

**DEVELOPING RICE VARIETIES FOR SUSTAINABLE CROPPING
SYSTEMS FOR HIGH RAINFALL ACID UPLAND SOILS OF TROPICAL
AMERICA**

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ABSTRACT

The CIAT Rice Program is developing rice lines adapted to the high rainfall, acid soil (oxisols and ultisols) environments of Latin America. Evaluation of breeding lines is conducted under high rainfall (2700 mm) upland conditions on well-drained, acid (pH <4.8), high aluminium saturation (>80%) soils under high disease (Piricularia oryzae, Rhynchosporium oryzae hoja blanca virus and grain discoloration) pressure and low fertility (250 kg dolomite lime, 60 kg N, 60 kg P₂O₅ and 50 kg K₂O). Selection criteria are intermediate and semi-dwarf height, intermediate tillering, lodging resistance, soil tolerance, disease resistance, and grain quality. After 5 years selection, lines from crosses among African, (IITA, IRAT), Brazilian upland and Surinam irrigated germplasm lines have been developed combining the desired traits. Multilocational trials under conditions similar to those for selection in Colombia, Panama, Guatemala and Brazil indicate that a number of advanced lines show superior adaptation, yield, response to inputs and grain quality when compared to the best local upland and irrigated varieties. Under low input (250 kg dolomite lime, 65 kg P₂O₅, 60 kg K₂O, 80 kg N) lines yielded 3.3 - 4.0 T/ha in large pots. Under higher inputs yields for many lines were >4.5 T/ha and they did not lodge, while presently available upland lines yielded much less and lodged under high input conditions. Some lines were able to yield well under zero input on newly opened native savana, producing 1.5 T/ha. Thus, lines from this program may be suitable for technified farmers able to afford inputs as well as for more traditional, subsistence rice farmers. This material should fit well into rotation schemes with improved tropical pastures and/or soybeans. In the former case, permitting farmers to recuperate their costs of land preparation and fertilization with the first rice crop and in the second case allowing the land to be productive in the early part of the wet season that is unsuitable for the legume. By increasing the productivity and stability of agriculture in the acid soil savana of Latin America pressure may be taken off the more fragile forest systems. Since these lines have been selected under very harsh conditions similar to those found in large areas of Southeast Asia and Africa, it is believed that these lines should prove useful in these areas as well.