"What Do You Mean, Herbicide Resistance?"

by Roger Long

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SCIENCE

Part II of a two-part series

"But I used XYZ herbicide for the first time this year and the chemical rep said my weeds are resistant. How can this be?"

Unfortunately, there are a couple of reasons why you could have weeds resistant to a product you've never used previously. Be aware that just because you use a new product, that doesn't necessarily mean you have never used the product's mode of action (MOA) before. Some MOA families are quite large, with the ALS-inhibiting group being a great example (refer to the MOA chart insert). The ALS herbicides also have a large number of weed species with biotypes resistant to this class of chemistry (refer to table). There are currently nine species with known herbicide resistance in the region, with three species having resistance to more than one MOA.

Once a biotype is resistant to a particular herbicide, it is more likely to be resistant to other herbicides with the same mode of action (MOA)—what is called target-site "cross-resistance."

Remember when most everyone used Pursuit (imazethapyr) on soybeans? During those years, a biotype resistant to imazethapyr (an ALS-inhibiting herbicide) began to flourish. It is now rare to kill Palmer amaranth with *any* ALS herbicide. One might argue that we now use glyphosate (a non-ALS mode of action) on Roundup Ready soybeans so it doesn't really matter, right?—*Wrong!* The ALS chemistry is not used very much on soybeans anymore but is commonly used on corn, milo, and wheat. This simple fact is why it is so important to know which MOA the herbicide you purchase utilizes. Once a biotype is resistant to a particular herbicide, it is more likely to be resistant to other herbicides with the same MOA—what is called target-site "cross-resistance."

Photo by Darrell Smith, *Farm Journal*.

Plan your herbicide applications so that different modes of action (MOAs) are used, preferably so that each weed species is controlled by several different MOAs during your crop rotation.

Both field observation and lab experiments validate the idea of cross-resistance within a MOA. As stated earlier, Palmer amaranth was first known to have ALS resistance in Kansas in 1991. The specific ALS herbicide in that case was Pursuit. In 1993, the company I worked for