BARNYARDGRASS EMERGENCE AND SEED PRODUCTION IN COTTON

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Abstract

Barnyardgrass (*Echinochloa crus-galli*) is a summer annual belonging to *Poaceae* family and is considered to be one of the most problematic weeds in cotton in Arkansas. Herbicide-resistant barnyardgrass biotypes have recently been documented in Arkansas. They include propanil-resistant (1992), propanil and quinclorac-resistant (1998), and clomazone-resistant (2007) biotypes. The widespread adoption of Roundup Ready® and Roundup Ready® Flex cotton and the exclusive use of glyphosate in cotton have increased the selection pressure for the evolution of glyphosate-resistant barnyardgrass biotypes. The knowledge of barnyardgrass emergence is essential to producing a herbicide-resistance model. The objectives of this study were to characterize barnyardgrass emergence from natural seed banks and study the impact of time of emergence on barnyardgrass seed production in cotton. In 2008 and 2009, sites in Fayetteville, Stuttgart, and Rohwer, AR, were established to observe cumulative barnyardgrass emergence from natural seed banks in silt loam and clay soil. Newly emerged barnyardgrass seedlings were counted biweekly or weekly and sprayed with 0.77 lb ae/A glyphosate. For the second objective, cotton was planted at Fayetteville and Rohwer, AR. Barnyardgrass cohorts were established at planting through 7 weeks after planting (WAP). Plots were kept weed free except for the established cohorts. Seeds were counted from two panicles from each plot and the number of panicles per plot was also documented. Barnyardgrass emerged earlier in clay soil than in silt loam soil. Peak emergence of barnyardgrass coincided with early growth stages of cotton if planted in late-April or early-May. Barnyardgrass produced up to 31 panicles per plot and 26,000 seeds per panicle. Significantly fewer seeds were produced by barnyardgrass when plants emerged after 5 WAP in cotton. Early emerging barnyardgrass cohorts have the potential to produce an extensive amount of seed. Data from this research will contribute to development of a computer-aided simulation model to evaluate risks of management strategies for reducing incidence of ACCase-, ALS-, and glyphosate-resistant barnyardgrass.