

Effectiveness of Preplant and Foliar Mn on Soybean

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Manganese

- Reports from Purdue and Kansas
- Work in Southern Illinois
- Questions about Mn in glyphosate tolerant soybean varieties.
 - Glyphosate flash.
 - Mn uptake but the plant does not utilize it.

Mn - glyphosate

- Soybean root exudates have changed with tolerance gene.
 - Reduced solubilize soil Mn
- Retards Mn metabolism in the plant.

Mn in plant

- Involved in photosynthesis
- A cofactor in many plant reactions
 - Activates about 35 different enzymes in plant.
 - Nitrogen metabolism in plant

Mn Deficiencies



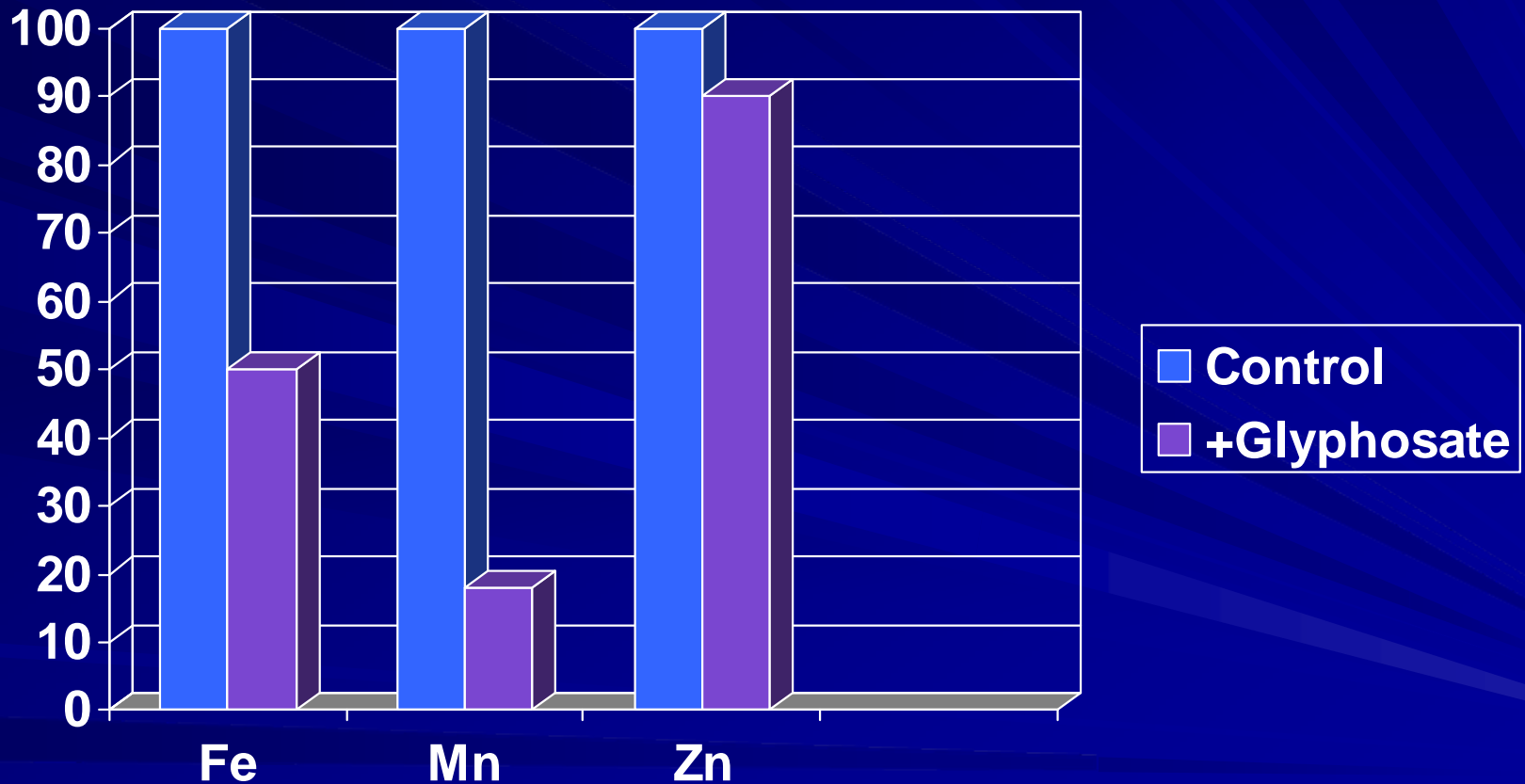
Mn



<http://extension.missouri.edu/explore/agguides/pests/ipm1007modeamino.htm>

Purdue work (Huber)

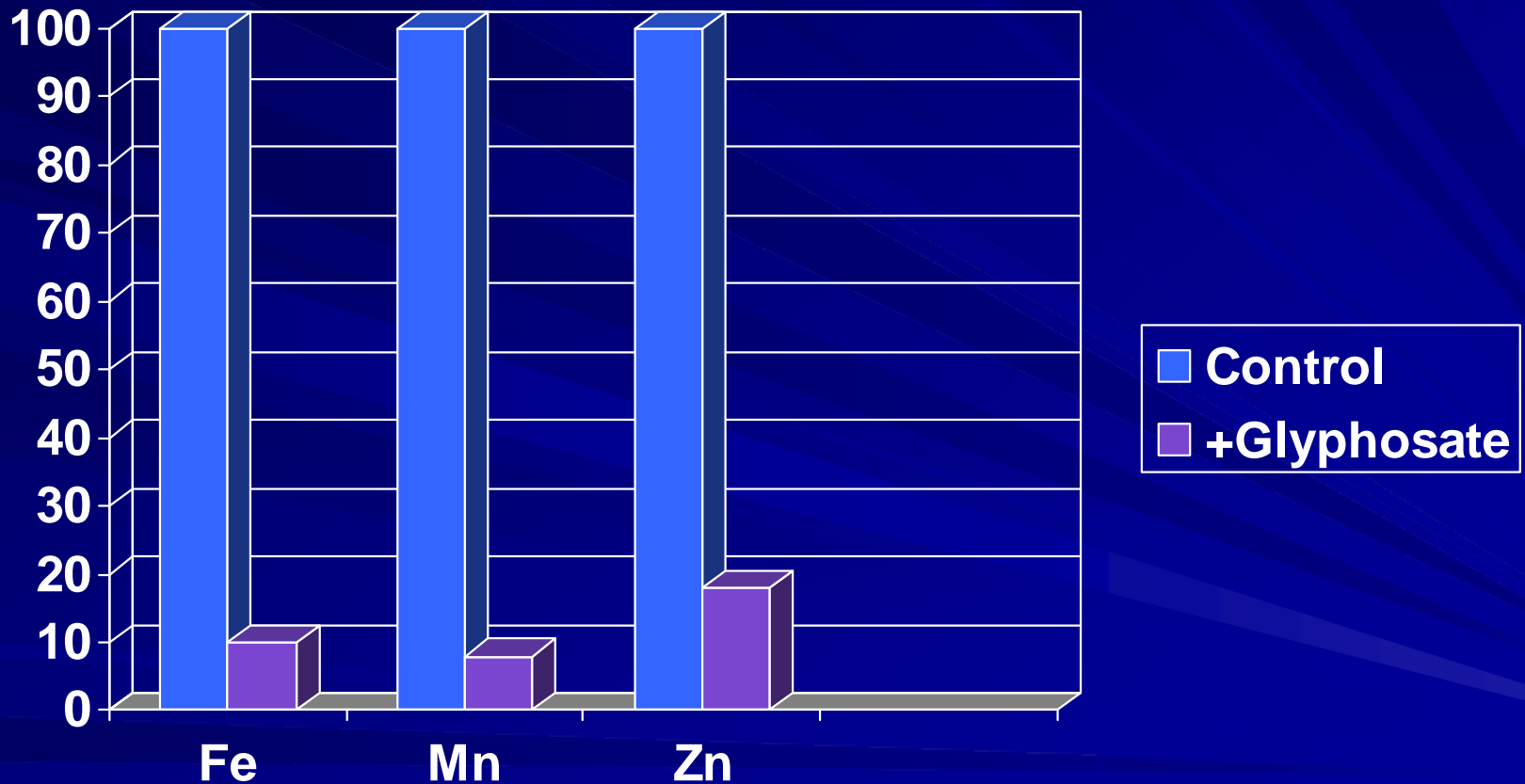
Root uptake (%)



Glyphosate at 2.5% of recommended rate.

Purdue work (Huber)

Translocation to shoot (%)



Glyphosate at 2.5% of recommended rate.

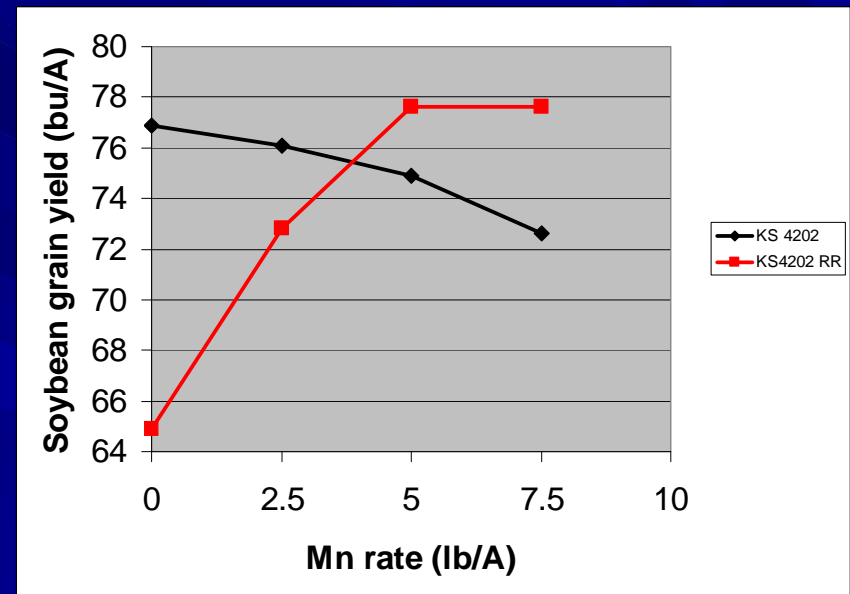
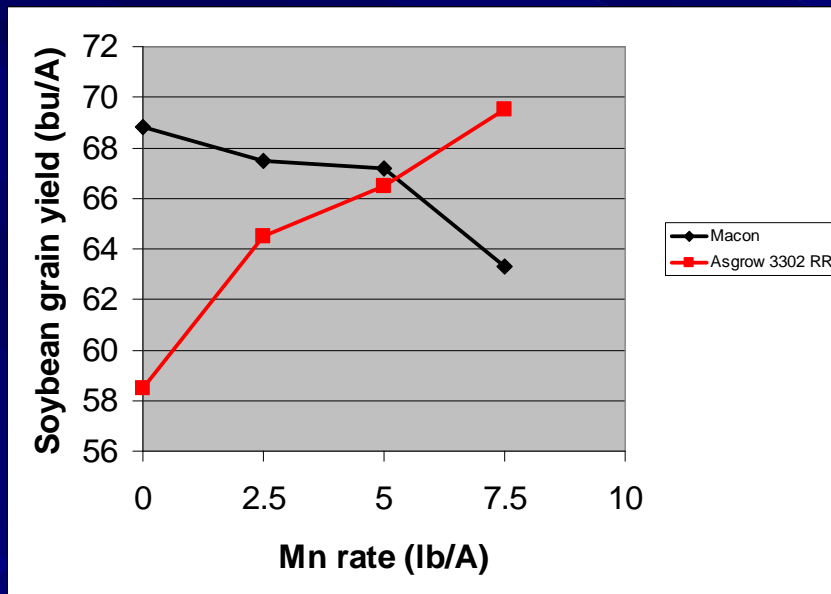
Huber conclusions

- Do not use glyphosate as a carrier for micronutrients.
 - Reduction of nutrient uptake
 - Reduction of nutrient utilization
 - Must wait 6 to 8 days after glyphosate application for plant uptake to occur.
- Reduced herbicide efficacy particularly with Zn products.

Kansas work (Gordon)

- Soybean
- High yielding situation
 - Irrigated
 - Neutral soil pH (6.9)
 - Crete silt loam soil
 - Soil applied Mn 0, 2.5, 5, and 7.5 lb Mn/A

Kansas work



Kansas conclusions

- In high yielding conditions (irrigated), the use of Mn reduces the yield decreases of glyphosate tolerant soybean varieties.
- Data recently presented at ASA, indicates that Mn has no effect in lower yielding conditions (non-irrigated) in North Central Kansas.

Illinois work

- 2004, 2005, 2006
- Three glyphosate tolerant varieties
- Check
- 5 lb/A Mn soil surface applied immediately after planting
- 0.5 lb/A Mn foliar
 - Pre = 3-5 day prior to glyphosate application
 - Post = 10 days after glyphosate application

Illinois (Ebelhar, Adee, and Hart)

	Soybean grain yields				
	2004	2005	2005L	2006	2006L
Trt	----- bushels per acre -----				
Check	60.1	58.3	46.0	70.6	61.2
Soil	59.7	59.2	48.7	70.0	59.3
Foliar pre rr	60.3	59.4	-	69.0	-
Foliar post rr		58.2	46.8	70.8	61.0

Illinois conclusions

- No effect on yield from Mn application.

Minnesota work

■ Morris and Lamberton

- Conventional variety
- Glyphosate tol. Var. – con. Herb. Prog.
- Glyphosate tol. Var. – glyphosate herb. Prog.
- Broadcast rates of Mn 0, 2.5, 5, 7.5, and 10 lb/acre, and 0.5 lb/acre foliar treatment.

Minnesota work

■ Rochester

- Glyphosate tol. Var. – glyphosate herb. Prog.
- Broadcast rates of Mn 0, 5, and 10 lb/acre ,
and 0.5 lb/acre foliar treatment.

Mn, Morris 2007

Mn	Con.	RU NO	RU Yes	Mean
lb/acre	---- Grain yield (bu/acre) ----			
0	36	43	41	40
2.5	39	37	45	40
5	39	39	51	42
7.5	39	34	36	36
10	40	37	37	38
Mean	39	37	42	

Mn, Lamberton 2007

Mn	Con.	RU NO	RU Yes	Mean
lb/acre	---- Grain yield (bu/acre) ----			
0	50	48	49	49
2.5	50	47	47	48
5	50	50	50	50
7.5	51	46	51	50
10	50	47	47	48
Mean	50	48	49	

Rochester 2007

Mn treatment	Grain yield bu/A
0	43.4
5	46.2
10	44.3
Foliar	42.5

Take Home Message - Mn

- Mn uptake and metabolism in soybean has been reported to be affected by glyphosate.
- Under high yielding conditions in Kansas, Mn application brought grain yields for glyphosate tolerant varieties up to conventional varieties.
- No response to Mn application in Illinois.

Take Home Message- Mn

- No response to Mn application at SW and WC Minnesota.
- A small response to Mn application near Rochester.

Questions

