TROPICAL SPIDERWORT WEED MANAGEMENT SYSTEMS IN ROUNDUP READY AND ROUNDUP READY FLEX COTTON

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Introduction

Tropical spiderwort is an invasive herbaceous perennial that grows as an annual in temperate climates (Holm et al. 1977) and has the ability to produce viable seed from both above and below ground flowers (Walker and Evenson 1985). It also has the ability to root and establish from cuttings created by cultivation. Since the introduction of Roundup Ready cotton in 1997, tropical spiderwort has fast become the most troublesome weed in several Southern counties in Georgia. In addition, tropical spiderwort poses a serious threat to agro-ecosystems of the Southern US due to recent changes in cultural practices and herbicide use patterns in our cropping systems. The objective of this experiment was to determine the most effective weed management system for control of tropical spiderwort program in Roundup Ready and Roundup Ready Flex cotton.

Materials and Methods

Cotton 'DP 555 BG/RR' was hill dropped on May 5th, 2005 with 3 seeds per 14 inch of row on 36 inch row spacing. Plots were 4 rows by 25 ft long and were prepared with conventional tillage practices. Weed management systems included six programs for Roundup Ready cotton and six programs for Roundup Ready Flex cotton, which will be commercialized in 2006.

In Roundup Ready cotton, systems included Prowl 3.3 EC (2 pt/A) preemergence followed by Roundup WeatherMax (22 oz/A) alone or mixed with Dual Magnum (8, 12, or 16 oz/A) applied overtop of 4-leaf cotton followed by a treatment precision directed to 10- to 12-leaf cotton (Table 1).

In Roundup Ready Flex cotton, systems included Roundup WeatherMax (16 oz/A) overtop of 1-leaf cotton and Roundup WeatherMax (22 oz/A) alone or mixed with Dual Magnum (8, 12, 16 oz/A) applied overtop of 6- to 8-leaf cotton and overtop of 10- to 12-leaf cotton (Table 2).

Tropical spiderwort was 1 inch, 1.5 inches, 3 inches, and 4 inches in height at the 1, 4, 6-8, and 10-12 leaf stages of cotton, respectively. Conditions throughout the growing season were ideal for postemergence weed control with lush spiderwort during times of Roundup WeatherMax application. Rainfall occurred within 28 hours of each Dual Magnum application for optimum herbicide activation.

Results and Discussion

In Roundup Ready cotton, Prowl 3.3 EC did not control tropical spiderwort (data not shown). At harvest, Roundup WeatherMax applied sequentially over the top of 4-leaf cotton and directed to 10- to 12-leaf cotton provided 56% control of tropical spiderwort (Table 1). Mixing Dual Magnum (16 oz/A) with Roundup WeatherMax at either the 4-leaf or the 10- to 12-leaf application improved control 29 to 31% at cotton harvest (Table 1). Sequential applications of Dual Magnum, regardless of rate, when mixed with Roundup WeatherMax and sprayed at the 4-leaf and 10- to 12-leaf timings were more effective, providing at least 95% control of tropical spiderwort at cotton harvest (Table 1).

Results in Roundup Ready Flex cotton were similar to those noted in Roundup Ready cotton. At harvest, applying Dual Magnum (16 oz/A) only once in mixture with Roundup WeatherMax at the 6- to 8-leaf or 10- to 12-leaf cotton stage was at least 20% more effective than three applications of Roundup WeatherMax applied alone to 1-leaf, 6- to 8-leaf, and 10- to 12-leaf cotton (Table 2). Systems with sequential Dual Magnum applications regardless of rate were the most effective herbicide programs, providing 96 to 97% control of tropical spiderwort at cotton harvest.

Conclusions

Sequential Dual Magnum applications should be used in Roundup Ready or Roundup Ready Flex cotton to manage tropical spiderwort. Dual Magnum only provides residual control and should be applied prior to tropical spiderwort emergence. The level of control observed in our treatments will only be achieved if tropical spiderwort is small and not stressed from environmental conditions and rainfall occurs within 48 hours of Dual Magnum application. Further testing is needed to determine if this control strategy will be successful in future growing seasons under periods of suboptimal growing conditions that places the tropical spiderwort plants under stress.

Literature Cited

Holm, L. G., D. L. Plucknett, J. V. Pancho, and J. P. Herberger. 1977. The world's worst weeds: distribution and biology. Honolulu, HI: University Press of Hawaii. 609 p.

Walker, S. R. and J. P. Evenson. 1985. Biology of *Commelina benghalis* L. in south-eastern Queensland. Growth, development, and seed production. Weed Res. 25:239-244.

Table 1. Tropical spiderwort control with Prowl 3.3 EC, Roundup WeatherMax, and Dual Magnum in Roundup Ready Cotton.

Herbicide Treatment					Tropical Spiderwort Control[a]				
Preemergence	Overtop of 4 leaf cotton		Directed to 10-12 leaf cotton		Days After Planting				
Prowl	Roundup WeatherMax	Dual Magnum	Roundup WeatherMax	Dual Magnum	35	61	83	116	147
pt/A	fl oz/A		fl oz/A		%				
2	22	—	22	—	44 c	56 c	50 d	49 c	56 c
2	22	16	22	—	99 a	97 a	90 b	83 b	85 b
2	22	—	22	16	72 b	76 b	82 c	84 b	87 b
2	22	8	22	8	99 a	99 a	99 a	94 a	96 a
2	22	12	22	12	99 a	99 a	98 a	95 a	95 a
2	22	16	22	16	99 a	100 a	98 a	96 a	96 a

[a] Means within a column followed by a common letter are not different according to Fisher's protected LSD test at P=0.05

Table 2. Tropical spiderwort control with Roundup WeatherMax and Dual Magnum in Roundup Ready Flex Cotton.

Herbicide Treatment					Tropical Spiderwort Control[a]				
1 leaf cotton	Overtop of 6-8 leaf cotton		Directed to 10-12 leaf cotton		Days After Planting				
Roundup WeatherMax	Roundup WeatherMax	Dual Magnum	Roundup WeatherMax	Dual Magnum	35	61	83	116	147
fl oz/A	fl oz/A		fl oz/A		%				
16	22	—	22	—	86 b	74 c	51 c	62 e	68 c
16	22	16	22	—	87 b	100 a	89 b	85 d	88 b
16	22	—	22	16	89 ab	86 b	96 ab	88 cd	89 b
16	22	8	22	8	89 ab	100 a	98 a	92 bc	96 a
16	22	12	22	12	96 a	100 a	99 a	96 ab	97 a
16	22	16	22	16	90 ab	100 a	99 a	98 a	97 a

[a] Means within a column followed by a common letter are not different according to Fisher's protected LSD test at P=0.05