

# Barley Cultivar Ranking Under Contrasting Tillage Systems in the U.S. Great Plains

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## Abstract

Barley production is shifting westward in the U.S. Great Plains into areas where high-residue farming practices are replacing conventional tillage methods. Our objective was to determine if barley cultivar ranking changed across contrasting tillage systems. Six barley cultivars were grown under clean- and no-till management in southwestern North Dakota during 2009, 2010, and 2011. Interactions between tillage systems and cultivars were not detected for any yield component ( $P > 0.05$ ). Likewise, yield components were unaffected by tillage system. An interaction between environment and cultivar was detected for grain yield, but the two-rowed cultivar Pinnacle produced equal or greater amounts of grain than the five other cultivars each year, averaging 6530 kg ha<sup>-1</sup> in 2009, 3400 kg ha<sup>-1</sup> in 2010, and 3232 kg ha<sup>-1</sup> in 2011. Results of this study indicate that barley recommendations based on cultivar adaptation in low-residue environments can be extended to high-residue environments in western portions of the Great Plains.

## Introduction

- Barley production is shifting westward because of disease problems in eastern parts of North Dakota
- No-till is replacing reduced- and clean-till
- In previous research, tillage x cultivar interactions existed in some environments (e.g., Thierrien and Grant, 1998), but not others (e.g., Ciha, 1982); our objective: to determine if a tillage x cultivar interaction exists in the U.S. Great Plains

## Materials and Methods

- Two tillage treatments
  - Clean-till and no-till
- Six barley cultivars
  - 2-rowed: Conlon, Conrad, Pinnacle
  - 6-rowed: Lacey, Stellar-ND, Tradition
- Experimental design
  - RCB in a split-plot arrangement: tillage whole plots and cultivar subplots
- Data collection
  - plant density, spike density, grain yield, and kernel weight in each 3- by 12-m cultivar subplot



## Results (continued)

- Kernels heavier for Pinnacle than other cultivars, except Conlon
- Plant density ( $P = 0.91$ ), spike density ( $P = 0.06$ ), grain yield ( $P = 0.37$ ), and kernel weight ( $P = 0.81$ ) unaffected by tillage

## Conclusion

- Barley cultivar recommendations unaffected by tillage system

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## References

Ciha, A.J. 1982. Yield and yield components of four spring barley cultivars under three tillage systems. *Agron. J.* 74:597-600.  
Therrien, M.C., and C.A. Grant. 1998. Effect of tillage management on yield performance in barley. *Can. J. Plant Sci.* 78:301-303.

## Results

- A tillage x cultivar interaction detected for plant density ( $P < 0.05$ )
- Plant numbers equal or greater for Tradition across both tillage systems.
- No cultivar x tillage interaction detected for spike density ( $P = 0.35$ ), grain yield ( $P = 0.89$ ), or kernel weight ( $P = 0.17$ )
- An environment x cultivar interaction detected for grain yield
- Pinnacle produced equal or greater amounts of grain than other cultivars within each environment

