thus confirming the observations made by other workers[5 6-8].

The vascular system serves as a pathway for the movement of water and essential metabolites. It was pointed out by Goodman *et al.*[4], that factors which alter the availability of water to the plant cell or impair the movement of water from one cell to another may cause profound alterations in permeability, photosynthesis, cell-wall metabolism, carbohydrate metabolism and other functions. Therefore, a satisfactory explanation for the variation in the lesion length in different treatment has yet to be proposed.

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PRODUCTIVE EFFICIENCY OF SEMI-DWARF CULTURES DERIVED FROM *JAPONICA* AND *INDICA* RICE HYBRIDS

THE growth pattern and yield potential of four recently evolved early (110–115 days) *japonica* × *indica* (*J* × *I*) cultures[1] were compared with that of six high yielding cultures derived from Dee-geo-Woo-gen (DgWg) parentage.

The cultures were grown during *kharif* 1974 under 50 and 100 kg N/ha. Nitrogen was applied in 3 splits (½ at planting + ¼ at mid-tillering + ¼ at primordial initiation); P_2O_5 and K_2O at the rate of 50 kg each/ha were applied at planting. The experiment was conducted in a split plot design with N rates in main plot and cultures in sub-plot. Three replications were maintained with a plot size of 2 m × 6 m and spacing of 20 cm × 15 cm. Observations were recorded on tillering, dry matter production and LAI. Yield and yield components were assessed at harvest.

The data are presented in Table I. The *J* × *I* cultures gave invariably higher yield than the cultures derived from DgWg gene source. Among the *J* × *I* cultures, *J* × *K*–34–278 (*Jikkoku* × *Kolamba*–540) gave the highest yield (4·84 t/ha) even at 50 kg N rate. The differences between the two N rates (50 and 100 kg N/ha) was not significant indicating that 50 kg N/ha was optimum. In view of their short duration, the yield obtained may be considered satisfactory.

The grain yields in *J* × *I* cultures were associated with yield attributes such as high panicle number/m², moderate grain number/panicle and high grain

TABLE I

Grain yield and associated characters of J × I and other cultures during kharif *reason at 50 kg N/ha.*

	Cultures	Yield t/ha	Panicles/ m²	Grain No./ Pan	1000 g wt. (g)	At flowering			HI
						DM-t/ha	LAI	SLW-mg/dm²	
A	*J* × *I cultures*								
	J × *K*-34–278	4·84	473	45	19·6	4·85	3·93	328	60
	J × *S*-62–102	4·53	509	46	19·2	4·52	3·81	342	67
	J × *CR*-1014–162	4·41	450	40	19·9	4·52	4·12	320	59
	H × *Z*-17–511	4·37	507	42	19·4	4·29	3·65	344	56
	Mean (A)	4·54	486	44	19·5	4·55	3·85	334	61
B	*Other cultures/ Varieties* (DgWg source)								
	CR-141–4004–192	4·32	411	39	23·1	3·84	3·13	350	62
	CR-110–174	4·25	377	47	20·5	3·79	2·50	387	57
	CR-126 42–1	4·25	479	38	21·2	3·90	2·54	405	61
	Ratna	4·11	433	43	20·6	4·01	3·03	392	47
	Pusa-2–21	4·19	441	41	21·7	3·91	2·64	402	55
	CR-44–36	3·80	417	39	21·2	4·29	3·27	366	47
	Mean (B)	4·15	426	41	21·4	3·96	2·85	384	55
	(A)/(B) × 100	110	114	108	91	115	136	85	111
	C.D. (0·05)	0·43	44	2·7	0·40	0·41	0·37	26	4

number/m² and growth attributes like high dry matter and LAI at flowering, thin leaves, late senescence of leaves and high harvest index when compared with other cultures confirming that dry matter and LAI at flowering were significantly associated with yield during *kharif*[2]. These cultures also possessed fine grains with good cooking quality and showed some tolerance to major pests and diseases even under high nitrogen rate (100 kg N). *J* × *I* hybrids appear to be better adapted to *kharif* conditions when compared with cultures one of the parents of which DgWg was the gene donor[1] (Fig. 1).

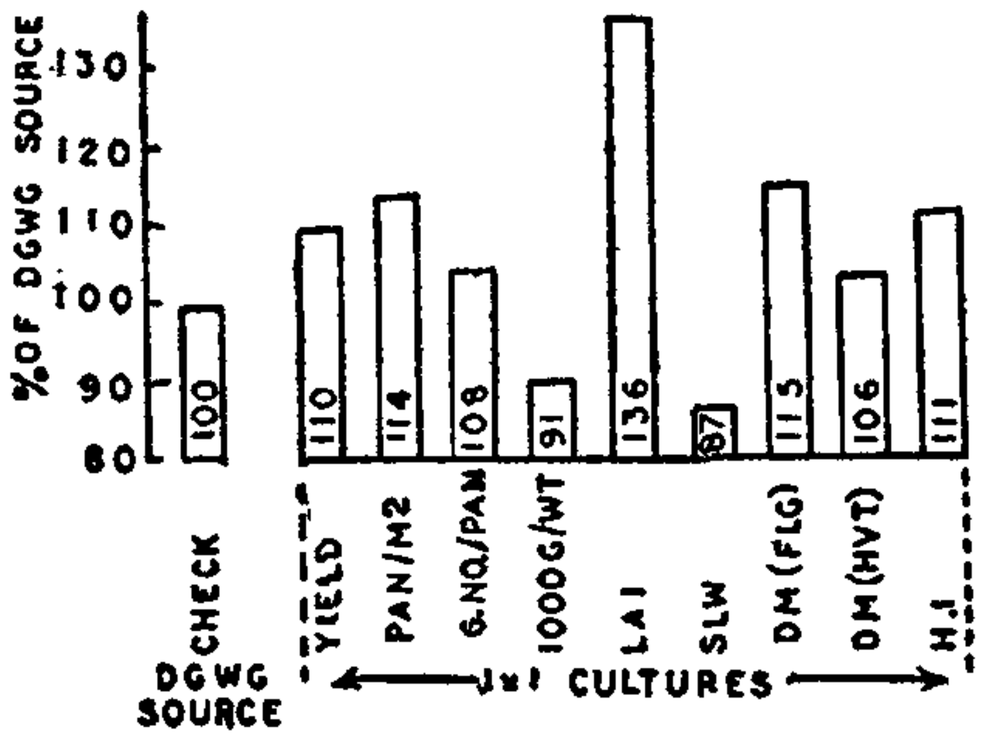

FIG. 1. Mean grain yield and other attributes of *J* × *I* cultures as percentage of check (DgWg source) varieties/cultures.

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