# 65th Annual Report
# National Cooperative Dry Bean Nurseries

# 2014

**Compiled by**
**Phillip N. Miklas, Coordinator**
**USDA-ARS**

**Cooperative Investigation among California, Colorado, Idaho, Maryland, Michigan, Montana, Nebraska, New York, North Dakota, Washington, and Wyoming -State Experiment Stations and Agricultural Research Centers- as part of the Regional W2150 Multi-State Project**

and

**University of Guelph, Canada**

and

**Agriculture Research Service – USDA**

**Call for 2015 Cooperative Dry Bean Nursery**

**Seed Submissions**

It is time to request seed submission for 2015 Cooperative Dry Bean Nurseries. I would like to receive **the list of seed submission** no later than **April 1, 2015** and **the seed** must be here no later than **April 15, 2015**. All entries will be planted in replicated test plots across several locations in the United State and Canada. Data will be taken for seed yield, 100-seed weight and several agronomic and marketing characteristics. They will also be included in several disease nurseries including bean rust and ….. Michigan will conduct canning tests.

**The seed requirements** for each of the three groups are as follows:

1. Small-seeded (Black, Navy, Others): ~**15 lbs/line**.
2. Medium-seeded (Great Northern, Pink, Pinto, Small Red, Others): ~**25 lbs/line**.
3. Large-seeded (Cranberry, Kidney, Others): ~**35 lbs/line**.

**Or 20,000 seeds**

**As in the past, all lines must be:**

X Western grown (West of the Rocky Mountain)
X Pathogen free
X If susceptible to BCMV, an ELISA test will be required.
X Acceptable commercial quality (no broken, decayed, or off color seed)
X **Seed should be untreated**

**Fees**: This fee structure was decided by the W-1150 members at The Annual meeting in Mayaguez, Puerto Rico in 2003

Public institutions: $150/ line submitted
Private institutions: $300/line submitted

**NURSERY OPERATIONS**

Public institutions that request a nursery will be charged US $150 to defray seed handling expenses including treating, bagging, boxing and shipping costs. Please let me know if your institution is going to submit the seeds and participate in the field trial for 2015 CDBN.

Should you have any questions or concerns about the submission or participant fees please contact me or if you know anyone else who might like to submit seed or plant the nursery please let me know.

**Contact and Shipping Information:**

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**Table 1. List of Contributors and Cooperators - 2014**

| Name | Location | Seed Submit | Planting seed | Locations no. |
|---|---|---|---|---|
| Shree Singh | Kimberly, ID | | yes | 1 |
| Mike Moore | Powell, WY | | yes | 2 |
| Bob Baumgartner | Lingle, WY | | yes | 3 |
| Paul Gepts, Antonia Palkovic | Davis, CA | yes | yes | 4 |
| Phil Miklas | Othello, WA | yes | yes | 5 |
| Mark Brick, Barry Ogg | Ft. Collins, CO | yes | yes | 6 |
| Juan M. Osorno | Hatton, ND; Park Rapids, MN | yes | yes | 7 |
| Carlos Urrea, Jim Schild | Scottsbluff, NE | | yes | 8 |
| Jim Kelly, Evan Wright | Frankenmuth, MI | yes | yes | 9 |
| Don Halseth<br>Eric Sandsted | Freeville, NY | yes | yes | 10 |
| Joyce Eckhoff | Sidney, MT | | yes | 11 |
| Peter Pauls, Tom Smith Alireza Navabi | Elora R.S, Ont | yes | yes | 12 |
| Talo Pastor- Corrales | Beltsville, MD | | yes (rust test) | |
| Bill Dean | Kimberly, ID | yes | yes (1 rep) | |
| James Myers | Corvallis, OR | yes | no | |

**Table 2. Contact information for 2014 Cooperative Dry Bean Nursery**

| Loc | First | Last | Affiliation | EMAIL | Phone |
|---|---|---|---|---|---|
| CA | Paul | Gepts | University of CA – Davis | plgepts@ucdavis.edu | 530-752-774 |
| CA | Antonia | Palkovic | University of CA – Davis | antoniapalkovic@gmail.com | |
| CO | Mark | Brick | Colorado State University | Mark.Brick@colostate.edu | 970-491-6551 |
| | Barry | Ogg | Colorado State University | Barry.Ogg@Colostate.edu | |
| ID | Shree | Singh | University of Idaho | singh@kimberly.uidaho.edu | 208-423-6559 |
| MD | Marcial | Pastor-Corrales | USDA/ARS | pastorm@ba.ars.usda.gov | 301-504-6600 |
| MI | Jim | Kelly | Michigan State University | kellyj@msu.edu | 517-355-0271 ext. 1181 |
| MT | Joyce | Eckhoff | MSU Eastern Ag Research Center | joyce.eckhoff@montana.edu | 406-433-2208 |
| ND | Juan | Osorno | North Dakota State University | juan.osorno@ndsu.edu | 701-231-8145 |
| NE | Jim | Schild | University of Nebraska | jschild@unl.edu | 308-632-1480 |
| NY | Donald | Halseth | Cornell University | deh3@cornell.edu | 607-255-5460 |
| | Eric | Sandsted | Cornell University | ers23@cornell.edu | |
| ON | Peter | Pauls | University of Guelph | ppauls@uoguelph.ca | 519-824-4120 ext 52460 |
| | Tom | Smith | University of Guelph | thsmith@uoguelph.ca | 519-824-4120 ext 8339 |
| PR | James | Beaver | University of Puerto Rico | j_beaver@hotmail.com | 787-832-4040 ext. 2566 |
| WA | Phil | Miklas | USDA-ARS | phil.miklas@ars.usda.gov | 509-786-9258 |
| WY | Mike | Moore | University of Wyoming | mdmoore@uwyo.edu | 307-754-9815 |
| WY | Baumgartner | Robert | University of Wyoming | Baumgart@uwyo.edu | 307 837 2000 |

**Table 3. List of 2014 Cooperative Dry Bean Nursery Entries**

| | | | | |
|---|---|---|---|---|
| 1 | Othello | check | ARS-Miklas | pinto |
| 2 | CELRK | check | ARS-Miklas | LRK |
| 3 | T39 | check | ARS-Miklas | black |
| 4 | PT11-13 | | ARS-Miklas | pinto |
| 5 | PT12-37 | | ARS-Miklas | pinto |
| 6 | CO 91212-4 | | CSU-Brick | pinto |
| 7 | ISB-P1 | | ISB-Dean | pinto |
| 8 | ISB-P3 | | ISB-Dean | pinto |
| 9 | ISB-19 | | ISB-Dean | pinto |
| 10 | ISB-20 | | ISB-Dean | pinto |
| 11 | Rosetta | | Kelly-MSU | pink |
| 12 | ElDorado | | Kelly-MSU | pinto |
| 13 | Powderhorn | | Kelly-MSU | GN |
| 14 | Snowdon | | Kelly-MSU | WK |
| 15 | Gypsy Rose | R11806 | Kelly-MSU | FDM |
| 16 | ND061210 | Talon | Osorno-NDSU | DRK |
| 17 | ND061106 | Rosie | Osorno-NDSU | LRK |
| 18 | ND060197 | | Osorno-NDSU | pinto |
| 19 | UCD 9634 | | Gepts-UCD | pink |
| 20 | UCD 9623 | | Gepts-UCD | FDM |
| 21 | Fathom | | Smith - Guelph | navy |
| 22 | Yeti | | Smith - Guelph | WK |
| 23 | Majesty | | Smith - Guelph | DRK |
| 24 | Inferno | | Smith - Guelph | LRK |
| 25 | 24-2 | DBY-24-2 | Myers | Yellow |
| 26 | 28-1 | DBY-28-1 | Myers | Yellow |
| 27 | 54-1 | DBY-54-1 | Myers | Yellow |
| 28 | 60-1 | DBY-60-1 | Myers | Yellow |
| 29 | R12859 | | Kelly-MSU | Red |
| 30 | NY104 | | Sandsted | LRK |
| 31 | NY105 | | Sandsted | LRK |
| 32 | 96-148 | | Sandsted | Black |
| 33 | 23ST-27 | | Osorno-NDSU | Pinto |
| 34 | SF103-8 | | Osorno-NDSU | Pinto |

## The 2014 CDBN

The 2014 CDBN comprised 31 test entries and three checks.

**Agronomic nurseries**
There were approximately 1600 seeds supplied to each location sufficient to plant four 4-row replications, 20 to 25 feet long, for each entry. Seed treatment was provided by Syngenta Seed Co. and consisted of Cruiser, Maxim XL + Apron XL (MSDS are included with bean shipment unless nursery operator requested otherwise). Note Idaho Seed Bean received 100 seeds of each entry for observation.

**Disease Nurseries**
There were 400 seeds (untreated) supplied to Beltsville, MD, for rust screening.

## DATA RECORDING AND SCALES

The following were commonly recorded data by the CDBN collaborators. For ease and uniformity of reporting we shall describe and abbreviate each trait:

1. **Early Vigor (EV)**: Scored on a 1 to 9 scale, where 1= excellent and 9= very poor, within the first 3 weeks after emergence.
2. **Days to Flower (DF)**: Actual number of days from planting to when approximately 50% plants in a plot have at least one opened flower.
3. **Days to Maturity (DM)**: Actual number of days from planting to when approximately 50% of plants in a plot have at least one dry pod.
4. **Plant Height (PH)**: Record in cm from the base of the plant (soil surface) to the top node bearing at least one dry pod with seed.
5. **Growth Habit (GH)**: Record during flowering and verified when crop is senescent as type I=determinate erect or upright, II= indeterminate erect, and III= indeterminate prostrate.
6. **Lodging (LG)**: Scored at harvest on a 1 to 9 scale, where 1= 100% plants standing erect, and 9= 100% plants lay flat on the ground.
7. **Pod Clearance (PC)**: Recorded at harvest as percent of pods on plants not touching the ground or in contact with the soil surface.
8. **Biomass Yield (BY)**: Total plant dry weight recorded at 12% moisture and rounded up to the nearest whole number (lb/a).
9. **Seed Yield (SY)**: Recorded in lb/a at 12 % moisture and rounded up to the nearest whole number.
10. **Harvest Index (HI)**: The ratio of SY/BY expressed in % BY at 12% moisture.
11. **Weight of 100 seeds (SW)**: Weight of 100 randomly taken undamaged seed in grams at 12 % moisture.
12. **Appearance Desirability (SD)**: An aggregate value for seed size, shape, color and brilliance for the respective market class recorded by various scales (see footnotes).

For other traits and scoring methods, a footnote is provided with associated details.

**Table 4. Summary agronomic and rust reaction data for the 2014 CDBN.†**

| | Market class | Seed yield | Seed weight | Days to flowering | Harvest maturity | Rust (MD) | Rust (CO) |
|---|---|---|---|---|---|---|---|
| **Line** | | **lbs/a** | **g 100 sd-1** | **days** | **days** | **1 to 9** | **1 to 6** |
| **96-148** | Black | 3112 | 24.6 | 50 | 105 | 1 | 2 |
| **T-39** | Black | 2935 | 20.2 | 50 | 102 | 1 | 2 |
| **Fathom** | Navy | 3246 | 22.6 | 45 | 103 | 8 | 5,6 |
| **Gypsy Rose** | FDM | 3447 | 29.6 | 49 | 103 | 5 | 5 |
| **UCD-9623** | FDM | 2700 | 36.4 | 42 | 93 | 8 | 5,6 |
| **Powderhorn** | GN | 3251 | 35.7 | 45 | 96 | 4 | 1 |
| **Rosetta** | Pink | 3122 | 34.5 | 47 | 101 | 6 | 5,6 |
| **UCD-9634** | Pink | 3020 | 35.1 | 44 | 98 | 8 | 5,6 |
| **R12859** | Red | 3099 | 35.6 | 46 | 96 | 4 | 1 |
| **PT11-13** | Pinto | 3979 | 38.3 | 47 | 99 | 2 | 1 |
| **PT12-37** | Pinto | 3654 | 38.6 | 49 | 100 | 2 | 2 |
| **ElDorado** | Pinto | 3453 | 44.5 | 45 | 105 | 8 | 5,6 |
| **23ST-27** | Pinto | 3392 | 39.5 | 47 | 96 | 8 | 5,6 |
| **ISB-19** | Pinto | 3375 | 37.8 | 44 | 98 | 2 | 2 |
| **ND060197** | Pinto | 3257 | 34.5 | 46 | 95 | 3 | 2 |
| **CO-91212-4** | Pinto | 3160 | 39.5 | 48 | 100 | 2 | 2 |
| **ISB-20** | Pinto | 3120 | 39.8 | 43 | 96 | 2 | 1 |
| **SF103-8** | Pinto | 3071 | 38.3 | 43 | 98 | 7 | 5,6 |
| **ISB P1** | Pinto | 2925 | 37.2 | 43 | 93 | 8 | 5,6 |
| **ISB P3** | Pinto | 2833 | 37.7 | 43 | 92 | 8 | 5,6 |
| **Othello** | Pinto | 2695 | 38.1 | 42 | 89 | 8 | 5,6 |
| **Majesty** | DRK | 2368 | 67.7 | 47 | 101 | 6 | 3 |
| **Talon** | DRK | 2208 | 52.5 | 44 | 99 | 7 | 1 |
| **Inferno** | LRK | 2909 | 60.7 | 44 | 104 | 5 | 2,3 |
| **NY-104** | LRK | 2462 | 59.0 | 42 | 94 | 8 | 4 |
| **NY-105** | LRK | 2371 | 63.7 | 41 | 95 | 8 | 3 |
| **Rosie** | LRK | 2291 | 52.3 | 44 | 102 | 7 | 4 |
| **CELRK** | LRK | 2252 | 58.1 | 41 | 92 | 8 | 4 |
| **Yeti** | WK | 2484 | 54.8 | 44 | 102 | 7 | 2 |
| **Snowdon** | WK | 2176 | 62.0 | 41 | 96 | 7 | 3 |
| **DBY-28-1** | Yellow | 3269 | 44.5 | 48 | 101 | 7 | 5 |
| **DBY-60-1** | Yellow | 3200 | 43.7 | 42 | 100 | 8 | 4 |
| **DBY-24-2** | Yellow | 3094 | 45.6 | 47 | 102 | 7 | 5 |
| **DBY-54-1** | Yellow | 2897 | 44.6 | 46 | 101 | 7 | 4 |

†Across locations not all market classes are tested in the exact same trial. At certain locations large, medium and small seeded market classes are tested in different trials within the same field or in completely different locations.

**Table 5. 2014 Summary for seed yield (lbs/A) for individual locations and averaged across locations.**

| | Market | 2-Jun | 27-May | 5-Jun | 23-May | 9-Jun | 3-Jun | 20-Jun | 5-Jun | 30-May | 27-May | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Line** | **class** | **CA** | **ID** | **MI** | **MT** | **ND** | **NE** | **NY** | **ON** | **WA** | **WY** | **Mean** |
| **96-148** | Black | 2348 | 2986 | 3754 | 3530 | 3080 | 3511 | 3043 | 3538 | 3339 | 1992 | 3112 |
| **T-39** | black | 2488 | 2096 | 3054 | 3953 | 2740 | 3343 | 2711 | 3474 | 3274 | 2216 | 2935 |
| **Fathom** | navy | 2484 | 3396 | 3614 | 4023 | 3180 | 3353 | 3020 | 3439 | 3508 | 2446 | 3246 |
| **Gypsy Rose** | FDM | 3049 | 3431 | 4673 | 3777 | 3070 | 3826 | 2974 | 3284 | 3572 | 2813 | 3447 |
| **UCD-9623** | FDM | 2436 | 2190 | 2868 | 4650 | 2600 | 3370 | 2439 | 2168 | 2143 | 2135 | 2700 |
| **Powderhorn** | GN | 1638 | 2857 | 3962 | 4733 | 3260 | 3660 | 2505 | 3186 | 3799 | 2908 | 3251 |
| **Rosetta** | pink | 2694 | 2342 | 3860 | 3920 | 3030 | 4078 | 2987 | 2796 | 2934 | 2576 | 3122 |
| **UCD-9634** | pink | 3375 | 2963 | 3389 | 4067 | 2790 | 3601 | 2618 | 2472 | 2677 | 2251 | 3020 |
| **R12859** | Red | 2045 | 3525 | 3906 | 4447 | 2960 | 3675 | 2753 | 2753 | 2775 | 2154 | 3099 |
| **PT11-13** | pinto | 3696 | 4309 | 4727 | 4690 | 3410 | 4293 | 2917 | 3781 | 4347 | 3620 | 3979 |
| **PT12-37** | pinto | 2936 | 3993 | 4231 | 3960 | 3550 | 3882 | 3132 | 3650 | 4377 | 2826 | 3654 |
| **ElDorado** | pinto | 2013 | 3080 | 4779 | 3977 | 3340 | 4093 | 3022 | 4270 | 3626 | 2334 | 3453 |
| **23ST-27** | Pinto | 2758 | 3677 | 3565 | 4497 | 3160 | 3783 | 2554 | 2993 | 4104 | 2826 | 3392 |
| **ISB-19** | pinto | 2615 | 3782 | 4035 | 3823 | 3450 | 3502 | 2087 | 3225 | 4164 | 3068 | 3375 |
| **ND060197** | pinto | 2077 | 3443 | 3774 | 4650 | 3090 | 3310 | 2577 | 2986 | 4135 | 2527 | 3257 |
| **CO-91212-4** | pinto | 2441 | 3127 | 3466 | 4013 | 2790 | 3922 | 2474 | 2946 | 4167 | 2258 | 3160 |
| **ISB-20** | pinto | 2572 | 4040 | 3430 | 3643 | 2950 | 3085 | 2085 | 2865 | 3843 | 2690 | 3120 |
| **SF103-8** | Pinto | 840 | 3314 | 3755 | 4157 | 2440 | 3464 | 2767 | 3490 | 4084 | 2401 | 3071 |
| **ISB P1** | pinto | 2796 | 2927 | 3223 | 4737 | 2610 | 3248 | 1637 | 2186 | 3316 | 2574 | 2925 |
| **ISB P3** | pinto | 3146 | 3021 | 3164 | 4330 | 2340 | 2711 | 2204 | 2188 | 3243 | 1984 | 2833 |
| **Othello** | pinto | 3089 | 2471 | 2599 | 4260 | 2140 | 3197 | 2789 | 1138 | 3164 | 2105 | 2695 |
| **Majesty** | DRK | 1685 | 2026 | 3058 | 3947 | 880 | 2476 | 2511 | 2503 | 2421 | 2176 | 2368 |
| **Talon** | DRK | 1594 | 1581 | 3319 | 3747 | 2090 | 2551 | 2039 | 2978 | 1151 | 1028 | 2208 |
| **Inferno** | LRK | 2341 | 3091 | 2707 | 3523 | 2450 | 3136 | 3045 | 3686 | 2790 | 2316 | 2909 |
| **NY-104** | LRK | 3442 | 1979 | 3608 | 3740 | 820 | 2406 | 2618 | 2714 | 2094 | 1199 | 2462 |
| **NY-105** | LRK | 2764 | 1815 | 2978 | 3390 | 1200 | 2282 | 2698 | 2853 | 2329 | 1402 | 2371 |
| **Rosie** | LRK | 1349 | 1452 | 2630 | 3533 | 2230 | 3067 | 2376 | 3291 | 1730 | 1251 | 2291 |
| **CELRK** | LRK | 2607 | 1522 | 3460 | 3007 | 810 | 2500 | 2312 | 3247 | 2278 | 774 | 2252 |
| **Yeti** | WK | 2917 | 1979 | 3183 | 3917 | 1560 | 2582 | 2484 | 3062 | 1749 | 1406 | 2484 |
| **Snowdon** | WK | 2624 | 1487 | 3489 | 2837 | 1000 | 2409 | 1889 | 2881 | 1957 | 1187 | 2176 |
| **DBY-28-1** | Yellow | 3294 | 2799 | 3494 | 3420 | 3170 | 3111 | 3227 | 3790 | 2744 | 3638 | 3269 |
| **DBY-60-1** | Yellow | 3068 | 2927 | 3531 | 4500 | 2700 | 3023 | 2848 | 3801 | 2539 | 3066 | 3200 |
| **DBY-24-2** | Yellow | 2574 | 3372 | 1406 | 4503 | 3140 | 3338 | 3040 | 3609 | 2957 | 3001 | 3094 |
| **DBY-54-1** | Yellow | 2290 | 2822 | 2703 | 4107 | 2890 | 3153 | 2777 | 3781 | 1998 | 2452 | 2897 |
| **Mean** | | **2532** | **2818** | **3453** | **4000** | **2556** | **3263** | **2599** | **3089** | **2713** | **2285** | **2931** |
| **CV%** | | **30.1** | **21.3** | **7.7** | **10.4** | **17.1** | **11** | **16** | **9.3** | **12.5** | **20** | |
| **LSD 0.05** | | | **979** | **350.0** | **680** | **520** | **585** | **742** | **338** | **560** | **649** | |

Ɨ Planting date for large-seeded types in ND/MN was May 30th.

**Table 6. 2014 Summary for seed weight (g 100 seeds$^{-1}$) for individual locations and averaged across locations.**

| Line | | ID | MI | MT | ND | NE | NY | ON | WA | WY | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **96-148** | Black | 27.1 | 25.6 | 24.2 | 22.1 | 24.1 | 23.0 | 21.8 | 29.3 | 27.0 | 24.6 |
| **T-39** | Black | 20.6 | 21.3 | 20.6 | 19.6 | 19.4 | 19.1 | 18.1 | 23.7 | 20.0 | 20.2 |
| **Fathom** | Navy | 22.0 | 24.9 | 23.3 | 21.5 | 21.2 | 21.6 | 19.6 | 24.9 | 24.0 | 22.6 |
| **Gypsy Rose** | FDM | 30.9 | 34.9 | 29.0 | 29.2 | 28.4 | 27.5 | 23.3 | 34.9 | 30.0 | 29.6 |
| **UCD-9623** | FDM | 32.4 | 38.2 | 38.3 | 35.8 | 36.3 | 31.9 | 31.9 | 39.5 | 39.0 | 36.4 |
| **Powderhorn** | GN | 37.2 | 36.5 | 40.2 | 33.8 | 35.6 | 30.0 | 29.7 | 40.8 | 39.0 | 35.7 |
| **Rosetta** | Pink | 31.9 | 39.0 | 34.7 | 33.8 | 34.3 | 32.4 | 27.2 | 38.7 | 36.0 | 34.5 |
| **UCD-9634** | Pink | 33.1 | 35.6 | 41.7 | 35.5 | 32.9 | 31.3 | 29.4 | 37.7 | 37.0 | 35.1 |
| **R12859** | Red | 34.2 | 35.4 | 38.7 | 34.6 | 37.4 | 30.6 | 25.9 | 43.5 | 39.0 | 35.6 |
| **PT11-13** | Pinto | 41.3 | 39.6 | 41.8 | 35.5 | 36.3 | 31.7 | 31.7 | 46.5 | 43.0 | 38.3 |
| **PT12-37** | Pinto | 41.9 | 40.4 | 40.3 | 38.8 | 37.0 | 35.5 | 31.1 | 44.5 | 41.0 | 38.6 |
| **ElDorado** | Pinto | 40.0 | 47.7 | 43.2 | 44.7 | 41.3 | 40.5 | 39.9 | 52.7 | 46.0 | 44.5 |
| **23ST-27** | Pinto | 45.6 | 38.7 | 44.3 | 40.0 | 38.4 | 33.4 | 30.2 | 48.9 | 42.0 | 39.5 |
| **ISB-19** | Pinto | 36.8 | 42.6 | 39.4 | 35.4 | 36.3 | 33.3 | 34.0 | 41.3 | 40.0 | 37.8 |
| **ND060197** | Pinto | 38.6 | 35.6 | 37.5 | 35.5 | 32.4 | 31.4 | 28.5 | 39.1 | 36.0 | 34.5 |
| **CO-91212-4** | Pinto | 41.1 | 41.8 | 41.5 | 37.3 | 41.4 | 35.2 | 32.0 | 44.6 | 42.0 | 39.5 |
| **ISB-20** | Pinto | 37.7 | 44.7 | 39.1 | 39.5 | 39.3 | 37.3 | 36.5 | 40.9 | 41.0 | 39.8 |
| **SF103-8** | Pinto | 42.7 | 37.5 | 39.6 | 38.5 | 37.5 | 36.1 | 31.2 | 43.1 | 43.0 | 38.3 |
| **ISB P1** | Pinto | 34.9 | 40.8 | 39.9 | 36.3 | 35.5 | 34.6 | 33.0 | 38.8 | 39.0 | 37.2 |
| **ISB P3** | Pinto | 36.0 | 40.9 | 42.3 | 36.9 | 35.5 | 36.4 | 35.1 | 37.7 | 37.0 | 37.7 |
| **Othello** | Pinto | 35.6 | 41.6 | 41.2 | 38.6 | 37.2 | 35.2 | 33.1 | 38.5 | 39.0 | 38.1 |
| **Majesty** | DRK | 53.3 | 84.1 | 72.1 | 62.0 | 55.6 | 72.0 | 65.8 | 64.4 | 66.0 | 67.7 |
| **Talon** | DRK | 50.9 | 61.7 | 55.1 | 49.0 | 46.3 | 52.8 | 54.3 | 51.8 | 49.0 | 52.5 |
| **Inferno** | LRK | 53.6 | 67.1 | 54.5 | 58.3 | 54.6 | 68.0 | 65.8 | 61.4 | 56.0 | 60.7 |
| **NY-104** | LRK | 55.1 | 66.4 | 61.8 | 54.2 | 51.4 | 64.5 | 61.5 | 52.5 | 60.0 | 59.0 |
| **NY-105** | LRK | 57.5 | 82.1 | 65.0 | 59.7 | 56.8 | 67.5 | 63.6 | 52.2 | 63.0 | 63.7 |
| **Rosie** | LRK | 42.0 | 59.0 | 49.6 | 54.0 | 45.3 | 58.6 | 56.8 | 47.9 | 47.0 | 52.3 |
| **CELRK** | LRK | 52.6 | 69.0 | 51.9 | 57.7 | 56.7 | 65.6 | 65.1 | 45.2 | 54.0 | 58.1 |
| **Yeti** | WK | 48.6 | 66.0 | 57.5 | 53.2 | 47.7 | 58.8 | 54.5 | 51.4 | 49.0 | 54.8 |
| **Snowdon** | WK | 55.9 | 77.1 | 63.4 | 60.5 | 55.8 | 67.4 | 62.8 | 52.7 | 56.0 | 62.0 |
| **DBY-28-1** | Yellow | 41.5 | 49.5 | 46.7 | 40.1 | 40.5 | 45.6 | 45.0 | 41.4 | 47.0 | 44.5 |
| **DBY-60-1** | Yellow | 41.9 | 51.9 | 39.6 | 40.3 | 38.8 | 46.5 | 45.0 | 41.8 | 46.0 | 43.7 |
| **DBY-24-2** | Yellow | 44.4 | 48.7 | 44.0 | 41.7 | 39.7 | 46.9 | 50.6 | 43.3 | 50.0 | 45.6 |
| **DBY-54-1** | Yellow | 43.2 | 51.5 | 44.3 | 39.4 | 41.2 | 44.2 | 45.1 | 43.9 | 47.0 | 44.6 |
| **Mean** | | **40.7** | **49.1** | **43.7** | **41.5** | **39.6** | **41.8** | **40.5** | **43.9** | **43.0** | **42.9** |
| **CV%** | | **15.3** | **3.4** | | **4.8** | **4.1** | **6** | | **4.3** | **7** | |
| **LSD 0.05** | | **37.6** | **2.9** | | **3.2** | **2.7** | **3.4** | | **3.0** | **4** | |

**Table 7. 2014 Summary for number of days to flower across locations and harvest maturity (days) for individual locations and average across locations.**

| | | No. of days to Flower | | | | | | | | No. of days to harvest maturity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Line** | | **ND** | **MT** | **NE** | **NY** | **MI** | **WY** | **Mean** | | **ID** | **ND** | **MI** | **NE** | **NY** | **ON** | **WA** | **Mean** |
| **96-148** | Black | 54 | 51 | 50 | 45 | 48 | 51 | 50 | | 105 | 103 | 96 | 98 | 102 | 118 | 110 | 105 |
| **T-39** | Black | 54 | 52 | 49 | 45 | 48 | 53 | 50 | | 100 | 103 | 96 | 96 | 100 | 113 | 105 | 102 |
| **Fathom** | Navy | 48 | 49 | 48 | 37 | 41 | 49 | 45 | | 105 | 100 | 99 | 98 | 99 | 116 | 108 | 103 |
| **Gypsy Rose** | FDM | 51 | 52 | 48 | 44 | 48 | 51 | 49 | | 105 | 109 | 96 | 99 | 96 | 112 | 105 | 103 |
| **UCD-9623** | FDM | 42 | 48 | 46 | 32 | 40 | 47 | 42 | | 98 | 100 | 89 | 88 | 83 | 101 | 91 | 93 |
| **Powderhorn** | GN | 45 | 49 | 46 | 39 | 42 | 50 | 45 | | 105 | 101 | 91 | 89 | 86 | 107 | 95 | 96 |
| **Rosetta** | Pink | 47 | 49 | 48 | 43 | 45 | 50 | 47 | | 105 | 106 | 95 | 96 | 96 | 110 | 101 | 101 |
| **UCD-9634** | Pink | 47 | 46 | 47 | 33 | 41 | 49 | 44 | | 102 | 107 | 92 | 95 | 91 | 106 | 94 | 98 |
| **R12859** | Red | 46 | 49 | 49 | 39 | 41 | 50 | 46 | | 105 | 103 | 92 | 91 | 86 | 103 | 95 | 96 |
| **PT11-13** | Pinto | 47 | 49 | 48 | 41 | 44 | 50 | 47 | | 105 | 103 | 92 | 91 | 92 | 110 | 98 | 99 |
| **PT12-37** | Pinto | 50 | 51 | 50 | 43 | 48 | 51 | 49 | | 105 | 102 | 94 | 93 | 95 | 113 | 100 | 100 |
| **ElDorado** | Pinto | 44 | 48 | 48 | 38 | 43 | 50 | 45 | | 105 | 106 | 97 | 99 | 99 | 113 | 115 | 105 |
| **23ST-27** | Pinto | 47 | 50 | 46 | 41 | 46 | 50 | 47 | | 100 | 102 | 90 | 91 | 87 | 106 | 98 | 96 |
| **ISB-19** | Pinto | 44 | 48 | 48 | 35 | 40 | 49 | 44 | | 102 | 102 | 93 | 91 | 91 | 111 | 95 | 98 |
| **ND060197** | Pinto | 45 | 47 | 48 | 41 | 43 | 50 | 46 | | 100 | 101 | 90 | 89 | 84 | 104 | 96 | 95 |
| **CO-91212-4** | Pinto | 51 | 49 | 48 | 40 | 46 | 51 | 48 | | 98 | 102 | 97 | 96 | 93 | 112 | 100 | 100 |
| **ISB-20** | Pinto | 41 | 48 | 46 | 34 | 40 | 49 | 43 | | 100 | 99 | 89 | 91 | 90 | 107 | 98 | 96 |
| **SF103-8** | Pinto | 43 | 47 | 46 | 35 | 42 | 47 | 43 | | 105 | 103 | 94 | 89 | 92 | 105 | 101 | 98 |
| **ISB P1** | Pinto | 41 | 48 | 46 | 36 | 39 | 49 | 43 | | 98 | 99 | 92 | 88 | 82 | 104 | 90 | 93 |
| **ISB P3** | Pinto | 42 | 47 | 48 | 33 | 40 | 48 | 43 | | 92 | 97 | 91 | 90 | 79 | 104 | 94 | 92 |
| **Othello** | Pinto | 41 | 47 | 46 | 33 | 38 | 47 | 42 | | 92 | 94 | 85 | 87 | 78 | 94 | 91 | 89 |
| **Majesty** | DRK | | 50 | 48 | 40 | 46 | 51 | 47 | | 105 | 104 | 100 | 94 | 96 | 115 | 91 | 101 |
| **Talon** | DRK | | 49 | 46 | 34 | 42 | 47 | 44 | | 105 | 106 | 98 | 90 | 88 | 113 | 94 | 99 |
| **Inferno** | LRK | | 47 | 46 | 36 | 40 | 48 | 44 | | 105 | 112 | 104 | 97 | 100 | 114 | 96 | 104 |
| **NY-104** | LRK | | 46 | 46 | 33 | 38 | 45 | 42 | | 105 | 93 | 94 | 87 | 91 | 109 | 83 | 94 |
| **NY-105** | LRK | | 46 | 46 | 33 | 37 | 44 | 41 | | 105 | 95 | 97 | 91 | 88 | 106 | 83 | 95 |
| **Rosie** | LRK | | 48 | 48 | 34 | 40 | 49 | 44 | | 105 | 113 | 98 | 97 | 97 | 115 | 92 | 102 |
| **CELRK** | LRK | | 46 | 48 | 32 | 38 | 42 | 41 | | 100 | 93 | 95 | 89 | 85 | 109 | 74 | 92 |
| **Yeti** | WK | | 49 | 47 | 37 | 42 | 48 | 44 | | 105 | 111 | 100 | 94 | 95 | 115 | 92 | 102 |
| **Snowdon** | WK | | 47 | 46 | 32 | 37 | 43 | 41 | | 102 | 98 | 97 | 96 | 90 | 105 | 82 | 96 |
| **DBY-28-1** | Yellow | 47 | 53 | 49 | 43 | 44 | 50 | 48 | | 105 | 104 | 97 | 97 | 100 | 112 | 93 | 101 |
| **DBY-60-1** | Yellow | 41 | 47 | 47 | 32 | 37 | 47 | 42 | | 105 | 105 | 94 | 96 | 93 | 110 | 95 | 100 |
| **DBY-24-2** | Yellow | 47 | 52 | 48 | 42 | 44 | 50 | 47 | | 105 | 106 | 101 | 98 | 98 | 113 | 95 | 102 |
| **DBY-54-1** | Yellow | 45 | 50 | 46 | 42 | 44 | 50 | 46 | | 105 | 105 | 97 | 97 | 95 | 110 | 95 | 101 |
| **Mean** | | **46** | **49** | **47** | **38** | **42** | **49** | **45** | | **101** | **103** | **95** | **93** | **92** | **109** | **95** | **98** |
| **CV%** | | **5** | **2** | **3** | **3** | **3** | **3** | | | **7** | **4** | **2** | **3** | **3** | **2** | **3** | |
| **LSD 0.05** | | **3** | **2** | **2** | **2** | **2** | **2** | | | **7** | **6** | **4** | **4** | **4** | **2** | **1** | |

**Table 8. Rust reaction data for 2014.**

| | | MD | MD | CO |
|---|---|---|---|---|
| | | Rust | Rust | Rust |
| Bean | Mkt | Score | Reaction | rating |
| Name | Class | 1 to 9 | Category | 1 to 6 |
| **96-148** | Black | 1 | Resistant | 2 |
| **T39** | Black | 1 | Resistant | 2 |
| **Fathom** | Navy | 8 | Susceptible | 5,6 |
| **Gypsy Rose** | FDM | 5 | Intermed | 5 |
| **UCD 9623** | FDM | 8 | Susceptible | 5,6 |
| **Powderhorn** | GN | 4 | Intermed | 1 |
| **Rosetta** | Pink | 6 | Intermed | 5,6 |
| **UCD 9634** | Pink | 8 | Susceptible | 5,6 |
| **R12859** | Red | 4 | Intermed | 1 |
| **PT11-13** | Pinto | 2 | Resistant | 1 |
| **PT12-37** | Pinto | 2 | Resistant | 2 |
| **ElDorado** | Pinto | 8 | Susceptible | 5,6 |
| **23ST-27** | Pinto | 8 | Susceptible | 5,6 |
| **ISB-19** | Pinto | 2 | Resistant | 2 |
| **ND060197** | Pinto | 3 | Resistant | 2 |
| **CO 91212-4** | Pinto | 2 | Resistant | 2 |
| **ISB-20** | Pinto | 2 | Resistant | 1 |
| **SF103-8** | Pinto | 7 | Susceptible | 5,6 |
| **ISB-P1** | Pinto | 8 | Susceptible | 5,6 |
| **ISB-P3** | Pinto | 8 | Susceptible | 5,6 |
| **Othello** | Pinto | 8 | Susceptible | 5,6 |
| **Majesty** | DRK | 6 | Intermed | 3 |
| **Talon** | DRK | 7 | Susceptible | 1 |
| **Inferno** | LRK | 5 | Intermed | 2,3 |
| **NY-104** | LRK | 8 | Susceptible | 4 |
| **NY-105** | LRK | 8 | Susceptible | 3 |
| **Rosie** | LRK | 7 | Susceptible | 4 |
| **CELRK** | LRK | 8 | Susceptible | 4 |
| **Yeti** | WK | 7 | Susceptible | 2 |
| **Snowdon** | WK | 7 | Susceptible | 3 |
| **DBY-28-1** | Yellow | 7 | Susceptible | 5 |
| **DBY-60-1** | Yellow | 8 | Susceptible | 4 |
| **DBY-24-2** | Yellow | 7 | Susceptible | 5 |
| **DBY-54-1** | Yellow | 7 | Susceptible | 4 |
| | | | | |
| **Pinto 114** | Susc | 8 | Susceptible | |
| **Aurora** | Inter | 4 | Intermed | |
| **Buster** | Res | 2 | Resistant | |

For MD rust, scale is based on disease severity and incidence with 1 = best and 9 = worst. Rust for CO is based on 1 = no symptom, 2 – necrotic fleck, 3 is small pustule and 4, 5, 6, are larger pustules.

**Table 9. Miscellaneous trait data for 2014 CDBN.**

| | | NY | NY | NY | MI | WA | ND | MI | MI | ON | ON | MT | NE | ID | NE | WA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | | Bio-mass | Har-vest index | Early vigor | Lod-ging | Lod-ging | Plant ht | Plant ht | Desir-ability | Mat-urity index | Har-vest ability | Test wt | Test wt | Ha bit | Hab it | Seed Appear-ance |
| | | lb/A | | 1 to 9 | 1 to 5 | 1 to 9 | cm | cm | 1 to 7 | Index | 1 to 5 | lb/bu | lb/bu | | | 1 to 5 |
| **96-148** | Black | 5694 | 53 | 6 | 1.5 | 5.3 | 55 | 51 | 2.5 | 36.1 | 3.0 | 62 | 61 | III | 3A | 3.0 |
| **T-39** | Black | 5291 | 51 | 6 | 3.0 | 7.7 | 53 | 46 | 2.8 | 36.8 | 4.1 | 64 | 62 | III | 3A | 3.0 |
| **Fathom** | Navy | 5749 | 53 | 7 | 2.0 | 4.3 | 51 | 49 | 3.0 | 35.7 | 1.9 | 66 | 64 | III | 3A | 2.0 |
| **Gypsy Rose** | FDM | 5580 | 53 | 5 | 2.0 | 6.8 | 60 | 48 | 4.7 | 35.2 | 4.2 | 64 | 63 | III | 3B | 2.0 |
| **UCD-9623** | FDM | 4488 | 54 | 5 | 1.0 | 2.0 | 52 | 47 | 3.7 | 25.8 | 2.6 | 62 | 61 | III | 2B | 4.0 |
| **Powderhorn** | GN | 4480 | 56 | 6 | 1.5 | 3.3 | 58 | 51 | 5.0 | 36.0 | 2.3 | 59 | 57 | II | 2B | 3.5 |
| **Rosetta** | Pink | 5451 | 55 | 5 | 1.0 | 2.0 | 60 | 51 | 5.0 | 30.7 | 2.4 | 63 | 62 | II | 2B | 3.5 |
| **UCD-9634** | Pink | 4710 | 56 | 5 | 2.0 | 3.0 | 57 | 51 | 4.0 | 28.0 | 2.7 | 63 | 61 | III | 2B | 3.0 |
| **R12859** | Red | 4820 | 57 | 6 | 1.0 | 2.2 | 63 | 51 | 5.7 | 32.1 | 2.1 | 61 | 60 | III | 2B | 2.5 |
| **PT11-13** | Pinto | 5153 | 57 | 5 | 2.0 | 4.5 | 54 | 52 | 4.0 | 41.5 | 3.2 | 60 | 59 | III | 2B | 3.0 |
| **PT12-37** | Pinto | 5603 | 56 | 5 | 2.0 | 6.3 | 63 | 52 | 4.3 | 39.0 | 3.3 | 60 | 59 | III | 2B | 2.0 |
| **ElDorado** | Pinto | 5223 | 58 | 5 | 2.0 | 5.0 | 57 | 52 | 5.0 | 45.3 | 2.6 | 61 | 60 | III | 2B | 4.0 |
| **23ST-27** | Pinto | 4688 | 54 | 5 | 2.5 | 6.0 | 45 | 48 | 4.0 | 34.1 | 3.5 | 64 | 60 | III | 3A | 1.5 |
| **ISB-19** | Pinto | 3841 | 54 | 5 | 4.0 | 8.2 | 56 | 42 | 3.3 | 34.9 | 4.1 | 61 | 61 | III | 3B | 2.5 |
| **ND060197** | Pinto | 4577 | 56 | 5 | 3.0 | 6.3 | 54 | 47 | 3.3 | 34.7 | 4.5 | 61 | 61 | III | 2B | 3.5 |
| **CO-91212-4** | Pinto | 4648 | 53 | 6 | 1.5 | 4.7 | 57 | 53 | 4.3 | 31.7 | 3.1 | 61 | 60 | III | 2B | 3.0 |
| **ISB-20** | Pinto | 3712 | 56 | 5 | 3.0 | 8.3 | 51 | 43 | 3.0 | 32.3 | 4.5 | 61 | 61 | III | 3A | 2.0 |
| **SF103-8** | Pinto | 4760 | 58 | 5 | 2.0 | 6.8 | 54 | 50 | 4.7 | 39.9 | 2.3 | 60 | 58 | III | 2B | 1.5 |
| **ISB P1** | Pinto | 3155 | 52 | 6 | 2.0 | 5.2 | 61 | 53 | 5.0 | 25.3 | 3.0 | 62 | 61 | III | 2B | 2.5 |
| **ISB P3** | Pinto | 4012 | 55 | 5 | 1.5 | 5.3 | 56 | 53 | 4.7 | 25.4 | 2.6 | 62 | 61 | III | 1A | 3.0 |
| **Othello** | Pinto | 4451 | 62 | 5 | 3.0 | 8.5 | 45 | 43 | 3.0 | 14.6 | 4.7 | 58 | 60 | III | 3A | 3.5 |
| **Majesty** | DRK | 4594 | 55 | 7 | 1.5 | 2.0 | 42 | 50 | 4.0 | 26.1 | 2.7 | 61 | 59 | III | 1A | 3.0 |
| **Talon** | DRK | 4099 | 50 | 4 | 1.5 | 3.5 | 55 | 47 | 4.0 | 31.7 | 3.3 | 60 | 57 | I | 1A | 3.5 |
| **Inferno** | LRK | 6002 | 51 | 4 | 2.5 | 3.2 | 61 | 49 | 3.0 | 38.9 | 3.3 | 62 | 59 | III | 1A | 2.0 |
| **NY-104** | LRK | 4445 | 59 | 6 | 1.0 | 1.2 | 34 | 45 | 4.0 | 30.1 | 3.0 | 57 | 57 | I | 1A | 3.0 |
| **NY-105** | LRK | 4515 | 60 | 5 | 1.5 | 1.8 | 37 | 48 | 4.0 | 32.5 | 2.8 | 59 | 58 | I | 1A | 3.5 |
| **Rosie** | LRK | 4972 | 48 | 4 | 1.0 | 2.0 | 57 | 46 | 4.0 | 34.4 | 3.0 | 61 | 59 | I | 1A | 2.5 |
| **CELRK** | LRK | 4087 | 57 | 4 | 1.0 | 1.5 | 35 | 46 | 4.0 | 35.8 | 3.1 | 57 | 57 | I | 1A | 3.0 |
| **Yeti** | WK | 5114 | 49 | 4 | 1.5 | 2.2 | 54 | 47 | 4.0 | 32.0 | 2.5 | 64 | 61 | I | 1A | 3.5 |
| **Snowdon** | WK | 3485 | 54 | 7 | 1.0 | 1.7 | 38 | 48 | 4.5 | 33.1 | 2.7 | 61 | 59 | I | 1A | 3.0 |
| **DBY-28-1** | Yellow | 5924 | 54 | 6 | 2.5 | 3.5 | 48 | 45 | 4.0 | 40.6 | 4.4 | 66 | 64 | III | 3B | 2.5 |
| **DBY-60-1** | Yellow | 4744 | 60 | 6 | 2.0 | 4.2 | 44 | 44 | 3.5 | 41.6 | 4.1 | 66 | 64 | III | 3A | 2.0 |
| **DBY-24-2** | Yellow | 5447 | 56 | 6 | 3.5 | 2.7 | 46 | 48 | 3.5 | 38.5 | 4.3 | 67 | 64 | I | 3A | 2.0 |
| **DBY-54-1** | Yellow | 5138 | 53 | 6 | 2.5 | 3.2 | 46 | 44 | 3.5 | 41.2 | 5.0 | 65 | 63 | III | 2B | 4.0 |
| **Mean** | | **4759** | **55** | **5** | **2.0** | **4.2** | **52** | **48** | **4.0** | **33.9** | **3.3** | **62** | **60** | | | **2.8** |
| **CV%** | | **14** | **5** | **13** | **7.7** | **17.8** | **11** | **3.4** | **10.9** | | **8.2** | **1.8** | **0.9** | | | |
| **LSD 0.05** | | **1165** | **4.4** | **1.2** | **0.6** | **1.2** | **8** | **2.7** | **0.6** | | **0.3** | **1.8** | **0.8** | | | |

Foot notes for Table 9. Early vigor whereby 1 = best and 9 = worst; lodging 1 = best and 5 or 9 = worst. Desirability where 7 is best and 1 is worst. Harvest-ability where 1 is best and 5 is worst. Seed appearance where 1 is best and 5 is worst.

Table 10. Canning data for 2013 CDBN from MI.

| | MI (2013) |
|---|---|
| | Canning |
| Line | Score |
| ISB 19 | 1.6 |
| CELRK | 3.3 |
| MAJESTY | 1.7 |
| UCD-9634 | 3.6 |
| ROSETTA | 3.5 |
| OAC REXETER | 2.8 |
| T-39 | 3.2 |
| GN9-4 | 2.1 |
| ISB-18 | 3.4 |
| PT11-9 | 3.7 |
| ISB 21 | 3.5 |
| PT9-6 | 2.7 |
| UC CANARIO 707 | 1.6 |
| OAC INFERNO | 2.6 |
| OTHELLO | 3.9 |
| ISB 20 | 2.3 |

**Canning Score 1-5: 1=highly undesirable and 5=highly desirable**

**CDBN information, Sidney, Montana**

Corresponding cooperator: Joyce Eckhoff
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**CDBN site:**

Altitude: 1950 ft
Latitude: 47° 40' N
Longitude: 104° 08'
Soil type: Savage silty clay
Previous crops: 2013 –sugarbeet, 2012 – small grain, 2011 – safflower
Residual soil N to 4 ft: 109 lb/ac
Residual soil P to 6 inches: 17 ppm
Applied fertilizer: 200 lb/ac 18-46-0 applied in fall, 2013
9% zinc applied at a rate of 1 pt/ac July 2
Herbicides: Prowl at a rate of 3 pt/ac applied May 14 and incorporated immediately
Fungicide: Quadris at a rate of 2 pt/ac applied July 2

Experimental design: Randomized complete block with three replications
Rows per plot: 3
Row length: 20 feet
Spacing between rows: 2 feet
Planted: May 23
Harvested: Sep 17
Harvest method: hand pulled, dried, and threshed with a Wintersteiger plot combine
Area harvested: 32 $feet^2$

Irrigated (sprinkler) on: June 24 (1.25"), July 10 (1.77 "), July 19 (1.77"), July 30 (1.77")

Precipitation April – August, 2014: 11.92 in
Ave (65 yr) precipitation April – August: 9.67 in
Precipitation September 2013 – August 2014: 14.97 in
Ave (65 yr) precipitation September – August: 14.11 in

Conditions were wet at planting. May and August had much above average rainfall.

**CDBN information, Powell, Wyoming:** Mike Moore, Wyoming Seed Certification Service; Camby Reynolds, Powell Research and Extension Center, Jolene Sweet, Wyoming Seed Certification Service, Andrea Pierson, Powell Research and Extension Center

In 2013, Wyoming ranked eighth nationally in dry bean (Phaseolus vulgaris L.) production, fourth in the production of pinto beans, and first in production of other bean market classes. In the same year, Wyoming growers produced 506,000 hundred-weight of pinto beans on 22,000 harvested acres, averaging 23 hundred-weight per acre.

The University of Wyoming Seed Certification Service coordinates the dry bean variety performance evaluation at this location in a continuous and on-going program. In cooperation with the National Cooperative Dry Bean Nursery, a wide range of germplasm is evaluated each year, including promising new lines and newly released varieties, assisting producers in selecting varieties best suited for Wyoming soils and climate. Public and private (proprietary) varieties are tested.

## Materials and Methods

The experiment was located at the University of Wyoming Research and Extension Center in Powell, Wyoming. The soil, a Garland clay loam, (fine, mixed, mesic: Typic Haplarid), was prepared by roller harrow and leveled in the spring. Chemical weed control consisted of a preplant incorporated chemical treatment of 2 pints of Sonalan and 1 pint of Outlook, which was applied on May 18. The plots received 65 units of N, 50 units of P and 5 units of Zn on May 18. The plots were planted on May 27 in three row plots that were 5.5 feet wide by 20 feet long. IH 185 planter units with cone attachments were used, set on 22-inch row spacing. The experimental design was a randomized block with 4 replications. Cultivation controlled weed escapes during the growing season. Furrow irrigation was applied on May 21, July 6, July 15, July 23, August 12, August 22, and September 2. Visual estimates for days to 50 percent bloom (50 percent of plants at second bloom) and days to maturity (50 percent of the plants with one buckskin pod) were made. Subplots of one row by 10 feet were pulled by hand, and plots were threshed with a Wintersteiger small plot combine. The seed was hand-picked to remove dirt clods and seed mixtures. Samples were then weighed for clean seed yield per plot and seeds per pound.

## Results and Discussion

Stand establishment was reasonable, although a post-planting irrigation was required to get the stand established. Summer temperatures were reasonable, but a hard frost the first week of September had an impact on all entries, and is at least part of the high CV for the trial. Days to maturity data was not reported due to data errors.

## Acknowledgements

This nursery was possible only with significant assistance from the staff at the Powell Research and Extension Center. R & E Center staff managed the plots, and Andrea Pierson took the growing season notes. Their efforts are greatly appreciated.