

# Influence of Roundup Herbicide on Manganese Nutrition of Soybean

**Cooperator:** Tyler and HD Ross

**Nearest Town:** Crookston

**Soil Type:** Bearden silt loam

**Tillage:** Field cultivator

**Previous Crop:** Sugarbeets

**Variety:** Asgrow 0301

**Planting Date:** 5-17-05

**Row Width:** 6"

**Fertilizer:** None

**Herbicide:** 1 qt. Roundup Original/a

**Harvest Populations:** 180,000

**Harvest Date:** 10-4-05

**Experimental Design:** Randomized complete block

## Purpose of Study:

To investigate the influence of glyphosate herbicide on the manganese nutrition of soybean. Previous research from Purdue University indicates manganese deficiency of soybean is induced with the application of roundup on roundup resistant varieties and can be remedied by adding Mn chelate as a foliar treatment.

## Results:

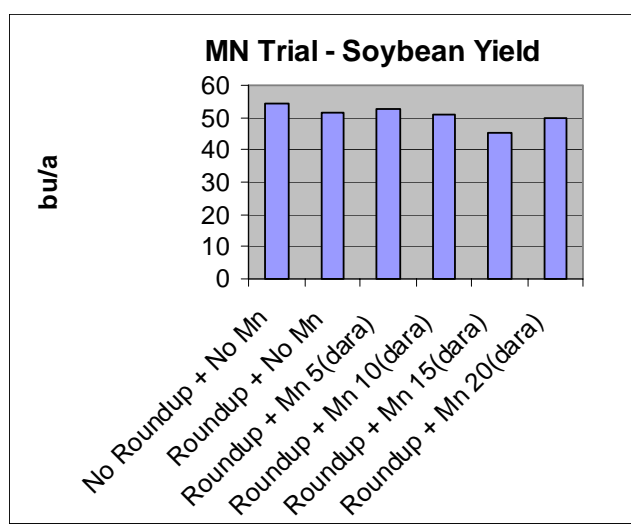
Results from the trial at Crookston in 2005 show no influence of roundup inducing manganese deficiency on the roundup resistant variety Asgrow 0301 with respect to yield, protein concentration, oil concentration and Mn uptake in plant material (table 1 & figure 1). Plots were treated with manganese chelate at 0.5 lb. Mn/a 5, 10, 15 & 20 days after roundup herbicide had been applied to soybean. Plant samples were collected and analyzed for manganese concentration at the same intervals allowing 5 days for the Mn to be absorbed by the soybean plant (figure 2). Soybean plant manganese concentration increased by applying manganese chelate 15 and 20 days after roundup application however it did not translate into an increased grain yield or quality of soybean. Our Red River Valley soils are able to supply enough manganese to the soybean plant therefore supplementing with foliar manganese chelate is not needed.

**Table 1. Soybean yield, protein % and oil % with and without roundup and Mn.**

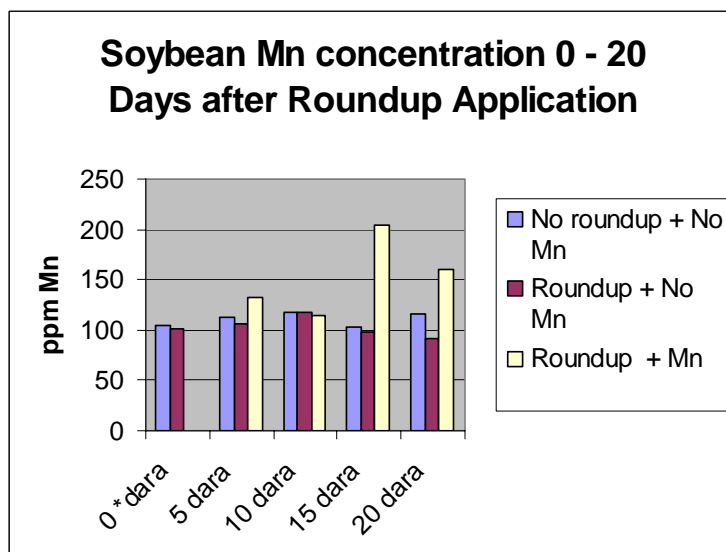
Treatment	Yield	Protein %	Oil %
No Roundup + No Mn	54.5	33.9	18.0
Roundup + No Mn	51.6	32.9	17.6
Roundup + Mn 5 <sup>1</sup> (dara)	52.7	33.0	17.9
Roundup + Mn 10(dara)	51.0	33.0	17.6
Roundup + Mn 15(dara)	45.5	33.4	17.9
Roundup + Mn 20(dara)	49.8	33.5	17.9
LSD .05	6.2	1.1	0.3

<sup>1</sup>Days after roundup application.

**Figure 1. Soybean grain yields with and without roundup and Mn.**



**Figure 2. Soybean Mn concentration 0 – 20 days after roundup application.**



\*Days after roundup application.

## Partnership/Funding:

Minnesota Soybean Research and Promotion Council

## For additional information:

Russ Severson