

EVOLVING PEST MANAGEMENT – WEEDS

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Abstract

Glyphosate resistance has been documented in nine weeds present in the United States including: common ragweed, common waterhemp, giant ragweed, hairy fleabane, horseweed, Italian ryegrass, johnsongrass, Palmer amaranth, and rigid ryegrass.

Glyphosate resistance in Palmer amaranth poses a particularly serious threat to cotton production. Palmer amaranth was already one of the most troublesome weeds of agronomic crops across the southern United States; resistance to glyphosate will only exacerbate the problem, especially in light of the widespread planting of glyphosate-resistant crops. A rapid growth rate and tall stature make Palmer amaranth extremely competitive with all crops, especially cotton. Research in Georgia during 2006 and 2007 noted that two glyphosate-resistant Palmer amaranth every 20 feet of row and emerging with the crop reduced cotton yield 23%. Additionally, spread of resistance through pollen in this dioecious species (forced outcrossing) likely will be rapid.

Preventative management programs relying heavily on residual herbicides with multiple modes of action have proven effective in slowing the spread of resistance and managing light infestations of this resistant pest. However, in fields with severe infestations, weed management programs relying exclusively on herbicides are often not effective, especially in dryland production areas. Cotton growers with severe infestations are being forced to utilize hand removal, cultivation, incorporated dinitroaniline herbicides, deep turning land, growing cultivars with tolerance to glufosinate, or growing other crops that provide greater weed management options. Several management tactics, especially in cotton, have forced some growers to abandon conservation tillage. In fact, during 2004 when glyphosate-resistant Palmer amaranth was first found in Macon County, Georgia, growers utilized conservation tillage production practices to produce 60% of the cotton in the county. By 2008, conservation tillage production was reduced to a mere 10% of the acreage.

Although resistant Palmer amaranth continues to spread at an alarming rate, growers have become more aggressive in their management programs. It is hopeful that the adoption of more forceful and proactive programs will reduce the rate of spread and begin to slowly reduce the number of resistant seeds present in the soil seedbanks of heavily infested fields.