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Selecting an Appropriate Planting Date for Winter Wheat

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Introduction

The planting date is a key component of winter wheat production in Virginia, as it can influence both early tiller development and susceptibility to damage resulting from freeze events later in the spring. Early leaf and tiller development is vital as the number of tillers per plant is a critical yield component (Klepper et al., 1982). Developing healthy fall tillers is one of the most important aspects for high wheat yields since research has shown that tillers that develop in the fall before January 1 contribute approximately 87% of grain yield (Tilley et al., 2019). These fall tillers produce spikes with large kernels. It takes approximately 300-400 growing degree days (GDD) for the wheat plant to produce its first tiller (Oakes et al., 2016).

Fall Weather Impact

Wheat should be planted when it has the best opportunity to reach 300-400 GDD as soon as possible (Heiniger et al., 2019), and 700 GDD (two tillers) by January 1. However, one of the recent challenges with wheat production due to warmer fall temperatures is the accumulation of enough GDD for adequate tiller development, but not too much GDD accumulation where the crop joints or enters the boot stage too early, risking spring freeze injury.

Figure 1 shows the average planting date required to reach 700 GDD for the 30-year period from 1981 to 2010. This weather data indicate that the ideal planting dates in this 30-year period were October 15-21 for much of central and eastern Virginia, and October 22-28 for Tidewater/southeast Virginia.

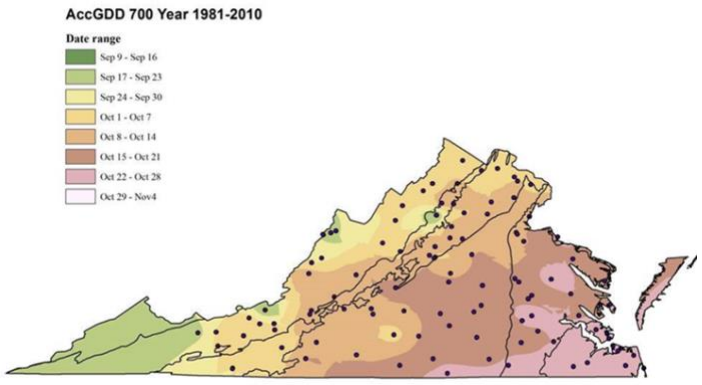

Figure 1. Planting date required to reach 700 GDD by Dec. 31 from 1981-2010. (Image by Wade Thomason)

Weather data over five years from 2019 to 2023 shows us that the planting date required to reach 700 GDD has shifted nearly two weeks compared to data just in the early 2000s.

Table 1. Planting date required to reach 700 GDD by Dec. 31 from 2019 to 2023. (Data by Joseph Oakes)

Location	Date
Warsaw	Oct 31 - Nov 11
Blackstone	Nov 5 - Nov 17
Painter	Nov 6 - Nov 15
Suffolk	Nov 10 - Nov 18

Based on weather data alone, we may be able to afford to shift plant dates to late October/early November and still achieve appropriate tiller development by the end of December.

Planting Date Studies

Wheat planting date studies were conducted across six site-years across central and eastern Virginia in 2024 and 2025 to determine if Virginia wheat growers can afford to shift their planting dates to stave off a spring freeze but still achieve adequate tiller growth in the fall by accumulating 700 GDD before December 31. These trials were conducted on-farm across six site years in the 2023-24 and 2024-25 growing seasons. Plant dates were separated into four categories: mid-Oct., late-Oct., mid-Nov, and late Nov.

Table 2. Locations and plant dates from the six on-farm trials.

Growing Season	Location / Variety	Plant Dates
2023-24	Richmond County DG 9172	Oct. 19 Oct. 30 Nov. 15 Nov. 28
2023-24	New Kent County USG 3352	Oct. 17 Oct. 27 Nov. 15 Nov. 30
2023-24	King William County DG 9172	Oct. 13 Oct. 29 Nov. 15 Nov. 30
2024-25	Richmond County DG 9172	Oct. 16 Oct. 31 Nov. 14 Dec. 2
2024-25	Westmoreland County DG 9172	Oct. 16 Oct. 31 Nov. 14 Dec. 2
2024-25	King William County DG 9172	Oct. 20 Nov. 5 Nov. 18 Dec. 8

Yield data from the six locations in 2024 and 2025 revealed no difference in yield between the two October plant dates and the two November plant dates, with the October plant dates yielding significantly higher yields than the November plant dates (Table 3).

Table 3. Yield (bu/ac) and Test Weight (lb/bu) across the six site-years in 2024 and 2025. Results with the same letter are not statistically significant at P<0.05.

Plant Date	Yield	Test Weight
PD 1 (mid Oct)	75.3 A	56.5 A
PD 2 (late Oct)	76.3 A	56.5 A
PD 3 (mid Nov)	65.6 B	58.1 A
PD 4 (late Nov)	51.8 B	55.3 A
mean	67.3	56.1
LSD	4.7	2.0

On average, wheat planted before October 31 will result in a 10 bushel per acre increase in yield over planting mid-November. There was no difference in test weight when delaying planting until November.

Conclusions

The data from these plant date studies show that there is no yield penalty when delaying planting from mid-October to late October (Figure 2).

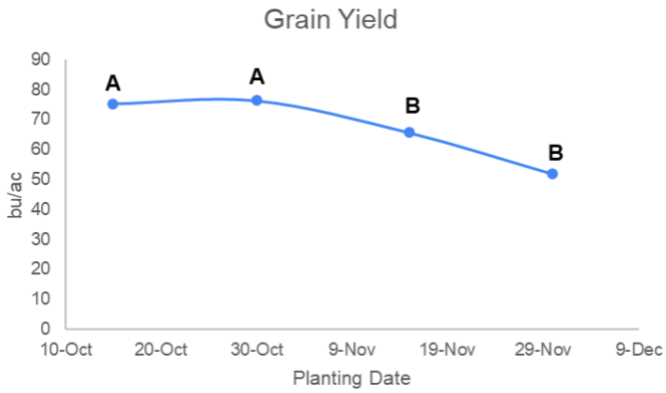

Figure 2. Average yield across planting dates.

Therefore, planting dates may be successfully shifted from mid-October to late October without a yield penalty. If planting must be delayed due to a variety of factors (too wet or too dry), there should be no concern for planting late October, as we can now accumulate the same amount of GDD when planting late October (Table 1) as we could when planting

mid-October in the early 2000s (Figure 1). Wheat producers should also be strategically in tune with the fall weather forecasts when selecting a planting date. When a warm fall is forecasted, planting should be later in October to not generate too much growth in the fall and risk late-spring freeze damage.

Acknowledgments

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Key Terms

Growing Degree Days – Heat units: ((Maximum Temperature + Minimum Temperature) ÷ 2) - 32

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