Comparison of Barley Accessions from Ethiopia, ICARDA, and the U.S. for Adaptation Traits and Protein Content

Sintayehu D. Daba¹, Richard D. Horsley¹, Paul B. Schwarz¹ and Flavio Capettini²

¹Department of Plant Sciences, North Dakota State University, Fargo, ND; ²Field Crop Development Centre, Alberta Agriculture and Rural Development, Lacombe, Alberta

Introduction

- Introduced barley germplasm from breeding programs, such as ICARDA, have been among the major sources of variability in breeding programs in Ethiopia.
- These materials can be used for selecting potentially new cultivars or parental material for crossing.
- The choice to use them as new cultivars or as parents for crossing depends on their adaptation.
- This poster reports on the comparison of four groups of barley accessions for adaptation to production in the barley growing regions of Ethiopia.

Materials & Methods

- Replicated trials were grown at Bekoji and Koffele, Ethiopia in 2011 & 2012.
- Four groups (origins) of accessions were used, including Landraces = 1, Ethiopian crosses = 2, ICARDA accessions = 3, and NDSU accessions = 4.
- Data were collected on crop stand (%), plant height (cm), lodging (%), scald (0-9), yield (t/ha), and grain protein content (%).
- Data are presented in the form of box plots.

Results

- Poor adaptation of NDSU lines is reflected in low stand establishment (Figure 1), susceptibility to scald (Figure 3), and low yield (Figure 4).
- NDSU accessions generally had better resistance to lodging than Ethiopian breeding lines and Landraces (Figure 2).
- ICARDA accessions were comparable or better in stand establishment and yield compared to Ethiopian breeding lines and Landraces (Figure 1 & 4, respectively).
- NDSU accessions generally had the lowest grain protein content (Figure 5) and may be sources of genes for low protein not found in the Ethiopian or ICARDA accessions (Figure 5).

Conclusions

- Among the introduced accessions, only some ICARDA accessions may be suitable for release as cultivars in Ethiopia.
- Some NDSU accessions could be useful sources of genes for reduced plant height, improved straw strength, and reduced grain protein content.
- The resistance to scald found in Ethiopian accessions should be maintained.

Acknowledgment

Funding for this PhD project was provided by NDSU, ICARDA, and the Kulumsa Research Center in Ethiopia. We also would like to thank Mr. Shimelis Gezahegne and Mr. Anberbir Haile for their support.