

Soybean Foliar Fertilizers

(Wellington SCIA Major Grant Project)

Purpose:

The purpose of this project was to evaluate the yield impact of foliar potassium and manganese on glyphosate tolerant varieties.

Liquid foliar fertilizers on soybeans have been tested in Ontario with little or no yield gain in fields with adequate soil test levels. One foliar nutrient that is known to increase soybean yields in Ontario is Mn. However, this increase is only evident when visual foliar leaf deficiency symptoms are evident. Recently, there has been some evidence that Mn may give a yield boost to glyphosate tolerant varieties even in the absence of visual deficiency symptoms. This may be a result of the glyphosate interference with Mn metabolism, which is often apparent in glyphosate tolerant soybeans after spraying. (yellow flash).

Another aspect of this study was to evaluate the potential of liquid foliar potassium fertilizer. Broadcasting 0-0-60 (solid K) during the growing season without incorporation is ineffective since the K will not reach the roots during that season. A liquid foliar product called Sure-K is available to tank mix with glyphosate.

Methods:

Three trials were established to evaluate Mn. Eight trials were established to test Sure K. The sure K sites were replicated twice while the Mn trials were replicated three times. Each plot within a trial was at least 30 feet wide with a minimum length of 1000 feet. All fertilizer treatments were tank mixed with glyphosate except for treatment #3 in the Mn trial.

Figure 1. Application of foliar fertilizers with glyphosate.



Manganese Trial

Three trials were designed with 3 replications with the following treatments:

- 1) Glyphosate only
- 2) Glyphosate plus Nortrace (2 lbs of Mn/ac)
- 3) Glyphosate plus Nortrace 10 days later

Potassium Trial

Eight trials were set up testing only Sure K. The treatments in these trials were:

- 1) Untreated check
- 2) Sure K (11L/ac of product)

Results and Summary:

Soybean yields were higher than average this year in Wellington County along with most of the province. Average yields for the county were 45 bu/ac while the 10 year average farm yield is 37 bu/ac. Previous research has shown that during high yielding years foliar feeding can produced little results. Despite this, a small statistical yield increase was found with the use of Sure K in 2008. (Table #1)

Adding Mn in with the glyphosate as a tank mix in the absence of true visual deficiency symptoms provided no extra yield. (Table #2) Making an extra pass to separate the Mn from the glyphosate to eliminate the possibility of antagonism also provided no extra yield in 2008. It must be noted that these fields did not show visual Mn deficiency symptoms. Previous research has shown that if soybeans are truly deficient in Mn they will respond to foliar feeding of Mn.

Table #1: Potassium Trial (Summary of 8 Trials):

| Treatment | Yield (bu/ac) | Advantage |
|-----------|---------------|-----------|
| Untreated | 48.7 a | - |
| Sure K | 49.5 b | 0.8 |

Table #2: Mn Trial Results (Summary of 3 Trials):

| Treatment | Yield (bu/ac) |
|-----------------------|---------------|
| Glyphosate | 44.7 a |
| Glyphosate + Nortrace | 45.6 a |
| 10 days later | 45.2 a |

Yields followed by the same letter are not statistically different at the 10% confidence level.

Next Steps:

These results indicate that further study is warranted to evaluate the possibility of extra yield with the use of Sure K.

Acknowledgements:

We would like to thank the many cooperators who lent their time and land to the project.

Project Contacts:

Horst Bohner, OMAFRA, horst.bohner@ontario.ca, 519-271-5858