Pinto bean response to row spacing and plant population, Carrington, 2020.
(Greg Endres, Bryan Hanson and Mike Ostlie)

The field trial was conducted at the NDSU Carrington Research Extension Center with support from Northarvest Dry Bean Growers Association to examine the response of pinto bean to row spacing and plant population. Experimental design was a randomized complete block with split plot arrangement (whole plot = row spacings, split plot = plant populations) with four replications. 'ND Palomino' was planted on June 2 on a conventionally-tilled Heimdal-Emrick loam soil in 28- and 21-inch rows, and 7-inch paired rows (centered at 28 inches) with planting rates of 60,000, 85,000 and 110,000 pure live seed/acre to establish targeted stands of 50,000, 70,000 and 90,000 plants/acre, respectively. After maturity, plants were hand-pulled and placed in windrows on September 9 and seed was harvested with a plot combine on September 11.

Averaged across planting rates, plant stand was similar among row spacings (Table). Plant emergence, first flower and maturity were similar among row types. Canopy closure was similar between 21-inch and paired rows, and both greater than 28-inch rows. White mold was not observed in the trial. Plant lodging was slightly less with 21-inch and paired rows compared to wide rows. Seed yield and test weight were similar among row types. Seed count was slightly less with wide rows compared to other row types.

Table. Pinto bean response to row spacing and plant population, Carrington, 2020.

	Plant[1]							Seed		
				Canopy closure (June 31)						
	Emerge	Stand (June 24)	Flower	Visual	Canopeo	Physiological maturity	Lodge (Sept. 2)	Yield	TW	Count
Treatment	DOY	plt/A	DOY	%		DOY	0-9	lb/A	lb/bu	seeds/lb
Row spacing (inches):										
28	164	60,737	204	68	71	244	4	1792	59.7	1,402
21	164	53,965	204	86	82	244	3	1670	59.4	1,474
paired 7	164	56,229	204	90	88	243	3	1910	59.7	1,496
LSD (0.10)	NS	NS	NS	7	7	NS	1	NS	NS	71
CV (%)	0.4	22.2	0.3	10.7	11.3	0.3	30.2	18.3	0.5	0.5
Planting rate (pls/acre):										
60,000	164	39,775	204	76	76	244	4	1685	59.6	1444
85,000	163	55,431	204	83	81	243	3	1800	59.5	1470
110,000	163	75,726	204	84	84	244	4	1887	59.6	1458
LSD (0.10)	1	6,816	NS	3	4	1	NS	116	NS	NS
CV (%)	0.6	16.9	0.2	4.5	6.5	0.3	25.8	9.1	0.6	0.6

[1]DOY (day of year): 164=June 12; 204=July 22; 244=August 31. Plant lodge: 0=all stems and branches vertical; 9=all stems and branches horizontal.

Averaged across row spacings, early season plant population was 39,775, 55,431 and 75,726 plants/acre with low, medium and high planting rates, respectively. Ratio of established plants compared to planting rates: 66%=low, 65%=medium and 69%=high. The relatively low percentage of established plants compared to planting rate may have been due to seed with possibly lower vigor. No practical differences were present with plant development. Canopy closure was similar between 55,430 and 75,730 plants/acre, and slightly greater than the low population of 39,770 plants/acre. Plant lodging was similar among plant populations. Yield was similar between the medium and high plant populations, and 115 to about 200 lb/acre greater than yield with the low population. Test weight was similar among plant populations.

No agronomic factors had statistical significance with the interaction of row spacing and plant population.