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Planting Pattern and Cultivar Effects on Flax Yields in Northwestern Iowa

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Abstract
In the United States, consumption of flaxseed and flaxseed oil is increasing both by direct consumption and as processed foods. Flaxseeds are high in alpha-linolenic acid, an omega-3 essential fatty acid, which is important for cardiovascular health. Whole-ground flaxseed in livestock diets can raise the level of these "healthy" fatty acids in meat and eggs. A new facility for organic flaxseed oil processing in Iowa has the potential to attract production to Iowa. Other grain buyers in the Upper Midwest are also increasing their purchase of flaxseed for animal feeds.

Disciplines
Agricultural Science | Agriculture

Planting Pattern and Cultivar Effects on Flax Yields in Northwestern Iowa

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Introduction

In the United States, consumption of flaxseed and flaxseed oil is increasing both by direct consumption and as processed foods. Flaxseeds are high in alpha-linolenic acid, an omega-3 essential fatty acid, which is important for cardiovascular health. Whole-ground flaxseed in livestock diets can raise the level of these "healthy" fatty acids in meat and eggs. A new facility for organic flaxseed oil processing in Iowa has the potential to attract production to Iowa. Other grain buyers in the Upper Midwest are also increasing their purchase of flaxseed for animal feeds.

Flax was grown throughout Iowa before 1950, but it was quickly replaced in our cropping systems. The last flax trials conducted by Iowa State University were in the early 1970s. New flax varieties and new grain-quality standards for modern markets create a need for field research to determine if flax grown in Iowa can meet market needs and provide a profit for producers.

The objective of this study was to investigate the yield capabilities of three flax cultivars identified as having food potential for the organic flax oil market. In addition, because the developing market is for organic flax and herbicides must not be used for organic production, weed management may be challenging. To help suppress weeds, an alternative planting pattern designed to shade the soil surface more quickly than rows created by a straight drill pass was studied. Three brown-seeded oilseed-type flax cultivars were also compared. In addition to this site, these same cultivars were compared on the Neely-Kinyon Research Farm in southwestern Iowa.

Materials and Methods

The experimental layout was a completely randomized block design with three replicates. The previous crop (2003) was RR soybean with no herbicide or fertilizer applied to the experimental area. Flax was planted on April 7 at a rate of 50 lb/acre and a 1-in. depth with a Massey Ferguson 8-foot end-wheel drill with single-disk openers. Drilled row spacing was 7 inches. The field was rolled following drilling. Treatments evaluated were planting patterns and flax cultivars.

For comparison of planting patterns, flax was drilled at the full planting rate in straight rows or double planted with a half rate for each pass of the drill. The second drill pass was at a 30-degree angle with the first pass, creating a diamond pattern in the field. Cultivars evaluated in both planting patterns were Bethune, Hanley, and Norlin.

All plots were hand harvested on August 5. Three 1-ft^2 samples were cut and the grain was air-dried while still in the bolls. Plant samples were hand threshed and weighed to determine yields.

Results and Discussion

Germination was good for all flax varieties and plant stands were uniform, though plant densities were not measured. Some height differential was observed across the plots, apparently due to wheel traffic from the previous year. This effect appeared consistent across all plots. Planting patterns did not affect flax yields (Table 1). The speculation that a seeding pattern closer to solid seeding would

shade the ground and suppress weeds better than a drilled pattern was not tested in this environment. Even without herbicide, weed pressure in the plots was extremely low. Flax cultivars differed in yield (Table 2). Cultivars Bethune and Norlin did not differ in yield, whereas Hanley yielded 12% better or approximately 230 lb more per acre.

Table 1. Effect of planting patterns on flax yield in 2004 at Sutherland, Iowa.

Planting pattern	Yield (lb/acre)
Drilled straight rows	1865a*
Drilled diamond pattern,- cross-planted	1828a

*Treatment difference followed by the same letter were not different, P<0.05.

Table 2. Effect of cultivars on flax yield in 2004 at Sutherland, Iowa.

Cultivar	Yield (lb/acre)
Bethune	1764b*
Hanley	2001a
Norlin	1775b

*Variety yields followed by the same letter were not different, P<0.05.