

WEED CONTROL RESEARCH IN SUGARCANE

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Sugarcane Seed Response to 2,4-D

Sugarcane growers often use 2,4-D to control morningglories (tie-vines) in late season to facilitate crop harvest. Although considered tolerant to 2,4-D, germination of buds from sugarcane stalks harvested for seed following a late season application can be affected. A field experiment was conducted at the St. Gabriel Research Station in St. Gabriel, La., to evaluate the effect of 2,4-D application timing on LCP 85-384 harvested for seed and planted using both whole stalks and billets.

Using a CO₂ backpack sprayer calibrated to deliver 8 gallons/acre, 2,4-D was applied at 1.5 qt/A (3.8 lb ai/gal) 7, 5, 3, and 1 week before planting. Sugarcane stalks were harvested on September 12, 2000, and planted at a constant seeding rate (two stalks with a 3-node overlap). For the billet planting, whole stalks placed in the opened row were hand cut into 18-inch sections (billets). Sugarcane was covered with 3 to 4 inches of soil, and beds were packed twice. A split plot experimental design with five replications was used. Whole plots consisted of planting method (whole stalk or billet) and sub plots were 2,4-D application timings. A significant application timing by planting method interaction was not observed for any of the parameters measured, but the main effects were significant.

Averaged across planting methods, differences in sugarcane shoot population among 2,4-D timings were observed from mid-October through April, but differences were not observed in September, a year following planting. Sugarcane shoot population was higher for the billet planting method throughout the season regardless of 2,4-D application timing, but stalk height was not affected by planting method. Sugarcane stalk height was reduced when 2,4-D was applied 5, 3, and 1 week before planting when compared to the nontreated control, but a reduction was not observed when applied 7 weeks before planting. Sugarcane and sugar yield were reduced 12 to 15% when 2,4-D was applied 5, 3, and 1 week before planting when compared to the nontreated control, but a reduction was not observed when applied 7 weeks before planting. Regardless of 2,4-D application timing, sugarcane and sugar yield averaged 19 and 18% higher, respectively, for billet planting when compared with whole-stalk planting.

Results show that LCP 85-384 sugarcane was not injured when 2,4-D at 1.5 qt/A was applied 7 weeks before harvest for seed whether planting whole stalks or billets at the same seeding rate. When 2,4-D was applied 5 weeks or closer to planting, however, sugarcane and sugar yield were reduced.

Alternatives for Johnsongrass Control in Sugarcane

In 2001, field experiments were conducted to evaluate CGA 362622 and Regiment as alternatives to Asulox for postemergence johnsongrass control in sugarcane. Additionally, CGA 362622 and Prowl were each applied with Asulox to evaluate their utility. In St. James Parish, La., herbicide treatments were applied to johnsongrass as tall as 24 inches with some plants in the boot stage. By 33 days after treatment, johnsongrass was controlled 69 to 78% with Asulox applied alone at the high rate of 3.34 lb/A (4 quarts) or with Prowl at 0.83 (1 quart) or 3.3 lb/A (4 quarts), and with Asulox at 2.5 lb/A (3 quarts) with Prowl at 3.3 lb/A (4 quarts). The high rate of CGA 362622 (0.028 lb/A) controlled johnsongrass 75%, but Regiment (0.02 lb/A) provided only 46% control. Both CGA 362622 and Regiment caused reddening/purpling of the johnsongrass foliage, stunting, and either no seed head emergence or abnormal seed head emergence. Where Prowl was applied with Asulox, fewer johnsongrass seed heads emerged when compared with Asulox alone. Sugarcane injury 33 days after treatment was not observed for any of the Asulox treatments, but was 18 and 29% for the high rates of CGA 362622 and Regiment, respectively.

Johnsongrass control for Asulox and CGA 362622 applied alone and in combination was evaluated in a noncrop area. Asulox controlled rhizome johnsongrass 71 days after treatment 28, 50, and 87% at 0.83, 1.65 (2 quarts), and 3.34 lb/A, respectively. Control was no more than 46% for CGA 362622 applied at 0.007 and 0.014 lb/A. However, when CGA 362622 was applied at 0.007 lb/A with Asulox at 1.65 lb/A, johnsongrass was controlled 80%. The combination of CGA 362622 at 0.014 lb/A and Asulox at 1.65 lb/A controlled johnsongrass 92%, a level comparable to that for Asulox alone at the labeled rate of 3.34 lb/A. In another experiment conducted in the same area, Asulox controlled johnsongrass 71 days after treatment 68, 76, and 86% for the 1.65, 2.50 and 3.34 lb/A rates, respectively. Prowl applied at 0.83, 1.65 (2 quarts), and 3.3 lb/A with Asulox at 1.65 lb/A controlled johnsongrass 69 to 75%. However, when the rate of Asulox was increased to 2.5 lb/A, control was 88 to 90% when at least 1.65 lb/A of Prowl was added, and equal to Asulox applied alone at 3.34 lb/A. Prowl in combination with Asulox could allow for a reduction in the use rate of Asulox without sacrificing johnsongrass control and for some residual weed control from the Prowl. This combination would also provide an economical benefit to the grower.

Sugarcane Response to Herbicides Applied in Spring and at Layby

An experiment was conducted to evaluate response of three sugarcane varieties, LCP 85-384, HOCP 85-845, and LCP 82-89, to the herbicides CGA 362622, Valor, and Velpar K4 (a premix of Velpar and Karmex). A Prowl + Karmex spring treatment followed by Prowl at layby was included as a standard for comparison. Averaged across herbicide treatments injury tended to be less for LCP 85-384. Sugarcane yield was at least 25% higher for 384 than for the other varieties. Sugar yield was 20% higher for 384 than for 845 (8,560 vs. 7,145 lb/A) and 32% higher for 384 than for 82-89 (8,560 vs. 6,470 lb/A). Averaged across varieties, injury was higher than 30% where CGA 362622 was applied twice (0.014 followed by 0.028 lb/A or 0.028 followed by 0.056 lb/A) and 17% when Valor was applied twice (0.25 followed by 0.125 lb/A). Injury for these treatments was accompanied by a reduction in sugarcane plant height in mid-July compared with the Prowl + Karmex standard. Sugarcane yield was reduced compared with the standard 8.2 to 19% where Velpar K4 (2.4 lb/A) or CGA 362622 was applied twice. Sugar yield was reduced 9 to 21% when Velpar K4, CGA 362622, or Valor was applied twice. Results clearly show that multiple applications of some of the newer herbicides can be detrimental to sugarcane growth and yield and that the effect is not variety dependent.

In another experiment, significant injury was observed for Valor applied at 0.25 lb/A on April 12 (20%), but injury for the same rate applied April 4 was 7%. Application of Regiment (0.020 lb/A) on April 12 injured sugarcane 44%. Injury was no more than 14% for the Velpar K4 applied either once or twice at 2.4 lb/A. For the May 29 rating date, sugarcane was injured when Valor was applied 27 days earlier (28%) and when Valor was applied at 0.25 lb/A on April 4 and again at 0.25 lb/A at layby on May 16 (25%). Sugarcane injury at the May rating was 78% where Regiment was applied in mid-April. Sugarcane yield and sugar yield were significantly reduced when Valor was applied postemergence, but not for the Velpar K4 treatments. The excessive injury observed with Regiment resulted in a sugar yield reduction of 36% compared with the standard.

2,4-D Alternatives Research

Use of 2,4-D for late season red morningglory control is prohibited in some parishes. Valor at 0.094 lb/A (3 oz product/A) and Spartan at 0.3 lb/A (6.7 oz/A) were very effective in controlling red morningglory with 24-inch runners when herbicide covered the weed foliage. In another study when morningglory was 72 inches tall and herbicide was applied to the lower 18 inches, Spartan at 0.3 lb/A provided excellent control 28 days after treatment. When applied overtop, Weedmaster at 1 quart/A and 2,4-D at 1 pint/A plus 0.5 or 1 pint/A of Weedmaster controlled 72-inch-tall red morningglory equal to 2,4-D at 1 quart/A.