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University of Minnesota Extension

May 5, 2008

Glyphosate-Resistant Weeds Confirmed in Minnesota

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Glyphosate-resistant biotypes of giant ragweed and common waterhemp have been confirmed in Minnesota and are listed on the International Survey of Resistant Weeds web site at: http://www.weedscience.org/in.asp. Both species appear to be resistant to approximately four-times the labeled use rate of glyphosate (4X).

Giant Ragweed:

Glyphosate-resistant giant ragweed was confirmed in McLeod County, MN on approximately 40 acres. Field management records indicate that glyphosate was used at least once each year at this site since 1998, with the first four years in a continuous soybean rotation. Other farmers in the area have reported giant ragweed surviving three applications in one season. Greenhouse tests by Syngenta also indicate a 4X level of glyphosate resistance to giant ragweed growing in Mower Co. In addition to MN, the following states have confirmed glyphosate-resistant giant ragweed: Arkansas, Tennessee, Ohio, Indiana and Kansas.

Common Waterhemp:

Glyphosate-resistant common waterhemp was confirmed in Renville County, MN on approximately 50 acres. There was no evidence of continuous glyphosate use at this site but there was evidence that the seed could have been transferred by field equipment.

Missouri, Illinois and Kansas have also confirmed glyphosate-resistant common waterhemp. It is important to note that the Missouri biotype is resistant to three herbicide modes of action that include the following chemistries: glyphosate (EPSP synthase inhibitors); Raptor and Pursuit (ALS inhibitors); and Cobra and Reflex (PPO inhibitors). Illinois has reported biotypes with resistance to both glyphosate and ALS inhibitors. It is highly likely that most common waterhemp biotypes in MN are ALS resistant and the integration of glyphosate resistance will only further complicate future management plans.

If the pattern of continuous reliance on glyphosate for weed control continues, it is likely that glyphosate resistance will follow the pattern of many other cases of herbicide resistance and increase at an exponential rate – slow at first followed by an increase in frequency. However, since the levels of glyphosate resistance are fairly low (4X) and it has taken approximately 8 to 10 years for selection of resistant weeds to occur, I would not assume that the battle is lost.

Management Recommendations:

Diversification with other herbicide modes of action via preemergence herbicides, postemergence tank mix partners or rotation to Liberty Link corn are some suggested chemical diversification strategies that can slow the rate of glyphosate resistance and reduce economic risk to the grower. Please note - for chemical diversification to be effective in reducing the likelihood of glyphosate resistance the alternative herbicide must provide highly effective control of the targeted weed species.

With the low levels of glyphosate resistance currently present (4X) at a low population frequency, glyphosate can still have an impact on weed populations. However, glyphosate rate does matter (don't reduce your rate), application to small (2 to 4 inch weeds) is more effective than application to larger weeds and proper spray application coverage definitely does improve glyphosate performance.

Value of Preemergence Herbicides:

Integration of a preemergence herbicide into your Roundup Ready cropping system can improve the

effectiveness of your glyphosate treatment by controlling many of the early emerging weed species and creating an environment where more of the weeds are at the same height and fewer in number at the time of glyphosate application. This will improve glyphosate effectiveness.

Corn and soybean preemergence herbicides will be more effective on common waterhemp than on giant ragweed. For preemergence control in soybean consider products such as: Authority First/Sonic, Prefix, Valor, and Gangster (list not inclusive); in corn consider products such as: Lumax, Harness/Surpass, SureStart (list not inclusive).

Postemergence Options:

Effective corn and soybean postemergence herbicide tank mix options are as follows: In soybean, glyphosate plus FirstRate has been shown to be quite effective on giant ragweed (unless the biotype is ALS resistant) and glyphosate plus Flexstar or Cobra can improve common waterhemp control. In corn, glyphosate tank mixed with plant growth regulator or pigment inhibitor herbicides or Liberty + atrazine on Liberty Link corn often improves control of both weed species.

Research Supports Diversification:

Research conducted in MN from 2004 – 2006 indicates very clearly that the use of a one-half rate of a preemergence acetanilide herbicide (e.g. Harness/Surpass) in corn reduces the risk of poorly timed postemergence applications. In plots not treated with an acetanilide herbicide, a delay in glyphosate application by one week after weed populations exceed 4 inches in height (around V4 corn) resulted in yield losses of 12 bu/A, delay of glyphosate application for another week resulted in an average yield loss of 27 bu/A. Early weed control in corn is very important and in many fields provides consistent economic returns while reducing the risk of poorly timed glyphosate applications.

In Summary:

Chemical diversification can provide consistent economic performance to the grower who uses Roundup Ready Technology and can help to reduce the probability of glyphosate-resistant weeds diminishing the economic value of this technology. Points to consider this year as you are planning your weed management program:

- Utilize other modes of action through use of a preemergence herbicide or a tank-mix partner.
- Consider alternating Roundup-Ready crops with Liberty-Link technology or a conventional hybrid or variety.
- As the growing season moves into high gear don't forget to scout your fields approximately 10 to 14 days after your first glyphosate application to detect weed escapes.
- If weeds survived, try to determine why. Was the failure caused by misapplication, poor weather, poor timing, or later weed flushes? Get on these problems early while there is still some time in the current growing season to address them.
- Keep in mind that many postemergence herbicides have crop size restrictions.
- If your glyphosate applications have failed to control the same weed species, in the same area of the field for several years you may have a resistant weed problem. The sooner you act on a potential problem, the better.
- Other weed species that are difficult to consistently control in glyphosate dominated cropping systems are: common lambsquarters, common ragweed and in no-till fields – horseweed.
- For more details on the biology and management of these weed species go to: The Glyphosate, Weeds and Crops website at: http://glyphosateweedscrops.org/
- For further information on the performance of various herbicide programs in University of MN research trials, check out the Applied Weed Science Research website at: http://appliedweeds.cfans.umn.edu/research.html