



The seedbeds at both the Alburgh and Glover locations were prepared by conventional tillage methods. All plots were managed with practices similar to those used by producers in the surrounding areas (Table 2). The previous crop planted at the Alburgh site was sweet corn and in Glover it was a mixture of grains and wheat. The field in Alburgh was spring plowed, disked and spike tooth harrowed to prepare for planting. At the Glover site the seedbed was prepared by spring moldboard plowed and followed by disk harrow. In Alburgh, the plots were planted on 5-Jun with a John Deere 1750 planter fitted with soybean rate. The trial at Glover was seeded on 10-Jun with a White 140 plate planter. Prior to planting, bean seed at both trial locations were treated with dry bean inoculant. Additionally in Glover, an organic approved fertilizer called MicroSTART 60 (3-2-3) was applied as a starter fertilizer at 350 lbs ac⁻¹. Plot size at both -inch row spacing.

Table 2. General trial management information of the 2015 heirloom dry bean trials in Alburgh, VT and Glover, VT.

Trial Information	Heirloom dry bean variety trials	
	Borderview Research Farm, Alburgh, VT	Morningstar Meadows Farm, Glover, VT
Soil type	Benson rocky silt loam	Sandy loam
Previous crop	Sweet corn	Mixed grain & wheat
Tillage operations	Spring plow, disk, & spike tooth harrow	Moldboard plow & disk harrow
Plot size (feet)	5 x 20	5 x 20
Row spacing (inches)	30	30
Replicates	4	3
Starter Fertilizer (lbs ac ⁻¹)	None	350 MicroSTART 60 (3-2-3)
Planting date	5-Jun	10-Jun
Tineweed	None	2x
Cultivation	4-Row Brillion: 17-Jun and 7-Jul	John Deere 4-row C-shank w/ crop shields: weekly for 5weeks starting 12-Jun
Harvest date	22-Sep	18-Sep

pulled, placed in a labeled plastic bag, refrigerated, and identified at the UVM Plant Diagnostic Laboratory.

At the time of harvest, at both trial locations, the number of pods were counted on three plants, three pod lengths were measured in centimeters, the number of beans in three pods were counted, and 10 pods were examined for the presence of disease. All plots were harvested in Alburgh on 22-Sep by hand. The harvested bean plants were then bundled and hung to dry overnight. Beans were then threshed with an Almaco Large Vogel plot thresher. Beans were then weighed to calculate yields and a DICKEY-John M3G moisture tester was used to determine bean moisture content. In Glover, all plots were harvested on 18-Sep by hand and threshed using an Almaco Large Vogel plot thresher. Beans were then weighed to calculate yield and a DICKEY-John MINI GAC Plus was used to determine bean moisture content and test weight.

Data was analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications were treated as random ef

RESULTS

Seasonal precipitation and temperature recorded at a weather station in close proximity to the trial site is shown in Table 3. The 2015 growing season brought a warmer and drier than average May followed by cooler and wetter June. Below average rainfall was recorded in July, August, and September totaled almost ten inches below the 30 year average. In Alburgh, there was an accumulation of 2578 Growing Degree Days (GDDs), which is 367 GDDs above the 30 year average.

Table 3. Temperature and precipitation summary for Alburgh, VT, 2015.

Alburgh, VT	May	Jun	Jul	Aug	Sept
Average temperature (°F)	61.9	63.1	70.0	69.7	65.2
Departure from normal	5.5	-2.7	-		

Heirloom Dry Bean Scouting

Several plant pests were identified through scouting this season (Table 5, Table 6). At both trial locations the fungal disease Anthracnose appeared to be an important systemic disease in bean fi

At the Alburgh location Anthracnose was identified on Black Calypso, European Soldier, Eye of Goat,

Table 7. 2015 Heirloom dry bean plant populations and harvest measurements, Alburgh, VT.

Variety	Plant population	Pods per plant	Pod length	Beans per pod	Yield
	# per ac ⁻¹	#	cm	#	lbs ac ⁻¹

Black Calypso

| Snow Cap | 9a | 15.3a | 47.0c

also had lowest number of diseased pods (3 pods). Snow cap had the highest pod disease incidence, 10 out of 10 pods.

Table 9. 2015 Heirloom dry bean plant populations and harvest measurements in Glover, VT.

Variety	Plant population	Pods per plant	Beans per pod	Diseased pods
	# per ac ⁻¹	#	#	# out of 10
Black Calypso	45,012	14	5	8
Orca	59,242*	22*	6	7
Raquel	41,818	14	4	7
Rattlesnake	42,398	16	7*	3*
Red Calypso	61,274*	5	5	9
Snow Cap	48,206	10		

Tongues of Fire	1,052	17.9	55.0
Vermont Appaloosa	785	19.0	62.5*
Vermont Cranberry	1,011		

were counted and the percent germination calculated (Table 11). All of the seed was purchased so it was surprising how variable the germination rates were (0-100%).

In Alburgh, the weather in June of below average temperatures and higher than average rainfall resulted in delayed, or prevented mechanical cultivation, and in turn created ideal conditions for weed growth and potentially increased root rot diseases like Fusarium. The low plant populations permitted even more weed growth. Even hand cultivati enough to knock back the weeds. These factors likely lead to lower than expected yields and quality in Alburgh. The weather at Morningstar Meadows Farm can be summed up as cool, 687 GDDs below the 30 year average, and wet, eight inches above normal. Weeds were also an issue at this site, however, the sandy soil allowed for better drainage and therefore, more mechanical cultivation was used to help reduce weed pressure.

Several plant pests were identified this season: Anthracnose, Common bacterial bean blight, and Bacterial brown spot were the most prevalent diseases. All three of these plant pathogens can be seed-borne and their spores can overwinter on crop debris. Interestingly, Raquel was the only variety to not have Common bacterial bean blight at the Alburgh site. The plant pathogens Fusarium and Alternaria, were identified in Alburgh as well, but with low incidence. The Fusarium fungal spores can live in the soil or on bean crop debris for several years, while Alternaria is an opportunistic fungus that infects plant tissue through wounds or following bacterial infections. There were fewer plant pests identified at the Glover location, but more varieties affected by one or more of the above described pathogens. The Red Calypso beans were complet Interestingly, the Glover site had a higher incidence of Potato leafhopper damage.

Overall, there were three heirloom dry bean varieties that performed relatively well this season across trial sites for both yield and quality: Vermont Appaloosa, Spanish Talosna, and Rattlesnake.

More research needs to be done to determine which varieties thrive in our climate and therefore, the Northwest Crops and Soils team plans on repeating this trial in 2016 at both trial locations.

Table 11. Heirloom dry bean germination

Dry bean variety	Seed germination
	%
Black Calypso	60
European Soldier	0
Eye of Goat	25
Jacob's Cattle	55
King of the Early	95
Light Red Kidney	40
Orca	80
Pinto	36
Raquel	70
Rattlesnake	100
Red Calypso	5
Snow Cap	45
Spanish Talosna	95
Tiger Eyes	90
Tongues of Fire	95
Vermont Appaloosa	90
Vermont Cranberry	100
Yellow Eye	29

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