Herbicide diversity needed to keep Roundup effective

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Using a diverse herbicide application strategy may increase production costs, but a five-year Purdue University study shows the practice will drastically reduce weeds and seeds that are resistant to a popular herbicide.

Excess usage of glyphosate-resistant crops has led to weeds, such as marestail, that also are resistant to glyphosate, the herbicide used in Roundup. Bill Johnson, a Purdue associate professor of weed science, said changing management practices can almost eliminate resistant marestail and its viable seeds in the soil.

"Another herbicide application is expensive, and it means more trips across the field," Johnson said. "But we can reduce the population and density of resistant weeds, which increases the crop yield potential."

The results of Johnson's five-year study were published in the journal *Weed Science*.

Marestail, also known as horseweed, was the first weed to develop resistance to glyphosate. Other weeds also are adapting, Johnson said, reducing the effectiveness of products such as Roundup, the most widely used herbicide on the market.

It is Roundup's popularity that is contributing to its diminished effect. Johnson said farmers have come to rely on Roundup Ready crops that resist glyphosate as an easy way to control weeds. But overuse of any

herbicide allows weeds to adapt and develop resistance.

Johnson's study found that farmers should diversify the herbicides they use. Using a variety of herbicides in addition to Roundup before planting and alternating between Roundup and other herbicides in corn can significantly reduce marestail.

Fields that had three resistant weeds for every susceptible weed while using only Roundup and Roundup Ready crops saw weed populations drop to one resistant weed for every six susceptible weeds while rotating herbicides as Johnson suggests. That rotation also may lead to a 95 percent decrease in the number of viable marestail seeds in the soil.

Continuing with only Roundup and Roundup Ready crops can intensify the problem, Johnson said.

"Glyphosate-resistant marestail develops very quickly in a field. Populations reach staggering levels of infestation in about two years after it is first detected," Johnson said. "For us, marestail being the first weed that developed resistance showed that a weed-management system that is solely reliant on glyphosate is starting to break down. However, a system that incorporates other herbicides with glyphosate can be sustainable for quite some time."

The Indiana Soybean Alliance, BASF, Dow AgroSystems, Monsanto and Syngenta funded Johnson's study. His next step is looking at management strategies that reduce the prevalence of other weeds that have built up resistance to glyphosate.

Source: Purdue University (news : web)