



EVALUATION OF TRIFLOXYSULFURON AND PYRITHIOBAC IN TRANSGENIC COTTON WEED CONTROL PROGRAMS

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RESEARCH PROBLEM

Transgenic cotton varieties now account for greater than 60% of the total cotton acreage planted in Arkansas. The Roundup Ready program (glyphosate-tolerant) and the BXN program (bromoxynil-resistant) provide acceptable control of many weeds that decrease cotton yields; however, neither program provides control of all troublesome weeds in Arkansas cotton production. The objectives of this research were to evaluate the contribution of trifloxysulfuron and pyriithiobac to these transgenic weed control programs, and also to compare weed control from applications of trifloxysulfuron and pyriithiobac applied alone at various weed growth stages.

BACKGROUND INFORMATION

Trifloxysulfuron (CGA 362622) is a new sulfonylurea being developed by Syngenta Crop Protection for postemergence use in cotton (Culpepper, 2001). Trifloxysulfuron provides activity on many key weeds in cotton production such as pitted morningglory, Palmer amaranth, sicklepod, and hemp sesbania (Wells, 2000). Use rates are extremely low and range from 0.1 to 0.25 oz/acre (Holloway, 2001). Trifloxysulfuron can be applied over-the-top of cotton as long as it has reached the 3-leaf growth stage. Cotton phytotoxicity is 13% or less following early post applications and 6% or less following post-directed applications. All visible injury dissipates within 14 days after applications under normal growing conditions (Holloway, 2001). Yellowing and stunting can occur following over-the-top applications, but the response dissipates quickly and does not affect yield (Holloway, 2000).

Pyriithiobac (Staple) was registered in the fall of 1995 for postemergence applications in cotton and is also an ALS inhibitor. It was the first herbicide to be registered for

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postemergence applications in nontransgenic cotton for control of numerous annual broadleaf weeds without risk of crop injury, yield and quality reductions, and maturity delays (Wilcut, 1998).

RESEARCH DESCRIPTION

Field studies were established at Rohwer, Arkansas, during the 2000 and 2001 growing seasons to determine the influence of CGA 362622 and pyriithiobac rates and application timings on weed control and crop safety. The cotton (*Gossypium hirsutum* L.) varieties DP 451 B/RR and BXN 47 were planted on 17-18 May 2000 and on 5 June 2001 in conventional 96-cm rows. The experimental design was a randomized complete block with four replications. Preemergence applications were applied at planting, and postemergence applications were applied over-the-top at the 3- to 4-leaf cotton growth stage. Preemergence and over-the-top applications were applied at a 140 l/ha volume with a CO₂ backpack sprayer equipped with 8002 VS flat fan nozzles. Cotton was grown under normal cultural practices and sprinkler irrigated as needed. Visual evaluations of control included sicklepod (*Senna obtusifolia*), hemp sesbania (*Sesbania exaltata*), pitted morningglory (*Ipomoea lacunosa*), prickly sida (*Sida spinosa*), and Palmer amaranth (*Amaranthus palmeri*).

RESULTS

Control of Palmer amaranth, sicklepod, and prickly sida was greater than 90% 14 days after preemergence applications of CGA 362622 at 5.3 and 8 g ai/ha and pyriithiobac at 70 g ai/ha (data not shown). At 28 days after preemergence applications, control of all species was similar with both rates of CGA 362622 and pyriithiobac and ranged from 88 to 95%. Crop injury occurred in 2000 following preemergence applications of both herbicides, but injury was greatest following applications of CGA 362622 at 8 g ai/ha and ranged from 35 to 49%. Significant rainfall was received in 2000 immediately following preemergence applications, which may have played a role in the high levels of injury produced. In 2001 injury was less than 15% with both herbicides at all rates.

Postemergence applications of CGA 362622 and pyriithiobac provided similar control of Palmer amaranth and pitted morningglory at all rates, with control ranging from 92 to 100% both years. CGA 362622 at 5.3 and 8 g ai/ha provided greater control of hemp sesbania and sicklepod compared to pyriithiobac. Postemergence control of prickly sida with CGA 362622 was very poor both years, while control with pyriithiobac at 70 g ai/ha was significantly higher compared to CGA 362622.

Roundup Ultra at 0.84 kg ai/ha provided greater than 90% control of Palmer amaranth both years; however, control of prickly sida, pitted morningglory, sicklepod, and hemp sesbania was 90% or less in both years. Roundup Ultra at 0.84 kg ai/ha combined with CGA 362622 at 8 g ai/ha provided greater than 90% control of all spe-



cies. Tank mixes of Roundup Ultra and CGA 362622 applied over-the-top of 3- to 4-leaf cotton produced injury in the form of necrosis, which slowly dissipated. Bromoxynil alone at 0.56 kg ai/ha provided greater than 88% control of pitted morningglory and hemp sesbania; however, control of sicklepod and Palmer amaranth was poor both years. Bromoxynil at 0.56 kg ai/ha combined with CGA 362622 at 8 g ai/ha and pyriithiobac at 70 g ai/ha provided greater than 90% control of all species.

PRACTICAL APPLICATION

Broadleaf weed control continues to be a major concern in cotton production. Advances in plant biotechnology have given rise to a new era in weed control with the glyphosate-tolerant and bromoxynil-resistant cotton varieties. These herbicides provide control of many problematic weeds in cotton production; however, no herbicide on the market provides control of all of the weeds that decrease cotton yield. Trifloxysulfuron and pyriithiobac may provide activity on weeds that are not controlled by glyphosate or bromoxynil.

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