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Glyphosate Tank-Mixes in RR Soybean

Scott Killpack, *Agronomy/Natural Resources Specialist*

The following article was written by Kevin Bradley, Weed Scientist, University of Missouri.

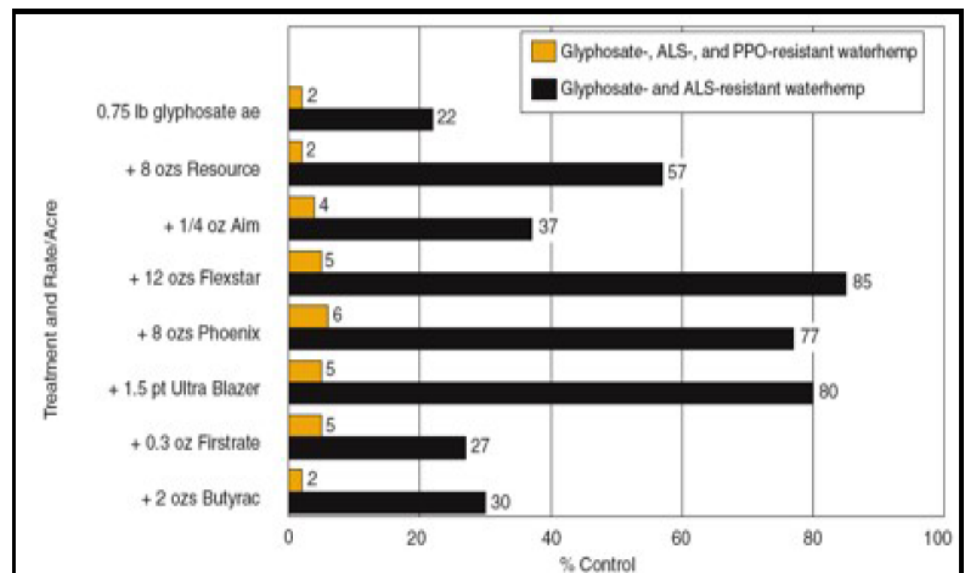
It seems that at this time in the season each year, there are always plenty of calls and questions about glyphosate tank-mix partners in Roundup Ready soybean. One of the first research projects I initiated after arriving at the university had to do with the utility of glyphosate tank-mix partners in Roundup Ready soybean and it seems like in some way we have evaluated glyphosate tank-mix partners every year since. Based on all of this research so far, my answer to the question of using a tank-mix partner with glyphosate falls into two categories:

1.) If you don't think you have glyphosate-resistant weeds present.

If you have a field where the weeds (including waterhemp) have gotten tall and you **don't** suspect you have any glyphosate-resistant weeds present, then our research shows that increasing the rate of glyphosate will generally provide as good or better weed control than adding a tank-mix partner to glyphosate in Roundup Ready soybeans. There may be some exceptions to this statement if you are dealing with weeds that have a natural tolerance to glyphosate. For example, a Resource tank-mix can sometimes provide better morning glory control than even a higher-than-normal rate of glyphosate. Also, there are some weeds like Asiatic dayflower and field horsetail that we are probably never going to kill with glyphosate and a tank-mix can often help with these kinds of weed species. For the most part however, our research has shown that if there are no resistant weeds present, our "normal" spectrum of weeds in Missouri will usually be controlled as good or better by a higher rate of glyphosate compared to a standard glyphosate application with a tank-mix partner. Another way of saying it is to take the money you were going to spend on the tank-mix partner and put that money towards a higher rate of glyphosate per acre.

2.) If you suspect you have a glyphosate-resistant weed present.

The other side of the coin is if you suspect that you do have a glyphosate-resistant weed like waterhemp present, then a tank-mix partner can be very beneficial. Increasing the



rate of glyphosate in this case will rarely provide better weed control and will almost certainly cost you more money. In our research with glyphosate resistant waterhemp (see black bars in graph below), we found that the addition of Ultra Blazer at 1.5 pts/A, Flexstar at 12 fl ozs/A, or Phoenix at 8 fl ozs/A to a standard rate of glyphosate provided from 77 to 85 percent control of glyphosate-resistant waterhemp six weeks after treatment. This is compared to only 22 percent control of glyphosate-resistant waterhemp that was achieved with a standard rate of glyphosate alone. As you can see from the remainder of the results in this graph, other tank-mix partners like Aim, Butyrac, and Firstrate were highly ineffective on glyphosate-resistant waterhemp. Resource provided some control compared to glyphosate alone, but as this graph clearly shows, there are better options for waterhemp control than Resource.

Although all of the research in this graph was conducted prior to the introduction of Cadet onto the marketplace, subsequent studies we have conducted with

this herbicide have shown that tank-mixes of this product with glyphosate are also ineffective on glyphosate-resistant waterhemp, or even on glyphosate-susceptible waterhemp that has gotten too tall. The label of this product clearly shows control of *two-inch* waterhemp with 0.9 fl ozs of Cadet per acre. This does not translate into control of 24-inch waterhemp with tank-mixes of the same rate!

If you suspect you have other glyphosate-resistant weeds like common or giant ragweed present, then tankmixes of the PPO-inhibiting herbicides like Ultra Blazer, Flexstar, and Cobra/Phoenix are probably still going to be your best option. Although for the most part Firstrate and some of the other ALS-inhibiting herbicides continue to have good activity on common and giant ragweed in Missouri, these herbicides are also very sensitive to weed height. This means that when ragweed gets over one foot or so in height, the likelihood of controlling them with these herbicides goes down dramatically.

Finally, as far as tank-mix partners are concerned I think one of the biggest things we need to avoid is the temptation to use a tank-mix partner just because it only adds another \$1 or \$2 per acre to the total application cost. Also, we should be aware of the potential for antagonism of some of these products with glyphosate. Just because a product appears to control weeds quicker, that doesn't always mean that the product or tank-mix treatment is better. In our research where we have the ability to compare different tank-mix treatments side-by-side, we will often rate a tank-mix treatment higher than a glyphosate-only treatment three- to five-days after application. However, when we come back and rate those same treatments 10- to 14-days after application, we will often see no differences in overall weed control between the tank-mixes and the glyphosate-only treatment.

Soybean Disease Update

Scott Killpack, Agronomy/Natural Resources Specialist

The following was written by Laura Sweets, Plant Pathology, University of Missouri.

Several different disease problems are beginning to show up in soybean fields throughout the state.

Stunting and yellowing of plants may be the result of Fusarium root rot, Rhizoctonia root rot or Phytophthora root rot. With Fusarium and Rhizoctonia root rot plants may showing yellowing of the lower leaves, general stunting and poor root development but the entire plant may not yet be dead. Fusarium root rot tends to cause a rotting of the main taproot. The taproot may be discolored (ranging from light brown to a dark blackish-brown) and deteriorated. Rhizoctonia tends to cause red to reddish-brown lesions on the stem at or near the soil surface. With Phytophthora root rot the entire plant may have an off-color, wilted appearance. Entire plants may be dead. One key symptom of Phytophthora is the darkbrown discoloration of the main stem from the soil line up the main

stem and even out the side branches. At this point in the season there are no control measures that can be taken for these soybean root rot diseases. If weather conditions are stressful, i.e. hot and dry, affected plants may die. If weather conditions are mild with adequate moisture, affected plants may survive but not recover.

Stunted, yellowed or poorly growing plants should also be checked for soybean cyst nematode.

If plants are carefully dug up and soil gently removed from the root system, it may be possible to see the white to yellow bodies of the females on the roots. If SCN is suspected, it would be wise to submit a soil sample for SCN analysis.

Some soybean foliage diseases are also showing up in low levels in parts of the state. Septoria brown spot is occurring but is not as widespread or severe as it has been the last few years. Bacterial

blight has been evident in some areas where there have been hail storms or storms with strong wind-driven rains that spread the bacterial pathogen. Bacterial blight lesions tend to be small, black to blackish-brown lesions with a slight yellow to light green halo. One or two samples have shown early symptoms of downy mildew. The upper leaf surfaces have bright yellow, irregular blotches and the downy mildew fungus may be obvious on the lower leaf surface as a purple to gray mold growth. None of the samples submitted thus far have had high levels of any of these foliage diseases.

Finally, A few scattered plants are showing what may be very early symptoms of SDS or sudden death syndrome of soybean. Leaves in the upper to mid canopy are showing yellow, irregular blotches in the interveinal leaf tissue. The few fields in which I have seen these symptoms were planted prior to the wet period the end of April the first of May.