Herbicide Resistance

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In the last several years, herbicide resistance in weeds has become an increasingly severe problem, particularly in the southern U.S. While the concept of weeds becoming resistant to herbicides is not new, the species which have developed this capacity recently have provided cause for concern.

For decades weed scientists have monitored the development of resistance to both pre- and postemergent herbicides from a number of herbicide modes of action. However, in the last 6-7 years we have seen a dramatic increase in the number of weed species developing resistance to one of the most widely used herbicides in modern production agriculture, glyphosate (the active ingredient in Roundup™). For example, Arkansas first documented horseweed resistance to glyphosate in 2003. That was followed by common ragweed in 2004, giant ragweed in 2005, Palmer amaranth in 2006, johnsongrass in 2007, and Italian ryegrass in 2008. All of these species were susceptible to glyphosate in the past but now cannot be adequately controlled by this herbicide.

Palmer amaranth

How does glyphosate resistance develop?

The simple answer is that applicators have relied too heavily upon a single mode of action for too long. In the case of glyphosate, the advent of glyphosate-tolerant crops has improved weed control in many instances but has also caused producers to decrease, or in some cases, eliminate the use of additional herbicides with alternate

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modes of action. This over-reliance on a single mode of action has resulted in the occurrence of several new herbicide resistant weeds. For example, since the widespread adoption of glyphosate-tolerant crops, many producers have completely eliminated the use of preemergent herbicides that would offer multiple modes of action.

Johnsongrass

How do we manage these resistant weeds?

In those areas that are currently affected by these resistant species, producers have had no choice but to change their management strategies. Some of these strategies include:

- Rotate herbicides with different modes of action
- Apply herbicides in tank-mixes or sequentially that include multiple modes of action
- Include the use of mechanical methods such as tillage
- Rotate to different crops
- Improve sanitation – clean equipment between field to limit spread of resistant plants

In states or areas that have not become infested with resistant species it is imperative that fields are scouted or monitored regularly. Any changes in weed populations that may indicate the presence of resistance should be dealt with rapidly.

Another management strategy is to apply a lethal rate of herbicide. Sometimes it is tempting for an applicator to reduce herbicide rates to decrease cost but this practice can contribute to weed resistance. Applicators should generally apply full label rates and be vigilant as to the presence of any weeds that survive treatment.

What is the bottom line?

Herbicide resistant weeds will continue to be an issue for farmers, ranchers, vegetation managers, and others involved in weed control. Through the use of an integrated weed management approach using scouting/monitoring, alternate herbicide chemistries, mechanical methods, crop rotation, etc. we can prevent herbicide resistance from becoming an insurmountable obstacle in our weed control programs.

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