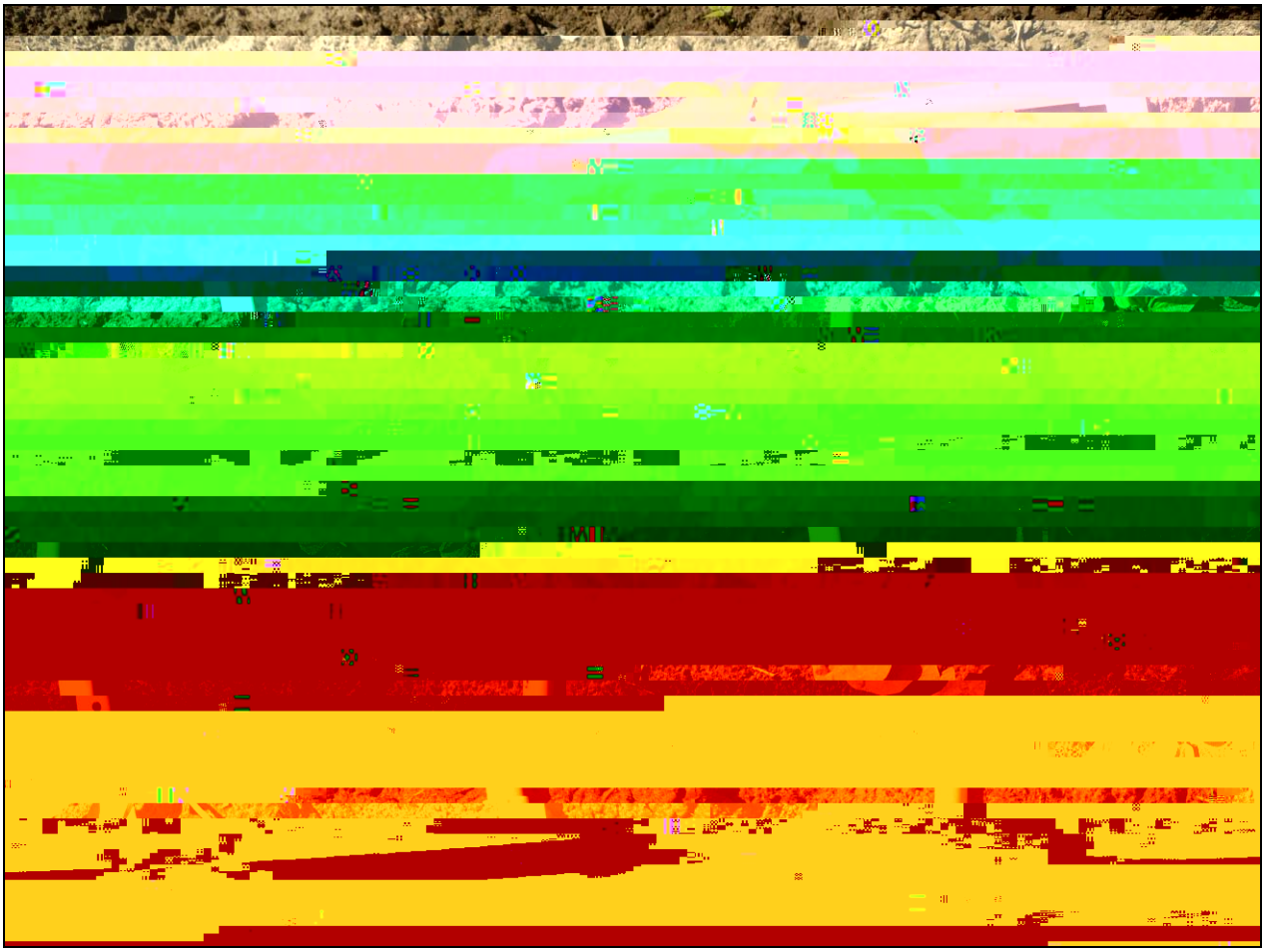
NORTHWEST CROPS & SOILS PROGRAM

2015 Dry Bean Seeding Rate Trial



Dr. Heather Darby, UVM Extension Agronomist
Erica Cummings, Lily Calderwood, Abha Gupta, Julian Post, and Sara Ziegler
UVM Extension Crops and Soils Technicians
(802) 524-6501

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UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

2015 DRY BEAN SEEDING RATE TRIAL

Dr. Heather Darby, University of Vermont Extension
heather.darby[at]uvm.edu

Dry beans (Phaseolus vulgaris), a high-protein pulse crop, have been grown in the Northeast since the

labeled plastic bag, refrigerated, and identified at the UVM Plant Diagnostic Laboratory. All plots were harvested on 22-Sep by hand, and the harvest area was two 5-foot sections in each plot. 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.

Table 2. Dry bean seeding rate trial specifics in Alburgh, VT, 2015.

Trial information	Borderview Research Farm Alburgh, VT
Soil type	Benson rocky silt loam
Previous crop	Corn with cover crop
Tillage operations	Spring plow, disk, and spike tooth harrow
Planting date	29-May
Plot size (feet)	10 x 30
Row spacing (inches)	30
Replicates	3
Plant emergence	11-Jun
Cultivation	4-Row Brillion: 17-Jun and 7-Jul
Harvest date	22-Sep

Data was analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications were treated as random effects and 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 varieties 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 (e.g. yield). Least Significant Differences at the 10% level of probability are shown. Where the difference between two varieties 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 varieties. In the example below, variety A is significantly different from variety C, but not from variety B. The difference between A and B is equal to 725, which is less than the LSD value of 889. This means that these varieties did not differ in yield. The difference between A and C is equal to 1454, which is greater than the LSD value of 889. This means that the yields of these varieties were significantly different from one another. The asterisk indicates that variety B was not significantly lower than the top yielding variety.

Variety	Yield
A	3161
B	3886*
C	**4615***
LSD	889

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 that totaled almost ten inches below the 30 year average. In Alburgh, there was an accumulation of 2578 Growing Degree Days (GDD), 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	-0.6	0.9	4.6
Precipitation (inches)	1.94	6.42	1.45	0.00	0.34
Departure from normal	-1.51	2.73	-2.70	-3.91	-3.30
Growing Degree Days (base 50°F)	416	416	630	624	492
Departure from normal	218	-58	-10	43	174

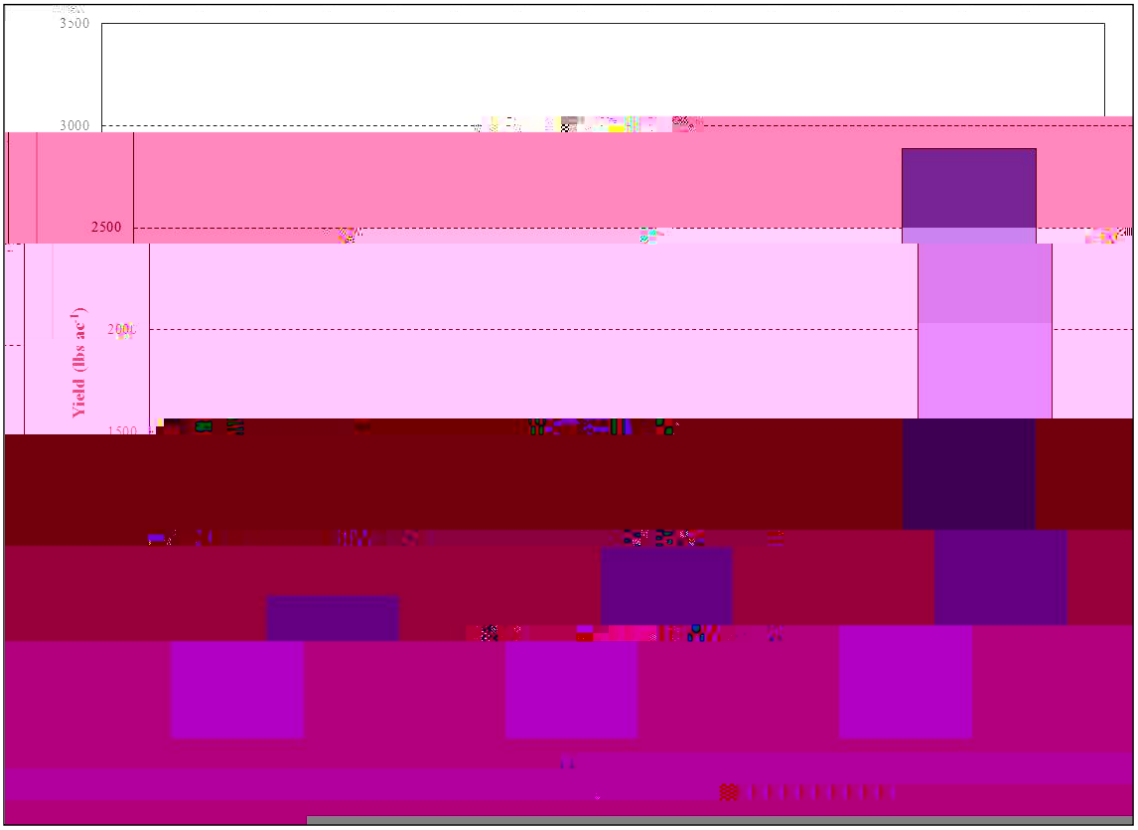
Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger.
Historical averages are for 30 years of NOAA data (1981-2010) from Burlington, VT.

Actual plant populations for all varieties trialed differed from the target seeding rates (Table 4). The black turtle bean population instead ranged from 51,691 (72.8% germination) to 80,731 (64.1% germination). The Pinto bean plant populations ranged from 21,490 (34.1% germination) to 34,848 (35.2% germination), far below the target seeding rates. Similarly, the Yellow eye bean populations were far below the target seeding rates, they ranged from 20,328 (37.4% germination) to 25,846 (23.5% germination). Interestingly, all varieties showed the seeding rates went from low to high although none met the target seeding rates. The actual plant populations of the medium and high seeding rates did not differ stt972-8(e)8(a)8(n)9( )-n1 0 0 1(s)7(t)-4(t972-8(e)8(a)8(n)9( )-n1 0 0 1(s)7(t)-4(t972-8(2(f)6.3)-4(s[d)-n1 c8( )-4(t))9

Pinto	63,000 (low)	21,490	34.1
Pinto	78,000 (medium)	30,492	**39.1**
Pinto	99,000 (high)	**34,848**	35.2
LSD (0.10)		NS	NA
Trial Mean		28,943	36.1

Yellow eye

Black Turtle beans had the highest overall average yield of 2885 lbs ac^{-1}; 1940 lbs ac^{-1} more than the average yield of the Pinto beans (945 lbs ac^{-1}) and 2178 lbs ac^{-1}



yielded significantly higher than the other two varieties. This could be attributed to higher plant populations of the Black turtle beans compared to those of the Pinto and Yellow eye beans. The denser plant canopy helped to minimize weed pressure and resulted in higher yields. More research needs to be done to determine the ideal dry bean seeding rates. Therefore, the Northwest Crops and Soils Program plans on repeating this trial in 2016.

ACKNOWLEDGEMENTS

The UVM Extension Northwest Crops and Soils Team would like to thank Roger Rainville and the staff at the Borderview Research Farm for their generous help with the trials, as well as acknowledge the USDA Northeast Sustainable Agriculture Research and Education (NE-SARE) program for their financial support. We would like to acknowledge Julija Cubins, Hillary Emick, Lindsey Ruhl, and Dan Ushkow for their assistance with data collection and entry. This information is presented with the understanding that no product discrimination is intended and neither endorsement of any product mentioned, nor criticism of unnamed products, is implied.

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