INTEGRATING 2,4-D AND DICAMBA RESISTANT SOYBEAN INTO WISCONSIN CROPPING SYSTEMS

Vince M. Davis[1]

Introduction

Glyphosate resistant crops, first released in 1996, have been the most rapidly adopted agriculture technology by the farming community in the U.S. The technology was rapidly adopted because weed management systems were drastically simplified. Weed management was simplified because glyphosate is a highly efficacious, non-selective postemergence herbicide for control of annual and perennial weed species, and when used in conjunction with glyphosate-resistant crops, a high-level of crop safety was ensured. Additionally, glyphosate is also safer for the environment, safer for humans and animals, cheaper, and slower to develop resistance in comparison to many other herbicide options. All of those reasons have contributed to make glyphosate an herbicide that growers and applicators prefer to use.

Unfortunately, in part due to its' own superior postemergence weed control efficacy and low cost, glyphosate has been relied upon too much in many glyphosate-resistant cropping systems. This 'over-reliance' on a single weed control strategy has created a 'shift' in the problematic weeds in many fields to become dominated by species where glyphosate is less efficacious, as well as infested with weed biotypes which are resistant to glyphosate. Currently, there are 21 weed species Worldwide documented with biotypes that are resistant to postemergence glyphosate. Some of these weeds like horseweed, giant ragweed, common ragweed, waterhemp, Palmer amaranth, and johnsongrass (just to name a few) infest millions of acres of corn, soybean, and cotton across the U.S. Additional management, additional herbicides, and subsequently additional costs have been the result of this progression.

One additional result of the increased glyphosate-resistant weeds in glyphosate-resistant cropping systems Worldwide has been the need for newer technologies to aid in weed control to ensure sustainability of our primary commodity crop production across the U.S. A couple of those developed technologies are crops with genetically modified traits which will allow them to be resistant to growth regulator herbicides in addition to glyphosate. The growth regulating herbicides of primary utility for these crop traits are 2,4-D and dicamba.

Dicamba-resistant Soybean

Monsanto Company, St. Louis, MO, is developing the addition of dicamba tolerance to the Genuity™ Roundup Ready 2 Yield™ Soybean platform which will offer growers an additional tool for flexible and effective weed management along with the increased yield opportunity of Roundup Ready 2 Yield™. Once approved, the dicamba tolerant technology will enable the use of dicamba and glyphosate tank-mixes for preplant burndown, at planting, and in-season applications adding considerable weed control value to the well-established and effective Roundup Ready® system. Monsanto and BASF are working together to develop innovative dicamba formulations for use with these herbicide-tolerant cropping systems, and both companies are working together to develop robust Best Management Practices for the use of dicamba over Dicamba tolerant soybeans. Dicamba tolerant soybeans are projected to

[1] Assistant Professor, Dept. of Agronomy, 1575 Linden Dr., Univ. of Wisconsin-Madison, Madison, WI 53706.

be commercialized in the middle of this decade, pending global regulatory approvals with initial product launches in the U.S. and Canada.

2,4-D-resistant Crops

Dow AgroSciences has developed traits conferring herbicide tolerance in plants. This technology was originally referred to as Dow AgroSciences Herbicide Tolerance (DHT) traits, and is now referred to as Enlist™ Weed Control System. In soybean, the trait will provide tolerance to pre-emergence and post-emergence applications of 2,4-D. In corn, the trait will provide tolerance to pre-emergence and post-emergence applications of 2,4-D and post-emergence applications of quizalofop, an ACCase – inhibitor grass herbicide. In conjunction with the Enlist crop traits, Dow AgroSciences is also developing new and novel proprietary technology that will significantly reduce the physical drift and volatility of 2,4-D relative to current DMA and ester 2,4-D herbicide formulations in the market. This new technology will be used to create proprietary pre-mix formulations of 2,4-D + glyphosate having improved compatibility and cold storage stability characteristics. Dow AgroSciences is also committed to providing comprehensive stewardship guidance for deploying this technology. Enlist technologies are also projected to be commercialized in the middle of this decade, pending global regulatory approvals.

Thoughts about Growth Regulator Resistant Crop Adoption in Wisconsin

I agree these growth regulator resistant technologies will offer many plausible and important weed control benefits. However, the adoption and acceptance of these technologies may once again stretch the entire crop production community to revolutionize. The benefits with these pending technologies will include increasing broad-spectrum postemergence weed control options, particularly for broadleaf weeds. Similar to glyphosate, the growth regulating herbicides are also relatively cheap, and weeds are slow to develop biotypes with resistance. However, growth regulator resistant weeds have been documented in a couple unique situations, so like glyphosate, it can happen when the herbicide is used too often.

The adoption of these technologies also bring much concern about the potential for these herbicides to be used more often, and as a result, find their way to sensitive vegetation which was not an intended target. Growth regulating herbicides cause plant symptoms that are highly visible which can lead to easy detection of off-site movement. There are three common ways these herbicides will move off-target including failure to properly clean spray equipment (which is very difficult in relation to other herbicides), particle drift during herbicide applications, and volatilization, or movement of vapor off the target after spray has deposited on the target surface. In summary, these technologies bring with them both opportunity and challenges for weed management systems which will be discussed.

References

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