

**Pinto bean response to starter and post-applied fertilizer, Carrington, 2018.**

(Greg Endres, Sam Richter 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 performance of pinto bean with selected treatments of phosphorus (P), Zinc (Zn), and sulfur (S) starter and post-applied fertilizer. Experimental design was a randomized complete block with four replications. Previous crop in 2017 was field pea. The dryland experiment was established on a conventional-tilled loam soil with 3.3% organic matter, 8.0 pH (0- to 6-inch depth), 6 ppm (med) P, 167 ppm (high) K and 0.35 ppm (med) Zn. Fungicide-treated 'Lariat' was planted with a 5-row planter in 22-inch rows on June 20. Starter fertilizer was in-furrow (IF) applied at planting. Post-emergence fertilizer treatments were applied on August 6 at the R3-4 stages with a hand-boom sprayer delivering 14 gpa through 80015 flat-fan nozzles at 35 psi. Plants were hand-pulled for field drying on September 17 and seed harvested with a plot combine on September 25.

Trial was replanted (original planting date of May 29) due to poor plant stands from soil herbicide residue and was limited to two replications for data. Days from planting to plant emergence, flowering, and maturity were similar among treatments (table). Plant stand was similar among treatments but tended to decrease with IF fertilizer compared to the untreated check. Seed yield, test weight, seed count and protein content were similar among treatments.

Table. Pinto bean response to in-furrow and post-applied fertilizer, Carrington, 2018.

| Fertilizer treatment <sup>a</sup>   | Plant <sup>b</sup> |                |             |                             | Seed  |             |        |         |
|---|--------------------|----------------|-------------|-----------------------------|-------|-------------|--------|---------|
|   | Emergence          | Stand (12-Jul) | Flower (R1) | Physiological maturity (R9) | Yield | Test weight | Count  | Protein |
|   | DOY                | plt/A          |             | DOY                         | lb/A  | lb/bu       | no./lb | %       |
| untreated check   | 178                | 86,010         | 212         | 256                         | 1640  | 57.1        | 1523   | 23.1    |
| IF 10-34-0 at 3 gpa   | 178                | 74,620         | 212         | 257                         | 1835  | 57.8        | 1482   | 22.8    |
| IF 10-34-0 at 3 gpa + water at 3 gpa  | 178                | 84,740         | 212         | 256                         | 1777  | 57.5        | 1476   | 22.8    |
| IF 10-34-0 at 2.75 gpa + water at 0.25 gpa                                      | 179                | 67,030         | 212         | 256                         | 1595  | 58.2        | 1490   | 23.5    |
| IF NWC Zn at 0.25 gpa + water at 2.75 gpa                                       | 179                | 78,420         | 212         | 255                         | 1491  | 57.2        | 1566   | 23.3    |
| IF 10-34-0 at 2.75 + NWC Zn at 0.25 gpa   | 179                | 84,740         | 212         | 255                         | 1560  | 57.4        | 1493   | 22.9    |
| IF 10-34-0 at 2.75 + water at 0.25 gpa/Post NWC Zn at 0.25 gpa                  | 178                | 78,420         | 212         | 256                         | 1766  | 57.7        | 1567   | 23.6    |
| IF Redline at 2 gpa + water at 1 gpa  | 179                | 78,420         | 212         | 256                         | 1682  | 57.3        | 1485   | 22.8    |
| IF 10-34-0 at 2.75 gpa + NWC Zn at 0.25 gpa/Post MAX-IN S at 0.5 gpa            | 178                | 78,420         | 212         | 256                         | 1675  | 58.3        | 1439   | 23.2    |
| IF RizeR at 1 gpa + Accomplish LM at 0.25 gpa + water at 1.75 gpa               | 179                | 74,620         | 212         | 255                         | 1765  | 57.3        | 1557   | 22.5    |
| IF 10-34-0 at 2.75 gpa/ Post Ascend at 6.4 fl oz + MAX-IN Ultra ZMB at 0.25 gpa | 179                | 72,090         | 212         | 255                         | 1660  | 58.0        | 1494   | 23.3    |
| mean  | 178                | 77,960         | 212         | 255                         | 1677  | 57.6        | 1507   | 23.1    |
| CV (%)  | 0.3                | 7.9            | x           | 0.3                         | 15.8  | 1.2         | 5.7    | 1.8     |
| LSD (0.05)  | NS                 |                |             |                             |       |             |        |         |

<sup>a</sup>NWC 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); MAX-IN Ultra ZMB: 3.6% S, 0.1% B, 3.0% Mn, 4.0% Zn (Winfield).

<sup>b</sup>DOY (day of year): 178=June 27; 212=July 31; 255=Sep 12.