

Relationship of flag leaf area to yield, filled grains per panicle, and panicle length in upland rice varieties

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Eight upland rice varieties and breeding lines were direct seeded during 1989 wet season, in a randomized complete block design with three replications to determine the relationship of flag leaf area to yield, panicle length, and number of filled grains per panicle. Flag leaf area was measured using the formula $K \times L \times W$ before leaf senescence.

The characters studied differed significantly among the entries (Table 1). The characters were highly correlated among themselves and with flag leaf area (Table 2). This indicates that flag leaf area has a significant influence on grain yield, directly or indirectly, through number of

Table 1. Analyses of variances in 8 upland rice varieties or lines for yield and yield-contributing characters. BRRI, 1989.

Variety or line	Flag leaf area (cm ²)	Yield (t/ha)	Filled grains (no./panicle)	Panicle length (cm)
BR1888-29-2-2-2	41.1 ± 3.97	3.62 ± 0.47	118 ± 11.27	26.3 ± 0.80
BR1888-29-2-2-3	44.5 ± 6.84	3.90 ± 0.25	142 ± 10.39	24.8 ± 0.55
BR1890-6-1-1-2	51.5 ± 9.61	3.82 ± 0.42	136 ± 24.44	25.9 ± 0.55
BR1890-10-2-1-1	54.0 ± 3.59	3.66 ± 0.06	133 ± 17.50	26.3 ± 1.10
BR1890-10-2-1-4	41.5 ± 3.23	3.24 ± 0.15	122 ± 10.69	25.8 ± 1.00
BR20	37.4 ± 3.73	3.46 ± 0.45	133 ± 17.67	23.3 ± 0.23
BR21	42.9 ± 4.45	3.70 ± 0.29	112 ± 7.23	25.9 ± 0.76
Hashikalmi	26.7 ± 0.26	1.97 ± 0.20	63 ± 0.58	20.8 ± 0.64
Variance	212.1**	1.16**	1876.71**	11.25**
CV (%)	10.2	7.0	8.8	3.1

filled grains/panicle and through panicle length.

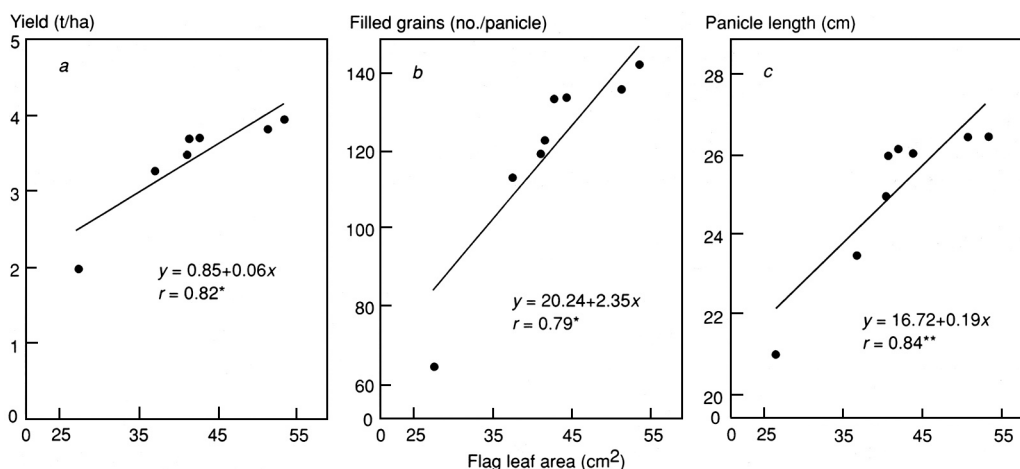
The contribution of flag leaf area to yield was confirmed by regression analysis. All three characters showed linear relationships with flag leaf area (see figure).

We conclude that flag leaf area can be used as a selection criterion for the improvement of high-yielding upland rice. ■

Table 2. Correlation coefficients among flag leaf area, yield, filled grains, and panicle length in upland rice, BRRI, 1989.

Components	Correlation coefficient ^a
Flag leaf area and yield	0.82*
Flag leaf area and filled grains/panicle	0.79*
Flag leaf area and panicle length	0.84**
Filled grains/panicle and yield	0.92**
Filled grains/panicle and panicle length	0.71*
Panicle length and yield	0.83*

^a * = significant at the 5% level. ** = significant at the 1% level.



Relationships of yield (a), number of filled grains per panicle (b), and panicle length (c) to flag leaf area in upland rice. BRRI, 1989.

Pest resistance – diseases

A new field inoculation method for *Xanthomonas oryzae* pv. *oryzicola* (Xoo)

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Bacterial leaf streak caused by Xoo has become a major disease of rice in China. Breeding for disease resistance has been

given more attention. An efficient field inoculation method for screening was needed.

We evaluated eight inoculation methods 1987-90. The modified improved needle-inoculation method gave 100% leaf infection (see table).

The inoculation tool has three parts: inoculation needles, inoculation suspension box, and inoculation suspension

storage bottle. Four pins are fixed on a 5-mm-long and 4-mm-wide rubber (another piece of rubber is stuck on the end of the pins for convenience in handling). A 2-cm-thick, 5-cm-long, 5-cm-wide sponge is placed in a suitable box. On one side of the box, a 10-cm-tall plastic bottle is inserted so the inoculum suspension can flow to the sponge.

Twenty rice leaves can be pricked simultaneously. When the pins are inserted into the leaves, the bacterial suspension on the sponge is squeezed