

had an F<sub>1</sub> with good quality. A japonica hybrid with good quality can be obtained by combining a sterile line with good quality and a restorer line with good quality. Combining different plant types and different panicle types will make the heterosis of F<sub>1</sub> more powerful.

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## Yield potential of Brazilian upland rice

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Brazil is the only rice-growing country where upland and irrigated lowland rice are equally important. Upland rice area in the 1999-2000 crop season was 2.35 million ha, while lowland rice area was 1.21 million ha. Production from these two ecosystems totaled 4.44 and 6.34 million t, respectively, indicating that average rice yield under irrigated conditions is 177% higher (IBGE 2001).

Nevertheless, EMBRAPA's breeding program has emphasized exploitation of yield potential in upland rice germplasm, as well as improving grain quality and increasing blast resistance. Lately, this effort has paid off. Our objective is to show that the yield potential of upland rice breeding lines is much higher than the national average and higher than that of the most common upland varieties.

Breeding lines generated by the different breeding programs in Brazil are included in a set of common trials (observation, preliminary, and advanced yield) that are evaluated in the Brazilian Network for Rice Germplasm Evaluation (BNRGE). Trials are conducted in the most important upland rice-growing areas in the country. Each trial includes around 16 entries plus 4 checks.

Table 1 compares the mean yields of two elite lines and two widely planted varieties in the 1999-2000 cropping seasons. Under a wide range of environments, the new lines outyielded

the checks by 8–10%. Evaluation trials were conducted under the best soil and weather conditions. The elite breeding lines proved to be even better than the commercial varieties, resulting in 13–16% more yield under the same environment (Table 2). These results reveal not only the responsiveness of elite lines but also their ability to withstand adverse conditions.

The best breeding lines, under good experimental conditions, achieve

yields almost three times higher than the national average (1.9 t ha<sup>-1</sup>). The release of new varieties, combined with better agricultural technologies that are already available, will increase the average yield of upland rice in Brazil in the short term.

## Reference

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**Table 1. Average yield (t ha<sup>-1</sup>) of elite breeding lines (EL) and check varieties (CV) of upland rice evaluated in BNRGE, 1999-2000.**

Genotype	Type	1999	2000	Av	% increase over check
CNA8557	EL	3.6	3.9	3.8	110
CNA8540	EL	3.7	3.8	3.8	110
Primavera	CV	3.4	3.6	3.5	102
Caiapó	CV	3.4	3.4	3.4	100
Trial av		3.4	3.5	3.5	
Trials (no.)		51	66	117	

**Table 2. Average yield (t ha<sup>-1</sup>) of elite breeding lines (EL) and check varieties (CV) of upland rice evaluated in high-yield environments, BNRGE, 1999-2000.**

Genotype	Type	1999	2000	Av	% increase over check
CNA8557	EL	5.4	5.3	5.3	116
CNA8540	EL	4.9	5.5	5.2	114
Primavera	CV	4.4	4.8	4.6	101
Caiapó	CV	4.5	4.7	4.6	100
Trial av		4.6	4.9	4.8	
Trials (no.)		20	22	42	