

Cultivar and Planting Date Effects on Organic Flax, 2005–2006

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Introduction

Recently, demand for organic flax (*Linum usitatissimum*) in the upper Midwest has increased due to consumer demand for flaxseed to improve diets and due to the recent construction of a certified organic oilseed expelling facility in Cherokee, IA. Challenges exist to raising flax in Iowa, yet the majority of production guidelines are from the 1940s, or from the cooler and drier climates of North Dakota and Canada. Flax production in these areas is typically managed using chemical pesticides and synthetic fertilizers. Growers in the upper Midwest need region-specific guidelines and information for organic production. During the 2005 and 2006 growing seasons, cultivar and planting date effects on grain yield, oil quantity, and oil quality were studied.

Materials and Methods

Five flax cultivars were evaluated for grain yield and oil characteristics. Cultivars selected to represent a range of maturity and listed from the earliest to the latest maturity, were: Norlin, Bethune, Hanley, Carter, and York. Flax was seeded at a rate of 50 lb/acre in a randomized complete block design, replicated four times with planting dates as the main plot and cultivars as the subplot. The experiment was planted with a Massey Ferguson 8-ft wide end-wheel drill with single-disk openers and 7-in. row spacings. Individual plots measured 7 ft × 25 ft. In 2005, MCPA (Rhomene) herbicide was applied to the first planting date plots and no underseeding was planted across the entire experiment. In 2006, the study was managed as organic production, with red clover seeded with flax at 14 lb/acre. Flax was harvested when

plots were 95% dark brown bolls. All plants were cut at ground level in four, 1-ft² quadrats/plot. Flax plants were air-dried, grain was hand threshed, weighed, and grain moisture measured. Grain yields were adjusted to 8% moisture. Flax oil percentage was estimated using nuclear magnetic resonance and expressed at 8% moisture. The fatty acid profile was measured using gas chromatography. For this research, oil quality is determined as the percentage of alpha linolenic acid (ALA, omega-3) in the oil content. All data were analyzed with the GLM model of SAS. Tests of differences between means were made at the 0.05 probability level and different treatment means were compared using a Duncan's Multiple Range Test.

Results and Discussion

Results for flax grain yield are reported for 2005 and 2006. Data for oil quantity and quality are currently only available for 2005.

Planting Date. To examine trends from each year, planting dates were characterized as early, mid-season, late, or very late based on the local planting dates for small grain crops (Table 1).

Grain yield. In both years, flax grain yield decreased linearly with a later planting date (Figure 1). Averaged over both years, the rate of yield decline was approximately 30 lb/acre/day. With the current organic flax price at \$0.35/lb clean flax, this is equivalent to a loss in gross income of approximately \$10.00/acre/day. Producers should plant flax as early as possible, preferably before small grains.

Oil quantity and quality. In 2005, oil quantity was not affected by planting date but percent ALA decreased linearly from 51% at the earliest planting date to 44% at the latest.

Cultivars

Grain yield: In 2005, Carter and York yielded more grain than Bethune, Hanley, and Norlin. In

2006, there was no difference in grain yield among the cultivars tested (Figure 2).

Oil quantity. In 2005, oil quantity among cultivars was similar and averaged 41%.

Oil quality. In 2005, Carter and Hanley produced significantly higher ALA percent than the other cultivars (Figure 3).

Acknowledgments

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Table 1. Time of flax planting in 2005 and 2006.

Year	Early	Mid-season	Late	Very late
2005	April 8	April 18	April 25	
2006		April 11	April 21	May 5

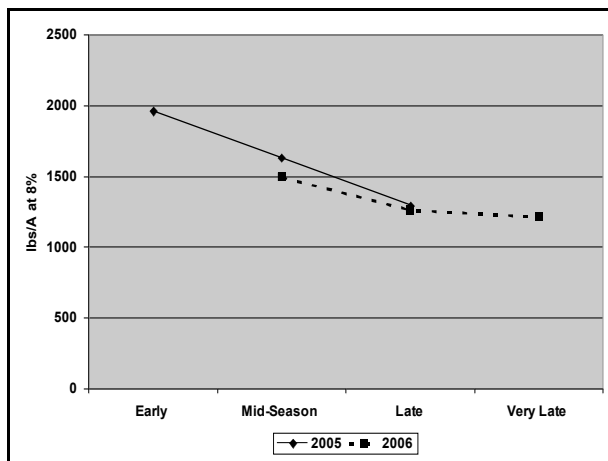


Figure 1. Planting date effect on flax grain yield, 2005 and 2006.

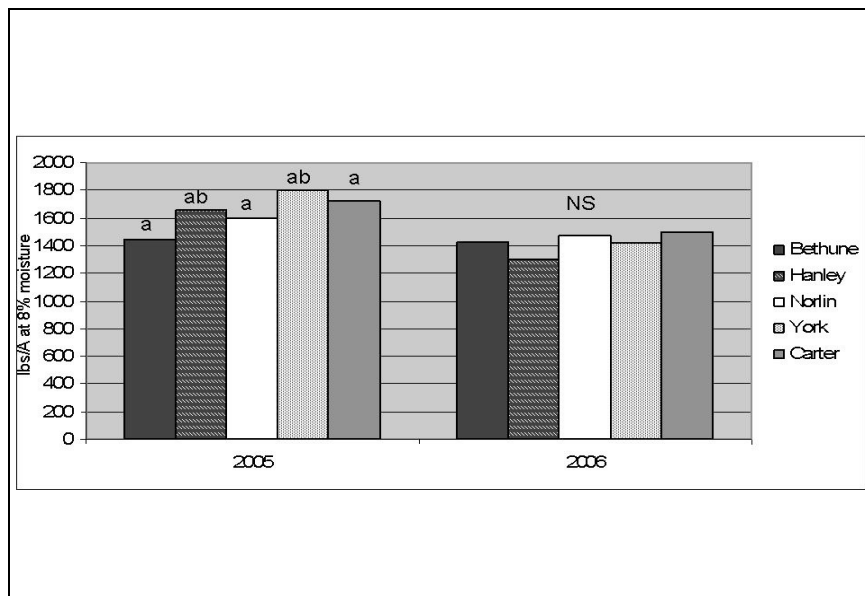


Figure 2. Grain yield response for five flax cultivars, 2005 and 2006.

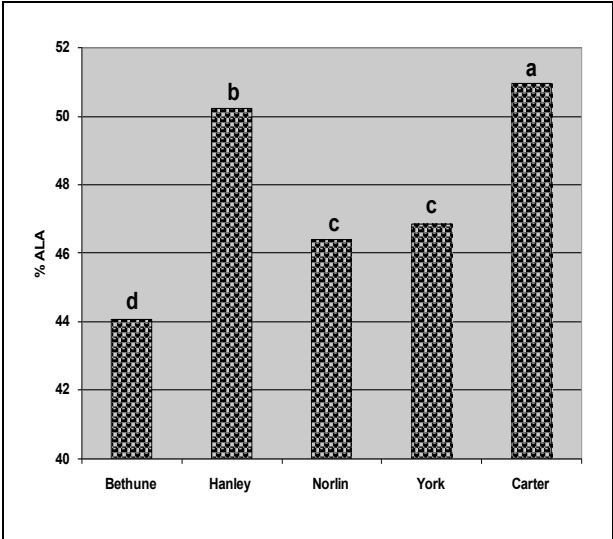


Figure 3. Percent alpha linolenic acid for five flax cultivars, 2005 and 2006.