PURDUE UNIVERSITY

PURDUE EXTENSION WEED SCIENCE

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Glyphosate and Foliar Fertilizers

Manganese deficiency is occasionally observed in soybean grown in northern Indiana. Because Mn deficiency symptoms frequently appear near the time of postemergence glyphosate applications in glyphosate-resistant soybean, producers and custom applicators occasionally tank-mix glyphosate and foliar Mn fertilizer to reduce application costs. Research has shown that glyphosate efficacy is antagonized when it is tank-mixed with some Mn fertilizers and Mn-EDTA appears to be the least antagonistic of the Mn fertilizers.

We conducted a greenhouse study to evaluate the effect of a couple of Mn fertilizers on glyphosate efficacy on velvetleaf and common waterhemp, two weeds which have shown variable tolerance to glyphosate. To conduct this study, we planted velvetleaf and waterhemp seeds in Styrofoam cups and allowed the weeds to grow to 4 to 6 inches in height. The treatments were applied with a greenhouse track sprayer calibrated to deliver 15 GPA. The glyphosate rate used was 11 oz/A or about ½ of the normal labeled rate. We used a low rate in an attempt to exaggerate the differences that can occur when spray conditions in the field are less than idea (i.e. big weeds, drought conditions). The treatments were applied in either de-ionized water or in well water. The well water is considered hard water with significant concentrations of calcium and iron in it. The Mn fertilizer solutions consisted of 6% Mn Sulfate applied at 32 oz/A and 6% Mn EDTA applied at 36 oz/A.

Figure 1 shows that hard water will reduce the ability of glyphosate to control of velvetleaf and waterhemp. Hard water reduced glyphosate efficacy on velvetleaf at least 20% at 1 and 4 weeks after treatment. Hard water reduced glyphosate efficacy on waterhemp 50% at 1 WAT and 30% at 4 WAT.

Figure 2 shows the effect of Mn fertilizers on glyphosate efficacy in deionized water. A reduction in efficacy was also noted when Mn sulfate and Mn EDTA were tankmixed with glyphosate in de-ionized water (Figure 2). Velvetleaf control was reduced at least 20% by the fertilizers and waterhemp control was reduced at least 30% by the fertilizers.

Figure 3 shows the effect of Mn fertilizers on glyphosate efficacy in hard water. A slight reduction in efficacy on velvetleaf by foliar fertilizers was noted when treatments were applied in well water (Figure 3). On waterhemp, Mn sulfate reduced glyphosate efficacy at 1 and 4 WAT. Mn EDTA did not reduce glyphosate efficacy at 1 WAT, but did reduce glyphosate efficacy at 4 WAT. The antagonistic effect of the Mn fertilizers was less, but overall control was lower to start with.

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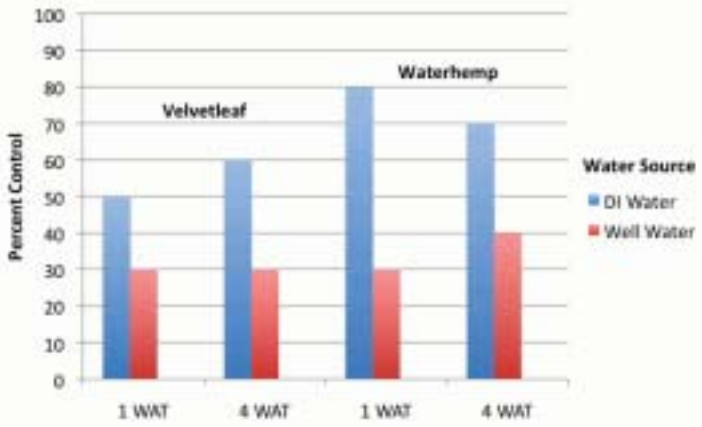

Figure 1. Velvetleaf and Waterhemp Control in Deionized vs Well Water

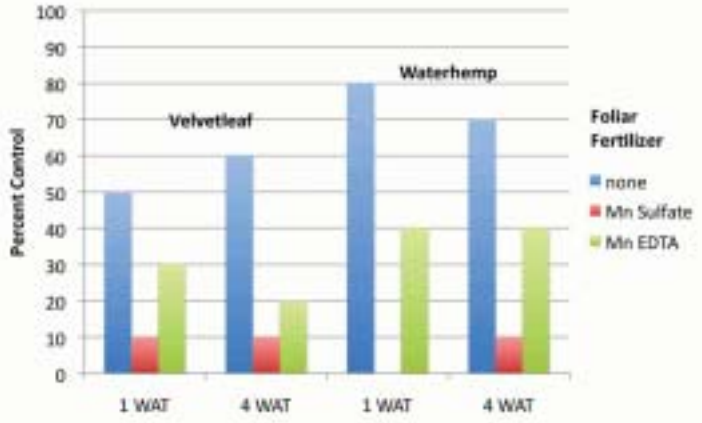

Figure 2. Velvetleaf and Waterhemp Control with Glyphosate + Foliar Fertilizers in Deionozed Water

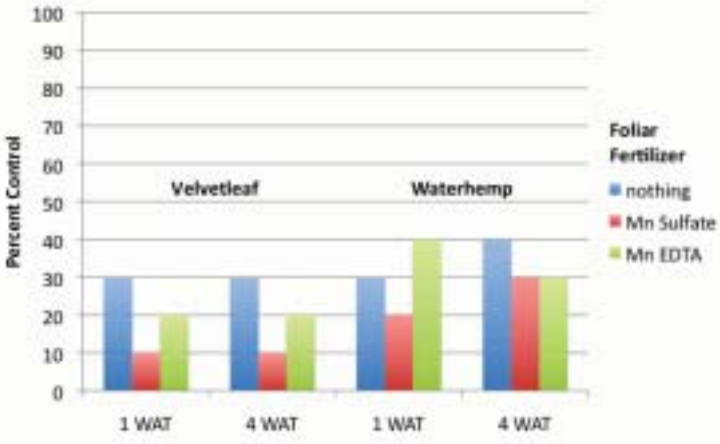

Figure 3. Velvetleaf and Waterhemp Control with Glyphosate + Foliar Fertilizers in Well Water

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Glyphosate and Foliar . . .

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Take home points:

1) Hard water can have a dramatic effect on herbicide activity. Remember to add ammonioum sulfate to the tank before herbicides are added to reduce the effect of hard water cations on glyphosate efficacy.

2) Mn EDTA is less antagonistic to glyphosate than Mn sulfate. However, both can reduce glyphosate efficacy on velvetleaf and waterhemp.