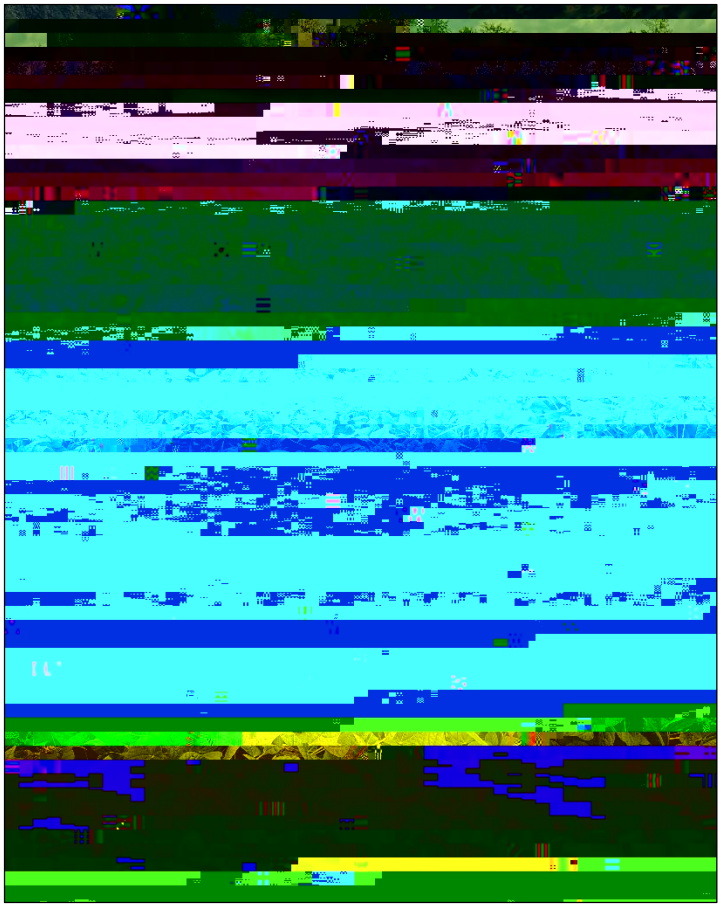
2022 Organic Black Bean Seeding Rate Trial



Dr. Heather Darby, UVM Extension Agronomist
Ivy Krezinski
UVM Extension Crops and Soils Technicians
(802) 524-6501

Visit us on the web at: http://www.uvm.edu/nwcrops

© March 2023, University of Vermont Extension

THE UNIVERSITY OF VERMONT EXTENSION

2022 ORGANIC BLACK 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

more locally-produced foods, and dry beans are no exception. But the yield and quality of organic dry beans has been affected by the lack of information on variety selection, inadequate management of diseases and weeds, and suboptimal recommendations for no-till production. Due to these production challenges, the exponential increase in consumer demand for organic dry beans has not been realized. Current management

For the no-till treatment, winter rye was planted on 20-Sep 2021 at a rate of 3 million pure live seeds ac^{-1} using a Sunflower no-till grain drill. In the spring, the rye was rolled down using a 10 foot I&J Crop Roller Crimper (Camp Douglas, WI) on 31-May 2022. Prior to termination, rye biomass was measured by collecting five representative samples using a $0.5m^2$ quadrat. All above ground plant material was collected using hand clippers, weighed, dried, and reweighed to calculate dry matter and yield. Black beans (VNS) were planted into rolled down rye on 6-Jun 2022 using a John Deere no-till planter. For the tilled treatment, the seedbed was prepared using a Pottinger TerraDisc. Black beans were planted into tilled soil on 31-May 2022 using a 4-row cone planter with John Deere row units fitted with Almaco seed distribution units (Nevada, IA). Prior to planting, all seed was treated with dry bean inoculant (*Rhizobium leguminosarum biovar phaseoli*). Plot sizes were 10ft x 20ft, with 4 rows at 30-inch spacing.

Dry bean emergence was measured 2-3 weeks after planting on 22-Jun 2022. The number of plants in two 1-meter sections were recorded. To assess peak dry bean and weed biomass during the growing season, all above ground plant material was removed from within one $0.5m^2$ quadrat per plot using hand clippers when dry bean plants reached R6/R7 growth stage. This stage is characterized by oldest pods having developed seeds (other parts of the plant have full-length pods with seeds almost as large as first pods; pods will be

RESULTS

Weather data were recorded throughout the season with a Davis Instrument Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT (Table 2). Cool and wet conditions persisted throughout the growing season in 2022. Temperatures were cooler than

Table 3. Statistical significance of tillage, seeding rate, and interactions on black bean productivity, Alburgh, VT, 2022.

	Tillage treatment	Dry bean seeding rate	Treatment x Seeding rate
Emergence population	***	***	*
Whole plant biomass	***	*	**
Weed biomass	***	NS	NS
White mold	NS[§]	NS	NS
Lodging	*	NS	NS

Table 4. Results by tillage treatment for black bean seeding rate trial, Alburgh, VT, 2022.

Treatment	Emergence population	DM yield at R6/R7 growth stage[1]	White mold incidence[2]	Lodging[3]	

LSD (p=0.10)	22777	465.4	NS[§]	NS	NS	34373	1.96	328.0
Trial Mean	117162	3513	225.9	0.03	2.50	130909	26.2	2235

[1]Whole bean plant and weed biomass assessed at R6/R7 growth stage to capture peak biomass. R6/R7 growth stage characterized by oldest pods having developed seeds (other parts of plant have full-length pods with seeds almost as large as first pods; pods will be developed over whole plant).

[2]Incidence; Out of 20 plants, number of plants with signs of white mold.

[3]Lodging; visual assessment of entire plot(1 66.024 626.86 Tm0 g0 G[I0000912 1 66.024 626.86 Tm0 g0 G6.024 626.86 Tm0 g0 G6.024 626.86 Tm0 g

LSD (p=0.10)	16443	856.1	NS§	NS	NS	23433	NS	293.9
Trial Mean	142861	4779	10.4	0.03	2.70	136880	28.8	3079