

RISK ASSESSMENT OF THE TRANSFER OF IMAZETHAPYR HERBICIDE TOLERANCE FROM CLEARFIELD RICE TO RED RICE (*Oryza sativa*). Weiqiang Zhang¹, Steven D. Linscombe², Eric Webster¹, Siyuan Tan³, and James H. Oard¹, Graduate Student, Professor, Professor, Senior Scientist, Professor, respectively, ¹Department of Agronomy and Environmental Management, 104 Sturgis Hall, LSU Agricultural Center, Louisiana State University, Baton Rouge, LA 70803, ²Rice Research Station, 1373 Caffey Road, Rayne, LA 70578, ³BASF Corporation. 26 Davis Drive, Research Triangle Park, NC 27709.

Hybridization between Clearfield rice and weedy red rice would have a direct impact on management and long-term strategies of imazethapyr technology for rice weed control. The objective of this research was to determine rates and agronomic consequences for outcrossing between Clearfield rice and red rice. Red rice populations showed extensive variation for plant height, panicle length, tillers/plant, seeds/plant, seed set and grain weight. Outcrossing was detected from all Clearfield rice cultivars ('CL121', 'CL141', 'CL161', and 'CLXL8') to red rice and was confirmed by phenotypic and DNA marker analyses. An overall outcrossing frequency of 0.17 % was observed in 2002 red rice samples with a range from 0 % to 0.46 %. Tolerance of 2002 red rice samples to imazethapyr corresponded to levels of acetohydroxyacid synthase (AHAS) activity. A majority (94 %) of the progeny from the 2002 samples segregated 3 resistant:1 susceptible for tolerance to imazethapyr, indicating that a single dominant gene from Clearfield rice was associated with tolerance in the hybrid material. The remaining samples did not segregate for tolerance, suggesting that spontaneous mutations for tolerance were present in this material before or after crossing with Clearfield rice. A four-fold increase in outcrossing frequency of 0.68 % was observed in 2003 red rice samples with the highest outcrossing frequency for a single location at 3.2 %. Results from this study indicate that outcrossing between Clearfield and red rice will occur rapidly at rates that warrant early-season field scouting and a crop rotation scheme to prolong usefulness of the Clearfield technology.