COMPARISON OF IMAZETHAPYR AND IMAZAMOX AS EITHER PRIMARY OR SALVAGE HERBICIDES IN IMIDAZOLINONE-RESISTANT RICE. James W. Heiser, J. Andrew Kendig, Chad L. Smith, and Paula M. Ezell, Graduate Research Assistant, Extension Associate Professor, Research Specialist, Senior Research Laboratory Technician, Division of Plant Sciences, University of Missouri Delta Research and Extension Center, Portageville, Mo. 63873, Reid J. Smeda, Associate Professor, Division of Plant Sciences, University of Missouri-Columbia, Columbia, Mo. 65211

Imazethapyr is currently used in imidazolinone-resistant (IR) rice (*Oryza sativa*) as the primary herbicide for the selective control of red rice (*Oryza sativa*) (a weedy biotype of commercial rice) and several other weeds. Unfortunately, red rice can hybridize with IR rice and acquire herbicide resistance. Current recommendations are for sequential, early postemergence imazethapyr applications. However, if there is a herbicide failure, labeling prohibits additional imazethapyr applications. Complete control of red rice is needed to minimize the possibility of selecting herbicide resistant plants. Currently, imazamox has a special local need (24c) registration for a clean-up or salvage application. Imazethapyr and imazamox have several similarities. However, current thought is that imazethapyr should be used for routine, early postemergence ("primary") application, and imazamox should be reserved for "salvage" situations.

A factorial arrangement of four primary treatments, four salvage treatments, and two herbicide scenarios were tested in 2003 and 2004 at the University of Missouri Delta Research and Extension Center Lee Farm. The primary treatments were: 1) Preemergence (PRE) only; 2) mid-postemergence only (MPOST) 4-5 leaf rice; 3) PRE followed by (fb) MPOST; and 4) Early postemergence (EPOST) 2-3 leaf rice fb MPOST. Treatments 1 and 2 were intended to result in a salvage situation while the latter two programs were label recommendations. Salvage treatments were applied at: 1) approximately 3 days preflood; 2) approximately 7 days postflood; 3) preflood fb postflood; and 4) no salvage treatment. To compare the two herbicides, imazethapyr was used as the primary herbicide fb imazamox as the salvage, or imazamox was used as the primary fb imazethapyr as the salvage.

Imazethapyr and imazamox were applied at 0.07 kg/ha and 0.044 kg/ha respectively. Postemergence treatments were applied with 0.25% V/V nonionic surfactant (NIS), and a blanket application of aciflourfen + NIS was made at the 4-5 leaf stage to control legume weeds. Treatments were applied using CO_2-back-pack spray equipment, 8002 flat-fan spray nozzles, and an application volume of 187 l/ha at approximately 160 kPa pressure. Standard rice production practices were followed. Plots were 2.25 by 4 m and the experimental design was a randomized complete block with four replications. Data were subjected to an analysis of variance with years considered a random factor and means were separated using a Fisher's protected LSD at the 5% significance level.

Without a salvage application, PRE only treatments resulted in less than 50% red rice control. Mid-POST only treatments resulted in less than 60% red rice control. Early-POST fb MPOST treatments resulted in 88% or better red rice control, while PRE fb MPOST treatments resulted in less than 85% control. Imazethapyr resulted in better control than imazamox in all primary alone treatments excluding PRE only. No treatment which did not include a salvage application resulted in greater than 90% red rice control. Imazethapyr PRE fb imazamox at all salvage timings resulted in greater than 90% red rice control. All PRE-only and MPOST-only treatments benefited from a salvage application; however, EPOST fb MPOST treatments were not statistically improved by a salvage application. When imazamox was applied PRE fb MPOST, control increased from 67% to 95, 96, and 98% when a salvage application of imazethapyr was applied at the preflood, postflood and both salvage timings respectively. Two salvage applications of imazamox following imazethapyr PRE fb MPOST improved control 16% while single applications at either preflood or postflood only increased control 14 and 12% respectively. While these two salvage treatments did not statistically improve weed control, numerical improvements in red rice control may be important due to the need to prevent outcrossing. These

results indicate that current recommendations of two pre-planned EPOST fb MPOST applications of imazethapyr, and imazamox as a salvage clean up (when needed) are appropriate. Imazamox generally did not provide as much control as imazethapyr when used as the primary herbicide at currently recommended timings. These data suggest that imazamox should not replace imazethapyr as the primary herbicide in imidazolinone-resistant rice.