

W011 Population Improvement Through Recurrent Selection in Rice. Prospect for Marker Assisted Recurrent Selection and Genome-Wide Selection

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Since 1992, we have been carrying out an upland rice breeding program for Latin American and the Caribbean based on the improvement of synthetic populations of broad genetic diversity through recurrent selection (RS). In this breeding scheme, at each RS cycle the population (P_n) is evaluated for specific traits and the selected units undergo recombination to generate the P_{n+1} population and pedigree breeding to develop new and improved breeding lines. Recombination of the selected units is facilitated by the presence of recessive nuclear male-sterility. RS constitutes an effective framework for combining the centralised improvement of a small number of complex traits with decentralised breeding for site-specific traits. It has allowed us to provide our partners with improved lines and progenitors. We are now adapting our RS strategies to the availability of cheaper genotyping tools and high throughput and precision phenotyping platforms. Established from several cycles of recombination among a large number of founder accessions, synthetic populations make-up a valuable material for association analysis, with lower LD and improved mapping resolution compared to the RILs populations. This paves the way for implementation of marker assisted recurrent selection (MARS) aimed at continuous extraction of lines for specific environments while keeping genetic diversity for long term progress for complex traits. Synthetic populations also constitute a good material for genome-wide selection (GWS). We intend to compare the relative efficiency of different GWS schemes and MARS scheme for the improvement of yield potential and drought tolerance.

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