Short Communication

Heterosis and per day productivity in rice hybrids of different maturity groups, developed from *indica/japonica* derived lines

M. S. Hossain[1], F. U. Zaman and A. K. Singh

Division of Genetics, Indian Agricultural Research Institute, New Delhi 110 012

It is important to know the duration of maturity along with duration wise yield potential of newly identified rice hybrids or varieties for acceptance by farmers for fitting into target regions or commonly followed crop rotation. Generally it is believed that short duration varieties are low yielding and only long duration verities give high yield in view of various reports showing strong correlation between crop duration and yield [1-5]. At the same time a good number of early maturity varieties and hybrids with fairly high yield are available with the farmers for cultivation *viz.* Govind, Pusa 834 and Pusa Rice Hybrid-10. Keeping this in view newly identified seventeen hybrids developed from *indica* and *indica/japonica* derived lines were grouped in four maturity groups along with their checks and analyzed group wise for per day productivity and level of standard heterosis over DRRH-1.

The study was conducted during *kharif* 2003 at IARI, New Delhi under irrigated condition. Seventeen F_1 hybrids developed by using *indica* CMS lines, Pusa 3A, Pusa 5A, Pusa 6A, PMS 2A and IR 58025A and eleven *indica/japonica* derived restorers, were evaluated along with *indica* hybrids DRRH-1, PRH-10 and *indica* variety Jaya in randomized block design with two replications.

Based on the crop maturity period, four hybrids were grouped as early duration type (H-1, H-2, H-15 and H-17), seven hybrids (H-6, H-7, H-8, H-11, H-12, H-13 and H-16) into medium early, five hybrids (H-3, H-4, H-5, H-9 and H-14) into medium and only one hybrid (H-10) into late duration type (Table 1). Among the checks, PRH-10 was placed into medium early group and DRRH-1 and Jaya were grouped wrth medium duration group. The productivity per day was recorded/computed individually as well as group wise. The early group (90-115 days) had per day productivity of 0.10 t/ha with a range of 0.08 to 0.12 t/ha. The medium early group also had per day productivity of

0.10 t/ha with range from 0.08 t/ha to 0.11 t/ha. In case of medium duration group the per day productivity was 0.11 t/ha ranging from 0.10 to 0.12 t/ha. The late maturing group included only one hybrid which showed a per day productivity of 0.08 t/ha. The check hybrids DRRH-1 and PRH-10 showed per day productivity of 0.06 t/ha and 0.07 t/ha, respectively. The average standard heterosis over DRRH-1 in the early maturing types was 39.73% with a range from 14.47% to 72.66%. In medium early group it was 54.99% with a range from 33.99% to 78.30%. In case of medium duration group the heterosis ranged from 68.11% to 104.90% with a group mean of 83.02%. The late group consisted only one hybrid which showed heterosis of 58.92%.

It is mteresting to note that early maturing group and medium early maturing group hybrids have same level of per day productivity. The range of per day productivity within the group is more or less similar in both maturity groups. The level of heterosis seems to be high in medium early group as compared to early maturity group though H-17 of early maturity group has shown per day productivity (0.12 t/ha) and heterosis (72.66%) as high as the best hybrid of the medium early group. This suggests the possibility of identifying highly heterotic hybrids in early maturity group, breaking the positive correlation between long duration and yield. Similar observations on combining high yield and early maturity in rice hybrids were noted earlier [6].

Medium duration hybrids also showed nearly same level of per day productivity (0.11 t/ha) as it was in early and medium early groups with a difference that lowest value was higher than other two duration groups. The level of heterosis in this maturity group was much higher (83%) than any other group. This suggests that the hybrids of medium duration group are likely to be much superior to hybrids of early and medium early maturity group. The hybrid H-9 showed highest yield

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Present address: Sher-e-Bangla Agricultural University, Dhaka, Bangladesh

Table 1. Heterosis and per day productivity of experimental hybrids belonging to different maturity groups

Maturity groups											
Early (90-115 days)			Medium early (116-130 days)			Medium (135-145 days)			Late (>145 days)		
Hybrids	Per day productivity (t/ha)	Heterosis over DRRH-1	Hybrids	Per day productivity (t/ha)	Heterosis over DRRH-1 (%)	Hybrids	Per day productivity (t/ha)	Heterosis over DRRH-1 (%)	Hybrids	Per day productivity (t/ha)	Heterosis over DRRH-1 (%)
H-1	0.10	45.96"	H-6	0.09	44.93**	H-3	0.10	73.45**	H-10	0.08	58.92**
H-2	0.08	14.47	H-7	0.09	47.70**	H-4	0.11	86.62**	-	-	-
H-15	0.09	25.83**	H-8	0.11	78.30**	H-5	0.10	68.11**	-	-	-
H-17	0.12	72.66**	H-11	0.11	65.46**	H-9	0.12	104.90**	-	-	-
-	-	-	H-12	0.11	65.28**	H-14	0.11	82.93**	-	-	-
-	-	-	H-13	0.08	33.99**	-	-	-	-	-	-
-	-	-	H-16	0.09	49.28**	-	-	-	-	-	-
Mean	0.10	39.73		0.10	54.99		0.11	83.02		0.08	58.92
check			PRH-10	0.07	5.42	DRRH-1	0.06	0.00			
			-	-	-	Jaya	0.05	−14.00			

**Significant at 1% level

heterosis (104.9%) with a per day productivity of 0.12 t/ha comparable to H-17 of early group. Late maturity group included only one hybrid which showed per day productivity of 0.08 t/ha with standard heterosis of 58.92%. Hence, no inference could be drawn unless more hybrids are included for the comparison. It is There fore, concluded, that though in general the hybrids of longer duration were found to be associated with higher yield heterosis, it is possible to identify specific hybrid combinations such as H-17 which could be as heterotic as most medium early hybrids but with very high per day productivity.

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