

Integrated germplasm improvement

Altering associations between characters in rice through gamma radiation

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We studied the usefulness of gamma radiation in altering character association in rice (*Oryza sativa* L.).

Dry seeds of cultivar J112 were treated with gamma rays (^{60}Co) with 15, 25, and 35 Krad doses. We conducted variability studies in the M_2 and M_3 generations. The M_3 progenies were grown along with parental varieties in an experiment that was laid out in a randomized block design during the 1993-94 dry season. Of 30 random plants, correlation coefficients were calculated for plant height, panicles plant $^{-1}$, panicle length, panicle weight, grains panicle $^{-1}$, 1000-grain weight, and yield plant $^{-1}$.

The treatments with gamma rays increased the correlation between panicle length and yield plant $^{-1}$, panicle width, and grains panicle $^{-1}$, and between panicle weight and grains panicle $^{-1}$, and plant height and plant weight (see table). This increased correlation among traits can be used to increase the rate of selection response for a primary trait.

Based on these results, the yield can be improved if selection is made for panicle length, panicle weight, and grains panicle $^{-1}$.

Total correlations between characters in control and irradiated progenies in the M_2 generation.^a

Characters	Yield plant $^{-1}$	1,000-grain weight	Grains panicle $^{-1}$	Panicle weight	Panicle length	Panicle plant $^{-1}$
<i>Control</i>						
Height	0.311	-0.228	0.142	0.119	-0.126	0.291
Panicles plant $^{-1}$	0.699*	-0.828**	0.209	0.155	0.355	
Panicle length	0.624*	-0.145	0.789**	0.754**		
Panicle weight	0.685*	-0.005	0.991***			
Grains panicle $^{-1}$	0.703**	-0.005				
1,000-grain weight	0.532*					
<i>15 Krad</i>						
Height	0.222	0.269	-0.751**	-0.654*	-0.480	0.367
Panicles plant $^{-1}$	0.675*	0.042	-0.289	0.378	-0.618*	
Panicle length	0.778**	0.100	0.767**	0.836**		
Panicle weight	0.847**	-0.167	0.971***			
Grains panicle $^{-1}$	0.850**	-0.314				
1,000-grain weight	0.166					
<i>25 Krad</i>						
Height	-0.045	0.017	-0.683*	-0.622*	-0.039	-0.221
Panicles plant $^{-1}$	0.609*	-0.053	0.455	0.458	0.191	
Panicle length	0.896**	-0.354	0.605*	0.629		
Panicle weight	0.812**	-0.572*	0.992***			
Grains panicle $^{-1}$	0.800**	-0.608*				
1,000-grain weight	0.360					
<i>35 Krad</i>						
Height	0.434	-0.208	-0.625*	-0.660*	0.061	-0.300
Panicles plant $^{-1}$	0.626*	0.487	0.228	0.218	0.057	
Panicle length	0.804**	0.675*	0.497	0.683*		
Panicle weight	0.809**	0.643*	0.966***			
Grains panicle $^{-1}$	0.849**	0.528*				
1,000-grain weight	0.518*					

^a* and ** = significant at the 0.05 and 0.01% level, respectively.

Any change in the correlation (positive or negative) of one character with another indicates a radiation-induced effect.

Changes in the relationships observed in this study coincide with other results and might be attributed to linkage effect, gene mutation, or change polygenic systems.

For some of the character combinations, an association was nonsignificant in the

control, but significant and negative in various treatments. Such character combinations included plant height and panicle weight and plant height and grains panicle $^{-1}$ for all doses studied. The change in the direction of the correlation coefficients indicates the changes in relationships between characters. ■

Integrated germplasm improvement—irrigated

Liangyou Peite, a new two-line hybrid rice released in China

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Two-line hybrid rice has many advantages over three-line hybrid rice. Liangyou Peite (Pei' Ai 64S/Teqing) was successfully bred over 10 yr at HRRRC. It was registered in 1994 with the Hunan Varieties Evaluation Committee and suggested for national re-

lease as one of the first two-line hybrid rice combinations. It shows high yield potential, good grain quality, and resistance to multiple diseases and insects. It had wide adaptability trials in South China and Hunan Province in 1991-93 (Tables 1 and 2).

In large-scale (3,330 ha) demonstrations in Hunan in 1991-94, Liangyou Peite yielded more than 7.5 t ha $^{-1}$ in the late season with a maximum yield of 10.4 t ha $^{-1}$. It yielded 9.0 t ha $^{-1}$ as a middle season crop, with a maximum yield of 11.3 t ha $^{-1}$. It

yielded a record of 17.1 t ha $^{-1}$ in Yongsheng County, Yunan.

Liangyou Peite had about 10% (0.8-1.1 t ha $^{-1}$) yield advantage over its three-line hybrid rice counterparts. Moreover, it has strong ratooning ability with an average yield of 2.3-3 t ha $^{-1}$ as a ratoon rice over the past 4 yr. In 1995, about 6,660 ha in China were planted to this hybrid.

The female parent, Pei' Ai 64 S, is the first practical thermosensitive genic male sterile line in China. It is an indica/javanica that has high combining ability and is compatible