

Category	: International Rice Research Conference
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Keyword 1	: Breeding Strategy
Keyword 2	: Breeding Simulation
Keyword 3	: Germplasm Enhancement
Title of Entry	: High Yielding Rice Plant Type Developed through Integrated Model-Assisted Selection and Conventional Breeding
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: The Rice Cultivar Selection Program (RiceCSP) and field studies have suggested that rice main crop grain yield in Texas could be improved by selecting for high levels of four primary phenotypic traits, namely, main culm node number, maximum node production rate, and potential source and sink masses. Advanced inbred lines that possessed this high yielding rice plant type (HYRPT) were selected during a 10-year long grain inbred rice breeding project at Texas A&M AgriLife Research Center. The objective of this study was to evaluate grain yield, four primary phenotypic traits, and yield-related trait performance of HYRPT selections. Twenty-six HYRPT selections produced by the integrated model-assisted selection and conventional rice breeding project and check cultivar Cocodrie were evaluated in RCB-designed yield and sampling field experiments at the Texas A&M AgriLife Research Center at Beaumont, Texas, in two summer cropping seasons. Variation in grain yield and plant height were significantly affected by year and genotype, while variation in number of days to maturity was significantly affected by year, genotype, and genotype x year interaction. Genotype grain yield ranged from 9,165 to 12,055 kg/ha, with Cocodrie yielding 9,453 kg/ha. Twenty-two genotypes had higher grain yields than Cocodrie, of which nine were significantly higher. The mean grain yield of the top five yielding genotypes (TXEL0148, TXEL0145, TXEL0149, TXEL0222, and TXEL0223), which were not significantly different from each other, was 11,592 kg/ha and this was 2,139 kg/ha or 22.6% higher than that of Cocodrie. Their mean plant height and number of days to maturity were 97.8 cm and 131.9 d, respectively, which were 12.3 cm and 6.1 days higher than those of Cocodrie, respectively. All top five yielding HYRPT selection had higher values of the four primary phenotypic traits than Cocodrie, except for the maximum node

production rate of TXEL0145. This study demonstrated the success in integrating model-assisted selection and conventional breeding and validated the targeting of the HYRPT design in crop improvement.

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