

Malt Barley Cultivar Ranking under Long-Term Tillage Systems in a Semiarid Region

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ABSTRACT

Malt barley (*Hordeum vulgare* L.) production is shifting in the Great Plains from conventional clean-tillage (CT) methods to reduced tillage (RT) and no tillage (NT). This study aimed to determine the effect of tillage on the relative ranking of malt barley cultivars for yield components, grain yield, and quality. Six barley cultivars were grown in southwestern North Dakota from 2010 through 2013 under long-term CT, RT, and NT. Ranking of cultivars did not change across tillage systems for plant density, plant height, or spike density ($P > 0.05$). Likewise, a tillage \times cultivar interaction was not detected for grain yield, except in 2012 ($P = 0.007$) when dry conditions developed and persisted. That year, the grain yield of cultivars Pinnacle and Conrad were 5160 and 4970 kg ha⁻¹ under NT management compared with 4170 and 3730 kg ha⁻¹ under CT. Yield of other cultivars was unaffected by tillage system in 2012. Tillage \times cultivar interactions were detected for grain protein concentration and test weight; however, one or more cultivars consistently produced grain with quality traits that were comparable or superior to those of other cultivars in each tillage system. Grain protein concentration decreased from 131 g kg⁻¹ under CT to 113 g kg⁻¹ under NT across years and cultivars, whereas grain test weight was sometimes heavier under NT. The results of this research indicate that cultivar recommendations can be extended across long-term contrasting tillage systems when malt barley is grown in the Great Plains.

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