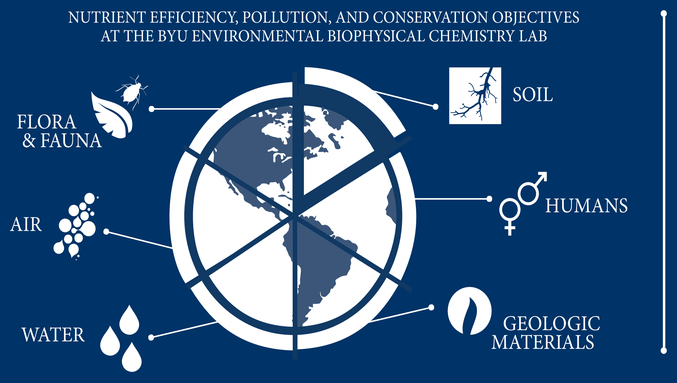

IRON EFFIEICNY OF MALAWI SOYBEAN VARIETIES

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STUDY OBJECTIVES

- INCREASE DIETARY NUTRITION
- INCREASE IRON EFFICIENCY IN RURAL CROPLAND
- INCREASE YIELD QUALITY GIVEN SOIL CONDITIONS

METHODS

- Mackwacha and Tikolore soybean varieties, native to Malawi, germinated in the dark for 6 days
- Transferred to pre-treatment solution as described in Sorensen *et al.* (1988) uniform across all treatments
  - Suspended 4 plants each in 14L buckets
- 18 d old plants transferred to final treatment solution as outlined in Terry *et al.* (1991) with four reps per treatment
  - +Fe treatments received 2.8ml Fe and 0.5ml HEDTA
  - Buckets amended with NaOH to raise solution pH and stimulate Fe-stress response
- Solution pH measured daily to monitor plant Fe-stress response, determined by handheld glass electrode meter
- Visual chlorosis measured periodically on a scale of zero (no chlorosis) to five (severe chlorosis)
- Shoot and root dry weights measured for all treatments on 27 d old plants

RESULTS

pH

- Both varieties seemingly lack an iron stress response in terms of pH
- Results not shown because no statistical differences in pH between the +Fe and –Fe treatments were observed

Visual Chlorosis (Fig.1)

- -Fe treatments showed significantly higher rates of iron chlorosis than +Fe for both Mackwacha and Tikolore varieties

Dry Weights (Fig.2)

- Both -Fe shoots and roots had significantly lower biomass weights for Tikolore variety, but this was not observed in Mackwacha variety

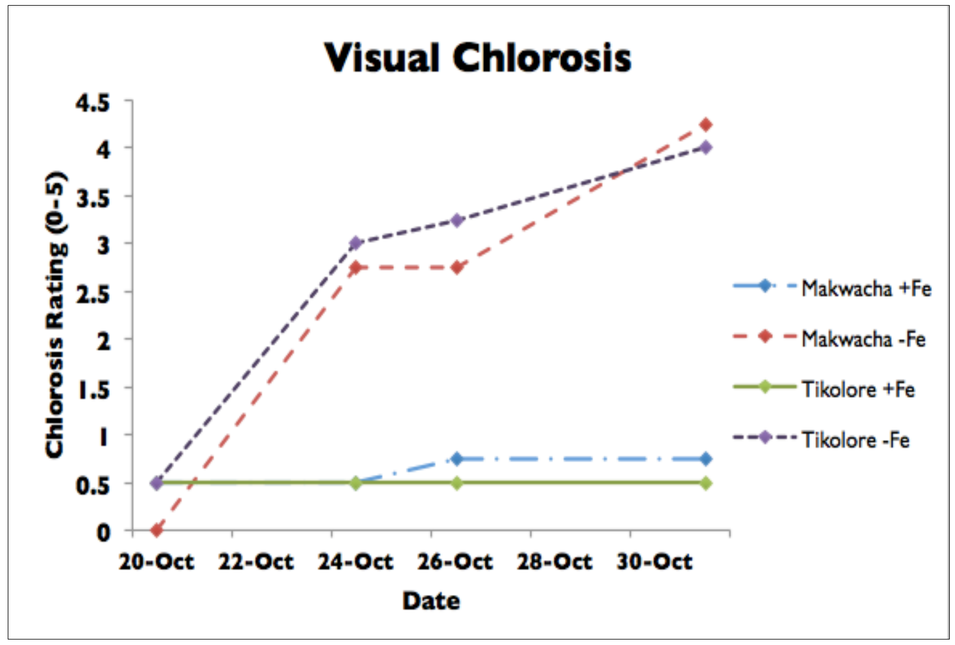

Figure 1*.Visual chlorosis was measured on a scale of 0 (no chlorosis) to 5 (severe chlorosis). Data reported as averages across all reps. Statistical differences in visual chlorosis emerged after the first day, with –Fe treatments exhibiting more severe chlorosis than +Fe treatments.*

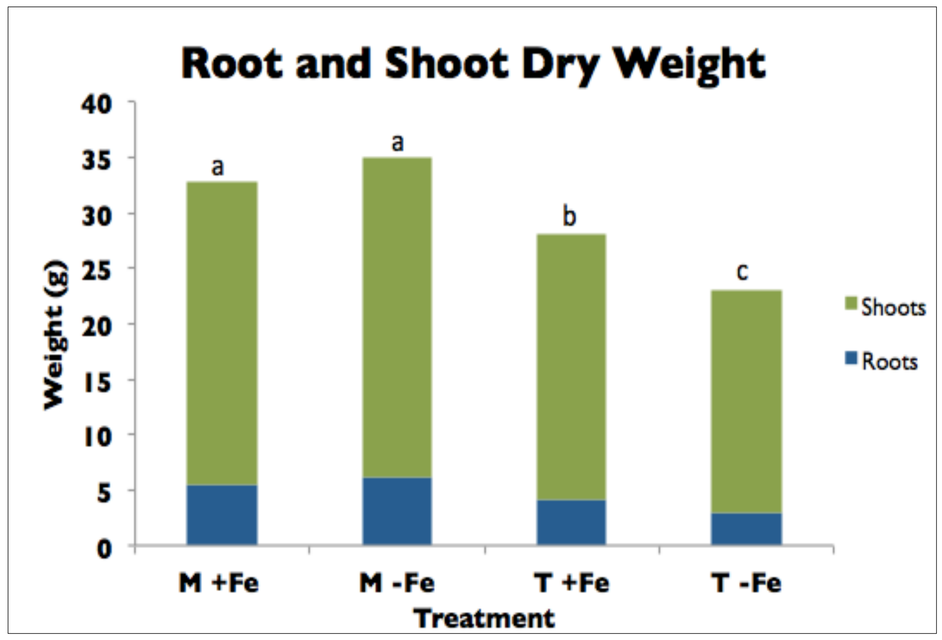

Figure 2. *Root and shoot biomass was measured by dry weight on 27 d old plants. Data reported as averages across all four reps. No statistical difference was shown between Mackwacha +Fe and –Fe treatments. Differences between Tikolore +Fe and –Fe were consistent, so bars were stacked.*

CONCLUSION

Both Mackwacha and Tikolore varieties seem to lack an iron-stress response in terms of pH. However, the plants clearly show visual signs of an iron-stress response. Mackwacha variety showed no statistical differences in root and shoot biomass, suggesting that growth is not significantly inhibited by iron stress. However, evident iron chlorosis will most likely affect the quality of the crop yield. Growth in Tikolore variety was shown to be significantly inhibited by an iron-stressed environment. Further studies would include testing these Malawi soybean varieties against a variety that is well-adapted to alkaline soils that most likely has a known iron-stress response. Also, testing for concentrations of iron reductant in the nutrient solution could determine whether or not either of these two varieties exhibit an iron-stress response at the roots.

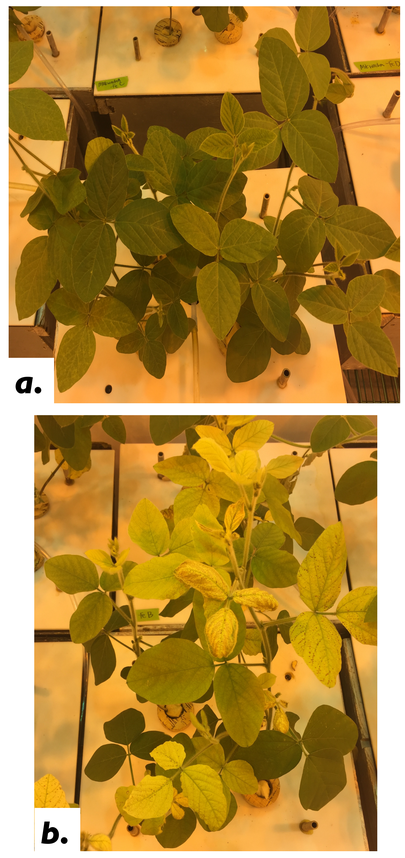

Figure 3. *Visual chlorosis of +Fe treatment (a) compared with –Fe treatment (b).*

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