

Managing Soybean Iron Deficiency Chlorosis with Agronomics and Economics

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Introduction

- Iron Deficiency Chlorosis (IDC) is one of the most yield damaging maladies of soybean in western Minnesota.
- IDC is a soil-borne abiotic stress caused by a lack of soluble iron (Fe^{2+}) to the plants.
- IDC symptoms include interveinal chlorosis and stunting of the growth.

Objectives

1. Examine tradeoffs and interactive effects between varieties, populations, and iron chelate rates across a range of IDC stress levels.
2. Evaluate the impact of variety selection, seeding densities, and iron chelate rates on overall economic return.

Materials and Methods

1. Field Sites: 10 unique IDC environments

- Paired on-farm experiments in Western MN
 - Danvers and Foxhome (2021/2022)
 - Graceville (2021)
- Plots were planted in two areas within each producer field: “hotspot” and “non-hotspot”

2. Treatments: 24 Treatments

- Iron chelate rates (Soygreen® AST): 0, 2 and 4 lbs./ac
- Varieties: Moderately Tolerant (AG12XF1) vs Highly Tolerant (AG13XF0)
- Seeding densities: 125,000 and 175,000 seeds/ac
- Nitrogen: 69 lbs. N/ac (urea) vs No Nitrogen

Results

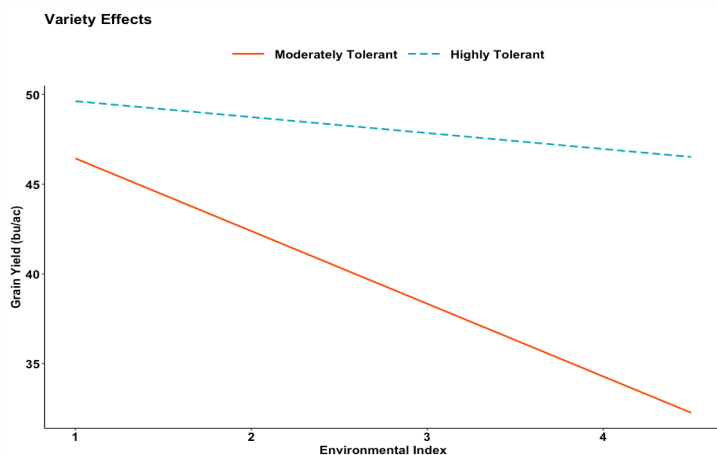


Figure 1. Soybean grain yield (bu ac^{-1}) in response to the interaction between varieties (MT and HT) and IDC severity measured by EI.

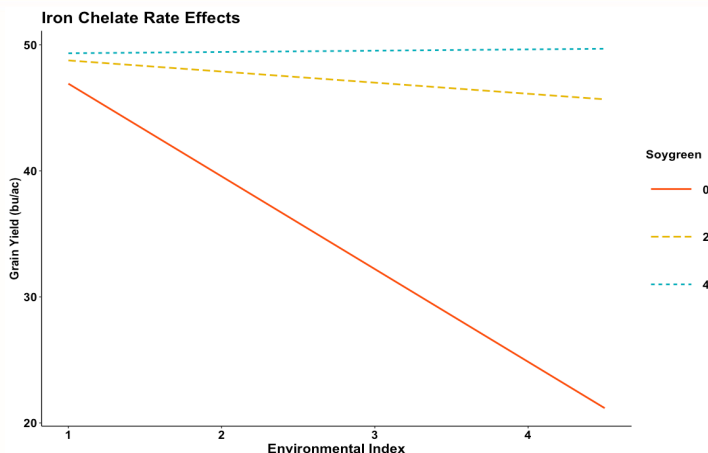


Figure 2. Soybean grain yield (bu ac^{-1}) in response to the interaction between Fe-EDDHA rates (0, 2, and 4 lbs. Soygreen® AST ac^{-1}) and IDC severity measured by EI.

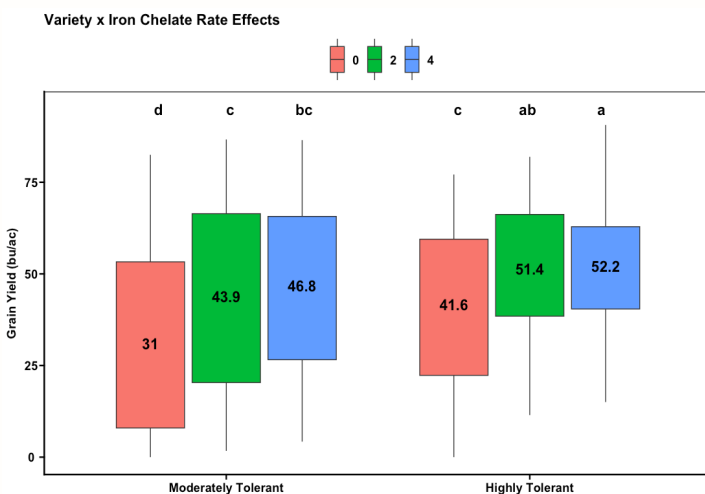


Figure 3. Distribution of grain yield (bu ac^{-1}) as related to Fe-EDDHA rates (0, 2 and 4 lbs. Soygreen® AST ac^{-1}) for both varieties (MT and HT).

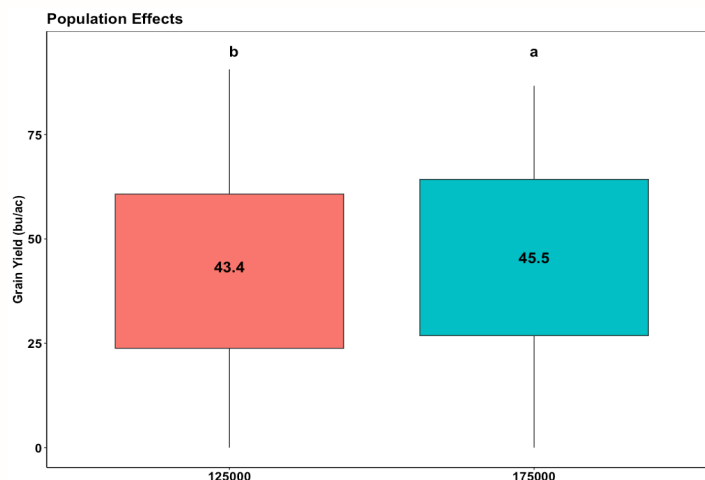


Figure 4. Distribution of grain yield (bu ac^{-1}) as related to seeding rates (125,000 and 175,000 seeds ac^{-1})