

DEVELOPMENT OF HYBRID RICE FOR STATE OF LOUISIANA, U.S.A.

J.H. Oard¹, S.D. Linscombe¹, D.L. Harrell¹, D.E. Groth¹

¹H. Rouse Caffey Rice Research Station, Louisiana State University Agricultural Center, Crowley, LA, U.S.A

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ABSTRACT

Hybrid rice, produced from the first generation (F_1) of seeds between a cross of two genetically dissimilar pure line (inbred) parents, represents a relatively new option for southern U.S. farmers. Commercial hybrids typically yield 10-20% more than the best inbreds grown under similar conditions believed to be the result of hybrid vigor or heterosis from crossing the two parents. Research goals of the Hybrid Rice program at the H. Rouse Caffey Rice Research Station, Crowley, LA, U.S.A. include: 1) development of male sterile lines (cytoplasmic A or environmental sensitive S), restorer (R) and maintainer (B) lines adapted to the southern U.S. environmental conditions; 2) identifying elite cross combinations through extensive test-crossing; and 3) exploring the feasibility of economical hybrid seed production.

Hybrid yield trials are conducted annually across six locations in Louisiana to evaluate agronomic and milling performance of selected entries for grain and head rice yields, grain quality, maturity, and height. Several hybrids have produced high yield potential across multiple locations with 18% to 23% yield advantage when compared to popular inbred varieties. Across all trials, greater or similar stability in grain and head rice yields was observed, as measured by the coefficient of variation, for hybrids as a group vs. inbred varieties. During the 2016 Testcross Observational Trial at Crowley, several new conventional and Newpath resistant hybrids produced low levels of grain chalk.

The LSU AgCenter Hybrid Breeding Program is currently developing hybrids that are resistant to the quizalofop-p-butyl (Provisia) herbicide for control of grasses that will complement the existing Clearfield technology. Inheritance studies in multiple populations showed that resistance to the herbicide quizalofop-p-butyl at the 2X field rate was controlled by a single, dominant gene that acted in a predictable Mendelian fashion. All reciprocal crosses indicated that maternal factors had no impact on the segregation or level of resistance to quizalofop-p-butyl. Several candidate hybrids were identified in the 2016 Testcross Observational Trial with high yield potential and high levels of resistance to the Provisia herbicide.