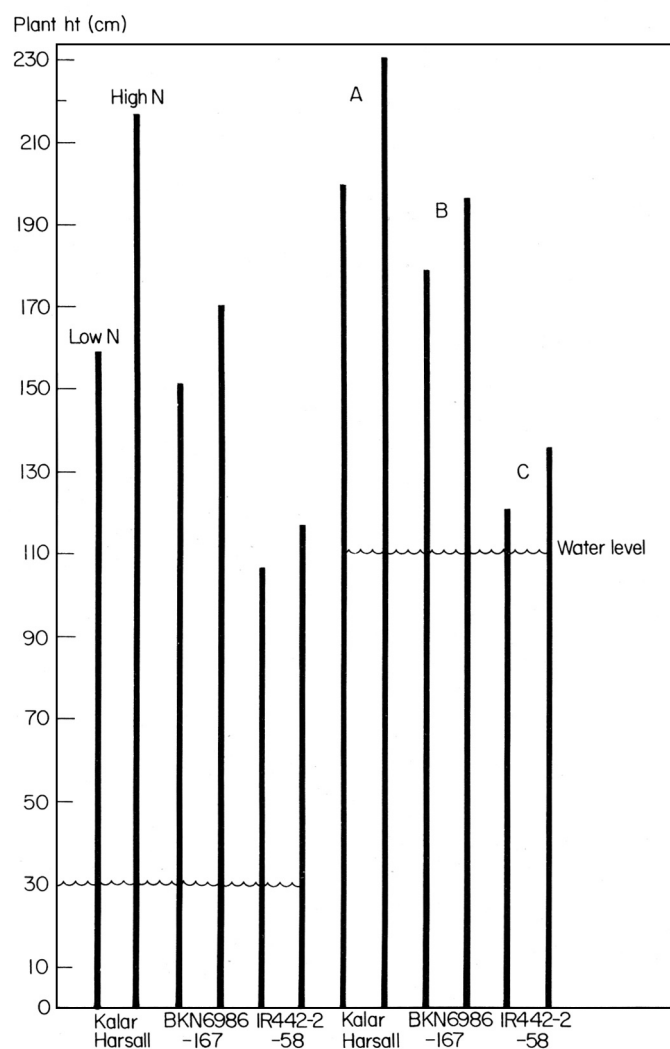
Character	N topdressed (ppm)	
	0	40
Plant ht (cm)	280	325
Basal tillers	14	13
Nodal tillers	0	9
Total tillers	14	22
Nodal root wt (g)	3.5	11.5
Panicle wt (g)	9.6	16.8
Total dry wt (g)	76.9	146.3
Panicle number	12	18
<i>Nitrogen (%) in</i>		
Culm	0.28	0.51
Dead leaf sheath	0.43	0.83
Green leaf	1.28	1.83
Dead leaf	0.33	0.73
Panicle	0.90	1.79

Varietal difference in plant length of some deepwater rices under medium-deepwater and deepwater conditions and at low and high nitrogen levels

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Three distinct types of phenotypic responses in terms of plant length were observed in deepwater rices of diverse origin, grown in low and high nitrogen (N) levels under medium-deep (30 cm) and deep (110 cm) water (see figure).

- Type A - a characteristic response of traditional rices (Kalar Harsall, Leb Mue Nahng 111, Chenab sel. 64-117) that elongate well above the water level at either 30 or 110 cm water depth with high N;
- Type B - characteristic of improved types (RD19, BKN6986-167, and BR223-B-38) with limited elongation ability, which tends to increase in height with high N, but not as much as Type A (the plant parts above water level of this type are optimum);
- Type C - typified by the reaction of IR442-2-58 (including B1050-Mr-18-2 and IR42) with intermediate height and very poor elongation ability, which tends to elongate only to a small degree with high N. The plant parts above water level of this type of response correspond to the optimum range (70-100 cm) under irrigated conditions. At 110-



Variation in plant height at flowering stage due to low and high N levels at medium-deep (30 cm) and deep (110 cm) water. A = traditional tall (Kalar Harsall), B = improved (BKN6986-167), and C = modern intermediate tall (IR442-2-58).

cm water depth, plants with this type of response are barely above water level (10 cm), and higher N cannot help them survive.

Type A response is typical of traditional indica varieties at shallow water conditions — application of high basal N has a negative effect because plants

become too tall and prone to lodging. This type is best suited to conditions where the water depth is great and the water rise rate is rapid. However, even under deepwater conditions, the plant parts above the water level are too long

and the plants tend to lodge. Type B is probably the optimum response for deep water. Even at medium-deepwater level, plants with type B reaction perform better because they are shorter than plants with type A.

Type C or intermediate height varieties with very limited elongation ability are possible for medium-deep water. Such plants, however, will not give reasonable yields in deeper water, even with the addition of N. ■

GENETIC EVALUATION AND UTILIZATION

Temperature tolerance

Cold-tolerant varieties from China

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Eleven best varieties based on cold tolerance at 4 growth stages have been selected from 1,474 Chinese varieties in the IRRI germplasm bank. The methods used for testing at the different growth stages were described in earlier papers. Early seedling stage was tested at 5°C, seedling stage at 12°C, panicle development stage and flowering stage at 15°C.

All entries (see table) are sinica except Hung Chao Lu Yu and Ai Yeh Lu. Ai Yeh Lu has short growth duration and Hung Chao Lu Yu has high protein content (13.1 to 13.6%). The agronomic characteristics of sinica varieties selected

Varities cold tolerant at 4 stages.

Acc. no.	Variety	Cold tolerance score ^a			
		ES	SS	PD	FS
01178	Chiang Tsenf Tao Ju	1	3	2	1
01179	Hung Chao Lu Yu	1	3	3	2
01254	Y Chang Ju	1	3	3	3
01269	Ta Chang Kong	3	2	2	3
01385	Fang Chi	3	3	2	3
01395	Chu Cheng	3	3	3	3
07288	Fi-Lai-Feng	1	2	3	3
10360	Ai-Yeh Lu (PI 160965)	3	3	2	2
28474	Hsiung-Yo 613	3	2	2	3
36852	Ching-Hsi 15	1	3	2	3
36853	Ching-Hsi 17	1	2	2	3

^a ES = early seedling stage, SS = seedling stage, PD = panicle development, FS = flowering stage. 1 = good, 9 = poor.

do not differ greatly. Fi-Lai-Feng has a long maturity period, but is resistant to bacterial blight. Chu Cheng has the highest 1,000-grain weight.

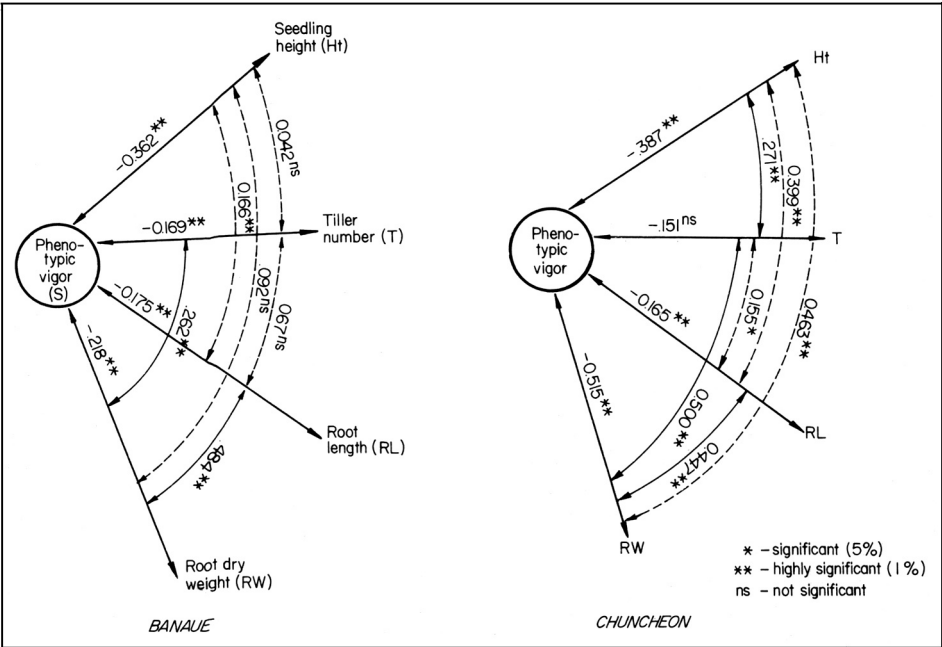
Most of these donor varieties do not have disease and insect resistance.

Crosses with varieties resistant to diseases and insect pests and with good plant type are necessary to improve grain yield and general adaptability. Seeds for national breeding programs are available at IRRI. ■

Evaluation of rooting ability of rice in puddled soil in low temperature

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In areas where temperature is low during transplanting, recovery of rice varieties after transplanting is poor because of poor rooting ability. To develop a practical and efficient method of screening varieties for good rooting ability, entries in the 1980 International Rice Cold Tolerance Nursery were evaluated 23 days after transplanting at Banaue, Philippines, and 13 days after transplanting at Chuncheon, Korea. There were 245 entries at Banaue and 215 at Chuncheon. High-tillering and vigorous varieties were given a visual



Correlation coefficients among plant characters at Banaue, Philippines, and Chuncheon, Korea.