

2016 Heirloom Dry Bean Variety Trial



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Dry beans (*Phaseolus vulgaris*), a high-protein pulse crop, have been grown in the Northeast since the carry more and more locally-produced foods, and dry beans are no exception. Currently, the demand for heirloom dry beans has far exceeded the supply. In an effort to support and expand the local bean market throughout the northeast, the University of Vermont Extension Northwest Crops and Soils Program, as part of a USDA NE-SARE Partnership Grant (PG16-049), established a second year of trials in 2016 to evaluate heirloom dry bean varieties to see which ones thrive in our region.

placed randomly within bean rows. In each quadrat, the number of plants was recorded. The number of plants with disease symptoms and insect damage were recorded. In addition, one plant per quadrat was pulled to examine roots for pest damage. Plants with unknown discoloration or damage were pulled,

RESULTS

Seasonal precipitation and temperature recorded at a weather station in close proximity to the Alburgh trial site is shown in Table 3. The weather during the 2016 growing season was warmer and drier than average. Below average rainfall was recorded in June, July, August, and September totaled 5.35 inches below the 30-year average. In Alburgh, there was an accumulation of 2222 Growing Degree Days (GDDs), which is 195 GDDs above the 30-year average.

Table 3. Temperature and precipitation summary for Alburgh, VT, 2016.

Alburgh, VT	Jun	Jul	Aug	Sep
Average temperature (°F)	65.8	70.7	71.6	63.4
Departure from normal	0.01	0.13	2.85	2.90
Precipitation (inches)				
Precipitation (inches)	2.81	1.79	2.98	2.47
Departure from normal	-0.88	-2.37	-0.93	-1.17
Growing Degree Days (50-86°F)				
Growing Degree Days (50-86°F)	481	640	663	438
Departure from normal	7.2	1.4	81.9	104

Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger.

Historical averages are for 30 years of data provided by the NOAA (1981-2010) for Burlington, VT. Alburgh precipitation data from 8/17/16-10/31/16 was missing and replaced by data provided by the NOAA for Highgate, VT.

Seasonal precipitation and temperature recorded at a weather station in close proximity to the Glover trial site is shown in Table 4. The 2016 growing season at the Glover location brought cooler than average temperatures in June and July followed by warmer temperatures in August, September, and October. Above average rainfall was recorded in the months of June, July, and August that totaled three inches higher the 30-year average. Below average rainfall was recorded in September and October.

Heirloom Dry Bean Scouting

Several plant pests were identified through scouting the trials this season (Table 5, Table 6). Root rots, primarily, Fusarium, Rhizoctonia, and Pythium root rot, were present at both trial locations. In Alburgh, Kenealy Yellow Eye had the lowest root rot severity (0.50 %) and King of the Early had the highest severity at 41.3 %. At the Glover trial location, Hutterite Soup had the lowest root rot infection severity (0.00 %) and Raquel had the highest with 56.3 % severity. Alternaria leaf spot (

Table 6. 2016 Heirloom dry bean disease severity in Glover, VT.

Variety	Root Rots	Common bacterial blight	Alternaria
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Table 7. 2016 Heirloom dry bean Potato leafhopper damage in Alburgh, VT and Glover, VT.

Variety	Alburgh, VT Potato leafhopper damage	Glover, VT Potato leafhopper damage
	%	%

Figure 1. 2016 Potato leafhopper damage of heirloom dry bean varieties in Alburgh, VT

Varieties with the same letter did not differ significantly (DDB05)-10(l)-10((DDB.7-5(5t d0((DDB.7-5(5t pVld 364.75 Tm

Table 8

varieties (Hutterite Soup, Keneary Yellow Eye, Peregrion, and Lowes Champion) had test weights that met or exceeded industry standards of 60 lbs bu⁻¹.

Table 9. 2016 Heirloom dry bean harvest measurements, Alburgh, VT.

Variety	Dry matter yield	Harvest moisture	Test weight
	lbs ac ⁻¹	%	lbs bu ⁻¹
Black Calypso	806	19.9*	59.1*
Hutterite Soup	646	25.5*	60.9*
Jacob's Cattle Gold	1179	27.0	54.1
Jacob's Cattle	1155	22.0*	57.3
Keneary Yellow Eye	734	19.8*	60.8*
King of the Early	1297	19.0*	58.2*
Low s Champion	1567	23.6*	60.0*
Lina Sisco	1241	19.8*	55.4
Light Red Kidney	1601	20.9*	55.4
Marifax	1252	23.0*	58.0*
Orca	1466	31.2	54.5
Peregrion	2264*	23.9*	60.4*
Raquel	973	26.3	54.5
Spanish Tolasna	856	25.7	58.3*
Tongues of Fire	242	36.0	43.6
Tiger's Eye	1135	20.6*	53.2
Vermont Appaloosa	920	21.9*	57.3
Vermont Cranberry	1412	23.0*	59.0*
<i>LSD (0.10)</i>	362	6.37	3.44
<i>Trial Mean</i>	1153	23.8	56.7

Values shown in **bold** are of the highest value or top performing.

* Dry beans that did not perform significantly lower than the top performing variety in a particular column are indicated with an asterisk.

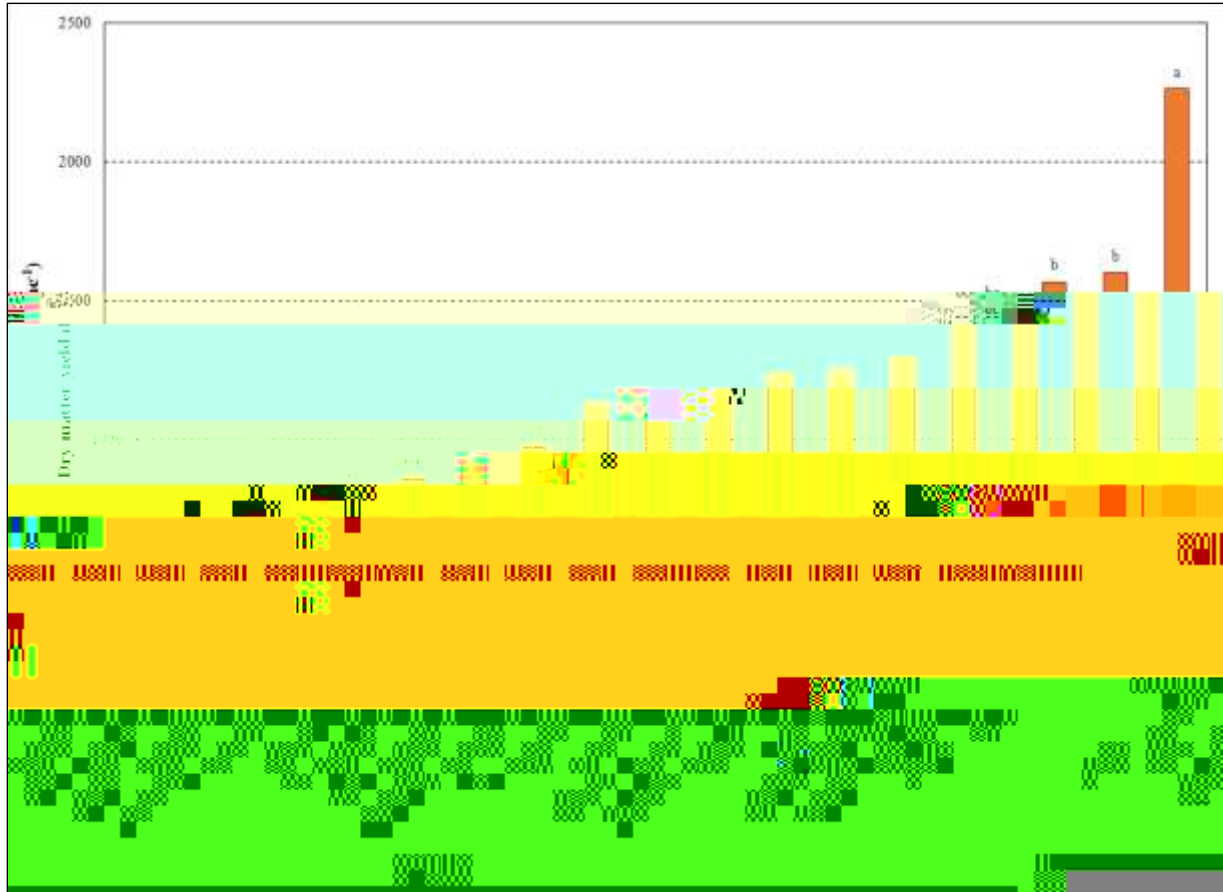


Figure 2. 2016 Heirloom dry bean yields, Alburgh, VT.
 Varieties with the same letter did not differ significantly in yield.

Heirloom Dry Bean Harvest Glover, VT

Plant population, plant height, pod distance to ground, and pod disease severity were all significantly different at the Glover trial location (Table 10). The highest plant population (65,703 plants ac⁻¹) and the lowest plant population was Low s Champion (4175 plants ac⁻¹). The tallest plant

Spanish Tolasna

this variety had one of the lowest pod disease severities (15.0%) as well. Several varieties that had higher pod distance from the ground and also lower pod disease severity included Marifax, Kenealy Yellow Eye, and Raquel. Peregrin was the exception with a pod distance to ground of 0.58 cm and pod disease severity of 15%.

Table 10. 2016 Heirloom dry bean plant populations and pre-harvest measurements in Glover, VT.

Variety	Plant population	Plant height	Pod distance to ground	Pod disease
	# per ac ⁻¹	cm		

Table 11. 2016 Heirloom dry bean yield and quality, Glover, VT.

Variety	Dry matter yield	Harvest moisture	Test weight
	lbs ac-1	%	lbs bu-1
Black Calypso	637	22.8*	
Hutterite Soup	1212	26.5	58.8*
Jacob's Cattle Gold	1018	32.8	55.3
Kenealy Yellow Eye	617	23.5*	58.1*
Lows Champion	355	26.8	56.8
Lina Sisco	1378	23.3*	56.8
Marifax	1014	22.8*	58.3*
Peregrine	2016*	25.6*	58.9*
Raquel	1182	30.0	54.7
Spanish Tolasna	938	32.0	54.3
Tiger's Eye	815	22.8*	52.1



DISCUSSION

It is important to remember that the results only represent one year of data. Seed quality continues to be an important issue in dry bean production. Before variety trials were planted, percent seed germination was determined for each variety and seeding rates adjusted and those varieties with low germination rates were eliminated from the 2016 trials. The one exception was Lowe's Champion (62% germination), which was kept in because it was a new variety for our trials. Even with adjusting for the low germination this variety had poor stand establishment (4175 plants ac^{-1}) indicating there might have been other seed quality issues.

The overall warmer and drier conditions throughout the 2016 growing season, in both trial locations, resulted in higher dry bean yields and quality. Weed pressure was minimal (0.14 5e4(r) condiosmination