NORTHERN GRAIN GROWERS ASSOCIATION

To Encourage and Support the Production, Processing, and Marketing of Grains in Vermont and the surrounding areas.

NEWS

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Save the Date!

The 11th Annual Winter Grain conference will be held on Wednesday, March 18, 2015 at The Essex Resort and Spa in Essex, VT. We're very excited to welcome Dru Rivers and Paul Muller of Full Belly Farm as our keynote speakers! Come hear how they have integrated growing grains into their dynamic vegetable operation. Dru and Paul, along with their farm partners Andrew Brait and Judith Redmond, grow a diverse mix of vegetables, herbs, nuts, flowers, fruit, and grains on their 350 acre certified organic farm in northern California. We will hear how they have blended-grains into their crop rotations and about their direct marketing approach. Plant breeder Pat Hayes from the University of Oregon will be here to discuss his barley breeding program. Pat's applied research efforts are directed at developing varieties and germplasm which meet a range of end uses: malting and brewing, food, feed, and forage. There will be sessions on hulless oats, malting grains, equipment, marketing, raising grains animal feed, hands-on baking, and so much more!

If you are interested in conference sponsorship or exhibit opportunities, please contact Susan Brouillette at susan.brouillette@uvm.edu. The deadline is January 20, 2015.

Growing Flax in Vermont

Susan Monahan and Heather Darby
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Image 1. Flowering flax, Alburgh, VT.

Flax *(Linum usitatissimum* L.*)* is a multi-purpose crop grown for its fiber, oil (linseed oil), and meal (Image 1). The importance of flax as a major crop in the United States drastically decreased in the 1980s when latex paints replaced linseed oil based paint. There has recently been renewed interest in flax, both for human consumption and for animal feed, for its high levels of heart-healthy omega-3 fatty acids. The UVM Northwest Crops and Soils (NWCS) Program has been studying flax to determine the best agronomic practices for growing flax in Vermont's climate. Flax is a spring annual that is usually planted as early as the ground can be worked. One of the main challenges to successfully growing flax

is weed control. Flax competes poorly with weeds due to its relatively short height (between 12 and 36 inches when mature) and tiny leaves.

Over the last two years the NWCS program initiated a weed control trial comparing four organic weed control strategies with a control of standard 6 inch row spacing and no cultivation. The treatments were: 1) narrow row treatment planted at 4.5 inch spacing, 2) wide row treatment planted at 9 inch row spacing and cultivated with a Schmotzer hoe narrow row cultivator one month after planting (see the Schmotzer hoe in action in a video on our website: http://www.uvm.edu/extension/cropsoil/grains), 3) tine-weed treatment planted at standard 6 inch row spacing and tine-weeded one month after planting, and 4) inter-seed treatment planted at standard 6 inch row spacing with the addition of Alice white clover at 4 lbs. acre^{-1}.

In 2013, two treatments in this study competed so poorly with weeds that we did not harvest them due to the excessive weed pressure. Only the narrow row and wide row treatments were effective at reducing weed pressure. Visually, it was clear that the wide row with cultivation treatment was most effective at competing with weeds; the narrow row treatment was a close second, and the control was overrun with weeds (Images 2-4).

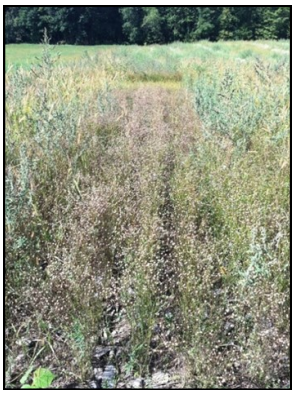

Image 2. Wide row flax with Schmotzer hoe.

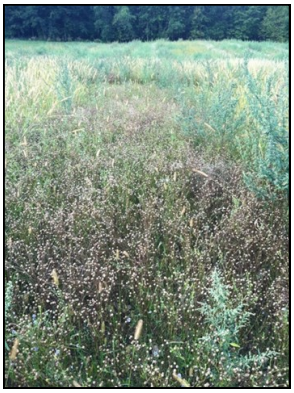

Image 3. Narrow row flax.

Image 4. Flax control plot.

The harvest data supports this; the wide row treatment yielded the most at 622 lbs. acre^{-1} (Figure 1). Interestingly, in 2014 lower overall weed pressure resulted in successful harvest from all treatment plots (Table 1). Flax yields averaged 1,158 lbs. acre^{-1}, which is closer to yields from traditional flax growing regions. There was no significant difference in yields or test weight amongst any of the weed control techniques. The reasons for this

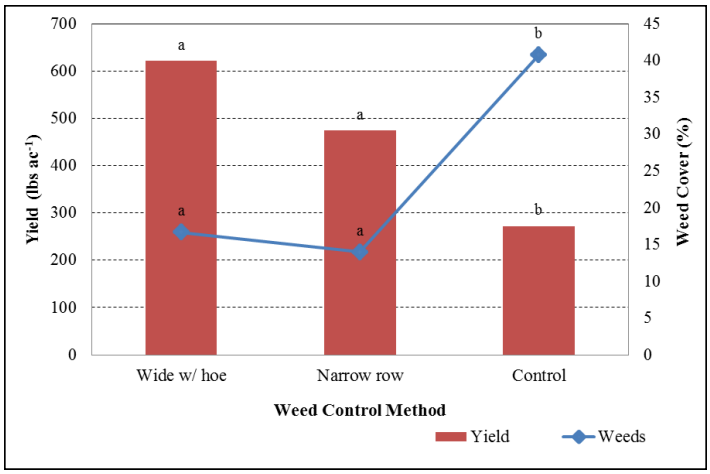

Figure 1. Yield and weed cover of flax plots managed with different weed control techniques, 2013.

Table 1. Harvest yield and test weight of flax grown with different weed control techniques, Alburgh, VT, 2014.

Weed management	Yield lbs ac^{-1}	Test weight lbs bu^{-1}
Wide row w/ Schmotzer hoe	1073	53.1
Inter-seed	1129	53.0
Tine-weed	1194	**55.0**
Narrow row	1195	54.9
Control	**1198**	53.6
Trial Mean	1158	53.9
LSD (p<0.10)	NS	NS

Values shown in **bold** are of the highest value or top performing.
NS – No significant difference amongst weed control techniques.

increase in yield included lower overall weed pressure and better harvest technique. The average weed populations in 2014 were 169 weeds meter^{-2} compared to 423 weeds meter^{-2} in 2013. Likely, the low weed pressure experienced by flax in 2014 resulted in adequate yields regardless of weed control technique. To harvest, plots were cut and swathed, and picked up with a combine four days later. This technique allowed the flax and weed biomass to dry down. Additionally, adjustments to the combine such as turning the air off prevented flax seed from being lost inside the combine.

Of the two cultivation strategies, the Schmotzer hoe was the most effective at removing weeds from the flax plots in both years. In 2013, tine weeding one month after planting killed 23% of weeds while cultivating with the Schmotzer hoe removed 81% of weeds (Table 2). In 2014, tine weeding one month after planting killed 88%

Table 2. Weeds removed from flax plots by mechanical cultivation (% of total weed population).

Mechanical cultivation	2013	2014
Tine weeding	23%	88%
Schmotzer hoe	81%	91%

of weeds while cultivating with a Schmotzer hoe removed 91% of weeds. Cultivation appears to be an adequate technique to control weeds in flax especially under moderate weed pressure. Timing of the cultivation is also important for successful removal of weed species. The weeds were cultivated in the cotyledon to first leaf stages, making them easier to remove with mechanical equipment.

The UVM Extension Northwest Crops and Soils Team would like to thank SARE for funding this research.

Image 1. Seeding spring wheat variety trial, Alburgh, VT, 2014.

2014 Spring Wheat Variety Trial Results

Borderview Research Farm, Alburgh, Vermont

Dr. Heather Darby, UVM Extension Agronomist
Erica Cummings, UVM Crop and Soil Coordinator

The University of Vermont Extension began the fifth year of extensive organic variety trials evaluating hard red spring wheat.

Table 1. Spring wheat varieties trialed in Alburgh, VT.

Spring Wheat Varieties	Type†	Origin and Release Year‡	Seed Source
AC Walton	HR	AAFC, PEI, 1995	2012 Saved trial seed, VT
Advance	HR	SDAES, 2011	South Dakota State University, SD
Barlow	HR	NDAES, 2009	North Dakota Foundation Seed
Elign	HR	NDAES, 2012	North Dakota Foundation Seed
Faller	HR	NDAES, 2007	Albert Lea Seed House, MN
Forefront	HR	SDAES, 2012	South Dakota State University, SD
Glenn	HR	NDAES, 2005	Albert Lea Seed, MN
Kaffé	SW	Semican, Canada	2013 Saved trial seed, VT
Magog	HR	Semican Inc.	Semican Atlantic Inc., Canada
Megantic	HR	SynAgri, 2008	2013 Saved trial seed, VT
Moka	HR	Semican, Canada	Semican Atlantic Inc., Canada
Prevail	HR	SDAES, 2014	South Dakota State University, SD
Prosper	HR	NDAES & MAES, 2012	Albert Lea Seed, MN
RB07	HR	MAES, 2007	Minnesota Foundation Seed
Sy Rowyn	HR	Sygenta Seeds Inc., 2013	2013 Saved trial seed, VT
Sy Soren	HR	Agripro Syngenta, 2011	Albert Lea Seed House, MN
Tom	HR	MAES, 2008	2012 Saved trial seed, VT
Velva	HR	NDAES, 2011	North Dakota Foundation Seed
Yorkton	HR	Western Canada, 2013	Semican, Canada

The project evaluated 19 spring wheat varieties (Table 1). The data reported was collected from the experimental site located at Borderview Research Farm in Alburgh, VT. The soil type was a Benson silt loam soil. The plots were seeded on 25-Apr and harvested on 8-Aug (Image 1).

At the time of harvest grain moisture, test weight, and yield were calculated. Quality measurements included: % crude protein, falling number, and mycotoxin (DON) concentration.

The 2014 yields were lower than those in 2013. The mean yield in Alburgh was 1686 lbs ac^{-1}, 203 lbs ac^{-1} less than the average yield in 2013. The highest yielding variety was Faller (2512 lbs ac^{-1}) (Table 2). Other top yielding varieties included AC Walton, Kaffé, Forefront, and RB07. The variety Forefront had the highest test weight of 56.0 lbs bu^{-1}. Eighteen of the 19 spring wheat varieties trial did not reach the optimal 56 to 60 lb bu^{-1} test weight for wheat. The variety with the highest protein content was Glenn (16.0%) (Table 3). All 19 spring wheat varieties had protein levels that met or exceeded industry standards of 12-15%. All of the falling numbers, except for Glenn (238 seconds), were above 250 seconds. The highest falling number was Magog (409 seconds). Other varieties with high falling numbers included, Sy Rowyn , Tom, Moka, Megantic and Yorkton. The variety with the lowest DON level was Yorkton (0.30 ppm). Ten of the 19 spring wheat varieties trialed in Alburgh were below the FDA's 1ppm limit.

2014 was another challenging growing season. The prolonged cool and wet spring delayed wheat

Table 2. Harvest data of the spring wheat varieties, Alburgh, VT.

Variety	Yield @ 13.5% mst.	Harvest moisture	Test weight
	lbs ac^{-1}	%	lbs bu^{-1}
AC Walton	2302*	20.6	52.3
Advance	986	19.7	53.8
Barlow	1791	19.3	54.8*
Elign	1543	19.5	54.6
Faller	**2512***	19.6	54.0
Forefront	2116*	17.7*	**56.0***
Glenn	1118	19.0	54.4
Kaffe	2127*	20.0	53.8
Magog	1791	19.6	54.0
Megantic	1351	**17.7***	55.5*
Moka	1791	20.3	55.0*
Prevail	1894	18.1*	54.1
Prosper	1878	20.0	53.8
RB07	2047*	19.4	53.5
Sy Rowyn	1243	18.3*	55.1*
Sy Soren	1368	19.0	54.4
Tom	1613	19.5	54.4
Velva	1264	19.6	51.3
Yorkton	1298	19.0	54.4
LSD (0.10)	528	0.68	1.32
Trial Mean	1686	19.2	54.2

Table 3. Quality results of the spring wheat varieties, Alburgh, VT.

Variety	Crude protein @ 12% mst.	Crude protein @ 14% mst.	Falling number @ 14% mst.	DON
	%	%	seconds	ppm
AC Walton	13.1	12.8	295	0.60*
Advance	13.7	13.4	292	2.57
Barlow	14.9	14.6	246	3.20
Elign	14.7	14.3	290	1.00*
Faller	12.7	12.4	354	0.80*
Forefront	14.9	14.6	312	0.47*
Glenn	**16.4***	**16.0***	238	1.87
Kaffe	12.6	12.3	299	1.37*
Magog	13.8	13.5	**409***	0.60*
Megantic	13.8	13.4	378*	0.97*
Moka	13.9	13.6	392*	0.67*
Prevail	14.3	14.0	360	2.23
Prosper	13.0	12.7	378*	1.00*
RB07	14.9	14.6	332	1.30*
Sy Rowyn	14.2	13.9	398*	0.63*
Sy Soren	15.3	15.0	341	1.07*
Tom	14.3	13.9	395*	1.37*
Velva	14.3	14.0	262	5.27
Yorkton	15.5	15.2	376*	**0.30***
LSD (0.10)	0.72	0.70	41.9	1.30
Trial Mean	14.2	13.9	334	1.44

Values shown in **bold** are of the highest value or top performing.
* Wheat varieties that are not significantly different than the top performing variety in a column are indicated with an asterisk.

planting and impacted stand establishment and plant tillering. This could help explain the increase in weed pressure which could have contributed to the reduction in grain yields this season. The below average temperatures, and above average rainfall, persisted throughout the growing season which resulted in delayed wheat development and dry down. The DON levels were not nearly as high as they were in 2013. Ten varieties were at or below the 1ppm FDA recommend limit for DON concentration. The average DON level in 2014 was 1.44 ppm, 3.53ppm below the average DON level in 2013.

It is important, as you make variety choices on your farm, that you evaluate data from test sites that are as similar to your region as possible.

More 2014 grain research results are being posted and can be found at the following websites: UVM Extension Northwest Crops and Soils Program http://www.uvm.edu/extension/cropsoil/ and the Northern Grain Growers Association http://northerngraingrowers.org/.