

THE IMPACT OF GROWTH PROMOTANTS AND RETARDANTS ON SECOND CROP PRODUCTION IN DRILL-SEEDED RICE

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ABSTRACT

The development of imidazolinone-resistant rice (Clearfield) allows control of seedling red rice in rice and increases the potential for second or ratoon crop production. Techniques and inputs to improve second crop grain yield can be more easily explored now that a second crop of red rice can be minimized. To this end, a growth promotant (gibberellic acid) and suppressant (maleic hydrazide) were tested for their effects on rice growth and production.

Cheniere, Cocodrie and CL131, varieties that mature early and can produce a second crop, were drill-seeded on 7-in row spacings on April 4, 2005. First and second crop were harvested on August 2 and November 3, respectively. Plot size was 8.75 (15 rows) x 23 ft. Standard agricultural practices were followed to provide adequate soil fertility, pest control, and water management. In separate tests with Cheniere and CL131, gibberellic acid formulated as N-Large Premiere (Stoller Enterprises, Inc., Houston, TX) and RyzUp (Valent U.S.A., Walnut Creek, CA), was applied during the heading and early milk stages of the first crop (July 6 - 11). In Cocodrie, maleic hydrazide (Royal MH-30 SG, Chemtura Corp., Middlebury, CT) was applied at 3, 4, 5, and 6 weeks after harvest of the first crop (weekly from August 24 – September 14). Rate of gibberellic acid was 5 g/A (2.5 fl oz N-Large Premiere and 5 fl oz RyzUp/A), and rates of maleic hydrazide were 0.75 and 1.5 lb/A.

Gibberellic acid increased plant stature in the first crop and had mixed effects on second crop grain yield. On average, gibberellic acid increased plant height from 91 to 95 cm. Early heading applications decreased grain yield from 8778 to 8195 lb/A while increasing second crop yield from 786 to 956 lb/A. Later applications had no effect on first crop grain yield (control and treatments ranged between 8275 and 8722 lb/A) while second crop grain yield increased from 997 lb/A to 1291 lb/A. The effect of the early heading applications decreased total (first plus second) crop grain yield, and the later applications had no effect on total crop grain yield.

Heading is uneven in the second crop, and heading as early as 3 weeks after harvest of the first crop occurs. Early heading produces panicles with grain that is exposed to the environment for several months before harvest (approximately 3 months after first crop harvest). Maleic hydrazide was applied to suppress early second crop growth and prevent losses from early heading. Maleic hydrazide decreased grain yield in the second crop, and the effect was dependent on rate and time of application. On average, grain yields were 928 and 832 lb/A for the low and high rates of maleic hydrazide, respectively, compared with the control (1057 lb/A). Regardless of rate, grain yields decreased continuously with time of application, averaging 950 lb/A with the earliest application and 832 lb/A with the latest application.

Growth promotants applied to the first crop in rice can enhance first crop growth and second crop yield, although total (first plus second) crop yield may not be affected. Growth

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suppressants applied to the second crop to minimize premature heading can reduce yield, and yield reductions are timing and rate dependent.