

ACTIVATION AND LENGTH OF RESIDUAL HERBICIDES UNDER FURROW IRRIGATION**Dilpreet S. Riar****Jason K. Norsworthy****Mohammad T. Bararpour****Holden D. Bell****Brandon W. Schrage****Sandeep Rana****University of Arkansas****Fayetteville, AR****Jason A. Bond****Delta Research and Extension Center, Mississippi State University****Stoneville, MS.****Abstract**

Variable soil moisture can lead to differences in the residual herbicide activity and ultimately Palmer amaranth control in furrows and on beds. Studies were conducted to determine (a) the extent of Palmer amaranth control over a 6-wk period with field application rates of residual herbicides labeled in corn, cotton, and soybean and (b) difference in Palmer amaranth control between furrows and beds under furrow irrigation system at Keiser (clay soil) and Marianna (silt loam soil), AR, in 2011 and 2012 and at Stoneville (sandy loam soil), MS, in 2011.

Palmer amaranth control at Keiser with all herbicides except Envoke (76%) and Staple (80%) was $\geq 92\%$ at 2 weeks after treatment (WAT). Palmer amaranth control with all herbicides at 3 WAT was similar to 2 WAT, but decreased for all herbicides by 2 to 17 percentage points by 6 WAT, except Callisto [94 versus (vs) 93%], Dual Magnum (98 vs 96%), Outlook (98 vs 94%), and Sencor (99 vs 98%). At Marianna, control with all herbicides except Envoke (63%), Staple (70%), Laudis (85%), Balance Flexx (88%), and Prowl (87%) was $\geq 90\%$ at 2 WAT. Palmer amaranth control with Envoke (53%), Staple (64%), Laudis (73%), Balance Flexx (77%), and Prowl (83%) at 3 WAT was less than at 2 WAT. By 6 WAT, only herbicide with control similar to 2 WAT was Direx (95 vs 93%). At Stoneville, only AAtrex (95%), Outlook (91%), and Sencor (90%) controlled Palmer amaranth $\geq 90\%$ at 2 WAT. Palmer amaranth control at 3 and 2 WAT was similar only for AAtrex (95 and 95%), Balance Flexx (79 and 85%), and Sencor (86 and 90%). Palmer amaranth control with all herbicide treatments at 6 WAT was less than 2 and 3 WAT. No biological difference in Palmer amaranth control between furrows and beds was observed at Keiser and Marianna, but because of less water holding capacity of soil, control in furrows was greater than beds at Stoneville at 3 (74% in furrows vs 64% at beds) and 6 (45% in furrows vs 31% at beds) WAT.

In general, Palmer amaranth control decreased in the order of decreasing water holding capacity of soil (Keiser > Marianna > Stoneville). Additionally, these studies demonstrated that the length of residual activity for Palmer amaranth control varied for herbicides depending upon soil texture and more herbicides at Keiser (AAtrex, Balance Maxx, Callisto, Caparol, Dual, Outlook, Reflex, Sencor, Valor, Warrant, and Zidua) compared to Marianna (Caparol, Direx, and Zidua) and Stoneville (none) provided residual activity of $\geq 90\%$ over a period of 6 wk. However, with emphasis on a zero tolerance for Palmer amaranth escapes, 90% control is not acceptable and there is need to overlay residual herbicides every 14 to 21 days until crop canopy formation.