

**ITALIAN RYEGRASS: NEW AND EMERGING GLYPHOSATE-RESISTANT WEED PROBLEM**

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**Abstract**

Italian ryegrass (*Lolium perenne* ssp. *multiflorum*) is an erect winter annual with a biennial-like growth habit. It is often planted as a cover crop, as a temporary lawn grass, for roadside restoration, or for soil enrichment; however, it often escapes from cultivation and becomes established in fallow fields as a winter weed. Italian ryegrass has a wide range of adaptability to soils, but it thrives on fertile soils in regions with mild climates. Plants begin to germinate in the fall and grow vigorously in winter and early spring. Individuals of the species are highly competitive for nutrients, water, and sunlight.

Glyphosate-resistant Italian ryegrass was first documented in the United States in Oregon in 2003. A population of glyphosate-resistant Italian ryegrass was identified in field crops in Washington County, MS, cotton in 2005. Populations of glyphosate-resistant Italian ryegrass could compromise preplant burndown practices and weed control options in row-crop production systems that utilize reduced tillage practices.

Research to address management of glyphosate-resistant Italian ryegrass was initiated at the Delta Research and Extension Center in Stoneville, MS, in 2005. Most research to date has been conducted at an on-farm site near Tribbett, MS, known to be infested with glyphosate-resistant Italian ryegrass. Initial studies concentrated on postemergence herbicide programs; however, the research focus has transitioned to using residual herbicides applied prior to glyphosate-resistant Italian ryegrass emergence. This research has resulted in several practical and effective management strategies for glyphosate-resistant Italian ryegrass, and it has also identified programs that provide inadequate control or that compromise the reduced tillage systems common in the Mississippi Delta.

Fall applications of Gramoxone Inteon controlled seedling glyphosate-resistant Italian ryegrass. However, Gramoxone Inteon provides no residual control, so subsequent flushes after application jeopardizes this treatment as a useful management option. Few effective spring management programs were identified. Although sequential programs in the spring were better than single-pass applications, tank-mixtures of multiple herbicides were required as components of the sequential programs. Gramoxone Inteon (1 lb ai/A) or glyphosate (0.77 lb ai/A) plus Select Max (0.047 or 0.07 lb ai/A) followed by Select Max (0.07 lb/A) and sequential applications of Gramoxone Inteon (1 followed by 1 lb/A) were the best sequential spring programs for controlling glyphosate-resistant Italian ryegrass. All sequential programs were expensive and left a copious amount of Italian ryegrass residue on the soil surface at planting.

Because spring applications proved to be ineffective and/or uneconomical, residual herbicides became the focus of research with glyphosate-resistant Italian ryegrass in 2007 and 2008. One study evaluated glyphosate-resistant Italian ryegrass control with fall-applied residual herbicides. Treatments included surface applications of Command, Prowl H2O, Dual Magnum, Valor, and KIH-485 and incorporated applications of Prowl H2O and Treflan. Fall applications of Command (0.75 lb ai/A), Dual Magnum (1.6 lb ai/A), and KIH-485 (0.147 lb ai/A) provided at least 92% control of glyphosate-resistant Italian ryegrass in May of the following year. In contrast, control with surface-applied Prowl H2O and Valor was 34 and 68%, respectively, at the same evaluation.

A study was initiated in 2007 to evaluate Gramoxone Inteon plus residual herbicide combinations applied at different application timings for control of glyphosate-resistant Italian ryegrass. Herbicide treatments included Gramoxone Inteon (0.75 lb/A) alone and in combination with Direx (1 lb ai/A), Linex (1 lb ai/A), Valor (0.064 lb ai/A), or Goal (0.5 lb ai/A) applied in fall (November), early-spring (March), or late-spring (April). Early-spring applications were generally less effective than fall or late-spring applications. Fall application of Gramoxone Inteon plus Direx controlled glyphosate-resistant Italian ryegrass 93% 140 days after application. Late-spring applications provided adequate control but, as with other postemergence programs, result in an undesirable amount of Italian ryegrass residue at planting.

Glyphosate-resistant Italian ryegrass represents a serious threat to cotton production systems in the Midsouth if it continues to spread. The presence of this weed also jeopardizes a traditional glyphosate-based burndown program. Programs targeting glyphosate-resistant Italian ryegrass should be based on fall-applied residual herbicides. Fall applications of Dual Magnum, Command, or KIH-485 provide excellent residual control that holds to the time of cotton planting.