

Planting Date Effects on the Yield & Nutritive Value of Fall-Grown Oat Cultivars

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For the dairy industry within the north-central U.S., options for producing emergency forage are limited when late-summer or fall inventories are inadequate, primarily because of the relatively short growing season. Fall-grown cereal crops can fill this niche, but knowing what to plant and when to plant it can be a challenge. Recent research has compared different systems for fall-grown cereal crops, and some concrete recommendations have emerged.

Differences in Cereal Crops . . .

When most cereal crops are planted in the fall throughout Wisconsin and the north central U.S., they remain leafy or in the vegetative stage of growth throughout the fall and winter and do not elongate (shoot a stem) until the following spring. However, oat is somewhat different; specifically, it will elongate and even produce a seed head before winter sets in. Past research has shown cereal crops, such as oat, that undergo stem elongation following late-summer establishment will likely exhibit a 2:1 DM yield advantage by early winter, compared to forages that remain vegetative until spring. But, as with most forages, there can be a trade-off between yield and quality as the plant matures.

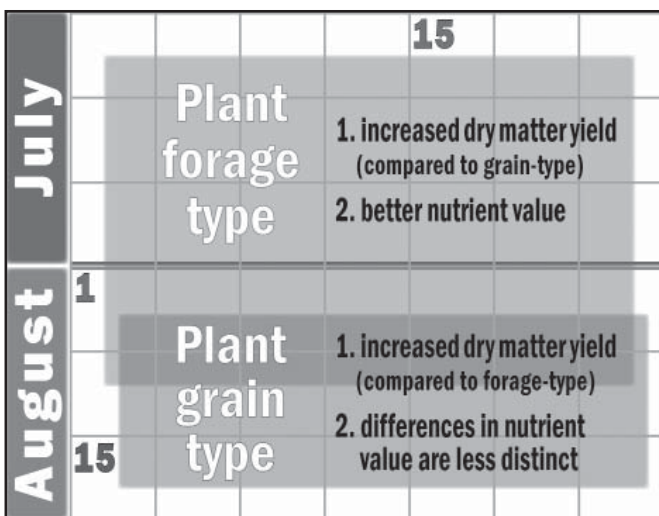
Since livestock producers often grow oat for use as a forage, breeders have developed forage-type oat cultivars. These cultivars generally exhibit delayed maturation so the plant matures at a slower rate than grain-type oat cultivars, which generally results in greater forage production.

Previous research conducted at Prairie du Sac, WI, (2006-2007) has shown fall-grown oat cultivars exhibit limited lignification (or hardening of the cell walls), likely because of cooler growing conditions; they also are energy dense, with estimates of TDN ranging from 59.2-71.6% over a wide range of harvest dates throughout the fall. These traits are generally favorable for supporting dairy production. Furthermore, the potential to ensile oat forages in the late-fall is intriguing, and this option also could be considered as a routine part of forage production programs throughout the north-central region.

Photo. Four oat cultivars, planted in late summer, were evaluated for yield and nutritive value based on three different planting dates



Figure. Optimum planting dates for early and late maturing fall-grown oats.



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Table 1. 3-year average of maximum yield (lbs DM/acre) as related to planting dates.

Cultivar	Maturity	Planting Date		
		July 15	Aug 1	Aug 15
Dane	Early	3,489	3,491	1,580
Ogle	Medium	3,881	3,789	1,493
Vista	Late	4,584	4,195	1,754
ForagePlus	Very Late	5,841	4,756	1,672

Table 2. Nutritional characteristics (% of DM) based on planting dates.

Planting Date	In-Vitro True Digestibility		TDN
	Range for all 4 Cultivars	ForagePlus Difference	
July 15	60.7-71.2	+9.7	50.3-59.2
Aug 1	71.2-85.2	+9.9	58.1-68.7
Aug 15	86.8-95.8	+2.7	68.5-74.7

So fall-grown oat seems like a good choice for late-season forage needs in the north central U.S., especially for dairy producers. But how do producers know which combination of cultivar and planting date to select for their forage needs? How will these selection decisions affect the expected yield and quality of the harvested forage? A recent study set out to answer these questions.

Comparing Four Cultivars . . .

The project objectives were to evaluate the effects of planting and harvest dates on the yield, nutritive value, and energy density of forages harvested from 3 grain-type oat cultivars (Dane, Ogle, and Vista) and 1 forage-type oat cultivar (ForagePlus) that typically exhibit maturation characteristics ranging from early (Dane) to very late (ForagePlus).

During a 3-year trial from 2007-2009, the 4 oat cultivars were planted on July 15, August 1, or August 15 on a Withee silt loam soil at the University of Wisconsin Marshfield Agricultural Research Station (central Wisconsin). Research plots were relocated annually to different areas within the research station, but a common soil type was used throughout the 3-year trial. In order to establish response trends throughout the fall for each combination of planting date and cultivar, 5 target harvest dates (15 days apart beginning September 15) were designated before the study began and were followed closely over the 3-year evaluation period.

Considering both agronomic (Table 1) and nutritional (Table 2) characteristics, results of this study show that the late-maturing ForagePlus cultivar is likely to maximize both yield and nutritive value throughout central Wisconsin when planting dates are extended as late as the first week of August (Figure).

When planting dates are delayed beyond the first week of August, the slower maturation rate of ForagePlus becomes an increasing liability. With late establishment dates, it is likely that more rapidly maturing grain-type cultivars will exhibit greater yields of DM before winter than forage-type cultivars (Figure 1). In addition, differences in nutritive value between grain and forage-type cultivars become less distinct following a delayed, mid-August establishment; therefore, under these circumstances, selection of a grain-type cultivar may be a more solid recommendation to producers.