

MICHIGAN DRY BEAN PERFORMANCE TRIALS

2023



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Michigan Dry Bean Performance Trials 2023

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Introduction

In 2023, Michigan State University researchers and Michigan dry bean producers tested 150 lines from 12 market classes of dry beans. The trial plots (Table 1) were placed in six locations across five Michigan counties: Bay, Huron, Montcalm, Sanilac, and Tuscola (two fields).

Small- and medium-seeded beans were tested in Bay, Huron, Sanilac, and Tuscola counties. Large-seeded beans were tested in Montcalm and Tuscola counties.

This report summarizes the results of the trials. Please contact Scott Bales (phone 989-262-8550, extension 2; email baleasco@msu.edu) with questions about the 2023 performance trials and suggestions for the 2024 trials.

Table 1. 2023 research trial conditions: The locations, grower co-operators, planting dates, nitrogen application rates and methods, total accumulated growing degree days (GDD), and total precipitation.

| County | Co-operator | Planting Date | Nitrogen Rate (Lbs./A) | Nitrogen Application Method | Total GDD ^a | Total Precipitation (Inches) |
|----------|---|---------------|------------------------|-----------------------------|------------------------|------------------------------|
| Bay | Spartan Acres | May 24 | 45 | 2x2 | 1,913 | 13.6" |
| Huron | Gruehn Farms | June 1 | 60 | Broadcast | 1,791 | 13.2" |
| Montcalm | Waldron Farms | May 31 | 85 | 2x2 followed by topdress | 1,823 | 15.6" + irrigation |
| Sanilac | Shaw Farms | May 31 | 60 | Broadcast | 1,816 | 9.6" |
| Tuscola | Saginaw Valley Research and Extension Center (two fields) | June 2 | 45 | Broadcast | 1,870 | 13.8" |

Note. Weather data was retrieved from the nearest Michigan Automated Weather Network (MAWN) and the MSU Enviroweather station nearest to the trial. All weather data is from the day of planting to harvest.

^aGrowing degree days (GDD) were calculated using the following equation: $[(MAX + MIN) \div 2] - 50 = GDD$

Methods

Dry beans were seeded in four-row plots that measured 6.6' wide by 24' long, with 20" rows. Each entry was replicated four times. All trial plots were designed as randomized complete blocks (RCB). (RCB is a standard agricultural trial design in which entries are randomly assigned to groups or blocks, and the blocks are randomly repeated. The goal of the replication is to control for variables that might affect an entry's yield, such as soil nutrient levels [Table 2], pest loads, and variability in soil textures.)

Trials received industry standard seed treatments, fertilization, and weed control applications at labeled rates. Yield data was obtained by direct harvest for small- and medium-seeded beans. Large-seeded beans were pulled by a two-row Pickett bean puller and then mechanically threshed to prevent harvest loss. Following harvest, samples were cleaned, weighed, and moisture tested.

Table 2. Soil test information from the 2023 performance trial locations, including the percentage of organic matter, soil type, soil pH, and soil cation exchange capacity (CEC). All macro- and micronutrients were sufficient for dry bean production.

| Location | Percentage of Organic Matter | Soil Type | Soil pH | Soil CEC |
|----------|------------------------------|-----------------|---------|----------|
| Bay | 2.4 | Sandy Clay Loam | 7.0 | 11.2 |
| Huron | 4.8 | Sandy Loam | 7.5 | 19.0 |
| Montcalm | 1.9 | Sandy Loam | 6.7 | 5.3 |
| Sanilac | 4.6 | Sandy Clay Loam | 7.8 | 18.6 |
| Tuscola | 3.3 | Clay | 7.1 | 19.3 |



Results

Tables 3 through 12 provide agronomic information such as plant maturity, height, lodging, and white mold tolerance. Plant maturity is rated visually in days after planting (DAP) for all locations. Lodging is rated on a scale of 1 to 5, with 1 indicating that the entry was completely erect in the field at harvest and 5 indicating that it was flat on the ground with stems and pods touching the soil surface. The percentage of white mold infection on each replication was calculated in Huron County due to sufficient disease pressure:

$$(\text{number of infected plants} \div \text{total plants per stand}) \times 100 = \text{percentage of infection}$$

The tables also present each entry's yield results in pounds per acre (Lbs./A) adjusted to 18% moisture.

The combined average yield for each entry across all sites in 2023 is also included. (**Note:** If an entry was grown under different production systems [irrigated versus dry land] at different sites, the combined yield was not calculated.) When possible, two- and three-year average yields were also calculated across locations. For example, the three-year average yield of a navy bean entry (Table 3) includes data from 2021, 2022, and 2023 at four locations per year (12 site-years).

The last three rows of the agronomic and yield results tables list the trial average (mean), least significant difference (LSD), and coefficient of variation (CV), respectively, for the data in each column.

The entry with the **highest** value in each yield column is followed by two asterisks (**). Any yields listed in the same column that are not significantly different from the highest yield are noted with one asterisk. Conversely, the entry with the **lowest** white mold infection percentage is also noted with two asterisks, and any entries in that column that are not significantly different from the lowest infection percentage are marked with one asterisk. This means that if two entries in the same column are followed by either one or two asterisks, the difference in values between the entries is not statistically significant.

Table 13 lists the sources of the dry bean varieties tested in 2023. The entries are organized by bean market class.



Table 3. Navy bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | White Mold Infection (%) | Bay (Lbs./A) | Huron (Lbs./A) | Sanilac (Lbs./A) | Tuscola (Lbs./A) | 1-year avg. (Lbs./A) | 2-year avg. (Lbs./A) | 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|--------------------------|--------------|----------------|------------------|------------------|----------------------|----------------------|----------------------|
| 12039 | 101 | 21 | 3.8 | 72 | 3,538 | 4,008** | 3,320* | 2,335 | 3,357* | 3,058 | 3,112 |
| 13057 | 99 | 25 | 3.3 | 97 | 3,412 | 3,407* | 2,998 | 1,714 | 2,703 | NA ^a | NA |
| 14075 | 99 | 23 | 3.3 | 85 | 2,778 | 2,770 | 2,587 | 2,934* | 2,952* | 2,748 | NA |
| 14078 | 102 | 23 | 1.8 | 62* | 3,666* | 3,315* | 3,238* | 1,791 | 2,976* | 2,990 | 2,947 |
| 14084 | 101 | 22 | 2.5 | 84 | 3,337 | 3,384* | 2,999 | 1,997 | 3,079* | 2,878 | 2,873 |
| <i>Argosy</i> | 102 | 22 | 2.3 | 73 | 2,818 | 3,110* | 3,412* | 2,344 | 2,766 | 2,648 | 2,839 |
| <i>Armada (13068)</i> | 100 | 19 | 2.0 | 80 | 3,901* | 3,569* | 2,966 | 2,553* | 3,349* | 3,000 | 3,052 |
| <i>Au Sable (N18103)</i> | 97 | 19 | 2.8 | 94 | 3,373 | 2,713 | 2,098 | 1,849 | 2,730 | 2,582 | 2,821 |
| <i>Blizzard</i> | 100 | 21 | 2.3 | 87 | 3,755* | 3,552* | 3,817* | 2,225 | 3,361* | 2,913 | 3,045 |
| <i>Charm</i> | 102 | 21 | 2.3 | 79 | 3,507 | 3,605* | 3,138 | 3,358** | 3,340* | NA | NA |
| <i>EX1802-N</i> | 96 | 18 | 1.0 | 93 | 2,350 | 2,852 | 2,344 | 1,571 | 2,330 | 2,214 | 2,263 |
| <i>EX1803-N</i> | 96 | 19 | 1.0 | 64* | 2,787 | 2,006 | 2,082 | 1,293 | 2,199 | 2,093 | 2,180 |
| <i>EX2109-N</i> | 98 | 18 | 2.0 | 99 | 2,999 | 3,302* | 1,845 | 1,546 | 2,512 | 2,389 | NA |
| <i>EX2110-N</i> | 100 | 19 | 1.0 | 80 | 2,671 | 2,640 | 1,983 | 1,338 | 2,479 | NA | NA |
| <i>EX2111-N</i> | 99 | 19 | 1.3 | 84 | 3,194 | 2,539 | 2,076 | 2,057 | 2,492 | NA | NA |
| <i>HMS Bounty (12047)</i> | 101 | 22 | 1.8 | 70* | 4,483** | 3,290* | 3,180 | 3,229* | 3,365* | 3,259* | 3,296* |
| <i>HMS Medalist</i> | 102 | 21 | 3.0 | 97 | 3,660* | 3,731* | 3,487* | 2,905* | 3,473* | 3,227 | 3,210 |
| <i>Liberty (15095)</i> | 102 | 22 | 3.3 | 86 | 4,114* | 3,380* | 3,005 | 3,089* | 3,425* | 3,364** | 3,365** |
| <i>N19246</i> | 97 | 18 | 1.8 | 74 | 3,155 | 1,947 | 2,606 | 2,426 | 2,327 | 2,728 | 2,903 |
| <i>N20395</i> | 100 | 19 | 1.0 | 87 | 2,914 | 3,069* | 2,554 | 2,231 | 2,598 | 2,873 | NA |
| <i>N21510</i> | 100 | 22 | 1.8 | 78 | 3,297 | 3,436* | 2,844 | 2,374 | 2,944* | NA | NA |
| <i>N21526</i> | 98 | 19 | 1.0 | 91 | 3,263 | 2,869 | 2,711 | 2,151 | 2,889 | NA | NA |
| <i>N21532</i> | 98 | 22 | 1.5 | 55** | 3,015 | 3,485* | 2,527 | 2,373 | 2,865 | NA | NA |
| <i>N22616</i> | 100 | 22 | 1.5 | 68* | 3,291 | 3,412* | 3,183 | 2,229 | 3,154* | NA | NA |
| <i>N22630</i> | 98 | 22 | 1.3 | 76 | 2,577 | 3,163* | 2,699 | 2,003 | 2,497 | NA | NA |
| <i>Nautica</i> | 101 | 22 | 1.3 | 82 | 3,573 | 2,557 | 2,634 | 3,093* | 2,858 | 2,676 | 2,866 |
| <i>ND Polar</i> | 102 | 21 | 2.0 | 87 | 3,308 | 2,145 | 2,414 | 1,984 | 2,232 | 2,571 | NA |
| <i>OAC Seal</i> | 102 | 18 | 2.5 | 66* | 3,028 | 3,280* | 2,832 | 2,689* | 2,928* | NA | NA |
| <i>Rogue</i> | 100 | 19 | 3.5 | 92 | 3,644* | 3,255* | 3,071 | 2,636* | 3,139* | 2,755 | 2,953 |
| <i>SV1893GH</i> | 103 | 20 | 4.0 | 92 | 3,794* | 2,628 | 2,905 | 2,594* | 3,111* | 2,781 | 3,015 |
| <i>T9905</i> | 102 | 18 | 4.0 | 95 | 3,476 | 2,655 | 2,942 | 2,426 | 2,881 | 2,557 | NA |
| <i>Valiant (08077)</i> | 99 | 20 | 1.5 | 99 | 3,537 | 3,766* | 3,247* | 2,725* | 3,156* | 3,029 | 2,975 |
| <i>Victory (15094)</i> | 99 | 21 | 2.3 | 91 | 3,578 | 3,935* | 3,852** | 2,982* | 3,477** | 3,087 | 3,148 |
| <i>Vigilant</i> | 96 | 21 | 1.0 | 72 | 3,197 | 2,798 | 2,171 | 2,535* | 2,714 | 2,664 | 2,767 |
| MEAN: | 100 | 20 | 2.0 | 80 | 3,334 | 3,126 | 2,833 | 2,326 | 2,928 | 2,795 | 2,928 |
| LSD_{(0.05):} | NA | NA | NA | 18 | 599 | 655 | 284 | 924 | 561 | 118 | 142 |
| CV: | NA | NA | NA | 19% | 15.30% | 17.80% | 14.10% | 19.50% | 19.40% | 10.00% | 14.10% |

Note. The **highest** yield in each yield column and the **lowest** infection percentage in the white mold infection column are marked with two asterisks. Any values in a column that are not statistically different from the column's two-asterisk entry are marked with one asterisk.

^aNA = Not available.



Table 4. Black bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | White Mold Infection (%) | Bay (Lbs./A) | Huron (Lbs./A) | Sanilac (Lbs./A) | Tuscola (Lbs./A) | 1-year avg. (Lbs./A) | 2-year avg. (Lbs./A) | 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|--------------------------|--------------|----------------|------------------|------------------|----------------------|----------------------|----------------------|
| 15619 | 102 | 20 | 4.0 | 90 | 2,466 | 3,450 | 3,246 | 2,859* | 2,796 | 2,966 | 2,990 |
| 15655 | 103 | 21 | 3.8 | 77 | 2,753 | 3,708 | 3,175 | 3,372* | 3,180 | NA ^a | NA |
| 16594 | 102 | 18 | 3.3 | 91 | 2,544 | 3,427 | 2,958 | 2,595 | 3,084 | NA | NA |
| 16598 | 102 | 21 | 3.8 | 99 | 3,223* | 4,051 | 3,373 | 2,993* | 3,305 | 3,249 | NA |
| 17751 | 101 | 19 | 2.3 | 86 | 2,651 | 3,912 | 3,283 | 2,516 | 3,152 | 3,310* | 3,365* |
| B18094173 | 100 | 19 | 1.5 | 60 | 3,023* | 4,594* | 4,069* | 2,928* | 3,226 | 3,382* | NA |
| B1904-3-1 | 101 | 20 | 1.8 | 62 | 3,282* | 3,740 | 3,803* | 3,106* | 3,571* | NA | NA |
| B19309 | 100 | 18 | 2.3 | 69 | 2,516 | 3,848 | 3,584* | 2,737* | 3,202 | 3,201 | 3,304* |
| B20536 | 102 | 20 | 2.0 | 46* | 2,738 | 4,648* | 3,262 | 2,405 | 3,264 | 3,312* | NA |
| B20591 | 100 | 18 | 1.5 | 45* | 2,413 | 4,362* | 3,604* | 2,854* | 3,471 | 3,032 | 3,288* |
| B20599 | 100 | 19 | 2.5 | 69 | 2,781 | 4,780** | 3,472 | 3,278* | 3,268 | 3,363* | NA |
| B21710 | 101 | 16 | 1.3 | 73 | 3,030* | 3,672 | 2,821 | 3,324* | 3,522* | 3,037 | NA |
| B22003 | 101 | 20 | 1.3 | 62 | 2,852 | 3,786 | 3,571* | 1,728 | 2,859 | NA | NA |
| B22041 | 99 | 20 | 2.3 | 66 | 3,345* | 4,596* | 3,189 | 2,828* | 3,768* | NA | NA |
| B22854 | 99 | 18 | 2.0 | 99 | 2,666 | 3,749 | 3,268 | 3,031* | 3,154 | NA | NA |
| B3035411 | 99 | 19 | 2.0 | 95 | 2,621 | 3,688 | 3,696* | 2,625 | 3,071 | 3,147 | NA |
| B4062257 | 101 | 18 | 1.5 | 60 | 2,086 | 3,662 | 3,329 | 2,775* | 3,007 | NA | NA |
| B5054313 | 100 | 20 | 2.5 | 85 | 2,682 | 4,295* | 3,438 | 2,832* | 3,467 | NA | NA |
| B7071259 | 97 | 19 | 1.3 | 73 | 3,795* | 4,473* | 3,363 | 3,183* | 3,861** | 3,570** | NA |
| B7072252 | 99 | 18 | 2.0 | 85 | 2,874 | 4,564* | 4,235** | 2,762* | 3,372 | NA | NA |
| B7072269 | 98 | 18 | 2.5 | 79 | 2,953* | 4,224 | 3,394 | 2,668* | 3,200 | 3,202 | NA |
| Bannock | 101 | 17 | 1.8 | 49* | 1,967 | 4,125 | 3,909* | 2,275 | 3,193 | NA | NA |
| Black Bear | 105 | 20 | 2.0 | 61 | 3,642* | 3,952 | 3,308 | 2,919* | 3,361 | 3,403* | 3,247* |
| Black Pearl (B19344) | 100 | 16 | 2.3 | 93 | 2,517 | 3,352 | 3,302 | 2,359 | 2,829 | 2,988 | 3,181* |
| Black Tails | 102 | 22 | 2.5 | 82 | 3,016* | 3,141 | 2,259 | 2,767* | 2,632 | 2,792 | 2,847 |
| BlackBeard (14506) | 103 | 25 | 3.0 | 94 | 3,816* | 4,369* | 3,732* | 3,507** | 3,653* | 3,324* | 3,326* |
| Eclipse | 98 | 39 | 1.8 | 80 | 1,955 | 3,464 | 2,898 | 2,331 | 2,582 | NA | NA |
| ND Twilight | 96 | 15 | 3.3 | 99 | 2,457 | 2,799 | 2,849 | 1,759 | 2,543 | 2,207 | 2,428 |
| Nimbus (14500) | 103 | 19 | 1.8 | 53 | 3,833** | 3,728 | 3,417 | 2,562 | 3,293 | 3,462* | 3,391** |
| Spectre (14497) | 105 | 20 | 2.3 | 24** | 3,052* | 3,643 | 3,211 | 2,704* | 3,141 | 3,148 | 3,155* |
| Umbra | 105 | 20 | 3.3 | 50* | 2,307 | 4,270 | 3,358 | 3,030* | 3,364 | NA | NA |
| Zenith | 100 | 18 | 1.3 | 39* | 2,417 | 3,645 | 2,777 | 2,189 | 2,884 | 3,018 | 3,150* |
| MEAN: | 100 | 19 | 2.2 | 72 | 2,822 | 3,929 | 3,348 | 2,744 | 3,197 | 3,156 | 3,139 |
| LSD_{(0.05):} | NA | NA | NA | 19 | 387 | 495 | 294 | 846 | 340 | 278 | 241 |
| CV: | NA | NA | NA | 23% | 19.40% | 10.70% | 12.40% | 18.10% | 18.20% | 17.90% | 19.10% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.



Table 5. Small red and pink bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | White Mold Infection (%) | Bay (Lbs./A) | Huron (Lbs./A) | Sanilac (Lbs./A) | Tuscola (Lbs./A) | 1-year avg. (Lbs./A) | 2-year avg. (Lbs./A) | 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|--------------------------|--------------|----------------|------------------|------------------|----------------------|----------------------|----------------------|
| 16686 | 98 | 21 | 4.2 | 61* | 3,627* | 3,594** | 3,409* | 2,847* | 3,543* | 3,061 | 3,149 |
| 17822 | 99 | 21 | 4.2 | 84 | 4,111* | 2,905 | 3,310 | 2,735* | 3,442 | 3,378* | NA ^a |
| 17837 | 100 | 22 | 3.2 | 70* | 4,291** | 3,410* | 3,899** | 2,153 | 3,867** | 3,088 | 3,087 |
| 17875 | 99 | 18 | 3.7 | 89 | 2,930 | 2,348 | 2,379 | 2,693* | 2,553 | 2,725 | 2,899 |
| 19837 | 96 | 17 | 3.0 | 98 | 3,825* | 2,738 | 3,618* | 3,362** | 3,393 | 3,180 | NA |
| 19857 | 101 | 21 | 4.5 | 61** | 3,833* | 2,829 | 2,991 | 2,732* | 3,218 | NA | NA |
| Coral ^b | 102 | 19 | 3.0 | 76* | 3,703* | 2,680 | 2,796 | 2,350* | 3,060 | 2,854 | 2,853 |
| R20653 | 103 | 21 | 4.5 | 73* | 4,220* | 2,916 | 3,399* | 2,757* | 3,512 | NA | NA |
| R20667 | 100 | 18 | 3.2 | 79* | 3,192 | 2,620 | 3,258 | 2,551* | 3,024 | 2,846 | 2,992 |
| R20669 | 102 | 21 | 4.0 | 75* | 4,225* | 2,713 | 3,657* | 3,271* | 3,532* | 3,552** | NA |
| R22092 | 99 | 18 | 1.7 | 66* | 3,339 | 3,026 | 2,791 | 2,748* | 3,052 | NA | NA |
| R22716 | 99 | 21 | 2.7 | 77* | 4,038* | 2,178 | 2,436 | 3,018* | 2,884 | NA | NA |
| Viper | 100 | 21 | 4.0 | 91 | 3,953* | 3,230* | 3,495* | 2,566* | 3,559* | 3,408* | 3,289** |
| MEAN: | 100 | 19 | 3.5 | 77 | 3,791 | 2,861 | 3,188 | 2,752 | 3,280 | 3,121 | 3,045 |
| LSD_{(0.05):} | NA | NA | NA | 21 | 819 | 386 | 557 | 1028 | 348 | 261 | 119 |
| CV: | NA | NA | NA | 23% | 18.10% | 11.30% | 14.65% | 20.97% | 15.69% | 18.99% | 11.11% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^a NA = Not available.

^b Pink bean variety.



Table 6. Pinto bean (conventional and slow darkening) agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | White Mold Infection (%) | Bay (Lbs./A) | Huron (Lbs./A) | Sanilac (Lbs./A) | Tuscola (Lbs./A) | 1-year avg. (Lbs./A) | 2-year avg. (Lbs./A) | 3-year avg. (Lbs./A) |
|-------------------------------------|----------------|-----------------------|---------------|--------------------------|--------------|----------------|------------------|------------------|----------------------|----------------------|----------------------|
| <i>Charro</i> | 101 | 21 | 3.0 | 36 | 2,554 | 3,812** | 3,881* | 3,393* | 3,541* | 3,442** | 3,369** |
| <i>EX2143-P</i> | 97 | 17 | 2.5 | 88 | 2,869 | 2,347 | 2,357 | 2,102 | 2,524 | NA ^a | NA |
| <i>EX2145-P</i> | 97 | 19 | 2.7 | 88 | 3,420* | 2,420 | 2,617 | 2,110 | 2,819 | NA | NA |
| <i>Gleam^b</i> | 98 | 21 | 2.7 | 95 | 2,550 | 3,131 | 3,475 | 2,984* | 3,052 | NA | NA |
| <i>Mystic^b</i> | 98 | 19 | 3.0 | 98 | 2,913* | 2,934 | 3,489 | 2,784 | 3,112 | NA | NA |
| <i>ND Falcon</i> | 101 | 22 | 2.0 | 12** | 2,307 | 2,887 | 2,577 | 2,422 | 2,591 | 2,691 | 2,679 |
| <i>ND Palomino^b</i> | 99 | 20 | 4.3 | 82 | 3,233* | 3,528* | 4,111** | 2,823* | 3,624** | 2,812 | 2,822 |
| <i>ND Rodeo^b</i> | 100 | 19 | 4.2 | 64 | 3,698** | 3,389 | 3,411 | 2,982* | 3,499* | NA | NA |
| <i>P19713</i> | 98 | 21 | 2.2 | 75 | 3,238* | 3,265 | 3,736* | 2,616 | 3,413* | 3,273 | 3,263* |
| <i>SV6139GR</i> | 98 | 20 | 2.5 | 94 | 3,209* | 2,158 | 3,487 | 2,272 | 2,952 | 2,676 | 2,950 |
| <i>USDA Diamondback^b</i> | 99 | 20 | 2.5 | 92 | 2,749 | 2,334 | 2,287 | 2,645 | 2,456 | NA | NA |
| <i>USDA Rattler</i> | 98 | 19 | 1.7 | 54 | 3,201* | 3,150 | 2,557 | 3,222* | 2,969 | NA | NA |
| <i>Vibrant^b</i> | 98 | 21 | 3.5 | 99 | 3,253* | 3,200 | 2,816 | 3,529** | 3,090 | NA | NA |
| MEAN: | 99 | 20 | 2.8 | 75 | 3,015 | 2,966 | 3,139 | 2,760 | 3,040 | 2,911 | 3,017 |
| LSD_{(0.05):} | NA | NA | NA | 16 | 792 | 327 | 583 | 735 | 319 | 158 | 191 |
| CV: | NA | NA | NA | 18% | 22.02% | 9.24% | 15.56% | 14.94% | 15.50% | 12.77% | 18.41% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^a NA = Not available.

^b Slow darkening variety.



Table 7. Great northern bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | White Mold Infection (%) | Bay (Lbs./A) | Huron (Lbs./A) | Sanilac (Lbs./A) | Tuscola (Lbs./A) | 1-year avg. (Lbs./A) | 2-year avg. (Lbs./A) | 3-year avg. (Lbs./A) |
|------------------------------|-----------------|-----------------------|---------------|--------------------------|--------------|----------------|------------------|------------------|----------------------|----------------------|----------------------|
| <i>Aries</i> | 96 | 18 | 3.8 | 99 | 3,208 | 2,273 | 2,187 | 2,000 | 2,417 | 2,322 | 2,337 |
| <i>Eiger</i> | 99 | 19 | 2.7 | 58 | 4,678** | 3,139** | 3,328** | 2,462* | 3,402** | 3,195** | 3,170* |
| <i>G19613</i> | 99 | 19 | 1.5 | 18** | 4,148* | 2,815* | 2,233 | 2,213* | 2,852 | 2,966* | 3,097* |
| <i>ND Pegasus</i> | 100 | 20 | 2.2 | 77 | 3,455 | 2,490 | 2,976* | 2,483** | 2,851 | 2,986* | 3,178** |
| <i>Powderhorn</i> | 94 | 15 | 1.7 | 91 | 2,407 | 2,663* | 2,194 | 2,057* | 2,330 | 2,417 | 2,521 |
| MEAN: | 98 | 18 | 2.4 | 68 | 3,579 | 2,676 | 2,584 | 2,243 | 2,770 | 2,777 | 2,860 |
| LSD_{(0.05):} | NA ^a | NA | NA | 19 | 904 | 530 | 461 | 474 | 291 | 273 | 195 |
| CV: | NA | NA | NA | 22% | 20.06% | 15.70% | 14.17% | 16.77% | 17.76% | 23.79% | 20.21% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.

Table 8. Cranberry bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | Montcalm (Lbs./A) | Tuscola (Lbs./A) | Irrigated 2-year avg. (Lbs./A) | Irrigated 3-year avg. (Lbs./A) | Dry Land 2-year avg. (Lbs./A) | Dry Land 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|-------------------|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| 16756 | 92 | 20 | 1.0 | 3,558* | 2,659 | 2,873 | 2,995 | 1,941 | 2,008 |
| 16758 | 89 | 14 | 1.0 | 2,789 | 1,858 | 2,606 | 2,871 | 1,321 | 1,599 |
| 16775 | 103 | 14 | 2.0 | 2,174 | 2,880 | 2,271 | 2,449 | 1,790 | 1,851 |
| 16816 | 92 | 14 | 1.0 | 3,041* | 2,233 | 2,726 | 2,942 | 1,700 | 1,816 |
| 151093 | 104 | 16 | 4.0 | 3,901** | 3,678 | 3,428** | 3,512** | 2,360* | 2,527* |
| <i>Amaranto</i> | 92 | 14 | 1.0 | 2,775 | 2,214 | 2,885 | 3,010 | 1,831 | 1,956 |
| <i>CR17-1-7-B2</i> | 105 | 18 | 4.0 | 1,709 | 3,626 | NA ^a | NA | NA | NA |
| <i>Etna</i> | 98 | 16 | 1.0 | 3,239* | 2,269 | 3,003 | 3,296* | 1,688 | 1,913 |
| <i>Firestripe</i> | 100 | 16 | 1.0 | 3,317* | 3,514 | 3,204* | NA | 2,141* | NA |
| <i>Jester (151085)</i> | 102 | 18 | 2.0 | 2,285 | 3,966** | 2,459 | 2,802 | 2,617** | 2,654** |
| <i>Krimson</i> | 95 | 14 | 3.0 | 2,244 | 2,103 | NA | NA | NA | NA |
| <i>Navabi</i> | 102 | 16 | 1.0 | 2,475 | 1,758 | 2,811 | NA | 1,830 | NA |
| MEAN: | 97 | 15 | 1.7 | 2,748 | 2,630 | 2,827 | 2,985 | 1,922 | 2,040 |
| LSD_{(0.05):} | NA | NA | NA | 436 | 1009 | 318 | 227 | 508 | 312 |
| CV: | NA | NA | NA | 13.20% | 27.48% | 13.50% | 11.23% | 31.60% | 22.55% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.



Table 9. Light red kidney bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | Montcalm (Lbs./A) | Tuscola (Lbs./A) | Irrigated 2-year avg. (Lbs./A) | Irrigated 3-year avg. (Lbs./A) | Dry Land 2-year avg. (Lbs./A) | Dry Land 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|-------------------|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| 11413 | 97 | 18 | 2.0 | 3,218* | 1,744 | 3,272* | 3,420* | 1,849 | 2,109* |
| 15916 | 95 | 19 | 2.0 | 2,811 | 2,368* | 2,879 | 3,109 | 2,314* | 2,416* |
| 15923 | 98 | 17 | 2.0 | 3,458* | 2,082* | 3,333** | 3,499** | 1,431 | 1,771 |
| 16998 | 95 | 18 | 2.0 | 2,718 | 2,581* | 2,790 | 3,086 | 2,088 | 2,219* |
| 161082 | 97 | 18 | 2.0 | 3,088* | 3,543* | 3,239* | 3,317* | 2,597** | 2,504** |
| <i>Big Red</i> | 94 | 18 | 2.0 | 2,827 | 1,791 | 2,974 | 3,162 | 1,455 | 1,871 |
| <i>California Early</i> | 96 | 16 | 2.0 | 2,566 | 2,236* | 2,839 | 2,904 | 1,876 | 1,902 |
| <i>K20743</i> | 98 | 19 | 2.0 | 2,718 | 3,014* | 2,698 | 3,256* | 2,176 | 2,491* |
| <i>K22604</i> | 101 | 19 | 3.0 | 3,548** | 3,607** | NA ^a | NA | NA | NA |
| <i>Pink Panther</i> | 99 | 16 | 1.0 | 3,043* | 2,430* | 3,091* | 3,252* | 1,916 | 2,029 |
| <i>Red Dawn (09363)</i> | 94 | 16 | 2.0 | 2,596 | 1,731 | 2,940 | 2,970 | 1,883 | 2,090* |
| <i>Ronnie's Red</i> | 103 | 22 | 3.0 | 2,707 | 2,835* | 3,034* | 2,754 | 2,187* | 2,447* |
| MEAN: | 99 | 18.2 | 2.3 | 2,941 | 2,497 | 3,033* | 3,156 | 1,979 | 2,168 |
| LSD_{(0.05):} | NA | NA | NA | 509 | 926 | 329 | 270 | 601 | 422 |
| CV: | NA | NA | NA | 14.47% | 30.97% | 12.78% | 12.64% | 36.47% | 28.78% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.



Table 10. Dark red kidney bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | Montcalm (Lbs./A) | Tuscola (Lbs./A) | Irrigated 2-year avg. (Lbs./A) | Irrigated 3-year avg. (Lbs./A) | Dry Land 2-year avg. (Lbs./A) | Dry Land 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|-------------------|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| 15977 | 100 | 19 | 3.0 | 1,741 | 1,963 | 2,192 | 2,656 | 1,672 | 2,029* |
| 161156 | 100 | 16 | 3.0 | 2,506 | 1,895 | 2,736 | 3,069* | 2,235* | 2,327* |
| 161165 | 94 | 18 | 1.0 | 2,832* | 2,822** | NA ^a | NA | NA | NA |
| 181017 | 100 | 20 | 2.0 | 2,530 | 2,563* | 3,036* | 3,212** | 2,499** | 2,567** |
| 181020 | 97 | 14 | 3.0 | 2,659 | 2,232* | 2,720 | 2,856 | 1,447 | 1,664 |
| 181021 | 92 | 22 | 1.0 | 2,863* | 2,393* | 3,152* | 2,896 | 1,635 | 1,858 |
| DRK1601-1 | 95 | 20 | 3.0 | 1,835 | 2,015 | NA | NA | NA | NA |
| Dynasty | 99 | 22 | 3.0 | 2,627 | 2,663* | 2,857 | 3,108* | 2,424* | 2,553* |
| Epic | 101 | 20 | 3.0 | 3,197** | 2,070 | 3,204** | 3,178* | 2,224* | 2,363* |
| Gallantry | 102 | 23 | 3.0 | 2,723* | 2,643* | 2,771 | 3,042* | 1,949* | 2,163* |
| Montcalm | 100 | 20 | 2.0 | 2,834* | 2,395* | 2,839 | 2,773 | 2,072* | 2,072* |
| ND Redbarn | 102 | 22 | 2.0 | 2,357 | 1,586 | NA | NA | NA | NA |
| Rampart (09434) | 101 | 18 | 3.0 | 2,705* | 2,165 | 2,899 | 3,033* | 2,025* | 2,229* |
| Red Hawk | 98 | 18 | 2.0 | 2,451 | 2,514* | 2,531 | 2,681 | 1,633 | 1,634 |
| Seattle (151011) | 101 | 18 | 2.0 | 2,310 | 2,501* | 2,607 | 2,934* | 2,332 | 2,358* |
| MEAN: | 99 | 18.6 | 2.2 | 2,545 | 2,295 | 2,795 | 2,953 | 2,012 | 2,151 |
| LSD_{(0.05):} | NA | NA | NA | 368 | 548 | 290 | 305 | 567 | 394 |
| CV: | NA | NA | NA | 12.17% | 19.80% | 12.47% | 15.30% | 33.00% | 27.10% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.



Table 11. White kidney bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | Montcalm (Lbs./A) | Tuscola (Lbs./A) | Irrigated 2-year avg. (Lbs./A) | Irrigated 3-year avg. (Lbs./A) | Dry Land 2-year avg. (Lbs./A) | Dry Land 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|-------------------|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| Beluga | 104 | 16 | 3.0 | 2,321 | 3,090* | 2,598 | 2,491 | 2,248 | 2,377 |
| Denali | 98 | 18 | 2.0 | 3,063* | 2,869* | 3,175* | 3,194** | 2,122 | 2,337 |
| K19830 | 101 | 20 | 2.0 | 2,839* | 3,091* | 3,172* | 3,109* | 2,402* | 2,698* |
| K19832 | 101 | 18 | 1.0 | 3,284* | 3,221* | 3,178* | NA ^a | 2,501 | NA |
| ND Whitetail | 101 | 17 | 3.0 | 2,266 | 3,032* | 2,854 | 2,828 | 2,665* | 2,707** |
| Snowdon | 102 | 18 | 2.0 | 2,247 | 2,291 | 2,713 | 2,845 | 1,832 | 2,013 |
| Snowshoe | 104 | 20 | 3.0 | 2,794 | 3,163* | 3,134* | NA | 2,914** | NA |
| WK1601-1 | 102 | 18 | 2.0 | 3,303** | 3,514** | 3,236** | NA | 2,534* | NA |
| MEAN: | 101 | 18 | 2.3 | 2,764 | 3,034 | 3,008 | 2,893 | 2,402 | 2,426 |
| LSD_{(0.05):} | NA | NA | NA | 486 | 889 | 523 | 343 | 567 | 262 |
| CV: | NA | NA | NA | 14.46% | 22.60% | 20.78% | 17.31% | 28.19% | 15.75% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.

Table 12. Mayocoba/yellow bean agronomic and yield results.

| ENTRY | Maturity (DAP) | Plant Height (Inches) | Lodging (1-5) | Montcalm (Lbs./A) | Tuscola (Lbs./A) | Irrigated 2-year avg. (Lbs./A) | Irrigated 3-year avg. (Lbs./A) | Dry Land 2-year avg. (Lbs./A) | Dry Land 3-year avg. (Lbs./A) |
|------------------------------|----------------|-----------------------|---------------|-------------------|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| Claim Jumper (13655) | 103 | 18 | 4.0 | 2,445* | 3,362** | 2,338 | 2,501 | 2,717** | 2,731** |
| Motherlode (191274) | 102 | 20 | 4.0 | 2,220 | 2,818* | 2,084 | 2,025 | 2,257 | 2,368 |
| RRY1803-1-1 | 94 | 18 | 3.0 | 2,047 | 2,440 | NA ^a | NA | NA | NA |
| Y1608-14 | 99 | 18 | 3.0 | 2,153 | 1,790 | 2,263 | 2,340 | 1,838 | 1,880 |
| Y1702-22 | 95 | 16 | 2.0 | 2,538* | 2,312 | 2,811** | 2,800** | 1,802 | 1,949 |
| Y19817 | 99 | 18 | 3.0 | 2,851* | 3,096* | NA | NA | NA | NA |
| Yellowstone | 98 | 16 | 4.0 | 2,856** | 2,388 | 2,598* | 2,611* | 1,935 | 2,169 |
| MEAN: | 99 | 18 | 3.2 | 2,444 | 2,601 | 2,419 | 2,455 | 2,110 | 2,219 |
| LSD_{(0.05):} | NA | NA | NA | 460 | 638 | 294 | 236 | 394 | 271 |
| CV: | NA | NA | NA | 15.37% | 19.94% | 14.32% | 14.05% | 21.97% | 17.85% |

Note. The highest yielding entry in each column is marked with two asterisks. Any entries in the column with yields that were not statistically different from the highest yielding entry are marked with one asterisk.

^aNA = Not available.



2023 Sourcing Information

Table 13. Sources of dry bean entries tested in the 2023 performance trials, organized by market class.

| Entry ID | Market Class | Source | Entry ID | Market Class | Source |
|-----------------------------|--------------|-----------------------|-----------------------------|--------------|------------------|
| 15655 | BL | ProVita | <i>Etna</i> | CR | Bayer |
| 16594 | BL | ProVita | <i>Firestripe</i> | CR | TVS ^e |
| 16598 | BL | ProVita | <i>Jester (151085)</i> | CR | ProVita |
| 17751 | BL | ProVita | <i>Krimson</i> | CR | TVS |
| 15619 | BL | ProVita | <i>Navabi</i> | CR | TVS |
| <i>B18094173</i> | BL | ADM ^a | 15977 | DRK | ProVita |
| <i>B1904-3-1</i> | BL | MSU ^b | 161156 | DRK | ProVita |
| <i>B19309</i> | BL | MSU | 161165 | DRK | ProVita |
| <i>B20536</i> | BL | MSU | 181017 | DRK | ProVita |
| <i>B20591</i> | BL | MSU | 181020 | DRK | ProVita |
| <i>B20599</i> | BL | MSU | 181021 | DRK | ProVita |
| <i>B21710</i> | BL | MSU | <i>DRK1601-1</i> | DRK | USDA-ARS |
| <i>B22003</i> | BL | MSU | <i>Dynasty</i> | DRK | Hensall Co-op |
| <i>B22041</i> | BL | MSU | <i>Epic</i> | DRK | ProVita |
| <i>B22854</i> | BL | MSU | <i>Gallantry</i> | DRK | Hensall Co-op |
| <i>B3035411</i> | BL | ADM | <i>Montcalm</i> | DRK | MSU |
| <i>B4062257</i> | BL | ADM | <i>ND Redbarn</i> | DRK | NDSU |
| <i>B5054313</i> | BL | ADM | <i>Rampart (09434)</i> | DRK | ProVita |
| <i>B7071259</i> | BL | ADM | <i>Red Hawk</i> | DRK | MSU |
| <i>B7072252</i> | BL | ADM | <i>Seattle (151011)</i> | DRK | ProVita |
| <i>B7072269</i> | BL | ADM | <i>Aries</i> | GN | ADM |
| <i>Bannock</i> | BL | Hensall Co-op | <i>Eiger</i> | GN | MSU |
| <i>Black Bear</i> | BL | ProVita | <i>G19613</i> | GN | MSU |
| <i>Black Pearl (B19344)</i> | BL | MSU | <i>ND Pegasus</i> | GN | NDSU |
| <i>Black Tails</i> | BL | ProVita | <i>Powderhorn</i> | GN | MSU |
| <i>BlackBeard (14506)</i> | BL | ProVita | 11413 | LRK | ProVita |
| <i>Eclipse</i> | BL | NDSU ^c | 15916 | LRK | ProVita |
| <i>ND Twilight</i> | BL | NDSU | 15923 | LRK | ProVita |
| <i>Nimbus (14500)</i> | BL | ProVita | 16998 | LRK | ProVita |
| <i>Spectre (14497)</i> | BL | ProVita | 161082 | LRK | ProVita |
| <i>Umbra</i> | BL | Hensall Co-op | <i>Big Red</i> | LRK | ProVita |
| <i>Zenith</i> | BL | MSU | <i>California Early</i> | LRK | TVS |
| 16756 | CR | ProVita | <i>K20743</i> | LRK | MSU |
| 16758 | CR | ProVita | <i>K22604</i> | LRK | MSU |
| 16775 | CR | ProVita | <i>Pink Panther</i> | LRK | Bayer |
| 16816 | CR | ProVita | <i>Red Dawn (09363)</i> | LRK | ProVita |
| 151093 | CR | ProVita | <i>Ronnie's Red</i> | LRK | ProVita |
| <i>Amaranto</i> | CR | Bayer | <i>Claim Jumper (13655)</i> | MY | ProVita |
| <i>CR17-1-7-B2</i> | CR | USDA-ARS ^d | <i>Motherlode (191274)</i> | MY | ProVita |



| Entry ID | Market Class | Source |
|---------------------------|--------------|-----------------|
| <i>RRY1803-1-1</i> | MY | USDA-ARS |
| <i>Y1608-14</i> | MY | USDA-ARS |
| <i>Y1702-22</i> | MY | USDA-ARS |
| <i>Y19817</i> | MY | MSU |
| <i>Yellowstone</i> | MY | MSU |
| <i>12039</i> | NA | ProVita |
| <i>13057</i> | NA | ProVita |
| <i>14075</i> | NA | ProVita |
| <i>14078</i> | NA | ProVita |
| <i>14084</i> | NA | ProVita |
| <i>Argosy</i> | NA | Hensall Co-op |
| <i>Armada (13068)</i> | NA | ProVita |
| <i>Au Sable (N18103)</i> | NA | MSU |
| <i>Blizzard</i> | NA | ProVita |
| <i>Charm</i> | NA | TVS |
| <i>EX1802-N</i> | NA | TVS |
| <i>EX1803-N</i> | NA | TVS |
| <i>EX2109-N</i> | NA | TVS |
| <i>EX2110-N</i> | NA | TVS |
| <i>EX2111-N</i> | NA | TVS |
| <i>HMS Bounty (12047)</i> | NA | ProVita |
| <i>HMS Medalist</i> | NA | ProVita |
| <i>Liberty (15095)</i> | NA | ProVita |
| <i>N19246</i> | NA | MSU |
| <i>N20395</i> | NA | MSU |
| <i>N21510</i> | NA | MSU |
| <i>N21526</i> | NA | MSU |
| <i>N21532</i> | NA | MSU |
| <i>N22616</i> | NA | MSU |
| <i>N22630</i> | NA | MSU |
| <i>Nautica</i> | NA | Hensall Co-op |
| <i>ND Polar</i> | NA | NDSU |
| <i>OAC Seal</i> | NA | Jefferies Seeds |
| <i>Rogue</i> | NA | Hensall Co-op |
| <i>SV1893GH</i> | NA | Bayer |
| <i>T9905</i> | NA | TVS |
| <i>Valiant (08077)</i> | NA | ProVita |
| <i>Victory (15094)</i> | NA | ProVita |
| <i>Vigilant</i> | NA | ADM |
| <i>Charro</i> | P | MSU |
| <i>EX2143-P</i> | P | TVS |

| Entry ID | Market Class | Source |
|-------------------------|--------------|------------|
| <i>EX2145-P</i> | P | TVS |
| <i>ND Falcon</i> | P | NDSU |
| <i>P19713</i> | P | MSU |
| <i>SV6139GR</i> | P | Bayer |
| <i>USDA Rattler</i> | P | Kelly Bean |
| <i>Coral</i> | PI | MSU |
| <i>Gleam</i> | SDP | ProVita |
| <i>Mystic</i> | SDP | ProVita |
| <i>ND Palomino</i> | SDP | NDSU |
| <i>ND Rodeo</i> | SDP | NDSU |
| <i>USDA Diamondback</i> | SDP | Kelly Bean |
| <i>Vibrant</i> | SDP | ProVita |
| <i>16686</i> | SR | ProVita |
| <i>17822</i> | SR | ProVita |
| <i>17837</i> | SR | ProVita |
| <i>17875</i> | SR | ProVita |
| <i>19837</i> | SR | ProVita |
| <i>19857</i> | SR | ProVita |
| <i>R20653</i> | SR | MSU |
| <i>R20667</i> | SR | MSU |
| <i>R20669</i> | SR | MSU |
| <i>R22092</i> | SR | MSU |
| <i>R22716</i> | SR | MSU |
| <i>Viper</i> | SR | ProVita |
| <i>Beluga</i> | WK | MSU |
| <i>Denali</i> | WK | MSU |
| <i>K19830</i> | WK | MSU |
| <i>K19832</i> | WK | MSU |
| <i>ND Whitetail</i> | WK | NDSU |
| <i>Snowdon</i> | WK | MSU |
| <i>Snowshoe</i> | WK | TVS |

Note. Bean entries are listed alphabetically within market classes. BL = black, CR = cranberry, DRK = dark red kidney, GN = great northern, LRK = light red kidney, MY = mayocoba/yellow, NA = navy, P = pinto, PI = pink, SDP = slow darkening pinto, SR = small red, WK = white kidney.

^aADM = Archer-Daniels-Midland

^bMSU = Michigan State University

^cNDSU = North Dakota State University

^dUSDA-ARS = U.S. Dept. of Agriculture – Agricultural Research Service

^eTVS = Treasure Valley Seed