BROWNTOP MILLET: AN EMERGING WEED PROBLEM

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Abstract

Browntop millet, a pasture grass used for hay and forage, has been found in late season cotton where soil residual herbicides were not applied at layby. Browntop millet may become established beneath the cotton canopy and form entanglements with cotton stalks resulting in interference at harvest. Browntop millet populations were lowest in treatments that were tilled in the fall of the previous year and had preemergence herbicides applied in spring. The absence of effective residual layby grass control programs may result in browntop millet recruitment into cotton fields. Browntop millet presence at harvest will not only complicate mechanical harvest but will likely affect lint color grade and trash content.

Introduction

Browntop millet (Urochloa *ramosa* (L.) Stapf), is a warm season annual grass that originated in South East Asia. It is used in the southern United States for forage, hay, and pastures, and is readily available from several seed companies. It is also recommended for erosion control along highways and reclamation sights because it forms dense semi-erect mats and has high growth rates. Browntop millet has been observed along the edges of soybean and cotton fields in Mississippi. After corn and soybean harvest, browntop millet was also observed in the fields growing together with volunteer corn and soybeans. Brown top millet has been observed along roadsides, and is competitive with, and can displace, bermudagrass. Browntop millet is not cold tolerant and succumbs to low temperatures in late fall but may be re-established from seed.

Cotton production practices in the Mississippi Delta usually include fall tillage either as shallow tillage to re-establish beds and irrigation furrows, or deep tillage followed by bedding to reduce soil compaction and restore beds. These production practices bury cotton residues and weed seed, and may reduce browntop millet populations. Preemergence herbicides, graminicides, and glyphosate control browntop millet so it would not be expected as a weed in crops. However, browntop millet is beginning to appear in late season soybean and cotton fields.

The objective of this study was to determine browntop millet response to preemergence herbicides and tillage practices commonly used in cotton production.

Materials and Methods

Research was conducted at the USDA-ARS Southern Weed Science Research Farm, Stoneville, MS on a Bosket silt loam (fine-silty, mixed thermic Aeric Ochraqualf) soil with pH 6.7 and 1% organic matter. Experimental plots were eight rows spaced 40 inches apart and 96 ft long. In the fall, the old beds were hipped, subsoiled, and re-hipped. No-tillage consisted of a single-pass with disk hipper set at 2 inches deep to open an irrigation furrow in the fall. One month prior to planting, the experimental area was treated with glyphosate at 1 lb/A to kill existing vegetation. Herbicide programs were: 1-PRE: metolachlor (1 lb/A), fluometuron (1.1 lb/A), followed by glyphosate (1 lb/A) POST at 1-leaf, 4-leaf cotton, and at layby; 2-No PRE: glyphosate (1 lb/A) at planting followed by glyphosate (1 lb/A) POST at 1-leaf and 4-leaf cotton, and at layby, using a hooded sprayer. Herbicide treatments were applied with a tractor-mounted sprayer with TeeJet 8004 standard flat spray tips delivering 20 gal/A water at 30 psi.

The experimental design was a randomized complete block with four replications. Main plots consisted of tillage and herbicide programs. Weed (culm) dry weight was determined in three randomly selected quadrats of 1 m^2 within each plot. Cotton was mechanically harvested from the center two rows. Data were subjected to ANOVA and means were separated using a Fisher's Protected LSD test at $P = 0.05$.

Glyphosate-resistant cotton cultivar 'DP 436RR' was planted on May 1 in 2005 and 2007; and May 2, 2006 at 45,000 seeds/A using a John Deere 7300 planter. Cotton was furrow irrigated as needed. Harvest preparation consisted of defoliation with two applications of Ginstar at weekly intervals at 6 and 3 oz/A, respectively.

Results and Discussion

The browntop millet biomass did not reduce cotton yields in this study. Seed cotton yields were 2563, 2708, and 2303 lb/A in 2005, 2006, and 2007, respectively. Browntop millet, which emerged after preemergence herbicides had dissipated through mid-season, was controlled by glyphosate at layby. Browntop millet biomass at harvest was that which had accumulated since layby. Browntop millet was the most prevalent weed at layby and again after defoliation, and was almost entirely responsible for the weed biomass accumulation. The presence of weeds at harvest may reduce harvest efficiency and quality in cotton. Browntop millet presents added concerns because its leaves and culms are difficult to separate from cotton during ginning.

Browntop millet biomass was highest in no-till plots (Table 1). Preemergence herbicides also contributed to reduction in browntop millet biomass. Although the levels of browntop millet were not competitive with cotton at harvest, these plants produced seed which could contribute to higher populations in subsequent years.

Browntop millet is not resistant to herbicides but has found a niche where it can become established. If detected in fields, it would be reasonable to include a residual herbicide at layby to break its cycle. Figure 1 shows browntop millet as it might be seen in a cotton field with a few culms emerging through the canopy. Figures 2-4 show browntop millet at densities causing interference.

Table 1. Effect of tillage and herbicide program on browntop millet recruitment at harvest. Note browntop millet was controlled by a layby application of glyphosate.

Tillage	PRE herbicide	2005	2006	2007
		g dry weight / m^2		
Conventional	No	45b	14b	147b
Conventional	Yes	44b	1b	28c
No Till	No	145a	114a	376a
No Till	Yes	148a	25b	70c

Means followed by the same letter are not significantly different at P = 0.05.

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Figure 1. Browntop millet culms emerging through the top of a cotton canopy at arrows.

Figure 2. After defoliation, browntop millet may be found growing in, up and through cotton stalks forming dense entanglements that can interfere with harvest.

Figure 3. Browntop millet at a density sufficient to cause yield loss and harvest interference.

Figure 4. Browntop millet overgrowing cotton.