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 has been displaced by the emphasis on commodity corn and soybeans. Flax has many uses including industrial oils from oilseed flax, food-quality flaxseed oil, linen products, fiberboard, and paper products from its 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/acre 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 nonmycorrhizal 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. Nonuniform 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 comes 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 lb/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-ft length of each plot was hand-hoed on August 16, 2004. On July 2, biomass samples were taken by randomly clipping three 1-ft^2 sections from each plot. The biomass samples were weighed, placed in a dryer at 67°C for 48 hours, and reweighed for dry weights. Flax height data was taken on July 1 by measuring three random plants in each plot, and flax population counts were taken on August 30 by placing a 1-ft^2 quadrant in three areas of each plot and counting the number of plants inside the quadrant. On July 1 the number of flowers in a 1-ft^2 area were counted three times per plot. On August 18, plant maturity data was gathered by counting the number of fully mature plants out of 10 randomly selected plants per plot. Lodging data was also taken on August 18 by selecting 10 plants/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 with a combine on August 30, 2004.

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 bolls compared with 62.5% fully mature bolls,

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).

Acknowledgments

We would like to thank the Leopold Center for Sustainable Agriculture for its support of the Neely-Kinyon projects and the Wallace Foundation for its input and support. Thanks to Mark and Julie Schuett of BIOWA Nutraceuticals, Cherokee, IA, and Spectrum Organic Products, Petaluma, CA, for supplying seed and assistance with this project. Thanks also go to Matt Rohrig, David Rosmann, Miriam Perozo Mur, Kristin Brown, Greg Shepherd, Carrie Rosman, and Vanessa Salvador-Ferrer for their help on production, data collection, and analytical aspects of this project.

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/A)
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