COTTON TOLERANCE AND PALMER AMARANTH CONTROL WITH ZIDUA, WARRANT, AND DUAL MAGNUM HERBICIDES Charles W. Cahoon A.C. York D. L. Jordan North Carolina State University Raleigh, NC

Abstract

Zidua (pyroxasulfone) is a new herbicide with projected registration for corn and soybean in 2012. Similar to the chloroacetamides Dual Magnum (s-metolachlor) and Warrant (acetochlor), Zidua is a seedling shoot inhibitor providing PRE (preemergence) control of both annual grasses and some broadleaf weeds. With the prevalence of glyphosate-resistant Palmer amaranth (Amaranthus palmeri), residual POST (postemergence) herbicides such as Dual Magnum and Warrant have become widely used in cotton weed management systems. The objective of this research was to evaluate the efficacy and crop tolerance of Zidua applied PRE and POST in cotton. Field experiments were conducted at three sites in North Carolina during the 2011 season. Zidua was applied PRE at 1, 1.5, and 2 oz/acre of formulated product (59.5, 89.3, and 119 g ai/ha) immediately after planting. Zidua at 1, 1.5, and 2 oz/acre, Dual Magnum at 1 pt/acre (1067 g ai/ha), and Warrant at 3 pt/acre (1260 g ai/ha) were applied POST to 2-leaf cotton. Additional treatments included Zidua at 1 oz/acre and Warrant at 3 pt/acre applied to 2-leaf and 6leaf cotton. All treatments, except a non-treated check, received Roundup PowerMAX (glyphosate potassium salt) at 22 fl oz/acre (866 g ae/ha) at the 2-, 6-, 12-leaf stages of cotton. Two-, 6-, and 12-leaf stages of cotton occurred 18 to 19, 33, and 46 (days after planting), respectively. Data for cotton stand, cotton height, cotton necrosis, Palmer amaranth control, and seed cotton yield were subjected to ANOVA. Data for the non-treated check were not included in the ANOVA. The interaction of trial by treatment was not significant for cotton stand, cotton height, cotton necrosis, Palmer amaranth control, and seed cotton yield. However, the main effect of treatment was significant for all parameters, with the exception of seed cotton yield. Pooled treatments were separated using Fisher's Protected LSD at p < 0.05. Zidua applied PRE at 1, 1.5, and 2 oz/acre reduced cotton stand approximately 17, 19, and 26%, respectively, 26 DAP (days after planting). Zidua applied PRE also stunted cotton; with cotton height reduced 6 to 9% 45 DAP. Zidua applied once POST reduced cotton height 28 to 31% 45 DAP. Comparatively, Dual Magnum and Warrant applied POST reduced cotton height 2 to 7% 45 DAP. Necrosis 7 days after 2-leaf treatment, ranged from 30 to 38% and 0% with Zidua applied POST and PRE, respectively. Necrosis with Warrant and Dual Magnum applied POST was less than Zidua POST, ranging from 11 to 16%. Necrosis was greatest with Zidua applied twice POST, injuring cotton 31% 7 days after applications at the 6-leaf stage, whereas Zidua applied once injured cotton 8 to 11%. Necrosis was less with Warrant applied twice POST and single applications of Warrant and Dual Magnum, ranging 3 to 5%. Control by Roundup PowerMAX was 87% in late August. Similarly, Zidua, Warrant and Dual Magnum applied once controlled Palmer amaranth 81 to 90%, 91%, and 84%, respectively. Late-season control was not improved with additional applications of Zidua or Warrant at the 6leaf stage. Zidua applications PRE were most effective late-season, providing greater than 99% control of Palmer amaranth. Although differences in Palmer amaranth control, cotton stand, cotton height, and cotton necrosis were significant when comparing herbicide treatments, these differences did not affect seed cotton yield. Performance during the 2011 season in North Carolina, suggests Zidua PRE would be preferred over Zidua POST for Palmer amaranth control and cotton tolerance. However, Zidua PRE reduced cotton stand and stunted growth. Further evaluation on varying soil types and exposure to differing environmental conditions is needed before establishing a role for Zidua in cotton weed management systems.