Research for Newly Emerging Weed Control Problems in Oklahoma Peanut Producing Regions

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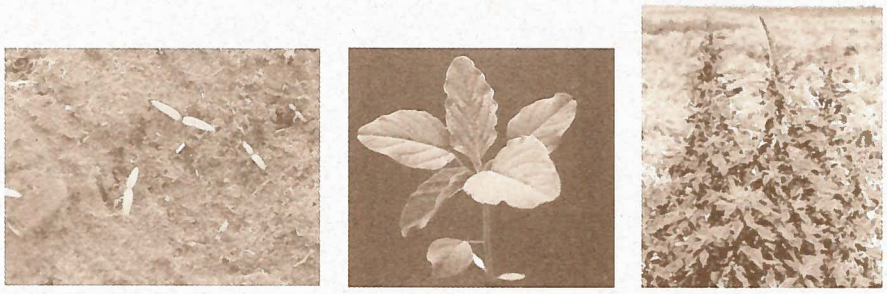
- Better utilization of currently labeled herbicides is essential for weed management in fields containing Palmer amaranth (*Amaranthus palmeri*) resistant to acetolactate synthase (ALS) inhibiting herbicides (e.g. Cadre®, Pursuit®, etc.). Practices that should be closely scrutinized include herbicide incorporation techniques, herbicide application timings, and tank-mix options.
- Oklahoma State University's recommendations for managing Palmer amaranth resistant to ALS inhibiting herbicides include adequate mechanical preplant incorporation of a seedling root inhibiting herbicide (such as pendimethalin/Prowl®) in the top 2 in of soil. Producers should consider an at-cracking application of metolachlor (Dual II Magnum®, Cinch®, etc.) or dimethenamid (Outlook®). If weeds have emerged by the at-cracking application, producers will need to include a postemergence herbicide to control these emerged weeds. Producers should also consider a layby application of metolachlor (Dual II Magnum®, Cinch®, etc.) or dimethenamid (Outlook®) if late emerging weeds have been problematic in the past. This weed is easier to manage prior to its establishment than once it has become established.
- Lactofen (Cobra®) herbicide was labeled for use in peanuts in November 2004. This product should provide adequate control of small actively growing Palmer amaranth, however, some crop injury will most likely occur. Other postemergence control options that should be considered when needed include 2,4-DB®, paraquat (Gramoxone Max®) plus 2,4-DB®, and acifluorfen plus bentazon (Storm®).

Many producers in the Caddo County peanut producing area witnessed poor control of Palmer amaranth (Figure 1) in the 2003 production season. Palmer amaranth (also known as Palmer pigweed and careless weed) is a broadleaf weed common to most peanut fields in southwestern Oklahoma. Control of the weed is typically achieved with preplant incorporated or preemergence applications of trifluralin (Treflan®), pendimethalin (Prowl®), metolachlor (Dual II Magnum® or Cinch®), flumioxazin (Valor®), imazethapyr (Pursuit®), or diclosulam (Strongarm®). Postemergence control is usually achieved with imazapic (Cadre®). Biotypes of Palmer amaranth resistant to ALS inhibiting herbicides have been documented across the United States. Of the products previously mentioned, Pursuit®, Cadre®, and Strongarm® are ALS inhibiting products. Repeated usage of these products for the past 4-10 years may have caused the selection of a herbicide



(a) (b) (c)

Figure 1. (a) Palmer amaranth newly emerging seedlings, (b) a 6-leaf plant, and (c) a mature plant.

resistant biotype in many Caddo County area fields. Although this seems fast for the development of a herbicide resistant weed population, similar development of resistance to this herbicide mode of action has occurred in different weed species in other regions of the United States, just as quickly. Alternative management strategies for the weed are being devised for the 2005 growing season in order to limit the spread and severity of the problem.

To address this developing weed problem, plots were established in Caddo County on a field with a known infestation of Palmer amaranth resistant to ALS inhibiting herbicides. All plots received pendimethalin (Prowl®) applied through chemigation in a no-till peanut production tillage system. Due to certain chemical properties of pendimethalin (i.e. low water solubility and strong affinity for clay particles and soil organic matter) it is extremely difficult to move this herbicide into the soil profile through irrigation or chemigation. This is a very important factor to consider since pigweed and other species germinate as deep as 1-2 in under ideal conditions. Poor Palmer amaranth control resulted from this application and was most likely due to lack of mechanical incorporation into the top 1-2 in of soil.

Additional chemical treatments evaluated for control of the herbicide resistant Palmer amaranth included combinations of flumioxazin (Valor®) applied preemergence, diclosulam (Strongarm®) applied preemergence, dimethenamid (Outlook®) applied at-cracking, and 2,4-DB® and/or imazapic (Cadre®) applied postemergence alone or tank-mixed with metolachlor (Dual II Magnum®) or pendimethalin (Prowl®). As anticipated, treatment regimes based on diclosulam (Strongarm®) and/or imazapic (Cadre®) did not control the resistant Palmer amaranth. Herbicide combinations involving flumioxazin (Valor®) were also unsuccessful in controlling this weed, but will be evaluated further. The best Palmer amaranth control (approximately 98 percent control) was achieved by following the preemergence application of pendimethalin with dimethenamid (Outlook®) applied at-cracking and a tank-mix application of 2,4-DB plus metolachlor (Dual II Magnum®) applied at layby approximately eight weeks after planting. A layby treatment of metolachlor (Dual II Magnum® or Cinch®) or dimethenamid (Outlook®) should be strongly considered for fields with significant Palmer amaranth infestations. These layby herbicides should be tank-mixed with 2,4-DB®, lactofen (Cobra®), paraquat (Gramoxone Max®) plus 2,4-DB®, or other postemergence herbicides if weeds are emerged at the time of application. Other herbicides that are currently not labeled for peanut production were evaluated, but will not be discussed at this time.