

**THE EFFECT OF GLYPHOSATE (ROUNDUP)
APPLICATION TIMING ON WEED CONTROL AND
BOLL DEVELOPMENT IN GLYPHOSATE-
TOLERANT (ROUNDUP READY) COTTON**

**M. W. Edenfield, B. J. Brecke,
D. L. Colvin and D. G. Shilling**

**University of Florida
West Florida Research and Education Center
Jay, FL**

Abstract

Field experiments were conducted at the West Florida Research and Education Center near Jay, FL in 1997, 1998, and 1999. Cotton 'DP 5415 RR' was planted first week of May in each year and the entire site of each experiment received pendimethalin at 0.84 kg/ha PPI and fluometuron at 1.7 kg/ha PRE. In the first study glyphosate and MSMA herbicide programs were evaluated to determine the effect of long-term purple nutsedge (*Cyperus rotundus*) control and tuber populations. Treatments were conducted on the same plots in each year. Herbicide treatments included an untreated check; glyphosate at 1.12 kg/ha POST over-the-top at 4 leaf cotton followed by (fb) glyphosate at 1.12 kg/ha POST-directed; norflurazon at 1.7 kg/ha PRE fb MSMA at 2.24 kg/ha plus cyanazine at 0.85 kg/ha POST-directed; norflurazon at 1.7 kg/ha PRE fb MSMA at 1.12 kg/ha POST over-the-top at 4 leaf cotton fb MSMA at 2.24 kg/ha plus cyanazine at 0.85 kg/ha POST-directed; and an untreated check. Herbicide treatments were split-plot in design (cultivation vs. no cultivation) with early-season cultivation as the main effect.

In the long-term purple nutsedge study the glyphosate treatment provided 90% control both mid- and late-season regardless of cultivation. MSMA fb MSMA plus cyanazine resulted in 65% mid-season control, which was increased to 75% with the addition of an early-season cultivation in 1997. By late-season there was no difference between glyphosate and the MSMA sequential treatment that included cultivation. MSMA plus cyanazine POST-directed without cultivation resulted in < 70% control. With regard to purple nutsedge tuber populations, all treatments resulted in less tubers in subsequent years except for the untreated check without cultivation which increased from 325 tubers per 0.25 m² in 1997 to 425 tubers in 1999. In 1997, glyphosate was the most effective treatment in reducing purple nutsedge tubers, and there was no advantage for an early-season cultivation. Glyphosate treatments without cultivation resulted in 58, 14, and 7 tubers per 0.25 m² in 1997, 1998, and 1999. The sequential MSMA treatment without cultivation resulted in 203, 12, and 9 tubers per 0.25 m² in 1997, 1998, and 1999.

The sequential MSMA treatment with cultivation resulted in 41, 3, and 3 tubers per 0.25 m² in 1997, 1998, and 1999.

In the second study, the effect of glyphosate on cotton fruit development and yield was investigated in 1999. Glyphosate at 0.85 kg/ha was applied POST over-the-top to 4, 6, 8, 10, and 12 leaf cotton. Sequential applications of glyphosate POST over-the-top and POST-directed were applied at 4 leaf fb 6 leaf, 4 leaf fb 8 leaf, 4 leaf fb 10 leaf, and 4 leaf fb 12 leaf cotton. Plots were maintained weed-free throughout the entire season. At the end of the season, following defoliation, 10 cotton plants per plot were randomly chosen for plant mapping and boll analysis following defoliation. Cotton was harvested with commercial equipment for seed yield following plant mapping.

Most cotton boll growth parameters were not affected by glyphosate. Single POST applications of glyphosate at 12 leaf cotton reduced position 1 boll retention. Position 1 boll retention was not affected when applied at 4, 6, 8, or 10 leaf POST over-the-top. Position 1 boll retention was also reduced when glyphosate was applied 4 leaf POST over-the-top fb 10 or 12 leaf POST over-the-top. No glyphosate treatment reduced position 2 boll retention, or position 1 and 2 boll retention on the 5 lowest sympodial branches. Even though glyphosate reduced position 1 boll retention at 10 and 12 leaf POST over-the-top, there was no yield difference between any glyphosate treatments and the untreated check.