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Planting Date Effects on WinterTriticale Grain and Forage Yield

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Abstract
Triticale (trit-ah-kay-lee) is a close relative of wheat. When durum wheat is pollinated with rye pollen, the cross is used in a breeding program to produce these stable, self-replicating varieties. Triticale yield, stress tolerance, and disease resistance are typically greater than similar traits found in wheat. Triticale doesn't currently possess the grain traits of bread wheat, so its greatest market potential is as animal feed.

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Introduction

Triticale (trit-ah-kay-lee) is a close relative of wheat. When durum wheat is pollinated with rye pollen, the cross is used in a breeding program to produce these stable, self-replicating varieties. Triticale yield, stress tolerance, and disease resistance are typically greater than similar traits found in wheat. Triticale doesn't currently possess the grain traits of bread wheat, so its greatest market potential is as animal feed.

Past research in Florida, Canada, Europe, and Australia and ongoing research at Iowa State University suggest that triticale is a high-quality feed for swine because of its superior lysine content and relatively high feed value compared with other cereal grains. Swine on triticale-based diets have had rates of gain similar to those of pigs fed corn-based diets. Triticale can also be used as forage for ruminants and as a cover crop.

When added to a rotation, triticale may increase yields of other crops in the rotation, reduce costs, improve distribution of labor and equipment use, provide better cash flow, and reduce weather risk. Additionally, production of triticale may provide environmental benefits such as erosion control and improved nutrient cycling. Triticale appears to be an ideal crop for producers using sustainable agriculture practices and organic farming techniques. Efficiency of nitrogen uptake favors triticale when compared with other grains. Phosphorus excretion from pigs fed triticale was as much as 29% less than from pigs fed corn.

Iowa State University investigators started a multidisciplinary, multisite research project on triticale in 2001. This research contains variety trials, planting date research, cropping system evaluations, soil quality assessments, and swine feeding trials. A winter triticale planting date study was performed for the 2003–2004 growing season at the Armstrong Research Farm as a part of these efforts.

Materials and Methods

Two winter triticale varieties (Trical 815 and DANKO Presto) were seeded at 330 seeds per square meter using a Tye® model 2007 drill with 10 rows spaced 20.3 cm apart. The previous crop was soybean and the ground was field cultivated before planting. 39 kg ha^{-1} of ammonium nitrate was applied at green up in the spring because soybean residue was harvested as hay prior to planting. Planting dates were September 15, September 24, October 5, and October 15.

Grain was harvested with a combine equipped with an on-board electronic weighing system. Harvested area was 4.57 m wide and 15.24 m long. Final grain yields were adjusted to 135 g/kg moisture and 61.9 kg/hl test weight. The experimental layout was a completely randomized block with four replications.

Results and Discussion

Average grain yields (based on 48 lb/bu and 13.5% moisture) were 60 bushels/acre for Trical 815 and 55 bushels/acre for DANKO Presto. Wet weather during grain filling reduced seed weight and grain yield, which were about 40% less than those recorded in southwest Iowa (at Treynor) in the previous season. The wet conditions also resulted in low test weight grain (42.5 lb/bu). Straw weight (dry matter basis) was estimated at 3.5 tons/acre and did not differ between cultivars or among planting dates. Wet weather is often associated with increased ergot infection in susceptible triticale cultivars. Ergot levels averaged 0.016%, considerably less than the 0.1% threshold for use as animal feed. This suggests that the cultivars used were quite tolerant to ergot infection.

There was no change in yield when planting was delayed from September 15 to October 5. However, the October 15 planting yielded 19% less than the September 15 planting. Results from three years of study in southwest, central, and northeast Iowa indicated that winter triticale grain yield was maximized when at least 300 growing degree days (GDDs) (base 4°C) were allowed to accumulate between planting and December 31 (Figure 1). Grain yield decreased linearly with fewer than 300 fall accumulated GDDs. Therefore, winter triticale should be planted by about October 6 to maximize yield in southwest Iowa. Grain yield of triticale planted on October 15 would have about 87% of full yield potential.

Forage harvests of September planted triticale on May 2 and May 24 produced 1.9 and 3.9 tons/acre (dry matter basis), respectively. October planting produced about 30 and 15% less forage than September planting for the May 2 and May 24 harvests, respectively. These results suggest that a sizeable amount of spring forage could be harvested from a winter triticale crop while allowing for timely planting of a corn or soybean crop.

When averaged across three years and three areas of Iowa, grain and forage yields at southwest locations were greater than yields at the central location or northeast location. This suggests that winter triticale production may be more successful in southwest portions of Iowa where the climate tends to be warmer and drier than in central or northeast Iowa.

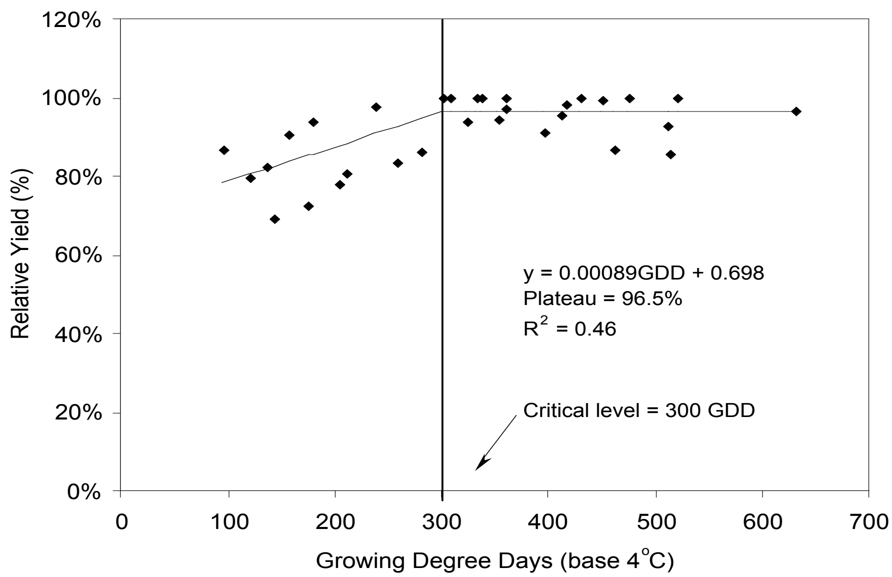

Figure 1. Effect of planting date on relative yield of winter triticale grown over three growing seasons at southwest, central, and northeast Iowa locations. Relative yields are based on mean grain yield of the highest yielding planting date within each location and growing season.