

Pinto bean response to starter and post-applied fertilizer, Carrington, 2017.

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A field study was conducted at the NDSU Carrington Research Extension Center with support from Northarvest Dry Bean Growers Association to examine the performance of pinto bean with selected phosphorus (P), Zinc (Zn), and sulfur (S) starter and post-applied fertilizer. Experimental design was a randomized complete block with four replications. The dryland trial was established on a conventional-tilled loam soil with 3.5% organic matter, 8.2-8.6 pH (0-24 inch depth), 51 lb/A nitrate-N, 8 ppm (med) P, 269 ppm (high) potassium and 0.83 ppm (med) Zn. Fungicide-treated 'Lariat' was planted with a 5-row planter in 22-inch rows on May 30 (Jday 150). Starter fertilizer was in-furrow (IF) applied at planting. Post-emergence fertilizer treatments were applied on July 31 at the R3-5 stages with a hand-boom sprayer delivering 14 gpa through 8001 flat-fan nozzles at 35 psi. Plants were hand-pulled for field drying on September 12 and seed harvested with a plot combine on September 13.

Soil variation in the trial area increased variability among plots and treatments. Days from planting to plant emergence, flowering, and maturity generally were similar among treatments (table). A trend existed for a delay in maturity with fertilizer treatments compared to the untreated check. Plant stand was similar among treatments but generally tended to decrease with IF fertilizer compared to the untreated check. Water dilution of 10-34-0 did not increase stand versus straight 10-34-0. Percent canopy closure was similar among treatments, though tended to be greater with fertilizer treatments compared to the untreated check. Seed yield, test weight, and seed protein were similar among treatments, though yield tended to increase with fertilizer treatments compared to the untreated check. IF 10-34-0 supplemented with IF- or post-applied Zn tended to increase yield.

Table. Pinto bean response to in-furrow starter and post-applied fertilizer, Carrington, 2017.

Fertilizer treatment ^a	Plant ^b					Seed			
	Emergence	Stand (12-Jun)	Flower (R1)	Canopy closure (21-Aug)	Physiological maturity (R9)	Yield	Test weight	Seeds/lb	Protein
	Jday	plt/A	Jday	%	Jday	lb/A	lb/bu		%
untreated check	159	76,510	199	84	246	2089	59.0	1247	18.5
IF 10-34-0 at 3 gpa	159	77,710	200	89	249	2298	59.2	1208	18.9
IF 10-34-0 at 3 gpa + water at 3 gpa	159	73,279	200	89	248	2451	59.8	1249	18.8
IF 10-34-0 at 2.75 gpa + water at 0.25 gpa	159	66,709	200	92	249	2728	59.5	1240	18.7
IF NWC Zn at 0.25 gpa + water at 2.75 gpa	159	69,874	199	94	249	2998	60.0	1202	18.6
IF 10-34-0 at 2.75 + NWC Zn at 0.25 gpa	159	69,080	199	86	247	2462	59.3	1252	18.4
IF 10-34-0 at 2.75 + water at 0.25 gpa/Post NWC Zn at 0.25 gpa	159	65,316	200	89	248	2568	59.5	1244	18.3
IF Redline at 2 gpa + water at 1 gpa	159	67,463	198	87	247	2487	59.4	1210	18.8
IF 10-34-0 at 2.75 gpa + NWC Zn at 0.25 gpa/Post MAX-IN S at 0.5 gpa	159	69,242	199	92	248	2750	59.1	1205	18.8
IF RizeR at 1 gpa + Accomplish LM at 0.25 gpa + water at 1.75 gpa	159	69,641	199	89	248	2536	59.2	1198	19.3
mean	159	70,482	199	89	248	2537	59.4	1226	18.7
CV (%)	0.1	1.2	0.3	6.6	0.7	2.4	1.1	3.4	2.6
LSD (0.05)	NS	NS	1	NS	NS	NS	NS	NS	NS

^aNWC Zn: 9.5% N, 4% S and 10% Zn chelate (Northwest Chemical). Redline: 6% N, 12% P, 2% K, 1% Zn, 0.3% Fe, 0.04% Mn, and 0.05% Cu (West Central). MAX-IN S= 0-0-19-13 (Winfield). RizeR: 7% N, 17% P, 3% K, 0.95% Zn, 0.2% Fe, 0.06% Mn, and 0.07% Cu; Accomplish LM: biochemical fertilizer catalyst (Loveland)

^bJday: 159=June 8; 199=July 18; 248=Sep 5. Plant stage at stand count = VC.