## COMBINATIONS OF ENVOKE AND STAPLE FOR PIGWEED CONTROL IN MISSISSIPPI D.M. Dodds Mississippi State University Mississippi State, MS C.H. Koger Mississippi State University Stoneville, MS

## <u>Abstract</u>

Palmer amaranth (*Amaranthus palmeri* S. Wats) is distributed across the Cotton Belt from California to Virginia. Palmer amaranth is a problematic weed due to rapid growth habit, prolific seed production, deep root system, high water use efficiency, and allelopathic potential. Previous research suggests that Palmer amaranth can produce an average of 400,000 seeds per plant with some plants producing up to 1,000,000 seeds. Palmer amaranth populations of one- to two-plants per 10-meters of cotton row warrant herbicide application. It is estimated that the *Amaranthus* genus infests approximately 157,000 hectares in Mississippi and cause up to 15% yield losses. Recently, glyphosate-resistant Palmer amaranth was identified in Georgia, North Carolina, Arkansas, and Tennessee. Populations of glyphosate-resistant Palmer amaranth are suspected in Louisiana and Tennessee. Resistance to glyphosate, as well as the lack of new herbicide development makes identification of currently available herbicides for control of Palmer amaranth necessary. Therefore, this study was initiated to determine the level of Palmer amaranth control provided by Envoke (trifloxysulfuron) and Staple (pyrithiobac) alone and in combination.

Studies conducted in 2007 at the Mississippi State University Delta Research and Extension Center evaluated control of Palmer amaranth in a monoculture system. Cotton tolerance to applications of Envoke and Staple alone and in combination was evaluated in a separate, monoculture experiment. Application rates of Envoke and Staple as well as application timing to Palmer amaranth and cotton are shown in Table 1. Applications to Palmer amaranth were made using a  $CO_2$  backpack sprayer whereas applications to cotton were made using a tractor-mounted, compressed-air sprayer. Cotton was maintained weed-free for the duration of the growing season. Palmer amaranth control and cotton injury was evaluated visually two weeks after application. Visual ratings were made on a scale of 0 = no control to 100 = complete plant death. Cotton lint yield was also collected.

Applications of Envoke or Staple alone to two- to four-inch Palmer amaranth resulted in 72% or less control. All combinations of Envoke and Staple except 0.007 and 0.0425 lb ai  $ac^1$ , respectively, resulted in approximately 70% control. However, Envoke and Staple at 0.007 and 0.0425 lb ai  $ac^1$ , respectively, yielded 85% control of two- to four-inch Palmer amaranth. All single and combination applications of Envoke and Staple resulted in 70% or less control of eight- to ten-inch Palmer amaranth. Applications to five-leaf cotton that included Envoke at 0.007 lb ai  $ac^{-1}$  resulted in up to 13% visual injury two weeks after application. Injury was manifested as reduced plant vigor; however, no differences in cotton plant height were observed. Less than 6% injury was observed for all applications to 10-leaf cotton. No significant differences due to herbicide application were present for lint yield. Applications of Envoke and Staple alone and in combination are not recommended for control of Palmer amaranth. Due to aggressive growth habit and prolific seed production, herbicides that will provide excellent levels of control should be used.

<b>Envoke Rate</b>	Staple Rate	Weed Stage	Cotton Stage
lb ai ac <sup>-1</sup>		in	# Leaves
-	0.0213	2-4/8-10	5/10
-	0.0425	2-4/8-10	5/10
0.0035		2-4/8-10	5/10
0.007		2-4/8-10	5/10
0.0035	0.0213	2-4/8-10	5/10
).007	0.0213	2-4/8-10	5/10
).0035	0.0425	2-4/8-10	5/10
0.007	0.0425	2-4/8-10	5/10
NIS at 0.25% v/v wa	s included with all treatmen	ts	
' A non-treated check	was included with each app	lication timing for	

 Table 1. Application rates and timings of Envoke and Staple to Palmer

 Amaranth and cotton<sup>a,b</sup>.

comparison purposes