

Black and navy bean response to row spacing and planting rates, Carrington, 2017.
(Greg Endres and Mike Ostlie)

The field study was conducted at the NDSU Carrington Research Extension Center with support from Northarvest Dry Bean Growers Association to examine the response of black and navy bean to row spacing and planting rates. Experimental design was a randomized complete block with split-split plot arrangement (whole plot=2 market types, sub plot=3 row spacings, sub-sub plot=3 planting rates) with four replications. The dryland experiment was conducted on a conventionally-tilled Heimdal-Emrick loam soil. ‘Eclipse’ black and ‘Avalanche’ navy bean were planted on May 26 in 14-, 21- and 28-inch rows with three planting rates. Targeted stands with planting rates of 100,000, 125,000 and 150,000 pls/acre were 90,000, 110,000 and 130,000 plants/acre, respectively. After maturity, plants were hand-pulled and placed in windrows on September 6 and seed was harvested with a plot combine on September 8.

With each market type, plant development [emergence, flowering (data not shown) and maturity], lodging and stand; canopy closure; seed yield; test weight; and seed count generally were similar among row spacing and planting rates (Tables 1 and 2). Navy bean seed yield tended to increase with decreasing row spacing.

Table 1. Black bean response to row spacing and planting rates, Carrington, 2017.								
Treatment	Plant ¹					Seed		
	Emerge	Stand	Canopy	Physiological	Lodging	Yield	Test weight	Count
	Jday	(June 12) plt/A	closure (August 4) %	maturity Jday	(Sept. 5) 0-9			
Row spacing (inches):								
14	157	128,300	82	243	0	2078	59.3	2130
21	157	127,960	69	240	0	1988	59.1	2205
28	157	135,650	65	241	0	2074	59.5	2180
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	NS	10.1	6.5	1.0	129.7	20.1	1.0	6.2
Planting rate (pls/acre):								
100,000	157	105,660	71	242	0	2060	59.4	2140
125,000	157	129,590	72	242	0	2036	59.4	2175
150,000	157	156,650	73	241	0	2044	59.2	2200
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	0.1	7.2	3.8	0.4	116.2	8.9	0.6	3.0
¹ Jday: 157=June 6; 242=August 30.								

Table 2. Navy bean response to row spacing and planting rates, Carrington, 2017.

Treatment	Plant ¹					Seed		
	Emergence	Stand (June 12)	Canopy closure (August 4)	Physiological maturity	Lodging (Sept. 5)	Yield	Test weight	Count
	Jday	plt/A	%	Jday	0-9	lb/A	lb/bu	no./lb
Row spacing (inches):								
14	156	121,180	93	246	1.0	2576	61.0	2220
21	157	111,720	76	246	0.5	2118	60.5	2165
28	157	113,120	71	246	0.5	1991	60.6	2095
LSD (0.05)	1	NS	NS	NS	0.5	NS	NS	NS
CV (%)	0.2	10.1	6.5	1.0	129.7	20.1	1.0	6.2
Planting rate (pls/acre):								
100,000	157	92,960	79	246	0.5	2217	60.7	2130
125,000	157	114,250	80	246	0.5	2155	60.6	2165
150,000	157	138,810	81	246	0.5	2311	60.9	2180
LSD (0.05)	NS	NS	NS	NS	NS	NS	0.3	NS
CV (%)	0.1	7.2	3.8	0.4	116.2	8.9	0.6	3.0
¹ Jday: 157=June 6; 246=September 3.								

Averaged across market types and planting rates (Table 3), and with similar plant population, canopy closure was greater with decreasing row spacing. Seed yield was similar but tended to be highest with 14-inch rows. Averaged across market types and row spacing, plant stands were 99,300, 121,900 and 147,700 plants/acre with the low, medium and high planting rates, respectively. Plant development, canopy closure and seed yield were similar among the three planting rates and plant stands. Seed count indicated larger seed with the low- vs. high-seeding rates.

Table 3. Black and navy bean response to row spacing and planting rates, Carrington, 2017.

Treatment	Plant ¹					Seed		
	Emergence	Stand (June 12)	Canopy closure (August 4)	Physiological maturity	Lodging (Sept. 5)	Yield	Test weight	Count
	Jday	plt/A	%	Jday	0-9	lb/A	lb/bu	no./lb
Row spacing (inches):								
14	157	124,741	87	245	0.5	2327	60.2	2175
21	157	119,841	73	243	0.5	2053	59.8	2185
28	157	124,385	68	244	0.5	2032	60.1	2135
LSD (0.05)	NS	NS	3	NS	NS	NS	NS	NS
CV (%)	0.2	10.1	6.5	1.0	129.7	20.1	1.0	6.2
Planting rate (pls/acre):								
100,000	157	99,313	75	244	0.5	2137	60.0	2135
125,000	157	121,922	76	244	0.5	2096	60.0	2170
150,000	157	147,731	77	244	0.5	2178	60.1	2190
LSD (0.05)	NS	5,210	NS	NS	NS	NS	NS	40
CV (%)	0.1	7.2	3.8	0.4	116.2	8.9	0.6	3.0
¹ Jday: 157=June 6; 244=September 1.								

No factors had statistical significance with the interaction of row spacing and planting rates. Seed yield was statistically significant with the interaction of market types, row spacing and planting rates. Highest seed yield (2440-2700 lb/acre) was obtained with navy bean in 14-inch rows at all three planting rates.