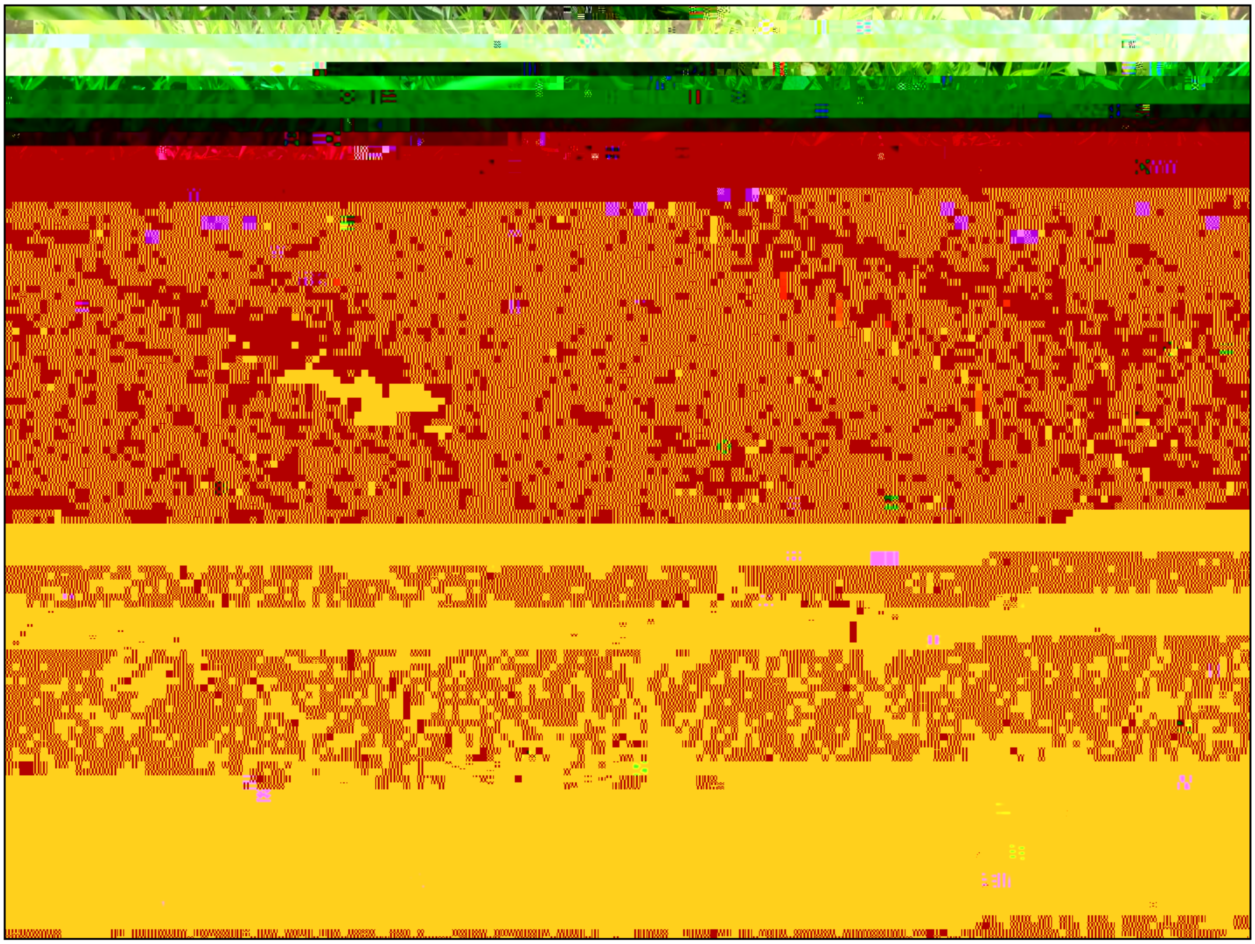
2016 Flax Weed Control Trial



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2016 FLAX WEED CONTROL TRIAL

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Flax (Linum usitatissimum L.) is a multi-purpose crop grown for its fiber, oil (linseed oil), and meal. The majority of production occurs in the Dakotas, Minnesota, and Montana. Recently there has been interest in growing flax in the northeast, both for human consumption and for animal feed, for its high levels of heart-healthy omega-3 fatty acids. Flax is a spring annual that is usually planted as early as the ground can be worked. However, one of the main challenges to successfully growing flax is weed control. Flax plants compete poorly with fast growing weeds due to its relatively short height (between 12 and 36 inches when mature) and tiny leaves. This trial was initiated to see if management, including different row spacing and cultivation, would reduce weed density in flax and improve yields.

MATERIALS AND METHODS

A trial was conducted at Borderview Research Farm in Alburgh, Vermont to evaluate the effectiveness of row spacing and cultivation on weed control and yield in flax (Table 1). The experimental design was a randomized complete block with four replications. Treatments consisted of four types of row spacing: STANDARD at 6.0” between rows, WIDE at 9.0” between rows, BANDED with a 5.0” seed spread in a row and 6.0” between rows, and NARROW at 4.5” between rows. Two treatments of the BANDED rows were planted in each replication. The WIDE and one of the two BANDED treatments were cultivated. The field was disked and spike tooth harrowed prior to planting. Plots were seeded with variety ‘Rahab 94’ at a seeding rate of 50 lbs ac^{-1} on 3-May. Mustard was also seeded as a surrogate weed at 15.6g per plot.

The NARROW row treatment was planted with a Kverneland grain drill (Image 1). The WIDE row treatment was also planted with a Kverneland grain drill (by plugging every other hole in the hopper for 9” row spacing). The STANDARD treatment was planted with a Sunflower 9412 no-till grain drill (Image 2). The BANDED treatments were planted with a custom built seeder that was made from a 12 row International row crop cultivator, and converted to an air seeder using a Gandy and a 6212 air box. Parallel linkage units we

Data were analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications within trials were treated as random effects, and soil amendment treatments were treated as fixed. Mean comparisons were made using the Least Significant Difference (LSD) procedure when the F-test was considered significant ($p<0.10$).

Variations in yield and quality can occur because of variations in genetics, soil, weather, and other growing conditions. Statistical analysis makes it possible to determine whether a difference among treatments is real or whether it might have occurred due to other variations in the field. At the bottom of each table a LSD value is presented for each variable (i.e. yield). Least Significant Differences (LSDs) at the 0.10 level of significance are shown, except where analyzed by pairwise comparison (t-test). Where the difference between two treatments within a column is equal to or greater than the LSD value at the bottom of the column, you can be sure that for 9 out of 10 times, there is a real difference between the two treatments. Treatments that were not significantly lower in performance than the top-performing treatment in a particular column are indicated with an asterisk. In this example, hybrid C is significantly different from hybrid A but not from hybrid B. The difference between C and B is equal to 1.5, which is less than the LSD value of 2.0. This means that these hybrids did not differ in yield. The difference between C and A is equal to 3.0, which is greater than the LSD value of 2.0. This means that the yields of these hybrids were significantly different from one another. The asterisk indicates that hybrid B was not significantly lower than the top yielding hybrid C, indicated in bold.

RESULTS AND DISCUSSION

Weather Summary

Seasonal precipitation and temperature were recorded with a Davis Instrument Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT. The growing season was dryer than normal with May-August receiv

Weed Pressure and Yield

Table 3. Weed populations

Table 4. Percentage of weed cover, flax yield, and mustard yield, Alburgh, VT,

Treatment	Weed cover	Flax yield	Mustard yield
	%	lbs ac^{-1}	lbs ac^{-1}
Banded row	**25.8**	468	590
Banded row - Schmotzer	37.3	518	510
Narrow row	57.4	583	488
Standard row	32.1	**668**	438
Wide row - Schmotzer	45.0	339	**278**
LSD (0.10)	NS	NS	NS
Trial Mean	39.5	515	461

Treatments in **bold** were top performers for the given variable.
NS – There was no statistical difference between treatments in a particular column (p=0.10).

Row spacing and cultivation did not significantly impact the percentage of weed cover, flax yields, or mustard yields (Table 4, Figure 1). The STANDARD row treatment had the highest yield at 668 lbs ac^{-1}, it was not significantly different from the other treatments (p=0.11). The mean yield for the trial was 515 lbs ac^{-1}. Overall yields were low compared to past years of flax research. High weed pressure made it difficult to harvest the flax seed and methods to improve weed control in flax did not help improve yields.

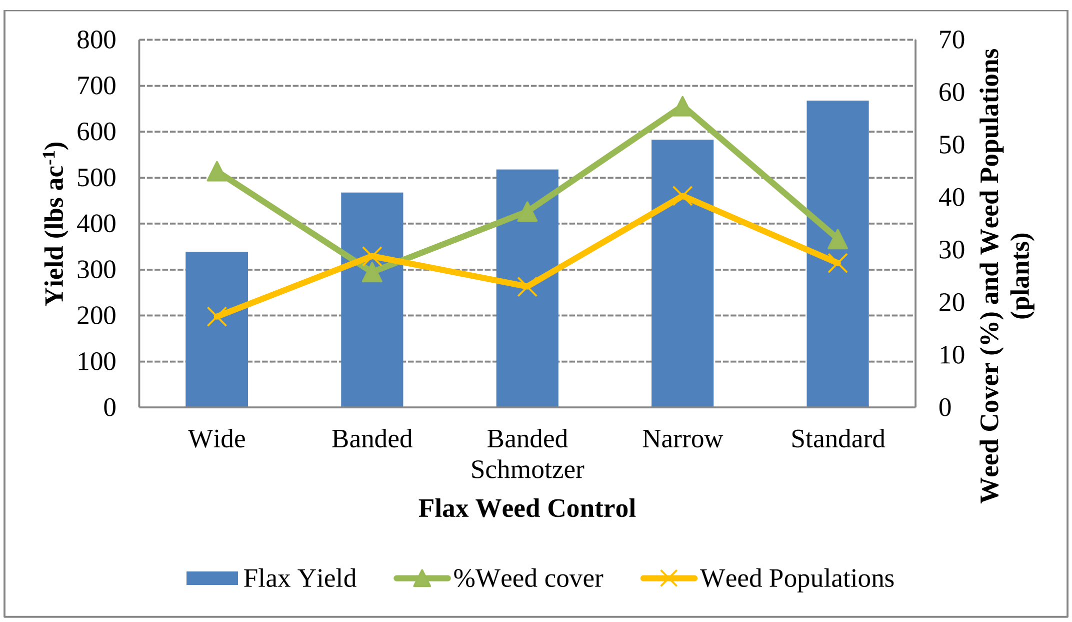

Figure 1. Flax Yield, %Weed Cover, and Weed Populations, Alburgh, VT, 2016.

It is important to remember that these data represent only one year of research and in only one location. Additional years of data need to be completed to determine optimal row spacing and weed control methods for flax in the Northeast region.

ACKNOWLEDGEMENTS

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