

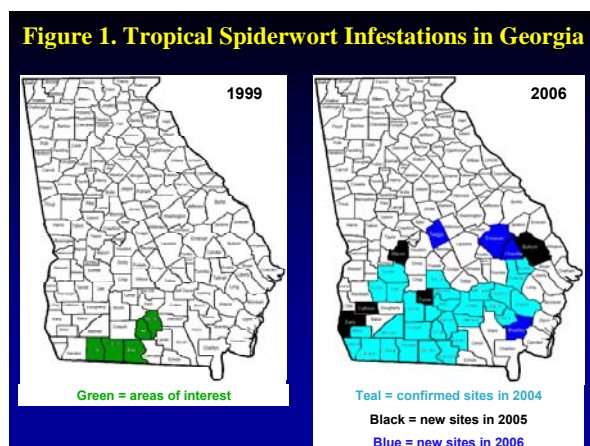
Management of Tropical Spiderwort in Georgia Cotton

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Introduction

Tropical spiderwort is among the world's worst weeds, and it is considered a weed in 25 crops in 29 countries (Holm et al. 1977). This weed was first observed in the continental U. S. in 1928 and was reported to be common through Florida by the mid-1930's (Faden 1993). In 1998, tropical spiderwort was present in Georgia but not considered a serious pest infesting cotton. However, by 2001, it had quickly become very problematic and was ranked as the ninth most troublesome weed. By 2002, tropical spiderwort was clearly the most troublesome weed facing Georgia producers in several southern counties. Although tropical spiderwort is no longer the most troublesome weed in Georgia cotton, it is extremely problematic and expensive to manage as it continues to spread throughout Georgia (Figure 1).



Preliminary data shows optimum temperatures for tropical spiderwort growth range from 30 to 35 C, indicating that the southeastern U.S. could provide an adequate environment for its rapid growth and reproduction (Burton et al. 2003). This, along with wide-spread planting of GR cotton and the heavy dependence upon glyphosate for weed management, suggests this problem is likely to increase across the region. The objective of our study was to determine the most effective weed management systems that should be recommended to manage this pest throughout Georgia.

Materials and Methods

Research studies were conducted in Georgia from 2001 to 2005 to determine the most effective herbicides needed in a systems approach to control tropical spiderwort. This previous research noted that Dual Magnum during early and late-season as well as Direx or Valor plus MSMA directed at layby were critical in the management of this pest. Research in 2006 was conducted to determine the most effective rates and applications timings of these herbicides. The study was conducted outside Cairo, GA on soils that were Tifton loamy sands (thermic Plinthic Kandiudults) with organic matter of 1.0% with a pH of 6.0.

The experiment compared 36 herbicide programs (Table 1). Prowl was applied preemergence over the trial area to remove other commonly present weeds, Prowl has no activity on tropical spiderwort. Topical applications were made when cotton had 3 leaves and spiderwort was one inch or less. Layby directed applications were made to 16 inch cotton and 1- to 6-inch tropical spiderwort.

Results and Discussion

Cotton injury was minor with all systems except for Valor mixtures applied at layby (data not shown). Valor mixtures caused up to 18% stem necrosis on younger, green-stem cotton plants. However within two weeks of application, no cotton injury was detectable on any plant.

Sequential glyphosate applications provided only 46% spiderwort control at harvest (Table 1). Glyphosate applied topically at early POST followed by (fb) glyphosate plus Direx, glyphosate plus Valor, or Direx plus MSMA at layby provided 57, 81 and 53% control of spiderwort, respectively. Poor late-season control by these systems was due to late-season spiderwort emergence. Adding 8 or 12 oz/A of Dual Magnum to the topical early POST glyphosate application or the layby directed application in the sequential glyphosate only program improved late-season control by at least 17%. However, these programs did not provide acceptable control with at most 78% control at harvest. Sequential applications including Dual Magnum applied at early POST and also at layby were generally the most effective programs.

Five herbicide programs provided greater than 90% control at harvest, four of which are currently labeled and will be recommended to manage tropical spiderwort. These systems included the following:

- 1) glyphosate + Dual Mag. 12 oz topical fb Direx + MSMA + Dual Mag. 8 oz layby
- 2) glyphosate + Dual Mag. 12 oz topical fb Direx + MSMA + Dual Magnum 12 oz at layby
- 3) glyphosate + Dual Mag. 12 oz topical fb glyphosate + Dual Mag. 12 oz
- 4) glyphosate + Dual Mag. 8 oz topical fb glyphosate + Dual Mag. 8 oz + Direx

Valor mixtures with Dual Magnum at layby were extremely effective controlling spiderwort but are currently not recommended for use because more research on crop response to this mixture at layby is required before obtaining labels.

No differences in cotton yields were noted among herbicide systems (Table 1). Lack of yield differences were noted because 1) tropical spiderwort emerged three weeks after planting and 2) the spiderwort was extremely small and controlled very effectively by topical glyphosate applications.

Table 1. Determining the most effective herbicide program for managing tropical spiderwort.*

Herbicide system		Control at harvest (%)**	Seed cotton yield**
Topical application	Directed application at layby		
WMax	WMax	46 n	1838 a
WMax	WMax + Dual Mag (8 oz)	63 klm	1929 a
WMax	WMax + Dual Mag (12 oz)	78 e-i	1992 a
WMax	WMax + Direx	57 lmn	1947 a
WMax	WMax + Dual Mag (8 oz) + Direx	76 g-j	1745 a
WMax	WMax + Dual Mag (12 oz) + Direx	83 b-i	1677 a
WMax	WMax + Valor	81 b-i	1480 a
WMax	WMax + Dual Mag (8 oz) + Valor	80 c-i	1636 a
WMax	WMax + Dual Mag (12 oz) + Valor	93 a-b	1626 a
WMax	Direx + MSMA	53 mn	1740 a
WMax	Direx + MSMA + Dual Mag (8 oz)	80 c-i	1723 a
WMax	Direx + MSMA + Dual Mag (12 oz)	84 a-i	1587 a
WMax + Dual Mag (8 oz)	WMax	76 g-j	1751 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (8 oz)	89 a-e	1543 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (12 oz)	89 a-e	1894 a
WMax + Dual Mag (8 oz)	WMax + Direx	81 b-i	1806 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (8 oz) + Direx	92 ab	1650 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (12 oz) + Direx	82 b-i	1854 a
WMax + Dual Mag (8 oz)	WMax + Valor	79 d-i	1629 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (8 oz) + Valor	77 f-j	1878 a
WMax + Dual Mag (8 oz)	WMax + Dual Mag (12 oz) + Valor	81 b-i	2966 a
WMax + Dual Mag (8 oz)	Direx + MSMA	74 h-k	1922 a
WMax + Dual Mag (8 oz)	Direx + MSMA + Dual Mag (8 oz)	88 a-g	1835 a
WMax + Dual Mag (8 oz)	Direx + MSMA + Dual Mag (12 oz)	88 a-g	1441 a
WMax + Dual Mag (12 oz)	WMax	66 jkl	1665 a

oz)			
WMax + Dual Mag (12 oz)	WMax + Dual Mag (8 oz)	81 b-i	1632 a
WMax + Dual Mag (12 oz)	WMax + Dual Mag (12 oz)	91 abc	1746 a
WMax + Dual Mag (12 oz)	WMax + Direx	76 g-j	1538 a
WMax + Dual Mag (12 oz)	WMax + Dual Mag (8 oz) + Direx	85 a-i	1767 a
WMax + Dual Mag (12 oz)	WMax + Dual Mag (12 oz) + Direx	80 c-i	1823 a
WMax + Dual Mag (12 oz)	WMax + Valor	74 ijk	1607 a
WMax + Dual Mag (12 oz)	WMax + Dual Mag (8 oz) + Valor	85 a-h	1640 a
WMax + Dual Mag (12 oz)	WMax + Dual Mag (12 oz) + Valor	89 a-e	1632 a
WMax + Dual Mag (12 oz)	Direx + MSMA	80 c-i	1671 a
WMax + Dual Mag (12 oz)	Direx + MSMA + Dual Mag (8 oz)	95 a	1596 a
WMax + Dual Mag (12 oz)	Direx + MSMA + Dual Mag (12 oz)	91 a-d	1754 a

*WMax = Roundup WeatherMax at 22 oz/A; Direx = 1.5 pt/A when mixed with glyphosate and 2.0 pt/A when mixed with MSMA; MSMA = 2.5 pt/A; and Valor 1.0 oz.

**Letters followed by the same letter are not different at P = 0.05.

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