

Evaluation of Flax Varieties for Certified Organic Production—Neely-Kinyon Trial, 2004

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Introduction

Flax (*Linum usitatissimum* (Linaceae)--Linen family) is an ancient crop that had been grown in Iowa for many years, but was displaced by the emphasis on commodity corn and soybeans. Flax has many uses, including industrial oils from oilseed flax, food-quality flaxseed oil, and linen products, fiberboard and paper products from the straw. Flaxseed oil is high in omega-3 fatty acids, which are associated with lowered risk of heart disease and lowered blood cholesterol levels. Flax has a 50-day vegetative period, a 25-day flowering period, and a 35-day period to maturity. Seeds are produced in bolls that contain 6–10 seeds. Seed color can be brown, golden, or yellow. The seed is covered with a mucilaginous coating. The flax crop responds to up to 50 lb/A nitrogen, similar to organic small grains. Mycorrhizal association may increase the ability of flax to take up phosphorus from the soil, so growing flax after mycorrhizal wheat rather than after non-mycorrhizal canola may improve phosphorus uptake by flax. Early seeded flax generally produces the highest yields, using the same planting dates as small grains. Frost seldom kills flax seedlings. Non-uniform maturity and ripening is a problem in late-seeded fields. Organic flaxseed oil can now be processed in Iowa to be sold around the world. With the introduction of this processing facility came a need for increased organic flax production in Iowa.

Materials and Methods

In 2004, CDC Bethune and Hanley varieties of flax were planted at the Neely-Kinyon Farm on May 4, at 75 lbs/acre. Plots measuring 18 × 500 ft. were laid out in a completely randomized design with four replications of both varieties. The flax plots were rotary hoed on May 28, and a 100-foot length of each plot was hand-hoed on August 16, 2004. On July 2, biomass samples were taken by randomly clipping three 1-square-foot sections from each plot. The biomass samples were weighed, placed in a dryer at 67° C for 48 hours, after which dry weights were taken. Flax height data was taken on July 1 by measuring 3 random plants in each plot, and flax population counts were taken on August 30 by placing a 1-square-foot quadrat in three areas of each plot and counting the number of plants inside the quadrat. Data was taken on flower number on July 1 by counting the number of flowers in a 1-square-foot area three times per plot. On August 18, plant maturity data was taken by counting the number of fully mature plants out of ten randomly selected plants per plot. Lodging data was also taken on August 18 by selecting 10 plants per plot and grading them on a scale of 0-9, 9 being fully lodged (equal to or greater than a 45° angle to the ground). Flax was harvested on August 30, 2004, with a combine.

Results and Discussion

Although there was a trend toward greater plant populations in the Hanley variety, the difference was not significant (Table 1). On July 1, the flax was significantly taller in the CDC Bethune variety. Flower number was not significantly different, although there was a trend toward higher number of flowers in the CDC Bethune variety (Table 1). On August 18, the Hanley variety had significantly more mature bolls than the CDC Bethune variety (85.0 % fully mature

bolts compared with 62.5% fully mature bolts, respectively). Lodging was not a problem in either variety. No significant differences were found in biomass dry weight, lodging, or yield in 2004 (Table 1).

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Table 1. Plant performance in the organic flax variety trial, Neely-Kinyon, 2004.

Variety	Stand plants/ft ²	Plant height (cm)	Flower number/ft ²	Plant maturity (%)	Lodging (%)	Biomass dry weight (g)	Yield (bu/ac)
CDC Bethune	81.13	70.17a	19.08	62.50b	0.69	30.94	15.92
Hanley	93.13	64.42b	14.08	85.00a	0.38	27.75	16.31
LSD 0.05	NS	3.60	NS	8.84	NS	NS	NS