2011 WINTER CANOLA VARIETY TRIAL

A winter canola trial was conducted in Alburgh, VT as part of the 2010-2011 National Winter Canola Variety Trial. In the past few years, many farms in the Northeast have been engaged in on-farm fuel production; in order for this to be economically viable, farmers must be able to reliably produce a high-yielding crop. Varietal selection is one of the most important aspects of crop production and significantly influences yield potential. Winter canola is a relatively new crop for the Northeast. The goal of this trial is to evaluate varieties that can survive the harsh winters of our region and ultimately produce high oil yields.

MATERIALS AND METHODS

The winter canola was planted on September 1, 2010 at a rate of 5 lbs per acre with a Kincaid cone seeder. The research plots were 5' x 20'. The seeds were treated with Herculex, a systemic insecticidal seed treatment. The previous crop was small grain, and the seedbed was prepared by moldboard plow and disk. The soil was a rocky Benson silt loam. The experimental design was a randomized complete block with three replications. Fifteen winter canola varieties were evaluated for winter survival, yield, and oil quantity. Winter survival percentages were measured in April 2011, after the danger of further winter loss had passed. Plots were harvested on July 19, 2011 with an Almaco SP50 plot combine. Seeds were pressed with a Kern Kraft Oil Press KK40. General trial information can be found in Table 1.

Table 1. Trial information for the winter canola variety trial.

Location	Alburgh, VT Borderview Farm
Soil type	Silt loam
Previous crop	Small grains
Plot size (ft.)	5 x 20
Seeding rate	5 lbs/acre
Replicates	3
Planting date	9/1/2010
Harvest date	7/19/2011
Tillage operations	Moldboard plow, disk harrow

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. All data was analyzed using a mixed model analysis where replicates were considered random effects. At the bottom of each table a LSD value is presented for each variable (e.g. yield). Least Significant Differences (LSD's) at the 10% level (0.10) of probability are shown. 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 in 9 out of 10 chances that there is a real difference between the two values. Treatments listed in bold had the top performance in a particular column; treatments that did not perform significantly lower than the top-performer in a particular column are indicated with an asterisk. In the example at right, treatment A is significantly different from treatment C but not from treatment B. The difference between A and B is equal to 400, which is less than the LSD value of 500. This means that these treatments did not differ significantly in yield. The difference between A and C is equal to 650, which is greater than the LSD value of 500. This means that the yields of these treatments were significantly different from one another.

Variety	**Yield**
A	**1600***
B	1200*
C	950
LSD (0.10)	500

RESULTS

Temperature and precipitation data for the 2010-2011 winter canola growing season can be seen in Table 2. Above average precipitation in the fall led to poor establishment of the canola crop. However, abundant snow cover in the winter of 2010-2011 may have played a role in canola overwintering successfully. There was a total of 3,618.5 Growing Degree Days (GDDs) accumulated, 412.6 more GDD's than the 30-year average.

Table 2. Temperature, precipitation, and Growing Degree Days (GDD) data by month for Alburgh, VT.

South Hero, VT (Alburgh)	Sept 2010	Oct 2010	Nov 2010	Feb 2011	March 2011	April 2011	May 2011	June 2011	July 2011
Avg. temperature (°F)±	64.0	50.6	39.9	20.8	32.9	46.6	58.7	67.1	74.4
Departure from normal	3.6	1.8	2.2	0.5	2.1	3.1	2.1	1.3	3.3
Precipitation (inches)*	4.32	6.73	2.93	3.12	3.39	7.88	8.67	3.52	3.68
Departure from normal	0.86	3.75	0.00	1.71	1.07	5.00	5.35	0.09	-0.29
Growing Degree Days (base 41°F)	689.0	290.0	93.0	0.0	4.5	227.0	530.0	783.0	1002.0
Departure from normal	107.0	47.7	48.0	0.0	4.5	51.0	45.9	39.0	69.5

* Precipitation for May-July 2011 was taken from Burlington, VT.
Based on National Weather Service data from cooperative observation stations in South Hero. Historical averages are for 30 years (1971-2000).

Winter survival estimates were taken on April 12, 2011. Winter survival was rated on a 0 to 10 scale, where 10 represented excellent winter survival and 0 indicates a complete lack of winter survival. There were no significant differences among varieties. All fifteen varieties tested had acceptable winter survivability (Table 3).

Table 3. Winter canola variety trial general results.

Variety	Winter survival	Harvest moisture	Yield @ 8% moisture	Test weight	Oil	Oil yield	
		%	lbs/ac	lbs/bu	%	lbs/ac	gal/ac
Baldur	7.67	7.90	1680	52.3*	30.9	513	67.1
Dimension	**8.33**	**11.9***	**1915**	50.7	**38.9**	**738**	**96.7**
Dynasty	8.00	9.00	1603	52.0*	33.3	537	70.3
Flash	8.00	11.7*	1503	50.7	33.1	505	66.1
Hornet	7.33	11.3*	1704	51.0	33.1	563	73.8
Kadore	7.33	7.50	1453	53.0	31.8	459	60.1
Kiowa	**8.33**	8.50	1672	51.8*	28.9	477	62.5
Riley	8.00	10.5*	1911	51.5*	29.7	573	75.1
Safran	7.67	9.40	1679	51.7*	32.0	537	70.3
Sitro	7.67	9.80	1566	51.3	36.2	564	73.9
Sumner	6.67	7.00	1581	**52.5***	35.8	565	74.0
VSX-3	7.33	7.60	1719	51.2	34.2	589	77.2
Virginia	7.67	8.00	1680	52.0*	34.8	579	75.8
Visby	7.67	9.70	1395	51.2	30.3	417	54.6
Wichita	7.00	6.50	1382	51.0	33.3	455	59.6
LSD (0.10)	NS	1.60	NS	1.0	NS	NS	NS
Trial Mean	7.64	9.10	1630	52.0	33.1	538	70.5

Treatments indicated in **bold** had the top observed performance in a particular column.
*****Treatments that did not perform significantly lower than the top performing treatment in a particular column are indicated with an asterisk.
NS- Treatments were not significantly different from one another.

There were no significant differences in seed or oil yield between winter canola varieties (Figure 1). The average yield across varieties was 1,630 lbs of seed per acre (Table 3). The test weight of all canola varieties exceeded the standard 50 pounds per bushel. The oil yield averaged 70.5 gallons per acre (Table 3).

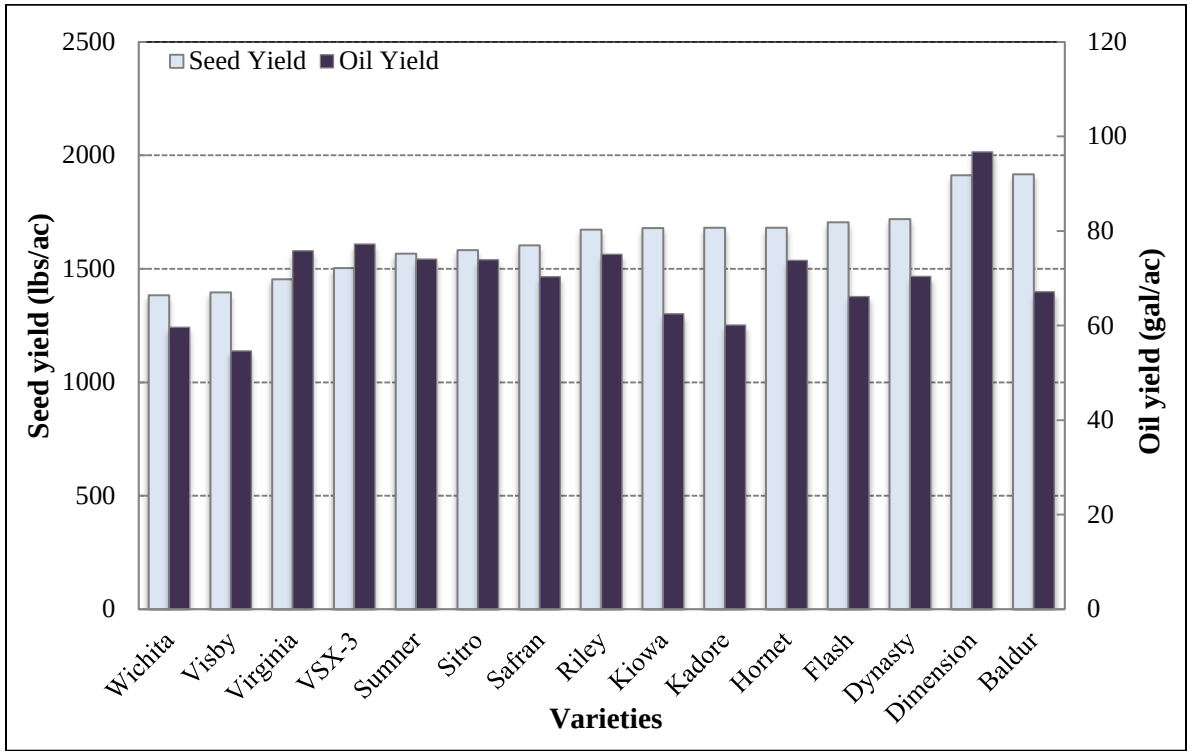

Figure 1. Seed and oil yields of 15 winter canola varieties. There was no significant difference in seed or oil yield by variety.

The oil content of the winter canola ranged from 28.9 to 38.9% extraction (Table 3). Oil content percentages are compared in Figure 2.

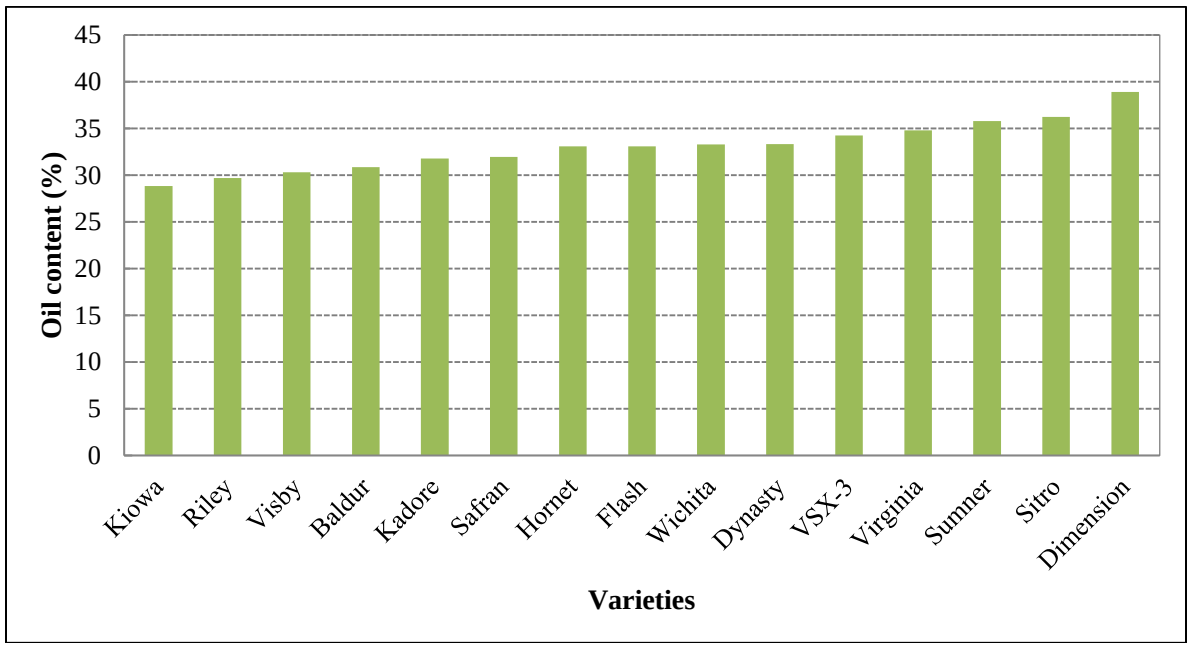

Figure 2. Oil percentage by weight of 15 winter canola varieties. There was no significant difference in oil content by variety.

DISCUSSION

The abundant snow cover during the winter months may have attributed to the ability of the canola to survive the winter months. This is the second year that winter canola has successfully overwintered. Improved survivability can also be attributed to earlier planting dates. Planting winter canola in late August and early September allows the plants to be better established prior to winter conditions.

Though there were no significant differences by variety in either seed or oil yields in this year's trial, average seeds yields were low. Interestingly, the 2010 trial average for seed yield was 3,137 lbs per acre. The lower yields observed in 2011 (1,630 lbs per acre) may have been due to poor fall stand establishment, soil compaction, and/or poor spring weather conditions. It is important to evaluate oilseed varieties on both seed and oil yields, since varieties with high seed yields do not necessarily have the highest oil yields. It is also important to note that this research represents results only from one season and in one location. More research should be done before making varietal selections.

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