LREC

## Langdon Research Extension Center

NORTH DAKOTA STATE UNIVERSITY

# 2014 ANNUAL RESEARCH REPORT

NDSU NORTH DAKOTA STATE UNIVERSITY

**Annual Research Report No. 89**

December 2014

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The 2014 annual research report is intended to provide producers information to aid in selecting varieties and/or hybrids. Variety information and research reports on crop disease and production can also be found at our website www.ag.ndsu.edu/langdonrec/. Variety trial results from all NDSU Research Extension Centers and the Main Station at Fargo, along with crop extension bulletins, can be accessed on the web at www.ag.ndsu.edu/varietytrials/.

Choosing a variety is one of the most important decisions a producer makes in successful crop production. Characteristics to consider in selecting a variety may include yield potential, disease resistance, protein content when grown with proper fertility, straw strength, plant height, test weight, yield stability across years and locations, quality and economic profitability. A variety's performance may differ from year to year and from location to location within a year due to varying environmental conditions. When selecting a variety to grow, it is best to consider a variety's performance over several years and locations.

The agronomic data presented in this publication are from replicated research plots using experimental designs that enable the use of statistical analysis. The trials are designed so that "real" yield and agronomic differences can be statistically separated from differences that occur by chance. The least significant difference (LSD) values given in the report are used for this purpose. For example, if the LSD 10% is 5 bushels, then if the difference between any two varieties is greater than 5 bushels they are said to be significantly different from one another 90 times out of 100 under those growing conditions. If the difference between two varieties is less than 5 bushels, they are not significantly different from one another. If there is a "NS" for the LSD 10% value it means there was no real difference between any varieties or the trial was too variable to detect a real difference. The CV stands for coefficient of variation and is expressed as a percentage. The CV is a measure of variability in the trial. Large CVs mean that a large amount of variation could not be attributed to differences in the varieties or agronomic characteristic.

The NDSU Langdon Research Extension Center, in addition to its on-station research program, conducted variety research trials at several locations in 2014. Trial locations were at Cavalier, Park River, Pekin, Cando, Aneta and Rugby. These locations are in cooperation with the farmer, the NDSU Extension Service and the County Agricultural Improvement Association.

**2014 Weather Summary**

The 2014 growing season (May-September) was slightly drier and warmer compared to the 30-year average from 1981 to 2010 at Langdon. Fall recharge at Langdon for September through October 2013 was 3.25 inches, exactly normal. Precipitation from November 2013 through March 2014 was 3.24 inches, 1.14 inches above below normal. Snowfall for 2013-2014 was 33.2 inches, less than one inch below normal. It was a very cold winter with temperature averaging $6.53^0$ F below normal from November – March. Spring was also very cold delaying planting dates across the region from mid-May to early June. Rainfall ranged from 77-149 percent of normal across the region from April-September with the Red River Valley area averaging 125 percent of normal. Temperatures averaged 0-4 degrees F below normal, April – September, with southern Pembina and eastern Walsh County having the greatest departure from normal. Yields were good for the cool season crops because the season started with a good moisture profile, disease levels were low, and rainfall was timely. Warm season crops yields were more variable but could be considered average. A frost/freeze occurred in parts of the region on September 12 which had the greatest effect on corn and late seeded canola which resulted in a high percentage of green seed. The fall season was warmer and drier than normal which allowed good harvest conditions and conditions for fall's work.

| 2014 Crop Management - Langdon | | | | | | |
|---|---|---|---|---|---|---|
| **Field Trial** | **Previous Crop** | **Seeding Rate Unit/Acre** | **Yield Goal** | **Planting Date** | **Harvest Date** | **Row Spacing** |
| Barley | soybean | 1.25 million pls | 100 bu | May 14 | Aug. 14 | 6 |
| Canola - LL, CL | soybean | 610,000 pls | 2500 lb | May 22 | Sept. 3 | 6 |
| Canola - RR | soybean | 610,000 pls | 2500 lb | May 22 | Sept. 3 | 6 |
| Corn | fallow | 28,000 thinned | 150 bu | May 16 | Oct. 21 | 30 |
| Durum | soybean | 1.50 million pls | 60 bu | May 14 | Aug. 28 | 6 |
| Drybean | soybean | 70-90,000 pls | 2000 lb | May 30 | Sept. 24 | 30 |
| Energy Beet | soybean | 45,000 thinned | 20 tons | May 28 | Oct. 10 | 30 |
| Field Pea | soybean | 300,000 pls | 60 bu | May 15 | Aug. 29 | 6 |
| Flax | soybean | 2.8 million pls | 40 bu | May 15 | Sept. 12 | 6 |
| HRSW | soybean | 1.50 million pls | 60 bu | May 14 | Aug. 27 | 6 |
| HRWW | hrsw | 1.25 million pls | 100 bu | Sept. 27, 2013 | Aug. 26 | 6 |
| Oats | soybean | 1.0 million pls | 120 bu | May 14 | Aug. 27 | 6 |
| Soybean - Conventional | soybean | 200,000 pls | 60 bu | May 24 | Oct. 8 | 6 |
| Soybean - LL | soybean | 200,000 pls | 60 bu | May 24 | Oct. 8 | 6 |
| Soybean - RR | soybean | 200,000 pls | 60 bu | May 24 | Oct. 8 | 6 |
| Sunflower - Confection | wheat | 17,000 thinned | 2500 lb | May 23 | Oct. 16 | 30 |
| Sunflower - Oil | wheat | 20,000 thinned | 2500 lb | May 23 | Oct. 16 | 30 |
| **Soil Type** - Svea-Barnes loam | | | | | | |

**Special thanks to our local cooperators and Extension Agents for their efforts in our off-station variety testing.**

Allan Wood - Cando
Dave Hankey - Park River
Brad Brummond - Walsh County Agent
Kent Schluchter - Cavalier
Samantha Lahman - Pembina County Agent
Doug Stein - Lakota
Oybek Turayev - Nelson County Agent
Lesley Lubenow - Area Extension Specialist
Tim Haakenson - Aneta
Jill Haakenson - Griggs County Agent
Dave Teigen - Rugby
Yolanda Schmidt - Pierce County Agent

| 2014 Crop Management – Off-Station | | | | | | |
|---|---|---|---|---|---|---|
| **Location (County/Field Trial)** | **Previous Crop** | **Seeding Rate Unit/Acre** | **Yield Goal** | **Planting Date** | **Harvest Date** | **Row Spacing** |
| **Cavalier (Pembina)** | | | | | | |
| HRSW | wheat | 1.50 million pls | 60 bu | May 29 | Sept. 8 | 6 |
| Soybeans | wheat | 200,000 pls | 60 bu | May 29 | Oct. 15 | 6 |
| Dry Bean | wheat | 70,000-90,000 pls | 2000 lb | May 29 | Sept. 23 | 30 |
| **Park River (Walsh)** | | | | | | |
| HRSW | cover crop | 1.50 million pls | 65 bu | May 27 | Sept. 8 | 6 |
| Barley | cover crop | 1.25 million pls | 100 bu | May 27 | Aug. 20 | 6 |
| Soybean | wheat | 200,000 pls | 60 bu | May 27 | Oct. 7 | 6 |
| **Pekin (Nelson)** | | | | | | |
| HRSW | soybean | 1.50 million pls | 60 bu | May 28 | Sept. 16 | 6 |
| Soybean | wheat | 200,000 pls | 60 bu | May 28 | Oct. 14 | 6 |
| **Cando (Towner)** | | | | | | |
| HRSW | soybean | 1.50 million pls | 60 bu | May 28 | Sept. 15 | 6 |
| Barley | soybean | 1.25 million pls | 100 bu | May 28 | Sept. 15 | 6 |
| Durum | soybean | 1.50 million pls | 60 bu | May 28 | Sept. 15 | 6 |
| Energy Beet | canola | 45,000 thinned | 20 tons | May 28 | Oct. 10 | 30 |
| **Aneta (Griggs)** | | | | | | |
| HRWW | canola | 1.25 million pls | 100 bu | Sept. 25, 2013 | Aug. 15 | 6 |
| **Rugby (Pierce)** | | | | | | |
| HRWW | hrsw | 1.25 million pls | 100 bu | Sept. 26, 2013 | Aug. 7 | 6 |

| **Location** | **Soil Type** |
|---|---|
| Cavalier | Borup silt loam |
| Park River | Glyndon silt loam, soybean – Fairdale silt loam |
| Pekin | Svea loam |
| Cando | Great Bend-Zell silt loam |

pls=pure live seeds

## Record of Climatological Observation
## Langdon, ND

| | Precipitation | | Dep. from | | Temperature | | Dep. from |
|---|---|---|---|---|---|---|---|
| | Normal* | 2014 | Normal | | Normal* | 2014 | Normal |
| April | 1.24 | 1.92 | +0.68 | April | 38.1 | 33.3 | -4.8 |
| May | 2.29 | 1.70 | -0.59 | May | 51.5 | 51.6 | +0.1 |
| June | 3.23 | 3.42 | +0.19 | June | 60.8 | 61.5 | +0.7 |
| July | 2.86 | 2.36 | -0.50 | July | 66.2 | 64.9 | -1.3 |
| August | 2.6 | 3.15 | +0.55 | August | 64.5 | 65.7 | +1.2 |
| September | 1.99 | 1.00 | -0.99 | September | 54.4 | 55.8 | +1.4 |
| Total | 14.21 | 13.55 | -0.66 | Total | 55.9 | 55.5 | -0.4 |

*113 year average

## Monthly Growing Degree Days and Normals-Langdon

| | Wheat Growing Degree Days | | | Corn Growing Degree Days | | | Sunflower Growing Degree Days | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2014 | Normal | Deviation | 2014 | Normal | Deviation | 2014 | Normal | Deviation |
| April | 198 | 274 | -76 | -- | -- | -- | -- | -- | -- |
| May | 616 | 613 | +3 | 241 | 219 | +22 | 354 | 314 | +40 |
| June | 863 | 875 | -12 | 358 | 356 | +2 | 523 | 519 | +4 |
| July | 959 | 1018 | -59 | 451 | 499 | -48 | 625 | 685 | -60 |
| August | 966 | 962 | +4 | 488 | 457 | +31 | 660 | 642 | +18 |
| September | 696 | 671 | +25 | 289 | 255 | +34 | 408 | 358 | +50 |
| Total | 4298 | 4413 | -115 | 1827 | 1786 | +41 | 2570 | 2518 | +52 |

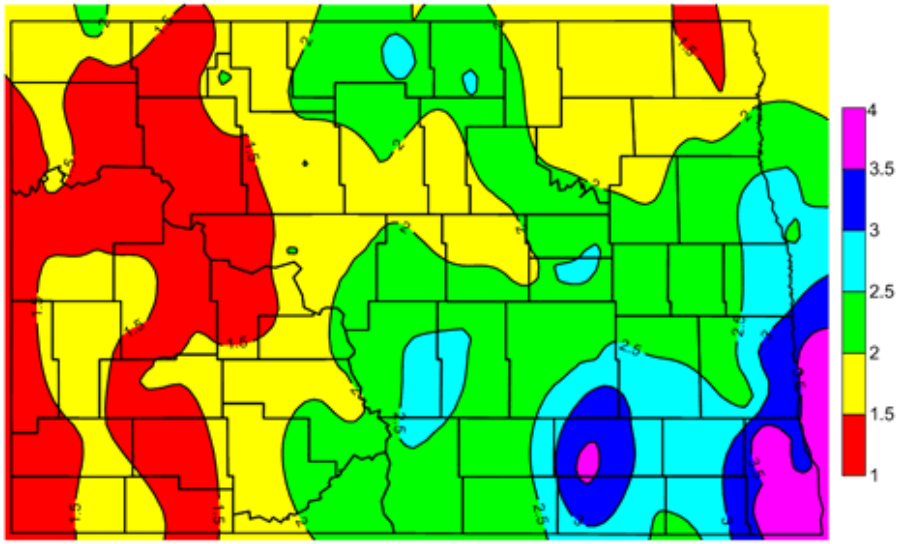
## Frost Dates, Langdon and Selected Cities

| | Last Spring Frost | | First Fall Frost | | Frost Free Days | |
|---|---|---|---|---|---|---|
| **Langdon** | 32°F | 28°F | 32°F | 28°F | 32°F | 28°F |
| Normal | 19-May | 8-May | 21-Sep | 28-Sep | 123 | 143 |
| 2014 | 16-May | 15-May | 12-Sep | 12-Sep | 119 | 120 |
| **Cavalier** | | | | | | |
| Normal | 14-May | 4-May | 25-Sep | 4-Oct | 132 | 152 |
| 2014 | 16-May | 15-May | 12-Sep | 8-Oct | 119 | 146 |
| **Park River** | | | | | | |
| Normal | 8-May | 30-Apr | 30-Sep | 10-Oct | 143 | 163 |
| 2014 | 16-May | 15-May | 13-Sep | 13-Sep | 120 | 121 |
| **Petersburg** | | | | | | |
| Normal | 17-May | 2-May | 25-Sep | 2-Oct | 133 | 151 |
| 2014 | 15-May | 15-May | 12-Sep | 4-Oct | 120 | 142 |

Normals are from the NWS, 2014 frost dates from nearest reporting NDAWN station.

## North Dakota April 2014 Precipitation (inches)

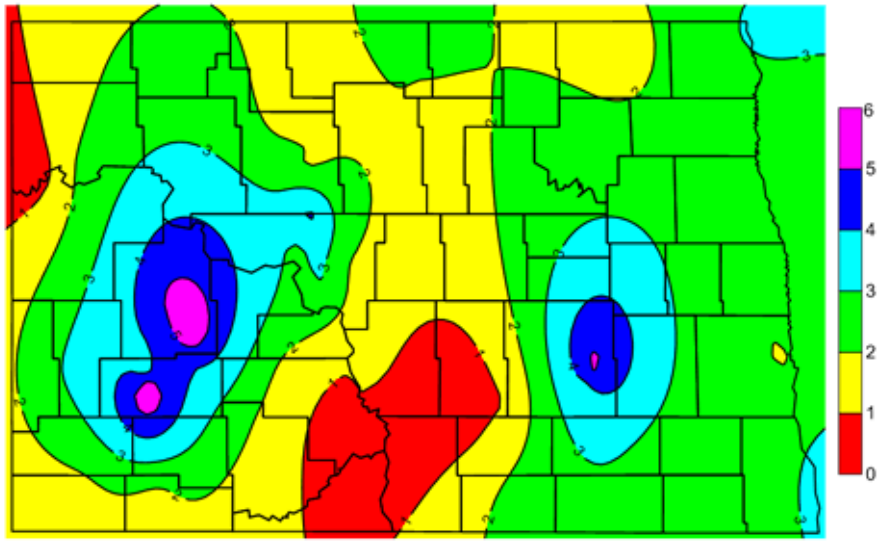
(Data from NWS Cooperative Network and North Dakota Agricultural Network)




ND State Climate Office

## North Dakota May 2014 Precipitation (inches)

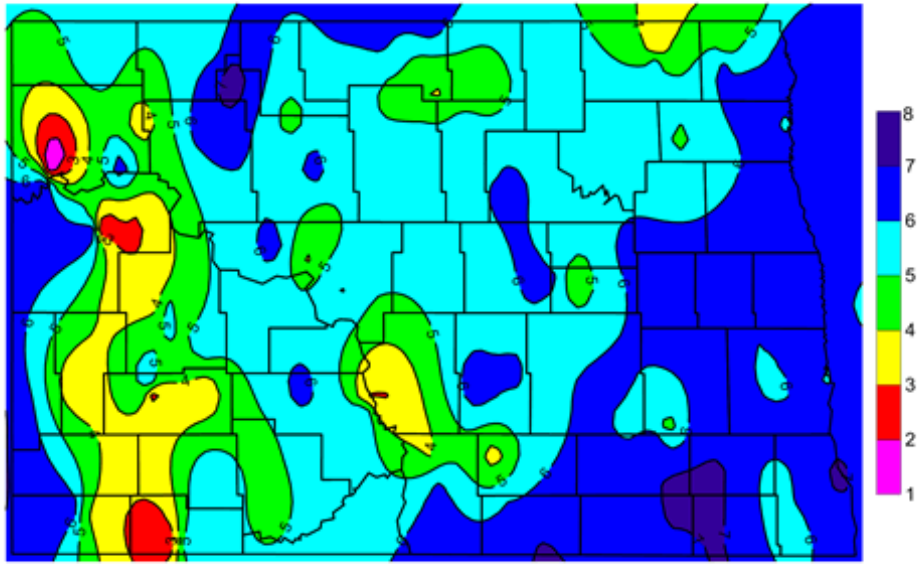
(Data from NWS Cooperative Network and North Dakota Agricultural Network)




ND State Climate Office

## North Dakota June 2014 Precipitation (inches)

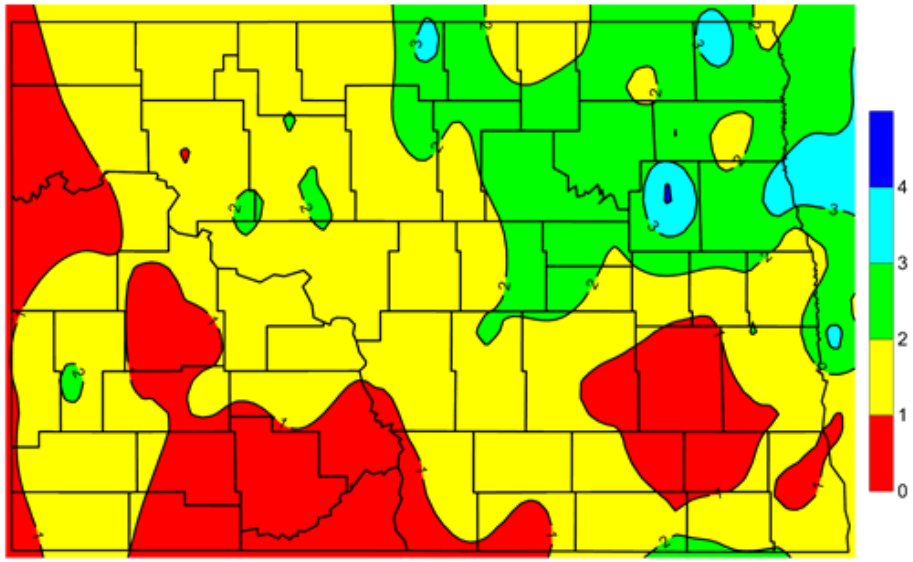
(Data from NWS Cooperative Network and North Dakota Agricultural Network)




ND State Climate Office

## North Dakota July 2014 Precipitation (inches)

(Data from NWS Cooperative Network and North Dakota Agricultural Network)

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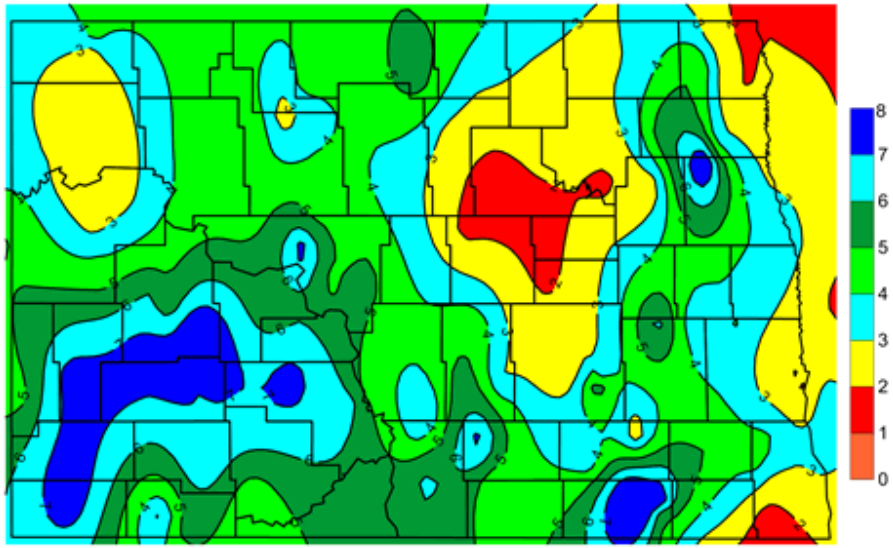
## North Dakota August 2014 Precipitation (inches)

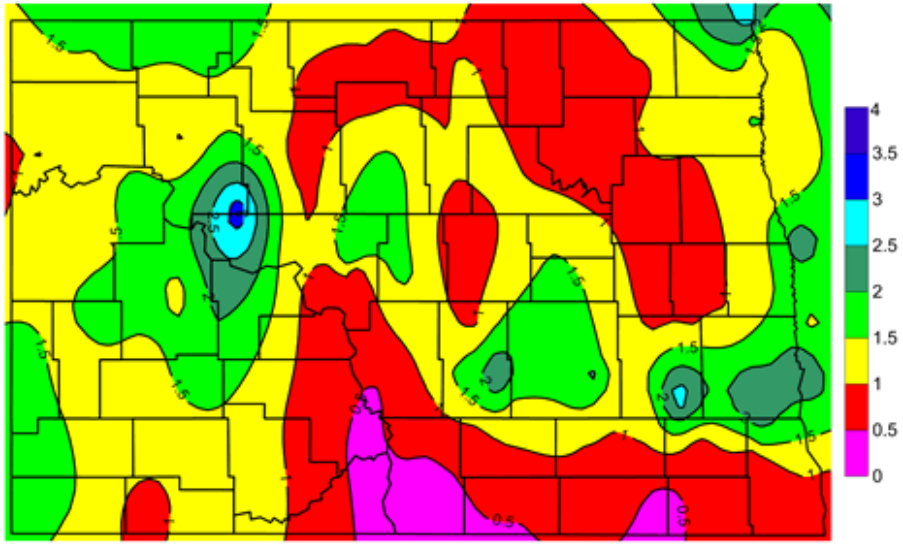
(Data from NWS Cooperative Network and North Dakota Agricultural Network)




ND State Climate Office

## North Dakota September 2014 Precipitation (inches)

(Data from NWS Cooperative Network and North Dakota Agricultural Network)

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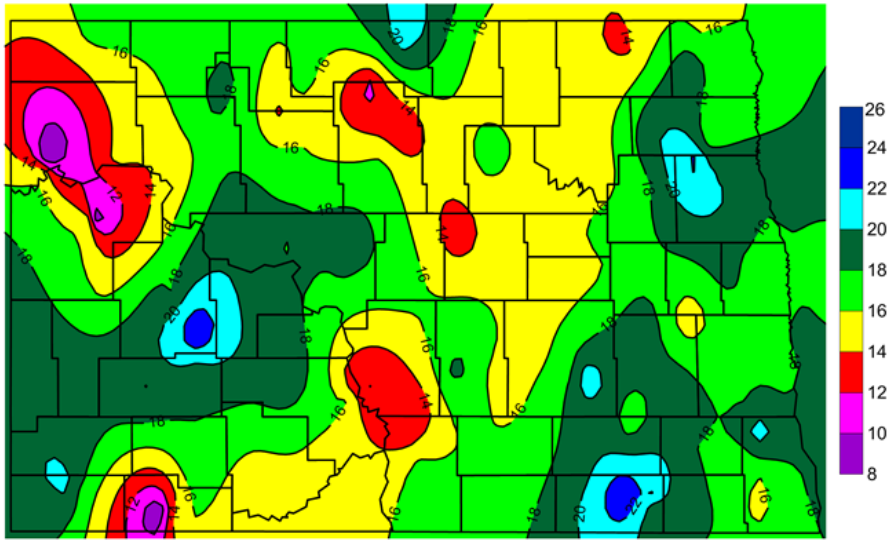
## North Dakota April to September 2014 Precipitation (inches)

(Data from NWS Cooperative Network and North Dakota Agricultural Weather Network)

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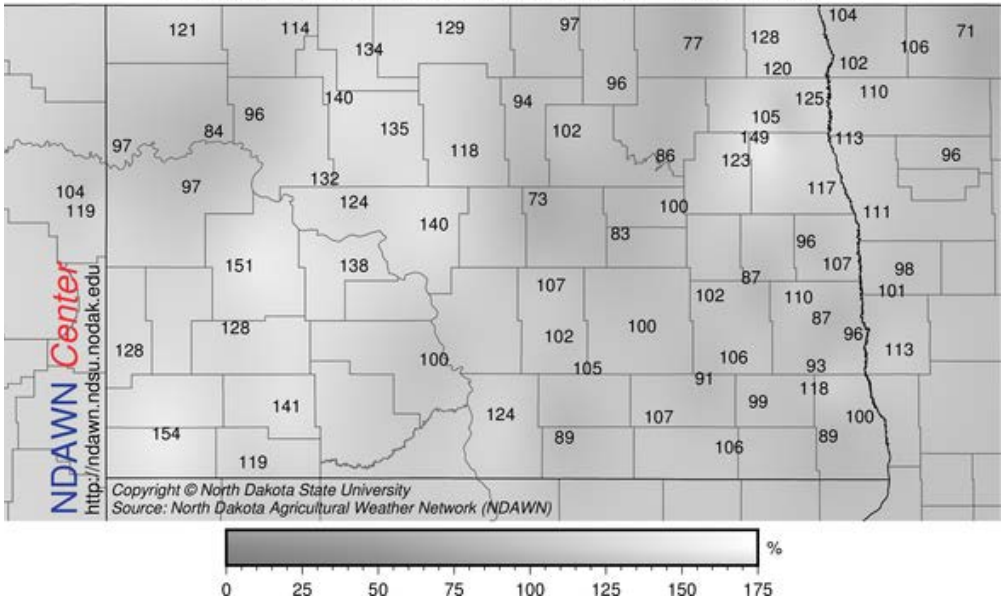
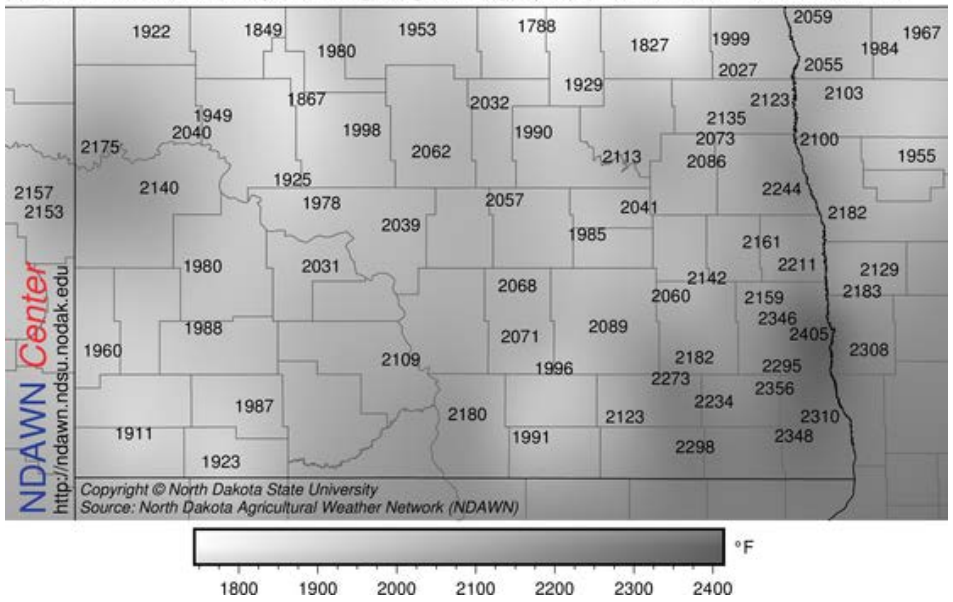
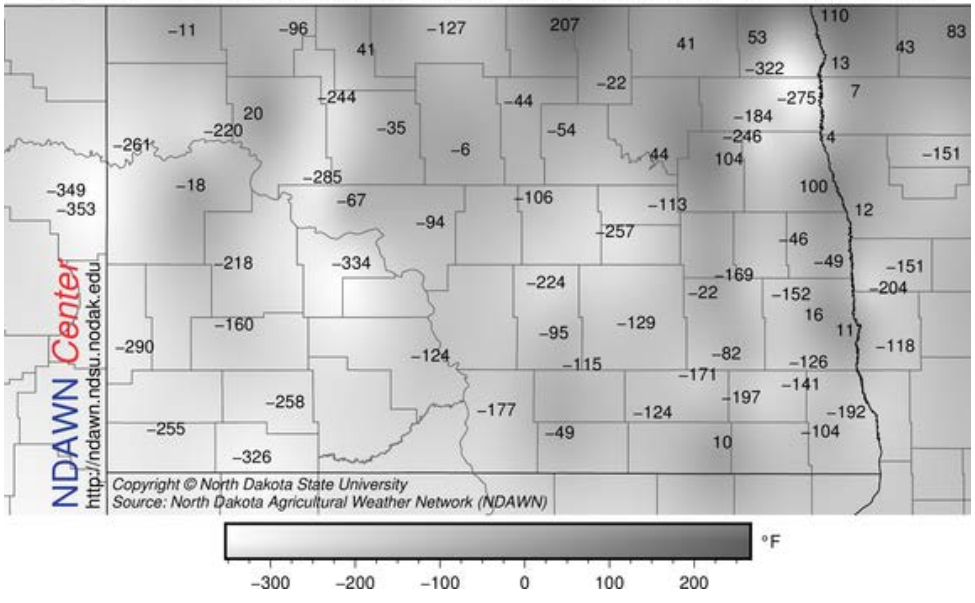
## Percent of Normal Rainfall (%) (2014-04-01 – 2014-09-30)



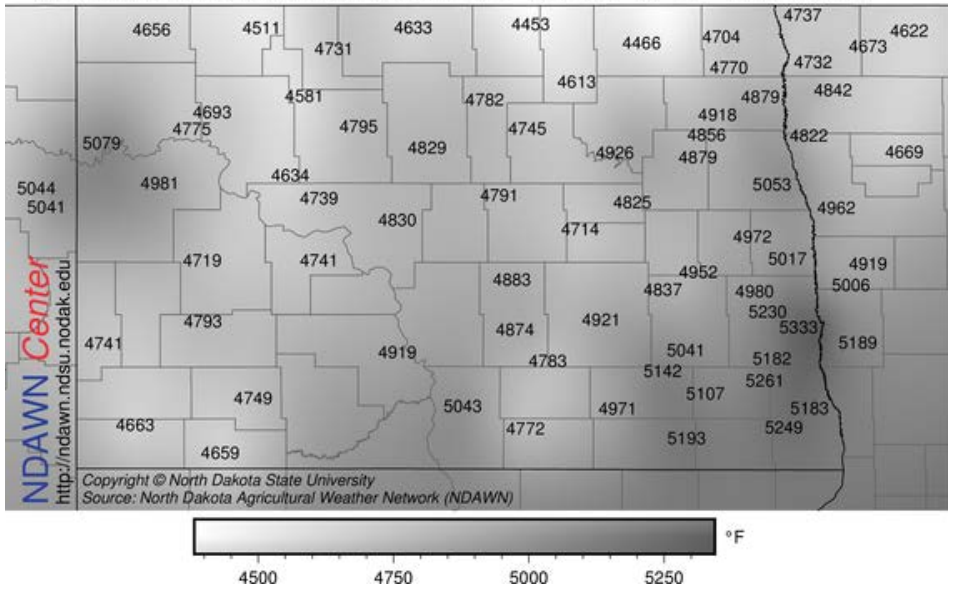
Corn Accumulated Daily Growing Degree Days (°F) (2014–05–01 – 2014–09–30)



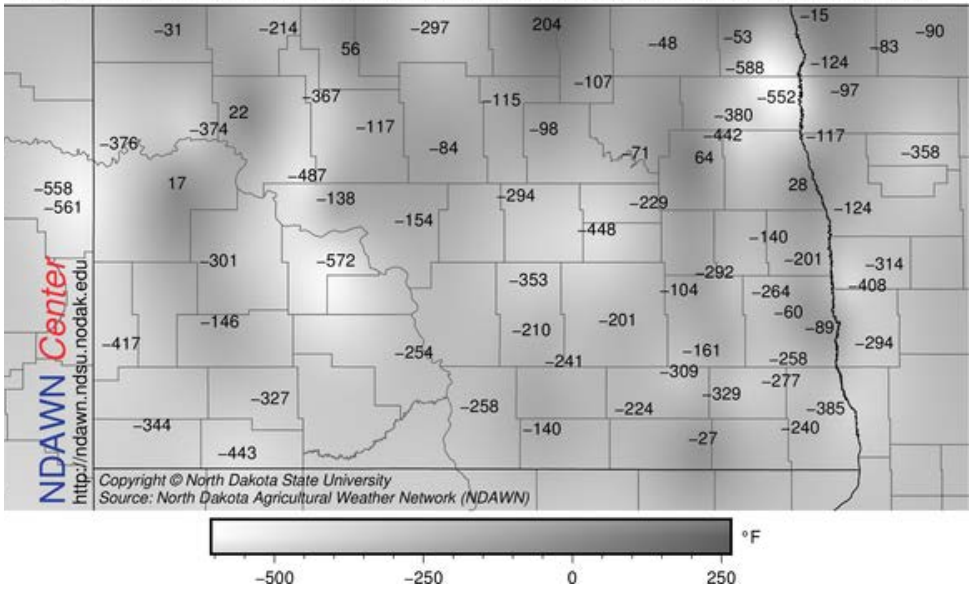

Departure from Normal Corn Accumulated GDD (°F) (2014–05–01 – 2014–09–30)




Accumulated Wheat Growing Degree Days (°F) (2014–04–01 – 2014–09–30)




Departure from Normal Wheat Accumulated GDD (°F) (2014–04–01 – 2014–09–30)



## Average Data by Crop and Year Across Sites

| HRSW | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Protein (%) | | | | | | Height (in) | | | | | Days to Head | | | | Return$/a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. Sites | 4 | 5 | 4 | 5 | 5 | 14 | 4 | 5 | 4 | 5 | 5 | 14 | 4 | 5 | 4 | 5 | 5 | 14 | 4 | 5 | 4 | 5 | 14 | 4 | 3 | 4 | 5 | 12 | 5 |
| Variety | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 3yr | 10 | 11 | 12 | 13 | 3yr | 2014* |
| Faller | 86 | 71 | 80 | 96 | 93 | 90 | 59.6 | 59.7 | 58.5 | 61.3 | 60.9 | 60.2 | 13.4 | 15.0 | 12.4 | 13.4 | 13.2 | 13.0 | 38 | 36 | 38 | 34 | 36 | 66 | 53 | 63 | 53 | 56 | 532 |
| RB07 | 76 | 66 | 75 | 85 | 83 | 81 | 59.2 | 59.5 | 58.4 | 61.0 | 60.6 | 60.0 | 13.8 | 15.5 | 13.4 | 14.5 | 14.1 | 14.0 | 35 | 33 | 35 | 32 | 33 | 65 | 51 | 59 | 51 | 54 | 526 |
| Barlow | 78 | 63 | 72 | 82 | 81 | 78 | 60.4 | 60.5 | 59.3 | 61.8 | 61.6 | 60.9 | 14.2 | 15.7 | 13.8 | 14.1 | 14.2 | 14.0 | 38 | 36 | 39 | 33 | 36 | 65 | 51 | 60 | 50 | 54 | 524 |
| Jenna | 79 | 65 | 73 | 85 | 81 | 80 | 58.7 | 58.8 | 57.5 | 59.9 | 60.0 | 59.1 | 14.1 | 15.5 | 13.4 | 14.0 | 13.9 | 13.8 | 35 | 32 | 34 | 32 | 33 | 69 | 55 | 64 | 54 | 58 | 502 |
| Prosper | 88 | 74 | 79 | 92 | 90 | 87 | 59.7 | 59.9 | 58.6 | 61.2 | 60.9 | 60.2 | 13.5 | 14.9 | 12.8 | 13.2 | 13.3 | 13.1 | 38 | 36 | 37 | 34 | 36 | 68 | 53 | 63 | 53 | 56 | 515 |
| Vantage | 74 | 63 | 62 | 80 | 74 | 72 | 62.3 | 61.4 | 60.4 | 62.8 | 62.2 | 61.8 | 15.0 | 16.5 | 14.8 | 15.5 | 15.6 | 15.3 | 35 | 34 | 35 | 31 | 33 | 71 | 56 | 64 | 55 | 58 | 559 |
| LCS Albany | 85 | -- | 72 | 94 | 84 | 83 | 59.1 | -- | 57.4 | 61.6 | 60.4 | 59.8 | 12.6 | -- | 12.2 | 12.8 | 12.5 | 12.5 | 35 | -- | 34 | 33 | -- | 69 | -- | 65 | 56 | -- | 431 |
| Samson | -- | 66 | 71 | 86 | 85 | 81 | -- | 59.1 | 58.7 | 60.2 | 59.9 | 59.6 | -- | 15.2 | 13.6 | 13.7 | 13.3 | 13.5 | -- | 31 | 31 | 29 | 30 | -- | 54 | 60 | 52 | 55 | 489 |
| Rollag | -- | 61 | 68 | 80 | 79 | 76 | -- | 60.4 | 59.2 | 62.1 | 61.8 | 61.0 | -- | 16.0 | 14.1 | 14.7 | 14.5 | 14.4 | -- | 32 | 33 | 30 | 32 | -- | 52 | 60 | 52 | 55 | 524 |
| SY Soren | -- | 62 | 73 | 81 | 77 | 77 | -- | 59.9 | 58.7 | 61.7 | 61.1 | 60.5 | -- | 15.7 | 13.5 | 14.6 | 14.2 | 14.1 | -- | 31 | 32 | 29 | 31 | -- | 52 | 61 | 51 | 55 | 498 |
| WB-Digger | -- | 68 | 77 | 93 | 82 | 84 | -- | 58.6 | 58.9 | 60.7 | 59.8 | 59.8 | -- | 15.0 | 12.9 | 13.9 | 13.6 | 13.5 | -- | 34 | 36 | 34 | 35 | -- | 52 | 61 | 53 | 55 | 499 |
| WB-Mayville | -- | 63 | 71 | 80 | 75 | 75 | -- | 59.8 | 58.7 | 60.9 | 60.6 | 60.1 | -- | 15.7 | 13.9 | 14.6 | 14.1 | 14.2 | -- | 30 | 31 | 29 | 30 | -- | 52 | 61 | 50 | 54 | 476 |
| Advance | -- | -- | 74 | 86 | 77 | 79 | -- | -- | 59.3 | 62.1 | 61.2 | 60.9 | -- | -- | 13.3 | 13.1 | 13.3 | 13.2 | -- | -- | 41 | 31 | -- | -- | -- | 57 | 52 | -- | 446 |
| LCS Breakaway | -- | -- | 74 | 82 | 78 | 78 | -- | -- | 60.0 | 62.6 | 62.3 | 61.6 | -- | -- | 13.9 | 14.6 | 14.4 | 14.3 | -- | -- | 34 | 30 | -- | -- | -- | 60 | 50 | -- | 521 |
| Elgin-ND | -- | -- | 75 | 88 | 82 | 82 | -- | -- | 58.1 | 61.2 | 60.7 | 60.0 | -- | -- | 13.1 | 14.3 | 14.0 | 13.8 | -- | -- | 40 | 36 | -- | -- | -- | 61 | 51 | -- | 520 |
| Forefront | -- | -- | 74 | 77 | 76 | 76 | -- | -- | 59.3 | 61.2 | 60.9 | 60.5 | -- | -- | 12.6 | 14.6 | 14.4 | 13.9 | -- | -- | 36 | 35 | -- | -- | -- | 59 | 48 | -- | 504 |
| Norden | -- | -- | 69 | 82 | 80 | 77 | -- | -- | 59.9 | 62.6 | 62.6 | 61.7 | -- | -- | 13.2 | 13.8 | 13.5 | 13.5 | -- | -- | 34 | 31 | -- | -- | -- | 61 | 53 | -- | 470 |
| LCS Powerplay | -- | -- | 72 | 89 | 83 | 81 | -- | -- | 58.8 | 61.7 | 61.6 | 60.7 | -- | -- | 12.7 | 13.6 | 13.7 | 13.3 | -- | -- | 34 | 32 | -- | -- | -- | 61 | 52 | -- | 500 |
| SY Rowyn | -- | -- | -- | 84 | 82 | -- | -- | -- | -- | 61.0 | 61.1 | -- | -- | -- | -- | 13.8 | 13.5 | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 50 | -- | 482 |
| Linkert | -- | -- | -- | 77 | 75 | -- | -- | -- | -- | 61.3 | 60.6 | -- | -- | -- | -- | 15.0 | 14.6 | -- | -- | -- | -- | 28 | -- | -- | -- | -- | 52 | -- | 506 |
| Prevail | -- | -- | -- | -- | 81 | -- | -- | -- | -- | -- | 60.6 | -- | -- | -- | -- | -- | 13.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 500 |
| SY Ingmar | -- | -- | -- | -- | 79 | -- | -- | -- | -- | -- | 61.5 | -- | -- | -- | -- | -- | 14.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 525 |
| WB9507 | -- | -- | -- | -- | 91 | -- | -- | -- | -- | -- | 60.0 | -- | -- | -- | -- | -- | 13.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 563 |
| LCS Iguacu | -- | -- | -- | -- | 85 | -- | -- | -- | -- | -- | 61.0 | -- | -- | -- | -- | -- | 11.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 412 |
| LCS Nitro | -- | -- | -- | -- | 87 | -- | -- | -- | -- | -- | 59.8 | -- | -- | -- | -- | -- | 12.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 424 |
| HRS 3378 | -- | -- | -- | -- | 80 | -- | -- | -- | -- | -- | 61.1 | -- | -- | -- | -- | -- | 12.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 438 |
| HRS 3361 | -- | -- | -- | -- | 82 | -- | -- | -- | -- | -- | 60.1 | -- | -- | -- | -- | -- | 13.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 495 |
| HRS 3419 | -- | -- | -- | -- | 87 | -- | -- | -- | -- | -- | 59.3 | -- | -- | -- | -- | -- | 12.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 463 |
| Glenn | 70 | 60 | 70 | 78 | -- | -- | 61.9 | 62.4 | 61.8 | 63.3 | -- | -- | 14.5 | 15.8 | 14.1 | 14.6 | -- | -- | 40 | 37 | 41 | 34 | 37 | 64 | 50 | 59 | 49 | 53 | -- |
| Breaker | 83 | 66 | 72 | 87 | -- | -- | 61.3 | 61.0 | 60.3 | 62.4 | -- | -- | 13.7 | 15.2 | 12.9 | 13.8 | -- | -- | 37 | 34 | 36 | 33 | 34 | 67 | 53 | 62 | 52 | 56 | -- |
| Velva | 77 | 64 | 74 | -- | -- | -- | 59.0 | 58.2 | 58.2 | -- | -- | -- | 13.9 | 15.5 | 13.3 | -- | -- | -- | 37 | 34 | 36 | -- | -- | 68 | 54 | 63 | -- | -- | -- |
| Brennan | 71 | 61 | 71 | -- | -- | -- | 59.2 | 60.0 | 59.3 | -- | -- | -- | 14.1 | 15.4 | 13.7 | -- | -- | -- | 33 | 30 | 31 | -- | -- | 65 | 52 | 60 | -- | -- | -- |
| Howard | 78 | 64 | -- | -- | -- | -- | 59.9 | 60.1 | -- | -- | -- | -- | 14.1 | 15.5 | -- | -- | -- | -- | 38 | 35 | -- | -- | -- | 66 | 54 | -- | -- | -- | -- |
| Kelby | 72 | 58 | -- | -- | -- | -- | 59.3 | 59.5 | -- | -- | -- | -- | 14.4 | 15.8 | -- | -- | -- | -- | 34 | 30 | -- | -- | -- | 65 | 51 | -- | -- | -- | -- |
| Brick | 74 | 60 | -- | -- | -- | -- | 60.3 | 61.1 | -- | -- | -- | -- | 14.2 | 15.2 | -- | -- | -- | -- | 39 | 37 | -- | -- | -- | 63 | 48 | -- | -- | -- | -- |
| Sabin | 75 | 59 | -- | -- | -- | -- | 59.1 | 58.2 | -- | -- | -- | -- | 14.2 | 16.1 | -- | -- | -- | -- | 37 | 34 | -- | -- | -- | 66 | 53 | -- | -- | -- | -- |
| Select | 66 | 64 | -- | -- | -- | -- | 59.7 | 60.7 | -- | -- | -- | -- | 14.0 | 15.6 | -- | -- | -- | -- | 38 | 36 | -- | -- | -- | 63 | 50 | -- | -- | -- | -- |

*Langdon-Dec. 5 quote. $6.35/bu, protein discount/premium $0.15 a fifth. 12% protein and below $4.85/bu.

## Average Data by Crop and Year Across Sites

| Durum | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Height (in) | | | | | | Days to Head | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No. Sites** | **3** | **3** | **3** | **2** | **2** | **9** | **3** | **3** | **3** | **2** | **2** | **9** | **3** | **3** | **3** | **2** | **2** | **9** | **3** | **3** | **3** | **2** | **2** | **9** |
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Alkabo | 79 | 62 | 69 | 86 | 69 | 75 | 58.4 | 59.2 | 58.5 | 61.3 | 59.2 | 59.7 | 42 | 38 | 38 | 42 | 40 | 40 | 69 | 55 | 64 | 52 | 57 | 58 |
| Lebsock | 76 | 63 | 68 | 79 | 69 | 72 | 59.5 | 59.7 | 58.8 | 61.1 | 59.6 | 59.8 | 41 | 39 | 38 | 41 | 39 | 39 | 71 | 54 | 62 | 51 | 55 | 56 |
| Tioga | 80 | 60 | 71 | 88 | 67 | 75 | 57.6 | 57.7 | 58.2 | 60.7 | 58.5 | 59.1 | 45 | 40 | 41 | 45 | 43 | 43 | 70 | 57 | 63 | 53 | 58 | 58 |
| Divide | 80 | 59 | 67 | 84 | 68 | 73 | 57.2 | 58.0 | 58.6 | 60.0 | 58.5 | 59.0 | 43 | 40 | 40 | 44 | 42 | 42 | 70 | 58 | 64 | 53 | 59 | 59 |
| Carpio | 80 | 62 | 69 | 90 | 67 | 75 | 59.4 | 59.6 | 58.7 | 61.6 | 58.4 | 59.6 | 43 | 39 | 40 | 45 | 41 | 42 | 71 | 57 | 65 | 54 | 59 | 59 |
| Joppa | 85 | 67 | 66 | 94 | 71 | 76 | 58.3 | 58.7 | 58.5 | 60.7 | 58.7 | 59.3 | 42 | 39 | 41 | 42 | 41 | 41 | 70 | 56 | 63 | 52 | 59 | 57 |
| Grenora | 86 | 61 | 67 | 89 | -- | -- | 57.9 | 57.8 | 57.3 | 60.2 | -- | -- | 41 | 37 | 37 | 40 | -- | -- | 69 | 56 | 63 | 52 | -- | -- |
| DG Max | 74 | 59 | 65 | 83 | -- | -- | 58.2 | 58.7 | 58.3 | 60.7 | -- | -- | 43 | 40 | 39 | 43 | -- | -- | 69 | 55 | 63 | 52 | -- | -- |
| Westhope | 76 | 61 | 66 | -- | -- | -- | 58.6 | 58.9 | 58.4 | -- | -- | -- | 41 | 39 | 39 | -- | -- | -- | 70 | 57 | 64 | -- | -- | -- |
| Wales | 76 | -- | 68 | -- | -- | -- | 57.8 | -- | 58.4 | -- | -- | -- | 41 | -- | 39 | -- | -- | -- | 69 | -- | 63 | -- | -- | -- |
| WB-Belfield | -- | 43 | -- | -- | -- | -- | -- | 55.8 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | -- | 51 | -- | -- | -- | -- |
| DG Star | 72 | -- | -- | -- | -- | -- | 57.0 | -- | -- | -- | -- | -- | 41 | -- | -- | -- | -- | -- | 68 | -- | -- | -- | -- | -- |
| Grande D'oro | 77 | -- | -- | -- | -- | -- | 59.7 | -- | -- | -- | -- | -- | 42 | -- | -- | -- | -- | -- | 71 | -- | -- | -- | -- | -- |

| Barley | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Protein (%) | | | | | | Plump (%) | | | | | | Days to Head | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No. Sites** | **3** | **3** | **3** | **2** | **3** | **8** | **3** | **3** | **3** | **2** | **3** | **8** | **3** | **3** | **3** | **2** | **3** | **8** | **3** | **3** | **3** | **2** | **3** | **8** | **3** | **1** | **3** | **2** | **6** |
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **3yr** |
| Lacey | 116 | 94 | 99 | 135 | 123 | 119 | 50.2 | 49.8 | 47.9 | 50.4 | 50.0 | 49.4 | 12.0 | 13.4 | 12.5 | 12.6 | 13.1 | 12.7 | 96 | 94 | 83 | 99 | 95 | 92 | 64 | 51 | 59 | 58 | 56 |
| Stellar-ND | 116 | 99 | 92 | 132 | 126 | 117 | 48.6 | 48.8 | 46.7 | 49.6 | 48.6 | 48.3 | 11.9 | 12.8 | 12.2 | 12.3 | 12.7 | 12.4 | 97 | 94 | 85 | 99 | 97 | 94 | 65 | 51 | 60 | 59 | 57 |
| Tradition | 118 | 97 | 77 | 138 | 124 | 113 | 49.7 | 49.8 | 46.1 | 50.7 | 49.5 | 48.8 | 12.0 | 13.0 | 12.9 | 12.5 | 12.7 | 12.7 | 96 | 92 | 80 | 99 | 94 | 91 | 64 | 53 | 62 | 58 | 58 |
| Celebration | 111 | 91 | 80 | 135 | 125 | 113 | 49.1 | 48.7 | 45.9 | 49.7 | 49.2 | 48.3 | 12.5 | 14.3 | 13.5 | 13.6 | 13.6 | 13.6 | 94 | 90 | 83 | 99 | 94 | 92 | 65 | 54 | 62 | 59 | 58 |
| Quest | 118 | 98 | 95 | 132 | 123 | 117 | 48.3 | 48.6 | 46.8 | 48.8 | 48.1 | 47.9 | 12.0 | 13.1 | 12.2 | 12.3 | 12.9 | 12.5 | 89 | 84 | 75 | 96 | 92 | 88 | 65 | 52 | 60 | 60 | 57 |
| Innovation | -- | -- | 94 | 130 | 130 | 118 | -- | -- | 47.0 | 49.4 | 49.8 | 48.7 | -- | -- | 12.7 | 12.4 | 13.3 | 12.8 | -- | -- | 81 | 98 | 97 | 92 | -- | -- | 59 | 58 | -- |
| Rasmusson | 126 | 104 | -- | -- | -- | -- | 49.4 | 49.4 | -- | -- | -- | -- | 11.6 | 12.7 | -- | -- | -- | -- | 94 | 91 | -- | -- | -- | -- | 65 | 50 | -- | -- | -- |
| Pinnacle* | 119 | 99 | -- | -- | -- | -- | 49.9 | 50.8 | -- | -- | -- | -- | 10.8 | 12.0 | -- | -- | -- | -- | 97 | 95 | -- | -- | -- | -- | 67 | 54 | -- | -- | -- |

*2-row barley

# HRSW Summary, Langdon 2010-2014

| | Yield(bu/a) | | | | | | Test Weight(lbs/bu) | | | | | | Protein(%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Barlow | 85 | 66 | 72 | 94 | 86 | 84 | 60.6 | 61.7 | 60.3 | 61.7 | 62.9 | 61.6 | 14.0 | 15.6 | 12.7 | 14.2 | 13.9 | 13.6 |
| Brick | 84 | 67 | 76 | 81 | 78 | 78 | 61.3 | 61.7 | 60.6 | 61.5 | 62.6 | 61.6 | 14.0 | 14.3 | 11.2 | 13.9 | 13.4 | 12.8 |
| Faller | 92 | 79 | 85 | 112 | 96 | 97 | 60.3 | 60.8 | 59.4 | 60.7 | 62.2 | 60.8 | 13.0 | 14.4 | 11.3 | 13.4 | 12.3 | 12.3 |
| Glenn | 77 | 58 | 68 | 91 | 76 | 78 | 62.5 | 62.9 | 62.6 | 63.0 | 64.0 | 63.2 | 14.2 | 15.6 | 13.1 | 14.6 | 14.4 | 14.0 |
| Prosper | 94 | 77 | 84 | 110 | 93 | 95 | 60.3 | 60.8 | 59.7 | 60.3 | 62.4 | 60.8 | 13.1 | 14.8 | 11.2 | 13.2 | 12.4 | 12.3 |
| RB07 | 79 | 70 | 74 | 96 | 88 | 86 | 59.8 | 60.3 | 58.8 | 60.4 | 62.1 | 60.4 | 13.5 | 15.2 | 12.3 | 14.5 | 13.8 | 13.5 |
| Velva | 74 | 69 | 72 | 99 | 93 | 88 | 57.4 | 60.1 | 59.2 | 60.2 | 61.2 | 60.2 | 13.6 | 14.7 | 12.1 | 13.8 | 12.5 | 12.8 |
| LCS Albany | 91 | 72 | 79 | 105 | 95 | 93 | 59.9 | 61.1 | 58.8 | 61.4 | 61.9 | 60.7 | 12.2 | 14.2 | 10.9 | 12.8 | 11.7 | 11.8 |
| Breaker | 88 | 67 | 75 | 99 | 83 | 86 | 60.3 | 62.2 | 61.3 | 61.9 | 62.7 | 62.0 | 13.7 | 14.9 | 12.1 | 14.1 | 13.0 | 13.1 |
| Brennan | 75 | 61 | 70 | 75 | 80 | 75 | 60.0 | 60.0 | 59.6 | 59.6 | 62.5 | 60.6 | 13.9 | 15.1 | 12.5 | 14.8 | 13.8 | 13.7 |
| Jenna | 82 | 72 | 74 | 95 | 87 | 85 | 59.9 | 59.4 | 58.4 | 59.0 | 61.4 | 59.6 | 13.9 | 14.8 | 12.3 | 13.8 | 12.7 | 12.9 |
| Samson | 82 | 62 | 72 | 92 | 86 | 83 | 58.3 | 59.2 | 60.1 | 59.8 | 60.9 | 60.3 | 13.0 | 15.1 | 12.6 | 13.9 | 12.5 | 13.0 |
| Select | 78 | 71 | 78 | 84 | 77 | 80 | 60.9 | 61.9 | 60.4 | 61.7 | 62.6 | 61.6 | 13.7 | 15.1 | 11.7 | 14.0 | 13.7 | 13.1 |
| Vantage | 78 | 58 | 67 | 86 | 81 | 78 | 62.3 | 61.8 | 61.4 | 62.1 | 63.5 | 62.3 | 14.7 | 16.0 | 13.0 | 15.8 | 14.4 | 14.4 |
| Elgin-ND | 89 | 71 | 76 | 99 | 90 | 89 | 60.1 | 60.9 | 59.2 | 61.1 | 62.3 | 60.9 | 14.0 | 15.4 | 12.0 | 14.1 | 13.7 | 13.3 |
| Norden | 77 | 67 | 73 | 90 | 81 | 81 | 61.2 | 62.6 | 61.3 | 62.2 | 63.2 | 62.2 | 13.8 | 14.9 | 12.1 | 13.9 | 13.2 | 13.1 |
| Alpine | 79 | 60 | 79 | 99 | 92 | 90 | 59.6 | 58.7 | 59.0 | 59.8 | 61.1 | 60.0 | 13.0 | 15.2 | 11.6 | 13.8 | 12.9 | 12.8 |
| Rollag | 76 | 63 | 70 | 83 | 85 | 79 | 61.4 | 61.4 | 60.0 | 61.6 | 63.0 | 61.5 | 14.0 | 16.1 | 12.6 | 14.8 | 14.1 | 13.8 |
| WB Digger | 81 | 66 | 80 | 99 | 90 | 89 | 59.9 | 59.5 | 59.8 | 60.4 | 61.9 | 60.7 | 13.3 | 14.4 | 11.8 | 14.1 | 12.8 | 12.9 |
| LCS Powerplay | -- | 67 | 75 | 101 | 88 | 88 | -- | 61.1 | 59.6 | 61.0 | 62.4 | 61.0 | -- | 15.0 | 11.5 | 13.5 | 13.4 | 12.8 |
| SY Soren | -- | 64 | 71 | 86 | 85 | 81 | -- | 60.6 | 59.9 | 61.4 | 63.2 | 61.5 | -- | 15.6 | 12.4 | 14.8 | 13.4 | 13.5 |
| Forefront | -- | 58 | 78 | 89 | 74 | 80 | -- | 61.3 | 60.6 | 60.5 | 62.1 | 61.1 | -- | 15.4 | 11.4 | 14.3 | 13.8 | 13.2 |
| WB Mayville | -- | 58 | 70 | 86 | 81 | 79 | -- | 59.9 | 59.9 | 60.3 | 61.4 | 60.5 | -- | 15.6 | 12.9 | 14.5 | 13.6 | 13.7 |
| Advance | -- | 70 | 81 | 97 | 85 | 87 | -- | 61.4 | 60.1 | 61.7 | 62.6 | 61.5 | -- | 14.3 | 12.1 | 12.9 | 12.6 | 12.5 |
| LCS Breakaway | -- | -- | 76 | 88 | 77 | 80 | -- | -- | 61.4 | 62.2 | 62.9 | 62.2 | -- | -- | 12.6 | 14.5 | 13.7 | 13.6 |
| Prevail | -- | -- | 74 | 89 | 85 | 82 | -- | -- | -- | -- | 61.9 | -- | -- | -- | -- | -- | 13.3 | -- |
| Linkert | -- | -- | -- | 81 | 82 | -- | -- | -- | -- | 60.8 | 62.2 | -- | -- | -- | -- | 15.4 | 13.6 | -- |
| MS Stingray | -- | -- | -- | 118 | 93 | -- | -- | -- | -- | 59.9 | 60.1 | -- | -- | -- | -- | 11.4 | 10.7 | -- |
| SY Rowyn | -- | -- | -- | 95 | 87 | -- | -- | -- | -- | 60.7 | 62.2 | -- | -- | -- | -- | 14.0 | 12.9 | -- |
| LCS Iguacu | -- | -- | -- | 94 | 91 | -- | -- | -- | -- | 60.2 | 62.0 | -- | -- | -- | -- | 12.4 | 11.6 | -- |
| HRS 3378 | -- | -- | -- | 90 | 87 | -- | -- | -- | -- | -- | 62.7 | -- | -- | -- | -- | -- | 12.4 | -- |
| HRS 3361 | -- | -- | -- | 98 | 85 | -- | -- | -- | -- | -- | 61.3 | -- | -- | -- | -- | -- | 13.5 | -- |
| SY Ingmar | -- | -- | -- | -- | 87 | -- | -- | -- | -- | -- | 62.9 | -- | -- | -- | -- | -- | 13.7 | -- |
| LCS Nitro | -- | -- | -- | -- | 91 | -- | -- | -- | -- | -- | 61.5 | -- | -- | -- | -- | -- | 11.8 | -- |
| WB9507 | -- | -- | -- | -- | 87 | -- | -- | -- | -- | -- | 60.4 | -- | -- | -- | -- | -- | 13.1 | -- |
| HRS 3419 | -- | -- | -- | -- | 89 | -- | -- | -- | -- | -- | 60.0 | -- | -- | -- | -- | -- | 12.3 | -- |
| MS-Chevelle | -- | -- | -- | -- | 91 | -- | -- | -- | -- | -- | 62.1 | -- | -- | -- | -- | -- | 12.5 | -- |
| Cardale | -- | -- | -- | -- | 84 | -- | -- | -- | -- | -- | 61.4 | -- | -- | -- | -- | -- | 13.8 | -- |
| Alsen | 78 | 54 | 68 | -- | -- | -- | 60.7 | 60.4 | 60.1 | -- | -- | -- | 14.2 | 15.9 | 12.4 | -- | -- | -- |
| Briggs | 83 | 67 | 71 | -- | -- | -- | 60.7 | 60.7 | 59.3 | -- | -- | -- | 14.1 | 15.4 | 12.5 | -- | -- | -- |
| Cromwell | 80 | 66 | 73 | -- | -- | -- | 61.2 | 61.9 | 60.7 | -- | -- | -- | 14.1 | 14.9 | 12.1 | -- | -- | -- |
| Freyr | 83 | 60 | 77 | -- | -- | -- | 60.0 | 59.5 | 59.5 | -- | -- | -- | 13.8 | 15.5 | 12.0 | -- | -- | -- |
| Howard | 88 | 66 | 74 | -- | -- | -- | 60.9 | 61.8 | 59.2 | -- | -- | -- | 13.8 | 15.4 | 12.5 | -- | -- | -- |
| Kelby | 79 | 58 | 69 | -- | -- | -- | 60.2 | 59.1 | 59.8 | -- | -- | -- | 14.1 | 15.3 | 12.6 | -- | -- | -- |
| Steele-ND | 87 | 66 | 73 | -- | -- | -- | 61.0 | 61.4 | 59.4 | -- | -- | -- | 14.2 | 15.3 | 12.4 | -- | -- | -- |
| Edge | -- | -- | 72 | -- | -- | -- | -- | -- | 57.8 | -- | -- | -- | -- | -- | 11.9 | -- | -- | -- |
| Brogan | 73 | 66 | -- | -- | -- | -- | 59.5 | 61.0 | -- | -- | -- | -- | 13.6 | 14.6 | -- | -- | -- | -- |
| Kuntz | 75 | 64 | -- | -- | -- | -- | 58.7 | 59.7 | -- | -- | -- | -- | 13.7 | 14.9 | -- | -- | -- | -- |
| Sabin | 81 | 66 | -- | -- | -- | -- | 59.9 | 59.9 | -- | -- | -- | -- | 14.0 | 15.4 | -- | -- | -- | -- |
| LSD 5% | 5.0 | 4.6 | 4.0 | 5.7 | 6.6 | | 0.6 | 0.5 | 0.5 | 0.4 | 0.7 | | 0.4 | 0.6 | 0.6 | 0.4 | 0.8 | |
| LSD 10% | -- | -- | 3.3 | 4.8 | 5.5 | | -- | -- | 0.4 | 0.3 | 0.5 | | -- | -- | 0.5 | 0.3 | 0.7 | |

## HRSW Summary, Langdon 2010-2014

| | Days to Head | | | | | | Height(in) | | | | | | Lodging(0-9) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **08** | **10** | **2yr** |
| Barlow | 67 | 54 | 61 | 52 | 53 | 55 | 40 | 38 | 37 | 33 | 37 | 36 | 3.0 | 1.5 | 2.3 |
| Brick | 63 | 50 | 60 | 50 | 49 | 53 | 40 | 39 | 39 | 33 | 37 | 36 | 0.8 | 1.8 | 1.3 |
| Faller | 69 | 57 | 63 | 55 | 54 | 57 | 39 | 37 | 37 | 35 | 35 | 36 | 1.9 | 0.8 | 1.4 |
| Glenn | 65 | 53 | 60 | 52 | 52 | 55 | 40 | 38 | 40 | 34 | 37 | 37 | 1.2 | 0.0 | 0.6 |
| Prosper | 70 | 57 | 64 | 55 | 53 | 57 | 39 | 37 | 37 | 34 | 36 | 36 | 2.2 | 1.5 | 1.9 |
| RB07 | 67 | 54 | 60 | 53 | 52 | 55 | 35 | 36 | 34 | 32 | 35 | 34 | 0.3 | 2.1 | 1.2 |
| Velva | 70 | 57 | 63 | 56 | 55 | 58 | 39 | 38 | 36 | 33 | 36 | 35 | 3.0 | 0.0 | 1.5 |
| LCS Albany | 70 | 59 | 65 | 57 | 55 | 59 | 36 | 34 | 32 | 32 | 35 | 33 | 0.8 | 1.8 | 1.3 |
| Breaker | 69 | 57 | 63 | 56 | 55 | 58 | 39 | 35 | 33 | 33 | 35 | 34 | 0.1 | 1.0 | 0.6 |
| Brennan | 67 | 57 | 61 | 54 | 54 | 56 | 33 | 32 | 29 | 27 | 32 | 29 | 0.0 | 3.7 | 1.9 |
| Jenna | 71 | 59 | 65 | 56 | 55 | 59 | 36 | 34 | 32 | 33 | 34 | 33 | 0.6 | 2.2 | 1.4 |
| Samson | 68 | 58 | 61 | 55 | 54 | 57 | 35 | 31 | 30 | 29 | 32 | 30 | 0.2 | 0.2 | 0.2 |
| Select | 64 | 52 | 57 | 50 | 51 | 53 | 38 | 39 | 36 | 33 | 36 | 35 | 1.8 | 1.8 | 1.8 |
| Vantage | 74 | 60 | 67 | 58 | 56 | 60 | 35 | 36 | 35 | 31 | 34 | 33 | 0.0 | 0.0 | 0.0 |
| Elgin-ND | 68 | 56 | 61 | 54 | 53 | 56 | 42 | 39 | 38 | 36 | 39 | 38 | -- | 1.8 | -- |
| Norden | 68 | 56 | 62 | 56 | 52 | 57 | 36 | 33 | 33 | 31 | 33 | 32 | -- | 0.3 | -- |
| Alpine | 68 | 57 | 62 | 54 | 54 | 57 | 37 | 36 | 35 | 32 | 35 | 34 | -- | 2.8 | -- |
| Rollag | 67 | 55 | 61 | 53 | 53 | 56 | 34 | 34 | 31 | 30 | 33 | 31 | -- | 0.8 | -- |
| WB Digger | 67 | 55 | 62 | 55 | 55 | 57 | 38 | 36 | 35 | 32 | 35 | 34 | -- | 1.6 | -- |
| LCS Powerplay | -- | 56 | 62 | 54 | 53 | 56 | -- | 34 | 34 | 33 | 34 | 34 | -- | -- | -- |
| SY Soren | -- | 55 | 62 | 55 | 53 | 57 | -- | 32 | 31 | 29 | 31 | 30 | -- | -- | -- |
| Forefront | -- | 51 | 58 | 51 | 52 | 54 | -- | 42 | 35 | 35 | 39 | 36 | -- | -- | -- |
| WB Mayville | -- | 56 | 62 | 53 | 51 | 55 | -- | 32 | 29 | 29 | 33 | 30 | -- | -- | -- |
| Advance | -- | 53 | 58 | 54 | 55 | 56 | -- | 35 | 40 | 31 | 34 | 35 | -- | -- | -- |
| LCS Breakaway | -- | -- | 60 | 52 | 53 | 55 | -- | -- | 32 | 29 | 33 | 31 | -- | -- | -- |
| Prevail | -- | -- | -- | -- | 54 | -- | -- | -- | -- | -- | 36 | -- | -- | -- | -- |
| Linkert | -- | -- | -- | 55 | 54 | -- | -- | -- | -- | 28 | 29 | -- | -- | -- | -- |
| MS Stingray | -- | -- | -- | 58 | 56 | -- | -- | -- | -- | 33 | 36 | -- | -- | -- | -- |
| SY Rowyn | -- | -- | -- | 52 | 53 | -- | -- | -- | -- | 30 | 33 | -- | -- | -- | -- |
| LCS Iguacu | -- | -- | -- | 57 | 55 | -- | -- | -- | -- | 31 | 35 | -- | -- | -- | -- |
| HRS 3378 | -- | -- | -- | -- | 55 | -- | -- | -- | -- | -- | 34 | -- | -- | -- | -- |
| HRS 3361 | -- | -- | -- | -- | 54 | -- | -- | -- | -- | -- | 34 | -- | -- | -- | -- |
| SY Ingmar | -- | -- | -- | -- | 54 | -- | -- | -- | -- | -- | 32 | -- | -- | -- | -- |
| LCS Nitro | -- | -- | -- | -- | 56 | -- | -- | -- | -- | -- | 34 | -- | -- | -- | -- |
| WB9507 | -- | -- | -- | -- | 52 | -- | -- | -- | -- | -- | 34 | -- | -- | -- | -- |
| HRS 3419 | -- | -- | -- | -- | 58 | -- | -- | -- | -- | -- | 33 | -- | -- | -- | -- |
| MS-Chevelle | -- | -- | -- | -- | 51 | -- | -- | -- | -- | -- | 33 | -- | -- | -- | -- |
| Cardale | -- | -- | -- | -- | 52 | -- | -- | -- | -- | -- | 36 | -- | -- | -- | -- |
| Alsen | 68 | 56 | 61 | -- | -- | -- | 37 | 36 | 35 | -- | -- | -- | 2.0 | 0.4 | 1.2 |
| Briggs | 66 | 53 | 60 | -- | -- | -- | 39 | 36 | 37 | -- | -- | -- | 2.5 | 2.3 | 2.4 |
| Cromwell | 70 | 58 | 64 | -- | -- | -- | 38 | 34 | 34 | -- | -- | -- | 1.6 | 3.1 | 2.4 |
| Freyr | 69 | 56 | 63 | -- | -- | -- | 38 | 35 | 35 | -- | -- | -- | 0.6 | 1.8 | 1.2 |
| Howard | 68 | 57 | 63 | -- | -- | -- | 40 | 39 | 37 | -- | -- | -- | 3.4 | 2.2 | 2.8 |
| Kelby | 67 | 56 | 60 | -- | -- | -- | 35 | 31 | 30 | -- | -- | -- | 0.1 | 2.9 | 1.5 |
| Steele-ND | 68 | 56 | 62 | -- | -- | -- | 40 | 38 | 36 | -- | -- | -- | 1.7 | 2.8 | 2.3 |
| Edge | -- | -- | 62 | -- | -- | -- | -- | -- | 34 | -- | -- | -- | -- | -- | -- |
| Brogan | 69 | 55 | -- | -- | -- | -- | 35 | 35 | -- | -- | -- | -- | -- | 0.6 | -- |
| Kuntz | 69 | 57 | -- | -- | -- | -- | 34 | 32 | -- | -- | -- | -- | 0.1 | 1.1 | 0.6 |
| Sabin | 68 | 57 | -- | -- | -- | -- | 37 | 39 | -- | -- | -- | -- | 2.2 | 1.8 | 2.0 |
| LSD 5% | 1.0 | 1.3 | 1.5 | 1.0 | 1.3 | | 1.0 | 1.9 | 1.6 | 1.8 | 1.9 | | 2.1 | 1.3 | |
| LSD 10% | -- | -- | 1.2 | 0.8 | 1.1 | | -- | -- | 1.3 | 1.5 | 1.6 | | -- | -- | |

## Nelson County HRSW Summary 2010-2014

| | Yield(bu/a) | | | | | | Test Weight(lbs/bu) | | | | | | Protein(%) | | | | | | Lodging(0-9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **14** |
| Faller | 83 | 83 | 81 | 95 | 102 | 93 | 59.5 | 60.6 | 57.3 | 63.2 | 60.7 | 60.4 | 13.1 | 14.4 | 13.5 | 14.0 | 14.1 | 13.9 | 2.2 |
| RB07 | 70 | 68 | 78 | 81 | 93 | 84 | 58.6 | 59.6 | 57.5 | 63.0 | 60.8 | 60.4 | 14.0 | 15.5 | 14.1 | 15.1 | 14.7 | 14.6 | 2.5 |
| Barlow | 77 | 68 | 77 | 81 | 88 | 82 | 60.6 | 59.8 | 58.6 | 63.3 | 61.4 | 61.1 | 14.4 | 15.4 | 14.3 | 14.9 | 14.7 | 14.6 | 0.9 |
| Jenna | 83 | 64 | 76 | 92 | 83 | 84 | 58.0 | 58.4 | 56.1 | 62.3 | 60.1 | 59.5 | 14.2 | 15.2 | 14.0 | 14.2 | 14.4 | 14.2 | 2.5 |
| Prosper | 88 | 84 | 77 | 88 | 100 | 88 | 59.8 | 60.5 | 57.1 | 63.2 | 60.5 | 60.3 | 13.2 | 14.5 | 13.8 | 13.7 | 13.9 | 13.8 | 2.1 |
| Vantage | 74 | 71 | 62 | 86 | 78 | 75 | 62.5 | 60.5 | 59.1 | 63.6 | 62.2 | 61.6 | 14.9 | 16.5 | 16.0 | 15.3 | 16.6 | 16.0 | 0.0 |
| LCS Albany | 89 | -- | 75 | 103 | 84 | 87 | 59.3 | -- | 56.1 | 63.5 | 59.8 | 59.8 | 12.6 | -- | 12.9 | 12.9 | 13.6 | 13.1 | 3.4 |
| Rollag | -- | 67 | 69 | 85 | 85 | 80 | -- | 60.9 | 57.8 | 63.8 | 61.7 | 61.1 | -- | 15.6 | 15.5 | 15.1 | 14.8 | 15.1 | 0.4 |
| Samson | -- | 65 | 75 | 87 | 98 | 87 | -- | 59.0 | 57.9 | 61.9 | 60.4 | 60.1 | -- | 14.8 | 14.3 | 14.2 | 14.0 | 14.2 | 0.0 |
| SY Soren | -- | 62 | 75 | 85 | 81 | 80 | -- | 59.0 | 57.3 | 63.6 | 60.9 | 60.6 | -- | 15.0 | 14.2 | 15.2 | 14.3 | 14.6 | 0.2 |
| WB-Digger | -- | 74 | 79 | 99 | 94 | 91 | -- | 59.1 | 57.8 | 62.1 | 59.6 | 59.8 | -- | 14.8 | 13.8 | 14.3 | 14.2 | 14.1 | 2.5 |
| WB-Mayville | -- | 70 | 76 | 85 | 86 | 82 | -- | 59.8 | 58.3 | 62.8 | 61.0 | 60.7 | -- | 15.7 | 14.5 | 15.0 | 14.4 | 14.6 | 0.1 |
| Advance | -- | -- | 74 | 84 | 85 | 81 | -- | -- | 58.4 | 64.0 | 60.9 | 61.1 | -- | -- | 13.9 | 13.4 | 13.7 | 13.7 | 2.2 |
| LCS Breakaway | -- | -- | 75 | 83 | 94 | 84 | -- | -- | 59.1 | 63.9 | 62.7 | 61.9 | -- | -- | 14.6 | 15.0 | 14.8 | 14.8 | 0.8 |
| Elgin-ND | -- | -- | 82 | 91 | 91 | 88 | -- | -- | 57.1 | 62.7 | 60.5 | 60.1 | -- | -- | 13.9 | 15.0 | 14.5 | 14.5 | 2.1 |
| Forefront | -- | -- | 73 | 80 | 81 | 78 | -- | -- | 57.5 | 63.1 | 60.9 | 60.5 | -- | -- | 13.8 | 15.4 | 14.7 | 14.6 | 3.3 |
| Norden | -- | -- | 72 | 89 | 92 | 85 | -- | -- | 58.5 | 64.1 | 63.0 | 61.9 | -- | -- | 14.0 | 14.1 | 13.8 | 14.0 | 0.1 |
| LCS Powerplay | -- | -- | 76 | 91 | 87 | 85 | -- | -- | 58.2 | 63.7 | 61.6 | 61.2 | -- | -- | 13.6 | 13.9 | 14.5 | 14.0 | 3.0 |
| Linkert | -- | -- | -- | 77 | 83 | -- | -- | -- | -- | 62.9 | 60.6 | -- | -- | -- | -- | 15.6 | 15.0 | -- | 0.1 |
| SY Rowyn | -- | -- | -- | 86 | 93 | -- | -- | -- | -- | 62.4 | 61.3 | -- | -- | -- | -- | 14.2 | 13.8 | -- | 1.7 |
| Prevail | -- | -- | -- | -- | 83 | -- | -- | -- | -- | -- | 60.5 | -- | -- | -- | -- | -- | 14.5 | -- | 3.0 |
| SY Ingmar | -- | -- | -- | -- | 86 | -- | -- | -- | -- | -- | 61.5 | -- | -- | -- | -- | -- | 14.9 | -- | 1.6 |
| WB9507 | -- | -- | -- | -- | 104 | -- | -- | -- | -- | -- | 60.0 | -- | -- | -- | -- | -- | 14.6 | -- | 1.2 |
| LCS Iguacu | -- | -- | -- | -- | 95 | -- | -- | -- | -- | -- | 61.1 | -- | -- | -- | -- | -- | 11.4 | -- | 2.1 |
| LCS Nitro | -- | -- | -- | -- | 99 | -- | -- | -- | -- | -- | 59.8 | -- | -- | -- | -- | -- | 12.4 | -- | 2.5 |
| HRS 3378 | -- | -- | -- | -- | 87 | -- | -- | -- | -- | -- | 60.9 | -- | -- | -- | -- | -- | 13.3 | -- | 2.0 |
| HRS 3361 | -- | -- | -- | -- | 86 | -- | -- | -- | -- | -- | 60.0 | -- | -- | -- | -- | -- | 13.9 | -- | 0.6 |
| HRS 3419 | -- | -- | -- | -- | 91 | -- | -- | -- | -- | -- | 59.3 | -- | -- | -- | -- | -- | 13.4 | -- | 0.3 |
| Glenn | 66 | 61 | 77 | 79 | -- | -- | 61.2 | 61.5 | 60.9 | 64.7 | -- | -- | 14.5 | 15.2 | 14.9 | 15.4 | -- | -- | -- |
| Breaker | 82 | 74 | 75 | 90 | -- | -- | 62.0 | 60.4 | 59.2 | 63.5 | -- | -- | 13.8 | 14.9 | 13.8 | 14.1 | -- | -- | -- |
| Velva | 80 | 75 | 79 | -- | -- | -- | 59.9 | 58.4 | 57.2 | -- | -- | -- | 14.0 | 15.3 | 14.0 | -- | -- | -- | -- |
| Brennan | 69 | 59 | 74 | -- | -- | -- | 58.5 | 59.1 | 58.6 | -- | -- | -- | 13.9 | 15.0 | 14.4 | -- | -- | -- | -- |
| Cromwell | 76 | 69 | 73 | -- | -- | -- | 60.7 | 60.5 | 57.8 | -- | -- | -- | 13.6 | 14.8 | 14.3 | -- | -- | -- | -- |
| Edge | -- | -- | 72 | -- | -- | -- | -- | -- | 57.2 | -- | -- | -- | -- | -- | 14.2 | -- | -- | -- | -- |
| Brick | 75 | 63 | -- | -- | -- | -- | 60.0 | 60.5 | -- | -- | -- | -- | 14.0 | 14.7 | -- | -- | -- | -- | -- |
| Sabin | 78 | 64 | -- | -- | -- | -- | 59.0 | 58.5 | -- | -- | -- | -- | 14.3 | 15.8 | -- | -- | -- | -- | -- |
| Select | 63 | 68 | -- | -- | -- | -- | 59.2 | 60.4 | -- | -- | -- | -- | 13.9 | 14.9 | -- | -- | -- | -- | -- |
| Howard | 78 | 73 | -- | -- | -- | -- | 60.2 | 60.2 | -- | -- | -- | -- | 14.4 | 15.1 | -- | -- | -- | -- | -- |
| Kelby | 66 | 56 | -- | -- | -- | -- | 58.4 | 58.5 | -- | -- | -- | -- | 14.2 | 15.4 | -- | -- | -- | -- | -- |
| LSD 5% | 8.2 | 5.2 | 6.9 | 6.5 | 5.0 | | 0.5 | 0.7 | 1.0 | 0.4 | 0.5 | | 0.4 | 0.6 | 0.7 | 0.5 | 0.4 | | 1.1 |
| LSD 10% | -- | -- | 5.7 | 5.4 | 4.2 | | -- | -- | 0.9 | 0.4 | 0.4 | | -- | -- | 0.5 | 0.4 | 0.3 | | 0.9 |

| Pembina County HRSW Summary 2011-2014* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yield(bu/a) | | | | Test Weight(lbs/bu) | | | | Protein(%) | | | |
| **Variety** | **11** | **13** | **14** | **3yr** | **11** | **13** | **14** | **3yr** | **11** | **13** | **14** | **3yr** |
| Faller | 71 | 100 | 88 | 86 | 60.3 | 61.4 | 61.7 | 61.1 | 14.2 | 13.6 | 13.8 | 13.9 |
| RB07 | 70 | 88 | 73 | 77 | 61.2 | 61.1 | 60.7 | 61.0 | 15.0 | 14.5 | 14.7 | 14.7 |
| Samson | 64 | 83 | 72 | 73 | 59.3 | 60.5 | 60.0 | 59.9 | 15.2 | 13.3 | 13.8 | 14.1 |
| Barlow | 68 | 87 | 75 | 77 | 62.2 | 62.2 | 61.4 | 61.9 | 15.0 | 14.2 | 14.3 | 14.5 |
| Jenna | 65 | 87 | 76 | 76 | 59.3 | 60.5 | 60.3 | 60.0 | 14.9 | 13.5 | 14.7 | 14.4 |
| Prosper | 74 | 99 | 80 | 84 | 59.9 | 61.4 | 61.9 | 61.1 | 14.4 | 13.3 | 13.7 | 13.8 |
| Rollag | 54 | 85 | 72 | 70 | 58.6 | 62.3 | 62.3 | 61.1 | 15.8 | 14.6 | 14.9 | 15.1 |
| SY Soren | 65 | 82 | 66 | 71 | 61.0 | 61.6 | 61.3 | 61.3 | 15.3 | 14.1 | 15.0 | 14.8 |
| Vantage | 64 | 79 | 68 | 70 | 62.0 | 63.3 | 62.6 | 62.6 | 15.9 | 14.4 | 15.3 | 15.2 |
| WB-Digger | 72 | 94 | 75 | 80 | 58.2 | 61.2 | 60.4 | 59.9 | 14.3 | 14.2 | 14.0 | 14.2 |
| WB-Mayville | 66 | 83 | 64 | 71 | 60.6 | 61.7 | 61.2 | 61.2 | 15.3 | 14.7 | 14.2 | 14.7 |
| Advance | -- | 88 | 70 | -- | -- | 62.0 | 62.0 | -- | -- | 13.2 | 13.6 | -- |
| LCS Breakaway | -- | 86 | 63 | -- | -- | 62.9 | 62.8 | -- | -- | 14.6 | 15.3 | -- |
| Elgin-ND | -- | 93 | 75 | -- | -- | 61.0 | 61.3 | -- | -- | 14.2 | 14.5 | -- |
| Forefront | -- | 81 | 68 | -- | -- | 61.3 | 61.0 | -- | -- | 14.4 | 15.1 | -- |
| Linkert | -- | 80 | 66 | -- | -- | 61.7 | 60.9 | -- | -- | 14.8 | 15.5 | -- |
| Norden | -- | 80 | 71 | -- | -- | 62.9 | 63.2 | -- | -- | 13.8 | 13.7 | -- |
| LCS Powerplay | -- | 92 | 75 | -- | -- | 61.8 | 62.3 | -- | -- | 13.4 | 13.6 | -- |
| SY Rowyn | -- | 90 | 66 | -- | -- | 61.1 | 61.4 | -- | -- | 13.3 | 14.4 | -- |
| LCS Albany | -- | 95 | 84 | -- | -- | 61.4 | 61.5 | -- | -- | 12.5 | 12.1 | -- |
| Prevail | -- | -- | 79 | -- | -- | -- | 61.2 | -- | -- | -- | 13.8 | -- |
| SY Ingmar | -- | -- | 67 | -- | -- | -- | 62.2 | -- | -- | -- | 15.2 | -- |
| WB9507 | -- | -- | 78 | -- | -- | -- | 60.3 | -- | -- | -- | 15.0 | -- |
| LCS Iguacu | -- | -- | 75 | -- | -- | -- | 61.8 | -- | -- | -- | 11.9 | -- |
| LCS Nitro | -- | -- | 77 | -- | -- | -- | 60.0 | -- | -- | -- | 12.2 | -- |
| HRS 3378 | -- | -- | 77 | -- | -- | -- | 61.8 | -- | -- | -- | 13.4 | -- |
| HRS 3361 | -- | -- | 81 | -- | -- | -- | 60.6 | -- | -- | -- | 14.3 | -- |
| HRS 3419 | -- | -- | 87 | -- | -- | -- | 59.6 | -- | -- | -- | 12.2 | -- |
| Glenn | 68 | 82 | -- | -- | 63.3 | 63.1 | -- | -- | 15.7 | 14.8 | -- | -- |
| Breaker | 66 | 86 | -- | -- | 61.0 | 62.8 | -- | -- | 14.6 | 13.4 | -- | -- |
| Sabin | 61 | -- | -- | -- | 57.7 | -- | -- | -- | 15.3 | -- | -- | -- |
| Velva | 65 | -- | -- | -- | 57.9 | -- | -- | -- | 14.6 | -- | -- | -- |
| Cromwell | 67 | -- | -- | -- | 59.7 | -- | -- | -- | 15.0 | -- | -- | -- |
| Brennan | 65 | -- | -- | -- | 61.4 | -- | -- | -- | 15.3 | -- | -- | -- |
| Brick | 64 | -- | -- | -- | 62.7 | -- | -- | -- | 15.2 | -- | -- | -- |
| Howard | 68 | -- | -- | -- | 59.5 | -- | -- | -- | 15.0 | -- | -- | -- |
| Kelby | 62 | -- | -- | -- | 61.3 | -- | -- | -- | 15.6 | -- | -- | -- |
| Select | 63 | -- | -- | -- | 61.1 | -- | -- | -- | 15.2 | -- | -- | -- |
| LSD 5% | 5.3 | 5.3 | 8.3 | | 1.1 | 0.4 | 0.5 | | 0.3 | 0.5 | 0.5 | |
| LSD 10% | -- | 4.4 | 6.9 | | -- | 0.3 | 0.4 | | -- | 0.4 | 0.4 | |

*The 2012 Pembina trial was lost to hail.

## Towner County HRSW Summary 2010-2014

| | Yield(bu/a) | | | | | | Test Weight(lbs/bu) | | | | | | Protein(%) | | | | | | Lodging(0-9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **14** |
| Faller | 86 | 61 | 71 | 85 | 84 | 80 | 60.1 | 58.6 | 55.8 | 61.1 | 58.6 | 58.5 | 13.5 | 16.6 | 13.0 | 13.9 | 14.1 | 13.7 | 6.5 |
| RB07 | 76 | 58 | 71 | 75 | 73 | 73 | 59.8 | 58.7 | 56.5 | 60.3 | 57.9 | 58.2 | 13.8 | 16.7 | 13.9 | 14.9 | 14.6 | 14.5 | 3.2 |
| Barlow | 76 | 54 | 64 | 73 | 75 | 71 | 60.7 | 58.9 | 57.3 | 60.8 | 59.9 | 59.3 | 13.9 | 17.3 | 14.0 | 14.8 | 15.1 | 14.6 | 2.6 |
| Jenna | 77 | 62 | 64 | 73 | 70 | 69 | 58.9 | 58.9 | 55.5 | 59.5 | 57.2 | 57.4 | 13.8 | 16.9 | 13.5 | 15.0 | 14.9 | 14.5 | 0.8 |
| Prosper | 88 | 65 | 70 | 79 | 79 | 76 | 59.9 | 59.1 | 56.1 | 61.3 | 58.3 | 58.6 | 13.4 | 16.3 | 13.7 | 13.7 | 14.3 | 13.9 | 6.4 |
| Vantage | 71 | 56 | 50 | 70 | 61 | 60 | 62.6 | 61.0 | 57.9 | 62.7 | 59.5 | 60.0 | 15.2 | 17.6 | 15.7 | 16.5 | 17.2 | 16.5 | 4.2 |
| LCS Albany | 82 | -- | 60 | 78 | 67 | 68 | 58.6 | -- | 54.7 | 61.0 | 57.7 | 57.8 | 12.8 | -- | 13.4 | 13.2 | 14.3 | 13.6 | 5.5 |
| Samson | -- | 71 | 64 | 77 | 81 | 74 | -- | 58.7 | 56.0 | 59.2 | 57.2 | 57.5 | -- | 15.8 | 13.9 | 14.3 | 14.0 | 14.1 | 0.2 |
| Rollag | -- | 60 | 60 | 68 | 70 | 66 | -- | 60.8 | 57.1 | 61.4 | 59.9 | 59.5 | -- | 16.8 | 14.4 | 15.4 | 15.4 | 15.1 | 0.3 |
| SY Soren | -- | 57 | 66 | 71 | 67 | 68 | -- | 59.8 | 56.5 | 61.2 | 58.8 | 58.8 | -- | 17.2 | 13.6 | 15.2 | 14.5 | 14.4 | 1.1 |
| WB-Digger | -- | 65 | 68 | 85 | 65 | 73 | -- | 58.3 | 57.0 | 60.4 | 56.3 | 57.9 | -- | 16.0 | 13.1 | 14.0 | 14.6 | 13.9 | 3.2 |
| WB-Mayville | -- | 57 | 64 | 68 | 66 | 66 | -- | 58.9 | 56.1 | 60.0 | 58.0 | 58.0 | -- | 16.4 | 13.9 | 14.9 | 14.8 | 14.5 | 0.0 |
| Advance | -- | -- | 61 | 78 | 64 | 68 | -- | -- | 57.5 | 61.7 | 58.6 | 59.3 | -- | -- | 13.5 | 13.7 | 14.1 | 13.8 | 4.0 |
| LCS Breakaway | -- | -- | 65 | 72 | 72 | 70 | -- | -- | 57.9 | 62.0 | 60.4 | 60.1 | -- | -- | 14.6 | 15.1 | 14.9 | 14.9 | 2.8 |
| Elgin-ND | -- | -- | 63 | 75 | 71 | 70 | -- | -- | 55.8 | 60.8 | 58.0 | 58.2 | -- | -- | 13.3 | 14.7 | 14.9 | 14.3 | 5.1 |
| Forefront* | -- | -- | 66 | 58 | 76 | 67 | -- | -- | 57.3 | 60.7 | 59.0 | 59.0 | -- | -- | 12.5 | 15.0 | 14.9 | 14.1 | 7.7 |
| Norden | -- | -- | 59 | 74 | 71 | 68 | -- | -- | 57.3 | 61.9 | 60.7 | 60.0 | -- | -- | 13.1 | 14.1 | 14.3 | 13.8 | 0.2 |
| LCS Powerplay | -- | -- | 61 | 81 | 74 | 72 | -- | -- | 56.4 | 61.3 | 59.5 | 59.1 | -- | -- | 13.0 | 14.0 | 14.8 | 13.9 | 4.6 |
| Linkert | -- | -- | -- | 70 | 64 | -- | -- | -- | -- | 60.1 | 57.9 | -- | -- | -- | -- | 15.7 | 15.1 | -- | 0.3 |
| SY Rowyn | -- | -- | -- | 73 | 78 | -- | -- | -- | -- | 61.1 | 59.2 | -- | -- | -- | -- | 14.2 | 14.3 | -- | 0.9 |
| Prevail | -- | -- | -- | -- | 74 | -- | -- | -- | -- | -- | 58.5 | -- | -- | -- | -- | -- | 14.0 | -- | 5.4 |
| SY Ingmar | -- | -- | -- | -- | 74 | -- | -- | -- | -- | -- | 59.1 | -- | -- | -- | -- | -- | 15.0 | -- | 1.3 |
| WB9507 | -- | -- | -- | -- | 93 | -- | -- | -- | -- | -- | 58.5 | -- | -- | -- | -- | -- | 14.6 | -- | 3.5 |
| LCS Iguacu | -- | -- | -- | -- | 74 | -- | -- | -- | -- | -- | 58.7 | -- | -- | -- | -- | -- | 11.7 | -- | 1.6 |
| LCS Nitro | -- | -- | -- | -- | 76 | -- | -- | -- | -- | -- | 57.0 | -- | -- | -- | -- | -- | 12.9 | -- | 1.8 |
| HRS 3378 | -- | -- | -- | -- | 66 | -- | -- | -- | -- | -- | 58.1 | -- | -- | -- | -- | -- | 13.3 | -- | 3.7 |
| HRS 3361 | -- | -- | -- | -- | 73 | -- | -- | -- | -- | -- | 58.1 | -- | -- | -- | -- | -- | 13.9 | -- | 0.7 |
| HRS 3419 | -- | -- | -- | -- | 77 | -- | -- | -- | -- | -- | 57.7 | -- | -- | -- | -- | -- | 13.7 | -- | 0.0 |
| Glenn | 73 | 53 | 60 | 70 | -- | -- | 62.5 | 62.0 | 59.5 | 63.2 | -- | -- | 14.4 | 16.9 | 14.3 | 15.3 | -- | -- | -- |
| Breaker | 80 | 61 | 66 | 78 | -- | -- | 61.8 | 60.5 | 58.5 | 62.4 | -- | -- | 13.4 | 16.3 | 13.0 | 14.3 | -- | -- | -- |
| Cromwell | 75 | 58 | 63 | -- | -- | -- | 61.4 | 59.3 | 56.9 | -- | -- | -- | 13.9 | 16.3 | 13.8 | -- | -- | -- | -- |
| Brennan | 73 | 58 | 67 | -- | -- | -- | 59.6 | 59.9 | 57.8 | -- | -- | -- | 13.8 | 16.7 | 14.1 | -- | -- | -- | -- |
| Velva | 79 | 55 | 66 | -- | -- | -- | 60.3 | 57.2 | 55.5 | -- | -- | -- | 13.9 | 17.1 | 13.7 | -- | -- | -- | -- |
| Edge | -- | -- | 63 | -- | -- | -- | -- | -- | 56.9 | -- | -- | -- | -- | -- | 14.1 | -- | -- | -- | -- |
| Sabin | 73 | 54 | -- | -- | -- | -- | 59.2 | 58.4 | -- | -- | -- | -- | 13.9 | 16.9 | -- | -- | -- | -- | -- |
| Howard | 79 | 59 | -- | -- | -- | -- | 59.6 | 59.9 | -- | -- | -- | -- | 13.6 | 16.6 | -- | -- | -- | -- | -- |
| Kelby | 72 | 56 | -- | -- | -- | -- | 59.5 | 59.9 | -- | -- | -- | -- | 14.2 | 16.9 | -- | -- | -- | -- | -- |
| Brick | 74 | 48 | -- | -- | -- | -- | 60.8 | 60.7 | -- | -- | -- | -- | 13.8 | 16.6 | -- | -- | -- | -- | -- |
| Select | 69 | 58 | -- | -- | -- | -- | 60.4 | 60.2 | -- | -- | -- | -- | 13.3 | 16.8 | -- | -- | -- | -- | -- |
| LSD 5% | 4.9 | 5.8 | 4.7 | 6.1 | 5.5 | | 0.7 | 1.3 | 0.9 | 0.6 | 0.7 | | 0.3 | 0.5 | 0.6 | 0.4 | 0.3 | | 1.3 |
| LSD 10% | -- | -- | 4.0 | 5.1 | 4.6 | | -- | -- | 0.7 | 0.5 | 0.6 | | -- | -- | 0.5 | 0.3 | 0.3 | | 1.1 |

*Forefront had some shelling prior to harvest in 2013.

# Walsh County HRSW Summary 2010-2014

| | Yield(bu/a) | | | | | | Test Weight(lbs/bu) | | | | | | Protein(%) | | | | | | Lodging(0-9) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Faller | 81 | 65 | 82 | 87 | 93 | 87 | 58.4 | 58.3 | 61.3 | 59.9 | 61.4 | 60.9 | 14.1 | 15.2 | 11.9 | 12.3 | 11.8 | 12.0 | 3.9 | 5.5 | 0.5 | 3.1 | 0.0 | 1.2 |
| RB07 | 79 | 65 | 78 | 86 | 88 | 84 | 58.4 | 57.6 | 60.8 | 60.0 | 61.3 | 60.7 | 13.9 | 15.2 | 13.1 | 13.4 | 12.9 | 13.1 | 0.7 | 6.5 | 0.0 | 2.6 | 0.0 | 0.9 |
| LCS Albany | 76 | 72 | 75 | 90 | 89 | 85 | 58.6 | 58.8 | 60.1 | 60.9 | 61.0 | 60.7 | 12.9 | 13.5 | 11.7 | 12.5 | 11.0 | 11.7 | 1.5 | 4.3 | 0.0 | 0.1 | 0.0 | 0.0 |
| Samson | 77 | 70 | 72 | 92 | 88 | 84 | 57.7 | 59.1 | 60.7 | 59.8 | 61.1 | 60.5 | 13.7 | 14.9 | 13.7 | 13.0 | 12.0 | 12.9 | 0.2 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Barlow | 74 | 57 | 76 | 73 | 81 | 77 | 59.6 | 59.7 | 60.9 | 60.8 | 62.2 | 61.3 | 14.6 | 15.4 | 14.0 | 12.5 | 13.1 | 13.2 | 1.8 | 4.5 | 1.5 | 2.2 | 1.8 | 1.8 |
| Jenna | 73 | 63 | 78 | 80 | 89 | 82 | 57.9 | 57.8 | 60.1 | 58.0 | 60.8 | 59.6 | 14.4 | 15.6 | 13.8 | 13.7 | 13.0 | 13.5 | 0.2 | 6.8 | 0.0 | 0.6 | 0.0 | 0.2 |
| Prosper | 80 | 71 | 87 | 81 | 96 | 88 | 58.9 | 59.4 | 61.6 | 59.8 | 61.5 | 61.0 | 14.2 | 14.7 | 12.4 | 12.2 | 12.1 | 12.2 | 3.7 | 5.0 | 0.3 | 4.0 | 0.3 | 1.5 |
| Vantage | 75 | 66 | 69 | 80 | 82 | 77 | 61.6 | 61.7 | 63.3 | 62.1 | 63.2 | 62.9 | 15.3 | 16.5 | 14.6 | 15.6 | 14.4 | 14.9 | 0.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| WB-Digger | 79 | 62 | 80 | 89 | 88 | 86 | 58.9 | 58.0 | 60.8 | 59.6 | 61.0 | 60.5 | 13.5 | 15.4 | 12.9 | 12.8 | 12.2 | 12.6 | 0.5 | 5.0 | 0.0 | 1.1 | 0.1 | 0.4 |
| LCS Powerplay | -- | 62 | 76 | 81 | 91 | 83 | -- | 59.5 | 61.1 | 60.5 | 62.0 | 61.2 | -- | 15.0 | 12.6 | 13.2 | 12.0 | 12.6 | -- | 5.8 | 0.0 | 3.6 | 0.0 | 1.2 |
| Rollag | -- | 63 | 74 | 80 | 82 | 79 | -- | 60.5 | 62.0 | 61.6 | 62.3 | 62.0 | -- | 15.6 | 13.9 | 13.6 | 13.4 | 13.6 | -- | 3.8 | 0.0 | 0.2 | 0.0 | 0.1 |
| SY Soren | -- | 62 | 79 | 82 | 84 | 82 | -- | 59.2 | 61.2 | 60.9 | 61.5 | 61.2 | -- | 15.3 | 13.9 | 13.8 | 13.6 | 13.8 | -- | 4.5 | 0.0 | 0.0 | 0.2 | 0.1 |
| WB-Mayville | -- | 63 | 74 | 79 | 77 | 77 | -- | 59.9 | 60.3 | 59.6 | 61.4 | 60.4 | -- | 15.3 | 14.2 | 13.8 | 13.3 | 13.8 | -- | 1.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Advance | -- | -- | 79 | 84 | 83 | 82 | -- | -- | 61.3 | 61.2 | 61.9 | 61.5 | -- | -- | 13.5 | 12.2 | 12.6 | 12.8 | -- | -- | 2.8 | 1.3 | 0.1 | 1.4 |
| LCS Breakaway | -- | -- | 80 | 80 | 85 | 82 | -- | -- | 61.7 | 61.8 | 62.9 | 62.1 | -- | -- | 13.7 | 13.8 | 13.1 | 13.5 | -- | -- | 1.0 | 2.4 | 0.0 | 1.1 |
| Elgin-ND | -- | -- | 77 | 80 | 83 | 80 | -- | -- | 60.3 | 60.4 | 61.4 | 60.7 | -- | -- | 13.2 | 13.5 | 12.2 | 13.0 | -- | -- | 1.5 | 4.1 | 0.5 | 2.0 |
| Forefront | -- | -- | 80 | 75 | 79 | 78 | -- | -- | 61.8 | 59.7 | 61.4 | 61.0 | -- | -- | 12.5 | 14.1 | 13.4 | 13.3 | -- | -- | 1.3 | 6.4 | 6.2 | 4.6 |
| Norden | -- | -- | 72 | 78 | 83 | 78 | -- | -- | 62.3 | 61.9 | 63.0 | 62.4 | -- | -- | 13.4 | 12.9 | 12.7 | 13.0 | -- | -- | 0.0 | 0.0 | 0.0 | 0.0 |
| Linkert | -- | -- | -- | 77 | 79 | -- | -- | -- | -- | 60.8 | 61.4 | -- | -- | -- | -- | 13.6 | 13.9 | -- | -- | -- | -- | 0.0 | 0.0 | -- |
| SY Rowyn | -- | -- | -- | 76 | 85 | -- | -- | -- | -- | 59.6 | 61.5 | -- | -- | -- | -- | 13.1 | 12.0 | -- | -- | -- | -- | 3.6 | 0.3 | -- |
| Prevail | -- | -- | -- | -- | 84 | -- | -- | -- | -- | -- | 60.8 | -- | -- | -- | -- | -- | 13.2 | -- | -- | -- | -- | -- | 2.7 | -- |
| SY Ingmar | -- | -- | -- | -- | 81 | -- | -- | -- | -- | -- | 61.9 | -- | -- | -- | -- | -- | 13.2 | -- | -- | -- | -- | -- | 0.0 | -- |
| WB9507 | -- | -- | -- | -- | 92 | -- | -- | -- | -- | -- | 60.6 | -- | -- | -- | -- | -- | 11.7 | -- | -- | -- | -- | -- | 0.0 | -- |
| LCS Iguacu | -- | -- | -- | -- | 91 | -- | -- | -- | -- | -- | 61.6 | -- | -- | -- | -- | -- | 10.9 | -- | -- | -- | -- | -- | 0.1 | -- |
| LCS Nitro | -- | -- | -- | -- | 94 | -- | -- | -- | -- | -- | 60.9 | -- | -- | -- | -- | -- | 10.9 | -- | -- | -- | -- | -- | 0.3 | -- |
| HRS 3378 | -- | -- | -- | -- | 85 | -- | -- | -- | -- | -- | 62.2 | -- | -- | -- | -- | -- | 12.1 | -- | -- | -- | -- | -- | 0.0 | -- |
| HRS 3361 | -- | -- | -- | -- | 85 | -- | -- | -- | -- | -- | 60.6 | -- | -- | -- | -- | -- | 12.2 | -- | -- | -- | -- | -- | 0.0 | -- |
| HRS 3419 | -- | -- | -- | -- | 93 | -- | -- | -- | -- | -- | 59.9 | -- | -- | -- | -- | -- | 11.3 | -- | -- | -- | -- | -- | 0.0 | -- |
| Glenn | 65 | 60 | 74 | 69 | -- | -- | 61.2 | 62.5 | 64.0 | 62.7 | -- | -- | 14.7 | 15.6 | 14.0 | 12.8 | -- | -- | 4.1 | 3.3 | 0.3 | 0.9 | -- | -- |
| Breaker | 82 | 63 | 71 | 86 | -- | -- | 61.1 | 61.1 | 62.2 | 61.5 | -- | -- | 13.9 | 15.3 | 12.6 | 13.2 | -- | -- | 0.3 | 3.5 | 0.0 | 1.5 | -- | -- |
| Velva | 74 | 57 | 78 | -- | -- | -- | 58.5 | 57.6 | 60.7 | -- | -- | -- | 14.1 | 15.9 | 13.5 | -- | -- | -- | 1.2 | 6.3 | 0.3 | -- | -- | -- |
| Brennan | 66 | 63 | 74 | -- | -- | -- | 58.5 | 59.8 | 61.1 | -- | -- | -- | 14.6 | 15.0 | 13.6 | -- | -- | -- | 1.3 | 3.3 | 0.0 | -- | -- | -- |
| Cromwell | 72 | 58 | 71 | -- | -- | -- | 59.5 | 59.7 | 62.5 | -- | -- | -- | 14.4 | 15.7 | 13.2 | -- | -- | -- | 2.4 | 7.0 | 0.0 | -- | -- | -- |
| Edge | -- | -- | 72 | -- | -- | -- | -- | -- | 59.0 | -- | -- | -- | -- | -- | 13.6 | -- | -- | -- | -- | -- | 0.0 | -- | -- | -- |
| Howard | 69 | 55 | -- | -- | -- | -- | 58.8 | 59.1 | -- | -- | -- | -- | 14.7 | 15.6 | -- | -- | -- | -- | 4.6 | 4.0 | -- | -- | -- | -- |
| Kelby | 71 | 58 | -- | -- | -- | -- | 58.9 | 58.9 | -- | -- | -- | -- | 15.1 | 15.6 | -- | -- | -- | -- | 1.8 | 6.0 | -- | -- | -- | -- |
| Sabin | 66 | 52 | -- | -- | -- | -- | 58.2 | 56.3 | -- | -- | -- | -- | 14.6 | 17.0 | -- | -- | -- | -- | 6.9 | 7.8 | -- | -- | -- | -- |
| Brick | 64 | 59 | -- | -- | -- | -- | 59.0 | 60.1 | -- | -- | -- | -- | 15.1 | 15.4 | -- | -- | -- | -- | 6.9 | 6.8 | -- | -- | -- | -- |
| Select | 54 | 62 | -- | -- | -- | -- | 58.1 | 60.1 | -- | -- | -- | -- | 15.0 | 16.1 | -- | -- | -- | -- | 4.6 | 5.5 | -- | -- | -- | -- |
| LSD 5% | 6.1 | 5.8 | 4.0 | 6.9 | 5.0 | | 0.6 | 1.0 | 0.6 | 0.5 | 0.4 | | 0.6 | 0.7 | 0.7 | 0.8 | 0.7 | | 1.7 | 2.7 | 0.7 | 2.8 | 0.8 | |
| LSD 10% | -- | -- | 3.3 | 5.8 | 4.2 | | -- | -- | 0.5 | 0.4 | 0.4 | | -- | -- | 0.5 | 0.7 | 0.6 | | -- | -- | 0.6 | 2.3 | 0.7 | |

## HRSW Disease by Location, Year and Variety *

| | Foliar Necrosis - % of Flag at Soft Dough | | | | | | | | | | | | | | LR% | FHB[1] FS - % | | | DON[2] - ppm | | | | FDK[3] (Tombstones)-% | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **4 site** | **L** | **W** | **L** | **W** | **L** | **P** | **W** | **N** | **T** | **L** | **N** | **W** | **T** | **N** | **2 site** | **L** | **T** | **2 site** | **L** | **L** | **L** | **2 site** | **L** | **L** | **L** |
| **Year** | **Avg.** | **14** | **14** | **12** | **12** | **11** | **11** | **11** | **11** | **11** | **10** | **10** | **10** | **10** | **11** | **Avg.** | **11** | **11** | **Avg.** | **12** | **11** | **10** | **Avg.** | **12** | **11** | **10** |
| **Variety:** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Advance | 10 | 5 | 13 | 15 | 8 | 13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.4 | -- | 2.0 | 0.3 | 3.6 | -- | -- | 0 | 2 | -- |
| Barlow | 13 | 6 | 18 | 15 | 15 | 13 | 13 | 25 | 22 | 20 | 7 | 9 | 7 | 5 | 1 | 2.8 | 0.6 | 5.0 | 0.9 | 0.5 | 1.2 | 1.1 | 1.0 | 2 | 1 | 1 |
| Elgin-ND | 11 | 6 | 14 | 15 | 10 | 18 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.4 | -- | -- | 0.3 | -- | -- | -- | 0 | 1 | -- |
| Faller | 14 | 13 | 13 | 10 | 20 | 18 | 8 | 20 | 15 | 18 | 15 | 21 | 11 | 5 | 3 | 1.3 | 0.3 | 2.3 | 0.5 | 0.3 | 0.7 | 0.5 | 0.2 | 0 | 1 | 0 |
| Forefront | 15 | 7 | 14 | 20 | 18 | 18 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0 | -- | 0.4 | 0.5 | 0.3 | -- | -- | 1 | 0 | -- |
| Jenna | 16 | 12 | 10 | 25 | 18 | 11 | 11 | 18 | 25 | 25 | 4 | 11 | 16 | 10 | 0 | 0.9 | 0.4 | 1.3 | 1.8 | 0.9 | 2.6 | 1.0 | 0.6 | 1 | 2 | 1 |
| LCS Albany | 18 | 9 | 17 | 13 | 33 | 14 | -- | 12 | -- | -- | 9 | 28 | 32 | 13 | -- | -- | 0.1 | -- | 1.2 | 1.1 | 1.2 | 0.8 | 0.8 | 1 | 2 | 0 |
| LCS Breakaway | 18 | 27 | 16 | 13 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | -- | -- | -- | 1 | -- | -- |
| LCS Powerplay | 30 | 10 | 22 | 45 | 45 | 45 | -- | 70 | -- | -- | -- | -- | -- | -- | -- | -- | 0.1 | -- | 1.1 | 0.4 | 1.7 | -- | -- | 0 | 2 | -- |
| Norden | 26 | 16 | 17 | 43 | 30 | 25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.1 | -- | 1.1 | 0.3 | 1.9 | -- | -- | 1 | 1 | -- |
| Prosper | 12 | 6 | 13 | 11 | 18 | 14 | 8 | 20 | 15 | 17 | 4 | 7 | 8 | 4 | 3 | 0.9 | 0.6 | 1.2 | 0.9 | 0.4 | 1.3 | 1.5 | 0.6 | 0 | 0 | 0 |
| RB07 | 20 | 12 | 11 | 28 | 28 | 15 | 9 | 80 | 38 | 63 | 15 | 48 | 19 | 17 | 0 | 0.9 | 0.7 | 1.0 | 1.0 | 0.4 | 1.5 | 0.5 | 0.3 | 0 | 0 | 0 |
| Rollag | 17 | 13 | 8 | 28 | 18 | 10 | 15 | 28 | 20 | 18 | -- | -- | -- | -- | 0 | 0.1 | 0.0 | 0.2 | 0.4 | 0.3 | 0.5 | -- | -- | 1 | 0 | -- |
| Samson | 30 | 16 | 28 | 38 | 38 | 10 | 10 | 22 | 27 | 24 | 22 | -- | 20 | -- | 1 | 1.4 | 1.3 | 1.5 | 3.4 | 1.4 | 5.4 | 1.9 | 1.1 | 2 | 5 | 4 |
| SY Soren | 15 | 13 | 15 | 15 | 15 | 18 | 21 | 17 | 27 | 21 | -- | -- | -- | -- | 0 | 0.3 | 0.4 | 0.2 | 0.5 | 0.3 | 0.7 | -- | -- | 0 | 1 | -- |
| Vantage | 11 | 9 | 14 | 10 | 10 | 9 | 8 | 17 | 10 | 26 | 8 | 24 | 4 | 7 | 0 | 6.4 | 4.1 | 8.6 | 1.8 | 1.4 | 2.1 | 1.1 | 1.9 | 2 | 5 | 0 |
| WB Digger | 16 | 14 | 14 | 20 | 18 | 20 | 8 | 25 | 23 | 28 | 17 | -- | 23 | -- | 0 | 3.5 | 3.7 | 3.2 | 2.8 | 1.5 | 4.0 | 1.5 | 1.8 | 1 | 4 | 2 |
| WB-Mayville | 41 | 35 | 53 | 35 | 40 | 68 | 27 | 63 | 70 | 78 | -- | -- | -- | -- | 0 | 0.9 | 1.1 | 0.7 | 1.9 | 1.2 | 2.5 | -- | 2.7 | 2 | 3 | 6 |
| Alpine | -- | 8 | -- | 20 | -- | 15 | -- | -- | -- | -- | 12 | -- | -- | -- | -- | -- | 0.6 | -- | 1.5 | 0.7 | 2.2 | 1.4 | 1.2 | 1 | 1 | 1 |
| Breaker | -- | 6 | -- | 20 | 30 | 8 | 10 | 23 | 17 | 45 | 6 | 9 | 10 | 8 | 0 | 1.4 | 0.4 | 2.3 | 1.0 | 0.7 | 1.2 | 1.0 | 1.2 | 1 | 1 | 0 |
| Brennan | -- | 13 | -- | 20 | 38 | 19 | 14 | 17 | 27 | 25 | 27 | 43 | 55 | 23 | 0 | 0.6 | 0.6 | 0.6 | 1.2 | 0.3 | 2.1 | 0.3 | 1.1 | 0 | 1 | 1 |
| Brick | -- | 15 | -- | 23 | -- | 48 | 14 | 38 | 22 | 65 | 17 | 35 | 28 | 36 | 0 | 0.1 | 0.1 | 0.1 | 0.6 | 0.3 | 0.8 | 0.3 | 0.5 | 1 | 0 | 0 |
| Cardale | -- | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Glenn | -- | 6 | -- | 18 | 25 | 18 | 11 | 32 | 22 | 23 | 16 | 38 | 17 | 4 | 1 | 1.1 | 0.5 | 1.6 | 0.6 | 0.4 | 0.8 | 0.3 | 1.0 | 0 | 0 | 0 |
| HRS 3361 | -- | 8 | 16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| HRS 3378 | -- | 9 | 11 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| HRS 3419 | -- | 4 | 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| LCS Iguaca | -- | 13 | 5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| LCS Nitro | -- | 8 | 19 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Linkert | -- | 4 | 5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MS-Chevelle | -- | 14 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MS-Stingray | -- | 3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Prevail | -- | 16 | 9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Select | -- | 16 | -- | 43 | -- | 23 | 8 | 45 | 23 | 25 | 33 | 86 | 77 | 59 | 0 | 0.7 | 0.2 | 1.1 | 0.9 | 0.3 | 1.4 | 0.8 | 1.3 | 1 | 1 | 1 |
| SY Ingmar | -- | 10 | 16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SY Rowyn | -- | 18 | 20 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Velva | -- | 6 | -- | 9 | 6 | 13 | 9 | 13 | 10 | 22 | 8 | 5 | 13 | 2 | 0 | 1.6 | 2.7 | 0.5 | 3.1 | 1.2 | 4.9 | 3.0 | 1.3 | 4 | 1 | 2 |
| WB9507 | -- | 14 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

L=Langdon, P=Pembina, W=Walsh, T=Towner, N=Nelson

[1]FHB-Fusarium Head Blight-Field Severity (Incidence x head severity).

[2]DON test results reported as <0.5 ppm on 2 replications are listed as 0.3 ppm

[3]Fusarium Damaged Kernels

LR%=Leaf Rust % at Flag leaf

*Disease levels were low in 2013, no notes were recorded. DON test results for 2014 unavailable at time of publishing.

## Durum Summary, Langdon 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Lodging (0-9) | | | | | Height (in) | | | | | Days to Head | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **08** | **09** | **10** | **11** | **4yr** | **11** | **12** | **13** | **14** | **3yr** | **11** | **12** | **13** | **14** | **3yr** |
| AC Commander | 72 | 54 | 71 | 95 | 88 | 85 | 54.1 | 57.1 | 58.0 | 59.9 | 60.7 | 59.5 | 6.0 | 0.0 | 5.0 | 0.0 | 2.8 | 34 | 32 | 34 | 35 | 34 | 60 | 65 | 58 | 57 | 60 |
| AC Navigator | 63 | 47 | 64 | 89 | 84 | 79 | 54.0 | 57.3 | 58.3 | 60.1 | 61.3 | 59.9 | 3.3 | 2.2 | 4.7 | 0.5 | 2.7 | 34 | 34 | 36 | 35 | 35 | 60 | 65 | 57 | 55 | 59 |
| Alkabo | 89 | 65 | 75 | 97 | 85 | 86 | 58.1 | 60.5 | 60.0 | 61.5 | 62.2 | 61.2 | 0.8 | 0.0 | 3.7 | 0.7 | 1.3 | 41 | 39 | 39 | 40 | 39 | 59 | 65 | 58 | 56 | 60 |
| Ben | 90 | 64 | 74 | 90 | 80 | 81 | 59.4 | 60.1 | 60.2 | 61.3 | 62.8 | 61.4 | 1.5 | 1.8 | 3.5 | 0.4 | 1.8 | 42 | 42 | 41 | 42 | 42 | 58 | 64 | 57 | 56 | 59 |
| Grenora | 95 | 64 | 76 | 98 | 86 | 87 | 57.6 | 59.0 | 58.7 | 60.8 | 62.1 | 60.5 | 1.5 | 2.8 | 5.1 | 1.1 | 2.6 | 39 | 39 | 38 | 38 | 38 | 59 | 64 | 58 | 56 | 59 |
| Lebsock | 87 | 69 | 79 | 89 | 79 | 83 | 58.7 | 60.6 | 60.0 | 61.2 | 62.6 | 61.3 | 2.0 | 0.0 | 3.3 | 0.3 | 1.4 | 41 | 40 | 38 | 39 | 39 | 57 | 64 | 57 | 55 | 59 |
| Maier | 81 | 64 | 73 | 91 | 83 | 82 | 56.1 | 59.2 | 59.1 | 60.4 | 62.0 | 60.5 | 3.8 | 1.3 | 5.7 | 0.2 | 2.8 | 40 | 39 | 38 | 39 | 39 | 58 | 65 | 57 | 55 | 59 |
| Mountrail | 87 | 61 | 77 | 103 | 87 | 89 | 57.7 | 59.1 | 59.0 | 60.3 | 61.8 | 60.4 | 3.8 | 3.8 | 5.3 | 0.1 | 3.3 | 41 | 41 | 39 | 40 | 40 | 61 | 65 | 58 | 57 | 60 |
| Pierce | 87 | 66 | 77 | 101 | 82 | 87 | 58.4 | 60.7 | 60.3 | 61.9 | 62.3 | 61.5 | 3.3 | 1.5 | 5.1 | 0.4 | 2.6 | 43 | 41 | 40 | 41 | 41 | 59 | 65 | 58 | 55 | 59 |
| Strongfield | 81 | 63 | 73 | 102 | 85 | 87 | 55.3 | 59.9 | 59.5 | 61.2 | 60.6 | 60.4 | 2.3 | 0.0 | 6.3 | 0.2 | 2.2 | 40 | 39 | 39 | 39 | 39 | 59 | 66 | 59 | 57 | 61 |
| Tioga | 90 | 65 | 78 | 96 | 84 | 86 | 57.1 | 59.5 | 59.4 | 60.9 | 61.9 | 60.7 | 3.5 | 1.5 | 4.4 | 1.2 | 2.7 | 45 | 41 | 41 | 43 | 42 | 60 | 65 | 58 | 56 | 60 |
| Carpio | 92 | 71 | 79 | 105 | 79 | 88 | 59.1 | 61.6 | 60.3 | 61.9 | 60.6 | 60.9 | 4.5 | 0.0 | 5.9 | 0.0 | 2.6 | 43 | 41 | 41 | 40 | 41 | 61 | 66 | 59 | 58 | 59 |
| Alzada | 58 | 50 | 61 | 73 | 80 | 71 | 53.5 | 56.5 | 56.7 | 59.6 | 57.7 | 58.0 | 0.0 | 0.0 | 7.2 | 0.3 | 1.9 | 31 | 31 | 29 | 33 | 31 | 55 | 62 | 56 | 54 | 57 |
| Divide | 90 | 65 | 75 | 94 | 84 | 84 | 56.7 | 59.9 | 60.0 | 60.2 | 61.4 | 60.5 | 1.8 | -- | 5.8 | 0.3 | -- | 43 | 40 | 40 | 41 | 40 | 61 | 66 | 59 | 58 | 61 |
| CDC Verona | 81 | 57 | 70 | 103 | 76 | 83 | 55.8 | 59.4 | 59.0 | 61.2 | 60.7 | 60.3 | -- | -- | 4.4 | 0.4 | -- | 40 | 40 | 40 | 40 | 40 | 61 | 66 | 60 | 56 | 61 |
| Rugby | -- | 58 | 67 | 86 | 74 | 76 | -- | 59.8 | 59.4 | 60.6 | 62.1 | 60.7 | -- | -- | -- | 0.3 | -- | 47 | 46 | 44 | 43 | 44 | 59 | 65 | 57 | 57 | 60 |
| Joppa | 95 | 75 | 75 | 102 | 86 | 88 | 60.0 | 60.1 | -- | 60.7 | 61.9 | -- | 4.0 | 1.7 | 4.7 | 0.7 | 2.8 | 42 | 42 | 37 | 42 | 40 | 59 | 64 | 58 | 57 | 60 |
| VT Peak | -- | -- | -- | 97 | 81 | -- | -- | -- | -- | 61.7 | 62.6 | -- | -- | -- | -- | -- | -- | -- | -- | 38 | 40 | -- | -- | -- | 57 | 56 | -- |
| MS Dart | -- | -- | -- | -- | 85 | -- | -- | -- | -- | -- | 61.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 39 | -- | -- | -- | -- | 57 | -- |
| DG Max | 78 | 64 | 69 | 90 | -- | -- | 57.2 | 60.4 | 59.7 | 61.0 | -- | -- | 2.3 | 0.7 | 5.1 | 0.4 | 2.1 | 43 | 41 | 39 | -- | -- | 57 | 65 | 57 | -- | -- |
| DG Star | 80 | 69 | 73 | -- | -- | -- | 56.5 | 60.4 | 59.0 | -- | -- | -- | 0.0 | 0.5 | 2.9 | 0.6 | 1.0 | 44 | 41 | -- | -- | -- | 55 | 63 | -- | -- | -- |
| Dilse | 84 | 61 | 70 | -- | -- | -- | 57.0 | 59.7 | 59.4 | -- | -- | -- | 3.3 | 1.9 | 5.5 | 0.2 | 2.7 | 43 | 40 | -- | -- | -- | 61 | 66 | -- | -- | -- |
| Wales | 84 | 68 | 79 | -- | -- | -- | 57.1 | 60.8 | 60.3 | -- | -- | -- | 1.0 | 0.0 | 3.2 | 2.1 | 1.6 | 41 | 40 | -- | -- | -- | 60 | 65 | -- | -- | -- |
| Westhope | 85 | 75 | 75 | -- | -- | -- | 58.2 | 61.2 | 60.1 | -- | -- | -- | -- | 0.6 | 3.4 | 0.5 | -- | 42 | 39 | -- | -- | -- | 60 | 65 | -- | -- | -- |
| WB-Belfield | -- | 45 | -- | -- | -- | -- | -- | 55.8 | -- | -- | -- | -- | -- | -- | -- | 0.1 | -- | 31 | -- | -- | -- | -- | 52 | -- | -- | -- | -- |
| Grande D'oro | 87 | -- | -- | -- | -- | -- | 59.2 | -- | -- | -- | -- | -- | 2.0 | 0.8 | 3.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| LSD 5% | 5.5 | 6.5 | 4.6 | 6.4 | 4.9 | | 1.0 | 0.8 | 0.8 | 0.5 | 1.0 | | NS | 2.0 | 1.3 | 1.4 | | 2.2 | 1.5 | 1.7 | 1.6 | | 1.0 | 0.9 | 1.0 | 1.1 | |
| LSD 10% | -- | -- | 3.8 | 5.3 | 4.1 | | -- | -- | 0.7 | 0.4 | 0.9 | | -- | -- | -- | -- | | -- | 1.3 | 1.4 | 1.4 | | -- | 0.8 | 0.9 | 0.9 | |

## Durum Summary, Towner County 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Height (in) | | | | | Days to Head | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **11** | **12** | **13** | **14** | **3yr** | **11** | **12** | **13** | **14** | **3yr** |
| Alkabo | 74 | 61 | 57 | 74 | 52 | 61 | 59.5 | 60.0 | 56.9 | 61.0 | 56.2 | 58.0 | 37 | 36 | 45 | 40 | 40 | 48 | 62 | 46 | 58 | 55 |
| Lebsock | 65 | 57 | 51 | 68 | 58 | 59 | 60.5 | 59.9 | 57.1 | 61.0 | 56.5 | 58.2 | 40 | 35 | 44 | 39 | 39 | 47 | 60 | 45 | 55 | 53 |
| Tioga | 76 | 50 | 57 | 79 | 50 | 62 | 59.2 | 57.6 | 56.5 | 60.5 | 55.1 | 57.4 | 38 | 39 | 49 | 42 | 43 | 53 | 61 | 47 | 59 | 56 |
| Divide | 74 | 51 | 52 | 73 | 51 | 58 | 58.9 | 56.9 | 56.8 | 59.8 | 55.6 | 57.4 | 37 | 38 | 47 | 42 | 42 | 54 | 62 | 47 | 59 | 56 |
| Carpio | 66 | 52 | 56 | 75 | 55 | 62 | 56.9 | 58.7 | 57.0 | 61.2 | 56.1 | 58.1 | 37 | 38 | 48 | 41 | 42 | 51 | 63 | 48 | 60 | 57 |
| Joppa | 74 | 60 | 52 | 85 | 56 | 64 | 59.0 | 59.0 | 56.7 | 60.7 | 55.4 | 57.6 | 37 | 39 | 46 | 40 | 42 | 50 | 62 | 46 | 60 | 56 |
| Grenora | 78 | 59 | 53 | 80 | -- | -- | 58.7 | 58.4 | 55.7 | 59.5 | -- | -- | 36 | 34 | 41 | -- | -- | 49 | 61 | 45 | -- | -- |
| DG Max | 71 | 55 | 53 | 75 | -- | -- | 59.4 | 58.9 | 56.4 | 60.4 | -- | -- | 37 | 38 | 46 | -- | -- | 48 | 61 | 46 | -- | -- |
| Westhope | 71 | 49 | 56 | -- | -- | -- | 59.1 | 57.2 | 56.8 | -- | -- | -- | 37 | 38 | -- | -- | -- | 51 | 63 | -- | -- | -- |
| Wales | 73 | -- | 54 | -- | -- | -- | 58.4 | -- | 56.7 | -- | -- | -- | -- | 37 | -- | -- | -- | -- | 61 | -- | -- | -- |
| WB-Belfield | -- | 39 | -- | -- | -- | -- | -- | 55.3 | -- | -- | -- | -- | 31 | -- | -- | -- | -- | 46 | -- | -- | | -- |
| LSD 5% | 7.2 | 5.3 | NS | 6.7 | NS | | 1.0 | 1.3 | NS | 0.5 | NS | | 3.1 | 2.6 | 1.2 | 1.9 | | 1.2 | 1.2 | 0.6 | 1.3 | |
| LSD 10% | -- | -- | NS | 5.5 | NS | | -- | -- | NS | 0.4 | NS | | -- | 2.1 | 1.0 | 1.5 | | -- | 1.0 | 0.5 | 1.1 | |

## Durum Diseases by Location, Year and Variety *

| Location | Foliar Necrosis % of Flag at Soft Dough | | | | | | | | | | FHB[1] FS - % | | | | FDK[2] (Tombstones) % | | | | | | DON ppm | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 Sites | L | L | N | T | L | T | N | L | L | 2 sites | L | L | T | 3 Sites | L | L | L | L | L | 5 Sites | L | L | T | L | L | L |
| Year | Avg. | 12 | 11 | 11 | 11 | 10 | 10 | 10 | 09 | 08 | Avg. | 12 | 11 | 11 | Avg. | 12 | 11 | 10 | 09 | 08 | Avg. [3] | 12 | 11 | 11 | 10 | 09 | 08 |
| **Variety:** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AC Commander | -- | 73 | 73 | -- | -- | 15 | -- | -- | 21 | 20 | 2.8 | 0.6 | 4.9 | -- | 4 | 2 | 4 | 6 | 2 | 6 | 4.3 | 2.7 | 3.9 | -- | 4.2 | 3.7 | 7.0 |
| AC Navigator | -- | 73 | 73 | -- | -- | 30 | -- | -- | 11 | 23 | 1.8 | 0.6 | 2.9 | -- | 4 | 3 | 5 | 6 | 3 | 6 | 4.2 | 4.0 | 6.3 | -- | 4.6 | 2.1 | 4.0 |
| Alkabo | 23 | 33 | 15 | 50 | 33 | 4 | 19 | 10 | 4 | 15 | 0.4 | 0.2 | 0.5 | 0.8 | 1 | 1 | 2 | 1 | 2 | 2 | 2.5 | 2.6 | 3.3 | 4.2 | 3.7 | 1.8 | 1.2 |
| Alzada | -- | 97 | 83 | -- | -- | 75 | -- | -- | 67 | 23 | 3.6 | 0.5 | 6.6 | -- | 5 | 2 | 6 | 8 | 3 | 10 | 4.0 | 1.4 | 6.8 | -- | 4.3 | 3.3 | 4.2 |
| Ben | -- | 8 | 43 | -- | -- | 2 | -- | -- | 5 | 20 | 1.6 | 0.4 | 2.7 | -- | 1 | 1 | 2 | 1 | 1 | 1 | 3.0 | 2.7 | 5.1 | -- | 3.0 | 1.8 | 2.2 |
| Carpio | 21 | 18 | 18 | 35 | 53 | 4 | 12 | 6 | 2 | 30 | 1.1 | 1.7 | 0.4 | 0.7 | 2 | 2 | 1 | 2 | 2 | 3 | -- | 2.1 | 2.3 | 3.4 | 3.1 | -- | -- |
| Joppa | 20 | 15 | 30 | 28 | 43 | 4 | 18 | 2 | 3 | -- | 1.7 | 0.4 | 3.0 | 2.0 | 2 | 2 | 2 | 2 | 2 | 3 | -- | 2.8 | 3.3 | 3.1 | 3.5 | -- | -- |
| CDC Verona | -- | 13 | 13 | -- | -- | 6 | -- | -- | -- | -- | 1.8 | 1.6 | 2.0 | -- | 2 | 3 | 2 | 3 | -- | -- | -- | 2.1 | 2.6 | -- | 4.3 | -- | -- |
| DG Max | 23 | 20 | 28 | 43 | 28 | 7 | 26 | 9 | 12 | -- | 1.0 | 0.5 | 1.4 | 0.2 | 2 | 2 | 1 | 3 | 1 | -- | -- | 2.0 | 2.1 | 4.3 | 3.5 | 1.8 | -- |
| DG Star | -- | 63 | 48 | -- | -- | 35 | 29 | 74 | 24 | 27 | 0.3 | 0.0 | 0.5 | -- | 1 | 1 | 0 | 2 | 1 | 1 | 1.7 | 1.7 | 2.3 | -- | 2.5 | 1.3 | 0.8 |
| Dilse | -- | 20 | 33 | -- | -- | 1 | -- | -- | 4 | 23 | 2.9 | 1.1 | 4.7 | -- | 2 | 2 | 2 | 3 | 2 | 3 | 3.1 | 3.3 | 3.6 | -- | 3.0 | 3.4 | 2.2 |
| Divide | -- | 15 | 10 | 16 | 20 | 4 | 6 | 5 | -- | 22 | 0.3 | 0.2 | 0.4 | 0.4 | 2 | 2 | 2 | 1 | -- | 2 | -- | 1.4 | 2.5 | 3.0 | 4.0 | -- | 1.5 |
| Grenora | 11 | 15 | 8 | 22 | 17 | 0 | 14 | 3 | 2 | 12 | 1.0 | 0.2 | 1.7 | 1.2 | 2 | 2 | 1 | 2 | 1 | 3 | 4.0 | 2.6 | 4.7 | 5.9 | 6.0 | 4.3 | 2.5 |
| Lebsock | 16 | 8 | 25 | 40 | 32 | 1 | 5 | 2 | 6 | 17 | 1.5 | 0.4 | 2.6 | 0.7 | 2 | 1 | 1 | 2 | 1 | 1 | 2.3 | 2.2 | 2.8 | 4.5 | 2.8 | 1.9 | 1.8 |
| Maier | -- | 20 | 25 | -- | -- | 3 | -- | -- | 4 | 20 | 1.4 | 0.6 | 2.2 | -- | 2 | 2 | 2 | 3 | 2 | 3 | 3.5 | 3.2 | 3.6 | -- | 4.0 | 2.9 | 3.8 |
| Mountrail | -- | 15 | 10 | -- | -- | 3 | -- | -- | 3 | 17 | 1.2 | 0.6 | 1.7 | -- | 4 | 5 | 3 | 3 | 2 | 3 | -- | 3.6 | 3.8 | -- | 4.2 | 2.9 | -- |
| Pierce | -- | 11 | 23 | -- | -- | 6 | -- | -- | 5 | 23 | 1.5 | 0.5 | 2.5 | -- | 2 | 2 | 2 | 2 | 1 | 2 | 3.1 | 4.0 | 2.2 | -- | 4.0 | 2.6 | 2.9 |
| Strongfield | -- | 13 | 38 | -- | -- | 6 | -- | -- | 5 | 10 | 2.0 | 0.7 | 3.3 | -- | 2 | 2 | 2 | 3 | 2 | 3 | 3.0 | 2.8 | 4.1 | -- | 2.8 | 3.1 | 2.4 |
| Tioga | 23 | 48 | 28 | 48 | 32 | 0 | 5 | 3 | 1 | -- | 0.6 | 0.1 | 1.0 | 1.9 | 1 | 2 | 1 | 1 | 2 | -- | -- | 1.6 | 3.4 | 2.9 | 3.2 | -- | -- |
| Wales | -- | 38 | 33 | -- | -- | 19 | 22 | 41 | 31 | 33 | 0.6 | 0.6 | 0.5 | -- | 1 | 1 | 1 | 2 | 1 | 3 | 2.5 | 3.3 | 2.7 | -- | 1.8 | 2.0 | 2.7 |
| Westhope | 39 | 35 | 38 | 80 | 47 | 11 | 23 | 43 | 26 | -- | 1.2 | 0.8 | 1.6 | 1.4 | 2 | 2 | 2 | 2 | 2 | -- | -- | 3.5 | 2.9 | 3.2 | 4.0 | 3.2 | -- |

L=Langdon, N=Nelson, T=Towner.

[1]FHB-Fusarium Head Blight Field Severity (Incidence x head severity).

[2]Fusarium Damaged Kernels

[3]Includes Langdon sites only.

*Disease levels were low in 2013, no notes were recorded.

*DON test results for 2014 unavailable at time of publishing. Leaf disease levels were low in 2014, no notes were recorded.

## Winter Wheat Summary - Langdon - 2012-2014

| | | Yield (bu/a) | | | | | | | | Test Weight (lbs/bu) | | | | | | | | Protein (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter[a] | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* | NoF* | wF* |
| **Variety** | Hardiness | **12** | **12** | **13** | **13** | **14** | **14** | **3yr** | **3yr** | **12** | **12** | **13** | **13** | **14** | **14** | **3yr** | **3yr** | **12** | **12** | **13** | **13** | **14** | **14** | **3yr** | **3yr** |
| Accipiter | 2 | 65.4 | 74.1 | 97.7 | 106.5 | 67.8 | 74.2 | 77.0 | 84.9 | 60.8 | 61.9 | 61.1 | 60.1 | 60.5 | 59.8 | 60.8 | 60.6 | 10.1 | 9.1 | 11.4 | 11.5 | 11.0 | 10.7 | 10.8 | 10.4 |
| Art | 8 | 67.4 | 75.2 | 73.7 | 79.6 | 63.8 | 71.0 | 68.3 | 75.3 | 61.3 | 61.6 | 61.9 | 61.1 | 58.1 | 58.9 | 60.4 | 60.5 | 9.8 | 10.1 | 14.3 | 14.5 | 13.6 | 13.4 | 12.5 | 12.7 |
| Broadview | 4 | 68.8 | 81.4 | 80.1 | 91.3 | 69.1 | 77.7 | 72.7 | 83.5 | 59.0 | 60.3 | 59.0 | 58.2 | 59.8 | 59.6 | 59.2 | 59.4 | 9.0 | 8.8 | 11.4 | 11.8 | 11.8 | 12.4 | 10.7 | 11.0 |
| CDC Falcon | 4 | 68.0 | 76.0 | 92.0 | 100.5 | 64.9 | 75.7 | 74.9 | 84.1 | 60.6 | 61.1 | 61.9 | 60.8 | 58.6 | 60.5 | 60.3 | 60.8 | 8.9 | 9.3 | 11.6 | 12.0 | 11.4 | 11.9 | 10.6 | 11.0 |
| Decade | 2 | 68.4 | 80.3 | 83.1 | 85.2 | 66.9 | 73.1 | 72.8 | 79.5 | 60.7 | 61.8 | 59.0 | 60.4 | 60.7 | 60.9 | 60.1 | 61.0 | 9.2 | 9.6 | 13.8 | 13.8 | 13.2 | 13.8 | 12.1 | 12.4 |
| Ideal | 5 | 65.2 | 74.5 | 88.9 | 95.6 | 66.1 | 67.5 | 73.4 | 79.2 | 60.3 | 60.9 | 61.7 | 61.8 | 60.6 | 60.7 | 60.8 | 61.1 | 9.8 | 9.6 | 12.2 | 12.7 | 11.9 | 11.1 | 11.3 | 11.1 |
| Jerry | 3 | 62.5 | 69.8 | 91.7 | 95.9 | 68.3 | 71.6 | 74.2 | 79.1 | 60.3 | 61.1 | 60.9 | 59.7 | 59.0 | 60.2 | 60.1 | 60.3 | 9.3 | 9.5 | 13.4 | 13.0 | 12.6 | 13.3 | 11.8 | 11.9 |
| Lyman | 5 | 65.9 | 69.7 | 97.0 | 99.2 | 66.5 | 72.4 | 76.5 | 80.4 | 60.5 | 61.5 | 61.0 | 60.8 | 59.2 | 59.9 | 60.2 | 60.7 | 10.7 | 10.0 | 14.0 | 14.2 | 13.5 | 13.7 | 12.7 | 12.6 |
| McGill | 4 | 69.9 | 77.7 | 87.6 | 86.9 | 58.0 | 68.8 | 71.8 | 77.8 | 60.4 | 61.5 | 61.1 | 61.4 | 58.5 | 59.7 | 60.0 | 60.9 | 9.4 | 9.0 | 12.4 | 12.5 | 12.1 | 12.5 | 11.3 | 11.3 |
| Overland | 5 | 73.9 | 74.5 | 88.6 | 91.8 | 66.6 | 69.4 | 76.4 | 78.6 | 60.8 | 61.4 | 61.3 | 61.4 | 60.5 | 60.8 | 60.8 | 61.2 | 9.3 | 9.4 | 13.3 | 13.2 | 13.0 | 13.1 | 11.8 | 11.9 |
| Peregrine | 2 | 73.7 | 76.2 | 85.8 | 85.6 | 74.5 | 76.4 | 78.0 | 79.4 | 61.1 | 61.0 | 61.1 | 60.7 | 58.9 | 60.3 | 60.3 | 60.7 | 8.8 | 9.3 | 11.2 | 11.6 | 11.7 | 12.0 | 10.5 | 11.0 |
| Robidoux | 6 | 72.2 | 79.5 | 76.3 | 94.0 | 50.6 | 52.6 | 66.4 | 75.4 | 59.8 | 61.2 | 62.1 | 61.0 | 59.7 | 60.0 | 60.5 | 60.7 | 9.5 | 9.1 | 11.9 | 12.0 | 13.0 | 12.3 | 11.5 | 11.1 |
| SY Wolf | 6 | 68.8 | 73.2 | 81.9 | 82.1 | 62.8 | 71.7 | 71.2 | 75.7 | 61.4 | 62.0 | 59.5 | 60.8 | 59.5 | 61.1 | 60.1 | 61.3 | 9.5 | 10.1 | 12.5 | 12.7 | 12.8 | 12.8 | 11.6 | 11.9 |
| WB Matlock | 2 | 65.5 | 78.7 | 93.4 | 102.6 | 67.5 | 75.8 | 75.5 | 85.7 | 61.1 | 62.0 | 61.7 | 61.3 | 59.8 | 60.6 | 60.8 | 61.3 | 9.2 | 9.0 | 12.7 | 12.2 | 13.2 | 12.2 | 11.7 | 11.1 |
| Flourish | 2 | -- | -- | 92.0 | 103.7 | 67.0 | 69.1 | -- | -- | -- | -- | 61.3 | 60.4 | 59.4 | 60.5 | -- | -- | -- | -- | 11.9 | 12.1 | 12.9 | 12.2 | -- | -- |
| Freeman | 6 | -- | -- | 92.0 | 97.3 | 68.0 | 75.6 | -- | -- | -- | -- | 60.5 | 59.8 | 60.7 | 61.2 | -- | -- | -- | -- | 12.4 | 12.6 | 12.9 | 12.8 | -- | -- |
| Moats | 2 | -- | -- | 90.5 | 99.6 | 71.4 | 75.0 | -- | -- | -- | -- | 61.8 | 61.3 | 58.7 | 59.6 | -- | -- | -- | -- | 11.9 | 12.2 | 12.5 | 12.9 | -- | -- |
| WB Grainfield | 6 | -- | -- | 84.6 | 79.3 | 49.8 | 52.2 | -- | -- | -- | -- | 61.0 | 60.4 | 60.1 | 60.5 | -- | -- | -- | -- | 12.6 | 12.4 | 13.2 | 12.9 | -- | -- |
| Emerson | 3 | -- | -- | 83.5 | 79.1 | 72.0 | 76.3 | -- | -- | -- | -- | 61.2 | 61.9 | 59.9 | 59.9 | -- | -- | -- | -- | 13.1 | 13.4 | 12.4 | 12.3 | -- | -- |
| AAC Gateway | 3 | -- | -- | -- | -- | 71.9 | 70.7 | -- | -- | -- | -- | -- | -- | 58.2 | 59.2 | -- | -- | -- | -- | -- | -- | 12.4 | 13.5 | -- | -- |
| Darrell | 6 | 63.3 | 68.9 | -- | -- | 64.7 | 67.3 | -- | -- | 61.1 | 61.7 | -- | -- | 58.1 | 58.6 | -- | -- | 9.9 | 10.3 | -- | -- | 13.1 | 12.8 | -- | -- |
| Boomer | 3 | 71.0 | 80.5 | 102.2 | 112.7 | -- | -- | -- | -- | 59.7 | 60.8 | 61.7 | 60.6 | -- | -- | -- | -- | 8.9 | 8.7 | 11.7 | 11.6 | -- | -- | -- | -- |
| Expedition | 4 | 57.0 | 76.1 | 91.2 | 96.1 | -- | -- | -- | -- | 59.3 | 61.0 | 61.7 | 60.9 | -- | -- | -- | -- | 8.6 | 9.1 | 12.2 | 12.5 | -- | -- | -- | -- |
| Wesley | 6 | 59.0 | 71.9 | 72.9 | 78.3 | -- | -- | -- | -- | 60.8 | 61.6 | 60.5 | 59.9 | -- | -- | -- | -- | 10.3 | 10.1 | 14.1 | 13.9 | -- | -- | -- | -- |
| Average | | 67.0 | 75.5 | 87.6 | 92.9 | 65.6 | 70.6 | 73.5 | 79.9 | 60.5 | 61.3 | 61.0 | 60.7 | 59.4 | 60.1 | 60.3 | 60.7 | 9.4 | 9.4 | 12.5 | 12.7 | 12.5 | 12.6 | 11.5 | 11.5 |
| LSD 5% | | 7.2 | | 11.1 | | 5.3 | | | | 0.7 | | 1.4 | | 1.1 | | | | 0.9 | | 0.6 | | 0.9 | | | |

*** wF** = Stratego at herbicide time, 4oz/a + Prosaro at early flower, 6.5 oz/a + NIS 0.125% v/v, **NoF** = No Fungicide

[a]Relative winter hardiness rating: 1 = excellent, 10 = very poor

## HRWW Yield Data Across Locations, 2010 - 2014

**Yield (bu/a)**

| | No Fungicide | | | | | | With Fungicide[d] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010[a] | 2011[b] | 2012[c] | 2014 | 2014 | 2012-14 | 2010[a] | 2011[b] | 2012[c] | 2014 | 2014 | 2012-14 |
| Variety | Avg | Avg | Avg | Aneta | Rugby | Avg | Avg | Avg | Avg | Aneta | Rugby | Avg |
| Accipiter | 89 | 67 | 76 | 78 | 62 | 73.0 | 98 | 89 | 77 | 84 | 68 | 76.5 |
| CDC Falcon | 90 | 68 | 78 | 81 | 64 | 75.2 | 99 | 83 | 78 | 92 | 68 | 79.0 |
| Decade | -- | 77 | 79 | 77 | 61 | 74.2 | -- | 89 | 80 | 86 | 64 | 77.5 |
| Ideal | -- | -- | 81 | 82 | 58 | 75.8 | -- | -- | 86 | 91 | 60 | 80.8 |
| Jerry | 95 | 69 | 75 | 81 | 63 | 73.2 | 102 | 78 | 79 | 85 | 63 | 76.3 |
| Overland | 99 | 79 | 85 | 78 | 59 | 76.6 | 105 | 91 | 86 | 86 | 63 | 80.5 |
| SY Wolf | -- | 82 | 80 | 76 | 52 | 71.7 | -- | 90 | 82 | 83 | 55 | 75.6 |
| WB-Matlock | 95 | 68 | -- | 86 | 65 | -- | 101 | 84 | -- | 90 | 66 | -- |
| Art | -- | 74 | 80 | 77 | -- | -- | -- | 87 | 84 | 87 | -- | -- |
| Darrel | -- | 80 | 82 | -- | 57 | -- | -- | 89 | 84 | -- | 62 | -- |
| AAC Gateway | -- | -- | -- | 76 | 56 | -- | -- | -- | -- | 84 | 61 | -- |
| Broadview | -- | -- | -- | 82 | 62 | -- | -- | -- | -- | 90 | 66 | -- |
| Emerson | -- | -- | -- | 76 | 64 | -- | -- | -- | -- | 78 | 66 | -- |
| Flourish | -- | -- | -- | 70 | 50 | -- | -- | -- | -- | 80 | 57 | -- |
| Freeman | -- | -- | -- | 84 | 51 | -- | -- | -- | -- | 86 | 53 | -- |
| Moats | -- | -- | -- | 81 | 57 | -- | -- | -- | -- | 85 | 60 | -- |
| Site Average | 94 | 74 | 79 | 79 | 59 | 74 | 101 | 87 | 82 | 86 | 62 | 78 |
| LSD 5% | | | | 5.5 | 5.9 | | | | | 5.5 | 5.9 | |

[a] 2010 data is an average of Tolna, Leeds and Lakota sites.

[b] 2011 data is an average of Devils Lake and Willow City sites.

[c] 2012 data is an average of Devils Lake, Willow City and Tolna sites.

[d] 2010 - With Fungicide = Prosaro at early flower, 6.5 oz/a +NIS 0.125% v/v.

[d] 2011, 2012 & 2014 - With Fungicide = Stratego at herbicide time, 4 oz/a + Prosaro at early flower, 6.5 oz/a + NIS 0.125% v/v.

## HRWW Test Weight Across Locations, 2010 - 2014

**Test Weight (lbs/bu)**

| | No Fungicide | | | | | | With Fungicide[d] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010[a] | 2011[b] | 2012[c] | 2014 | 2014 | 2012-14 | 2010[a] | 2011[b] | 2012[c] | 2014 | 2014 | 2012-14 |
| Variety | Avg | Avg | Avg | Aneta | Rugby | Avg | Avg | Avg | Avg | Aneta | Rugby | Avg |
| Accipiter | 60.3 | 59.4 | 60.1 | 60.1 | 55.8 | 59.0 | 62.1 | 61.2 | 60.4 | 60.5 | 57.0 | 59.6 |
| CDC Falcon | 59.2 | 57.9 | 59.7 | 61.0 | 56.9 | 59.3 | 60.8 | 59.9 | 60.8 | 61.9 | 58.3 | 60.5 |
| Decade | -- | 59.7 | 61.6 | 59.9 | 56.2 | 59.8 | -- | 60.7 | 62.1 | 60.6 | 57.0 | 60.5 |
| Ideal | -- | -- | 61.9 | 60.3 | 57.6 | 60.4 | -- | -- | 62.4 | 60.9 | 59.0 | 61.2 |
| Jerry | 59.2 | 59.4 | 60.2 | 60.5 | 57.6 | 59.6 | 60.4 | 60.4 | 60.9 | 61.4 | 57.6 | 60.2 |
| Overland | 60.3 | 60.2 | 61.9 | 59.8 | 58.7 | 60.5 | 60.6 | 61.0 | 61.9 | 61.3 | 59.2 | 61.1 |
| SY Wolf | -- | 60.6 | 62.3 | 59.3 | 57.1 | 60.2 | -- | 61.0 | 62.2 | 61.6 | 57.3 | 60.8 |
| WB-Matlock | 60.3 | 60.0 | -- | 61.2 | 57.8 | -- | 61.1 | 61.1 | -- | 62.1 | 58.6 | -- |
| Art | -- | 59.5 | 61.9 | 60.8 | -- | -- | -- | 61.0 | 62.3 | 61.6 | -- | -- |
| Darrel | -- | 60.4 | 61.6 | -- | 56.1 | -- | -- | 60.6 | 61.8 | -- | 57.1 | -- |
| AAC Gateway | -- | -- | -- | 60.9 | 56.7 | -- | -- | -- | -- | 61.6 | 58.0 | -- |
| Broadview | -- | -- | -- | 58.7 | 55.3 | -- | -- | -- | -- | 60.3 | 56.2 | -- |
| Emerson | -- | -- | -- | 61.1 | 57.3 | -- | -- | -- | -- | 61.2 | 58.1 | -- |
| Flourish | -- | -- | -- | 58.2 | 53.3 | -- | -- | -- | -- | 59.8 | 54.3 | -- |
| Freeman | -- | -- | -- | 59.6 | 54.9 | -- | -- | -- | -- | 60.9 | 56.0 | -- |
| Moats | -- | -- | -- | 60.7 | 56.1 | -- | -- | -- | -- | 61.7 | 56.7 | -- |
| Site Average | 59.9 | 59.7 | 61.2 | 60.1 | 56.5 | 59.8 | 61.0 | 60.8 | 61.6 | 61.2 | 57.3 | 60.5 |
| LSD 5% | | | | 1.1 | 1.4 | | | | | 1.1 | 1.4 | |

[a] 2010 data is an average of Tolna, Leeds and Lakota sites.

[b] 2011 data is an average of Devils Lake and Willow City sites.

[c] 2012 data is an average of Devils Lake, Willow City and Tolna sites.

[d] 2010 - With Fungicide = Prosaro at early flower, 6.5 oz/a +NIS 0.125% v/v.

[d] 2011, 2012 & 2014 - With Fungicide = Stratego at herbicide time, 4 oz/a + Prosaro at early flower, 6.5 oz/a + NIS 0.125% v/v.

## HRWW Protein Across Locations, 2010 - 2014

**Protein (%) - 12% moisture basis**

| | No Fungicide | | | | | | With Fungicide[d] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | 2010[a] Avg | 2011[b] Avg | 2012[c] Avg | 2014 Aneta | 2014 Rugby | 2012-14 Avg | 2010[a] Avg | 2011[b] Avg | 2012[c] Avg | 2014 Aneta | 2014 Rugby | 2012-14 Avg |
| Accipiter | 10.8 | 11.7 | 10.5 | 11.3 | 13.1 | 11.3 | 10.9 | 11.3 | 11.0 | 11.5 | 13.5 | 11.7 |
| CDC Falcon | 11.0 | 12.2 | 10.6 | 10.7 | 13.3 | 11.3 | 11.4 | 11.9 | 10.7 | 10.7 | 13.0 | 11.3 |
| Decade | -- | 12.0 | 11.3 | 11.9 | 13.6 | 12.0 | -- | 11.8 | 11.5 | 11.9 | 13.5 | 12.1 |
| Ideal | -- | -- | 10.0 | 10.9 | 13.7 | 11.2 | -- | -- | 10.5 | 11.1 | 13.7 | 11.4 |
| Jerry | 11.9 | 12.2 | 10.6 | 11.6 | 14.0 | 11.7 | 11.9 | 12.3 | 11.0 | 11.5 | 13.4 | 11.7 |
| Overland | 11.6 | 12.0 | 10.1 | 11.7 | 13.3 | 11.3 | 11.6 | 12.1 | 10.4 | 11.9 | 12.8 | 11.4 |
| SY Wolf | -- | 12.3 | 10.9 | 12.1 | 13.4 | 11.8 | -- | 12.3 | 11.0 | 11.9 | 13.3 | 11.8 |
| WB-Matlock | 11.8 | 12.7 | -- | 12.0 | 13.3 | -- | 11.8 | 12.8 | -- | 11.7 | 13.2 | -- |
| Art | -- | 12.6 | 11.6 | 12.8 | -- | -- | -- | 12.5 | 11.9 | 12.4 | -- | -- |
| Darrel | -- | 12.0 | 10.8 | -- | 13.5 | -- | -- | 12.0 | 11.1 | -- | 13.6 | -- |
| AAC Gateway | -- | -- | -- | 12.0 | 13.4 | -- | -- | -- | -- | 11.8 | 13.4 | -- |
| Broadview | -- | -- | -- | 10.7 | 12.7 | -- | -- | -- | -- | 10.7 | 13.1 | -- |
| Emerson | -- | -- | -- | 11.3 | 13.3 | -- | -- | -- | -- | 11.7 | 13.1 | -- |
| Flourish | -- | -- | -- | 11.5 | 13.1 | -- | -- | -- | -- | 11.2 | 13.2 | -- |
| Freeman | -- | -- | -- | 11.1 | 13.4 | -- | -- | -- | -- | 10.7 | 13.3 | -- |
| Moats | -- | -- | -- | 12.0 | 13.4 | -- | -- | -- | -- | 11.5 | 13.0 | -- |
| Site Average | 11.4 | 12.2 | 10.7 | 11.6 | 13.3 | 11.5 | 11.5 | 12.1 | 11.0 | 11.5 | 13.3 | 11.6 |
| LSD 5% | | | | 0.5 | 0.5 | | | | | 0.5 | 0.5 | |

[a] 2010 data is an average of Tolna, Leeds and Lakota sites.
[b] 2011 data is an average of Devils Lake and Willow City sites.
[c] 2012 data is an average of Devils Lake, Willow City and Tolna sites.
[d] 2010 - With Fungicide = Prosaro at early flower, 6.5 oz/a +NIS 0.125% v/v.
[d] 2011, 2012 & 2014 - With Fungicide = Stratego at herbicide time, 4 oz/a + Prosaro at early flower, 6.5 oz/a + NIS 0.125% v/v.

### Corn Grain Hybrid Trial – 2014

A corn hybrid trial was planted on May 16, 2014 at Langdon which included 49 hybrids. A killing freeze of 28° F. occurred on September 12 with temperatures ranging from 28-32° F for five hours. Corn development at that date was from late R3 (milk) to R4 (dough) stage. Average silk date for the trial ranged from August 9-15 for the various hybrids. Total growing degree days (GDD) to September 12 was 1620. At Langdon, we need around 1800 GDD for 75 day corn to mature, and 1900 GDD for 80 day corn. Corn yields only averaged 50.5 bu/a with 40.1 lb/bu test weight. The data was not meaningful so is not presented.

## Barley Summary - Langdon - 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Lodging (0-9) | | | Plump (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **07** | **08** | **2yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Lacey | 128 | 110 | 97 | 164 | 134 | 131 | 50.3 | 49.6 | 48.5 | 50.9 | 52.1 | 50.5 | 2.8 | 2.8 | 2.8 | 94 | 94 | 86 | 98 | 99 | 94 |
| Stellar-ND | 128 | 116 | 94 | 159 | 142 | 132 | 49.1 | 48.6 | 48.4 | 50.0 | 50.9 | 49.8 | 4.8 | 1.0 | 2.9 | 97 | 95 | 88 | 99 | 99 | 95 |
| Tradition | 131 | 114 | 69 | 163 | 133 | 122 | 49.8 | 49.3 | 47.0 | 50.9 | 51.9 | 49.9 | 3.8 | 1.0 | 2.4 | 95 | 92 | 81 | 98 | 98 | 92 |
| Celebration | 123 | 108 | 78 | 165 | 144 | 129 | 49.4 | 49.3 | 47.0 | 50.3 | 51.9 | 49.7 | -- | 1.0 | -- | 92 | 95 | 86 | 98 | 98 | 94 |
| Quest | 133 | 108 | 94 | 163 | 130 | 129 | 48.4 | 48.7 | 48.2 | 49.3 | 50.3 | 49.3 | -- | 0.5 | -- | 88 | 87 | 76 | 96 | 96 | 89 |
| Innovation | 126 | 117 | 91 | 160 | 138 | 130 | 49.6 | 48.7 | 47.4 | 50.2 | 51.8 | 49.8 | -- | -- | -- | 93 | 92 | 81 | 98 | 99 | 93 |
| Rasmusson | 150 | 117 | -- | -- | -- | -- | 48.9 | 49.5 | -- | -- | -- | -- | 2.8 | 1.8 | 2.3 | 94 | 94 | -- | -- | -- | -- |
| AC Metcalfe* | 122 | 93 | 71 | 154 | 125 | 117 | 50.0 | 49.4 | 47.6 | 52.5 | 53.3 | 51.1 | 7.3 | 3.0 | 5.2 | 94 | 88 | 81 | 97 | 97 | 92 |
| CDC Copeland* | 136 | 89 | 86 | 172 | 127 | 128 | 48.2 | 49.2 | 47.6 | 49.9 | 50.9 | 49.5 | 7.5 | 1.3 | 4.4 | 97 | 92 | 84 | 96 | 97 | 92 |
| Conlon* | 125 | 99 | 83 | 138 | 126 | 116 | 51.5 | 51.6 | 49.3 | 52.5 | 52.4 | 51.4 | 6.5 | 2.3 | 4.4 | 97 | 97 | 92 | 99 | 99 | 97 |
| Pinnacle* | 130 | 115 | 91 | 180 | 138 | 136 | 49.1 | 51.1 | 49.7 | 53.1 | 53.9 | 52.2 | 6.8 | 0.3 | 3.6 | 95 | 95 | 91 | 98 | 98 | 96 |
| Rawson* | 140 | 107 | 83 | 166 | 122 | 124 | 48.7 | 49.4 | 47.7 | 51.8 | 52.1 | 50.5 | 6.0 | 3.5 | 4.8 | 98 | 95 | 95 | 99 | 99 | 98 |
| Conrad* | -- | 98 | 77 | 155 | 125 | 119 | -- | 50.1 | 47.7 | 51.2 | 52.7 | 50.5 | 7.8 | 3.5 | 5.7 | -- | 92 | 88 | 97 | 98 | 94 |
| Lilly* | 116 | 92 | -- | -- | -- | -- | 50.6 | 48.8 | -- | -- | -- | -- | -- | -- | -- | 91 | 87 | -- | -- | -- | -- |
| Sunshine* | 128 | -- | -- | -- | -- | -- | 49.8 | -- | -- | -- | -- | -- | -- | -- | -- | 96 | -- | -- | -- | -- | -- |
| LSD 5% | 13.7 | 10.9 | 6.4 | 10.3 | 6.7 | | 0.7 | 0.8 | 0.8 | 0.6 | 0.9 | | 3.1 | NS | | 0.5 | 3.3 | 3.9 | 0.7 | 0.9 | |
| LSD 10% | -- | -- | 5.4 | 8.6 | 5.5 | | -- | -- | 0.7 | 0.5 | 0.7 | | -- | -- | | -- | -- | 3.3 | 0.6 | 0.8 | |

*2-row

## Barley Summary - Langdon - 2010-2014

| | Height (in) | | | | | | Protein (%) | | | | | | Days to Head | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Lacey | 39 | 36 | 37 | 28 | 33 | 33 | 12.3 | 13.3 | 12.2 | 12.5 | 12.2 | 12.3 | 64 | 51 | 61 | 52 | 52 | 55 |
| Stellar-ND | 39 | 34 | 35 | 29 | 33 | 32 | 12.1 | 12.4 | 12.0 | 12.5 | 12.3 | 12.3 | 64 | 51 | 63 | 53 | 52 | 56 |
| Tradition | 40 | 36 | 34 | 29 | 33 | 32 | 12.0 | 12.7 | 12.2 | 12.5 | 12.0 | 12.2 | 65 | 53 | 64 | 52 | 52 | 56 |
| Celebration | 38 | 35 | 34 | 28 | 33 | 32 | 12.3 | 13.7 | 13.3 | 13.6 | 12.9 | 13.3 | 66 | 54 | 65 | 53 | 53 | 57 |
| Quest | 39 | 38 | 37 | 31 | 34 | 34 | 11.9 | 12.7 | 12.2 | 12.2 | 12.2 | 12.2 | 66 | 52 | 62 | 54 | 52 | 56 |
| Innovation | 38 | 33 | 37 | 26 | 32 | 32 | 12.3 | 12.5 | 12.8 | 12.4 | 13.0 | 12.7 | 64 | 51 | 61 | 52 | 50 | 54 |
| Rasmusson | 37 | 32 | -- | -- | -- | -- | 12.1 | 12.5 | -- | -- | -- | -- | 66 | 50 | -- | -- | -- | -- |
| AC Metcalfe* | 38 | 35 | 31 | 32 | 29 | 31 | 11.9 | 13.7 | 12.7 | 11.7 | 12.6 | 12.3 | 67 | 54 | 65 | 56 | 54 | 58 |
| CDC Copeland* | 40 | 36 | 35 | 35 | 32 | 34 | 11.3 | 12.9 | 12.1 | 11.8 | 12.2 | 12.0 | 70 | 56 | 65 | 59 | 56 | 60 |
| Conlon* | 35 | 34 | 35 | 30 | 30 | 32 | 12.3 | 12.7 | 12.8 | 11.7 | 12.4 | 12.3 | 60 | 49 | 57 | 50 | 48 | 52 |
| Pinnacle* | 39 | 35 | 35 | 31 | 33 | 33 | 10.8 | 12.0 | 11.7 | 11.3 | 11.5 | 11.5 | 66 | 54 | 62 | 55 | 53 | 57 |
| Rawson* | 38 | 36 | 33 | 31 | 32 | 32 | 11.3 | 11.9 | 11.6 | 10.8 | 11.7 | 11.4 | 63 | 50 | 61 | 52 | 50 | 54 |
| Conrad* | -- | 31 | 28 | 29 | 27 | 28 | -- | 12.7 | 12.0 | 12.3 | 12.7 | 12.3 | -- | 55 | 65 | 57 | 55 | 59 |
| Lilly* | 32 | 31 | -- | -- | -- | -- | 11.2 | 12.1 | -- | -- | -- | -- | 67 | 53 | -- | -- | -- | -- |
| Sunshine* | 32 | -- | -- | -- | -- | -- | 11.5 | -- | -- | -- | -- | -- | 68 | -- | -- | -- | -- | -- |
| LSD 5% | 1.0 | 3.3 | 1.7 | 2.0 | 1.9 | | 0.5 | 0.7 | 0.9 | 0.6 | 0.0 | | 1.0 | 1.0 | 1.2 | 1.1 | 1.3 | |
| LSD 10% | -- | -- | 1.5 | 1.7 | 1.6 | | -- | -- | 0.8 | 0.5 | 0.7 | | -- | -- | 1.0 | 0.9 | 1.1 | |

*2-row

## Barley Summary - Towner County - 2009-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Lodging (0-9) | | | Protein (%) | | | | | | Plump (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **09** | **10** | **11** | **12** | **14** | **3yr** | **09** | **10** | **11** | **12** | **14** | **3yr** | **11** | **14** | **2yr** | **09** | **10** | **11** | **12** | **14** | **3yr** | **09** | **10** | **11** | **12** | **14** | **3yr** |
| Lacey | 122 | 118 | 77 | 83 | 117 | 92 | 50.1 | 50.8 | 49.3 | 46.4 | 48.7 | 48.1 | 0.5 | 6.8 | 3.7 | 11.9 | 12.2 | 13.7 | 14.2 | 14.8 | 14.2 | 98 | 95 | 95 | 72 | 88 | 85 |
| Stellar-ND | 125 | 112 | 83 | 75 | 118 | 92 | 48.6 | 49.2 | 48.3 | 45.1 | 48.1 | 47.2 | 1.0 | 7.3 | 4.2 | 11.3 | 11.8 | 13.5 | 13.1 | 14.2 | 13.6 | 98 | 97 | 95 | 78 | 93 | 89 |
| Tradition | 122 | 123 | 81 | 68 | 117 | 89 | 49.5 | 50.6 | 49.1 | 45.5 | 47.6 | 47.4 | 0.8 | 8.0 | 4.4 | 11.7 | 12.4 | 13.4 | 14.4 | 14.4 | 14.1 | 98 | 96 | 93 | 76 | 85 | 85 |
| Celebration | 126 | 116 | 71 | 73 | 114 | 86 | 49.4 | 49.5 | 47.8 | 44.6 | 47.4 | 46.6 | 1.3 | 8.8 | 5.1 | 11.8 | 12.8 | 15.1 | 14.1 | 15.8 | 15.0 | 98 | 92 | 89 | 77 | 86 | 84 |
| Quest | -- | 120 | 81 | 78 | 130 | 96 | -- | 48.4 | 46.7 | 45.3 | 47.8 | 46.6 | 3.0 | 7.5 | 5.3 | -- | 12.3 | 13.6 | 13.6 | 15.3 | 14.2 | -- | 87 | 80 | 66 | 86 | 77 |
| Innovation | -- | -- | -- | 76 | 130 | -- | -- | -- | -- | 45.6 | 48.5 | -- | -- | 7.3 | -- | -- | -- | -- | 14.3 | 14.8 | -- | -- | -- | -- | 71 | 92 | -- |
| Rasmusson | 128 | 128 | 84 | -- | -- | -- | 49.8 | 50.5 | 47.9 | -- | -- | -- | 1.5 | -- | 1.5 | 11.6 | 11.7 | 13.3 | -- | -- | 13.3 | 97 | 91 | 87 | -- | -- | -- |
| Pinnacle* | 125 | 121 | 79 | -- | -- | -- | 50.9 | 51.7 | 49.6 | -- | -- | -- | 2.0 | -- | 2.0 | 11.0 | 10.9 | 12.4 | -- | -- | 12.4 | 99 | 98 | 94 | -- | -- | -- |
| LSD 5% | NS | NS | 5.6 | 10.0 | NS | | 0.4 | 0.7 | 0.8 | NS | NS | | 1.1 | NS | | 0.4 | 0.4 | 0.4 | NS | 0.8 | | 0.6 | 2.8 | 3.7 | 8.3 | 4.4 | |
| LSD 10% | -- | -- | -- | 7.3 | NS | | -- | -- | -- | NS | NS | | -- | NS | | -- | -- | -- | NS | 0.6 | | -- | -- | -- | 6.0 | 3.6 | |

*2-row barley

## Barley Summary - Walsh County - 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Protein (%) | | | | | | Plump (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 14 | 3yr | 10 | 11 | 12 | 13 | 14 | 3yr |
| Lacey | 103 | 95 | 116 | 106 | 117 | 113 | 49.4 | 50.4 | 48.9 | 49.9 | 49.2 | 49.3 | 11.6 | 13.2 | 11.1 | 12.6 | 12.2 | 12.0 | 99 | 93 | 91 | 99 | 98 | 96 |
| Stellar-ND | 108 | 100 | 108 | 104 | 117 | 110 | 47.4 | 49.6 | 46.5 | 49.2 | 46.9 | 47.5 | 11.7 | 12.5 | 11.4 | 12.1 | 11.7 | 11.7 | 99 | 92 | 88 | 99 | 98 | 95 |
| Tradition | 101 | 97 | 94 | 113 | 121 | 109 | 48.7 | 51.0 | 45.8 | 50.4 | 49.0 | 48.4 | 11.6 | 12.9 | 12.0 | 12.4 | 11.6 | 12.0 | 98 | 92 | 84 | 99 | 98 | 94 |
| Celebration | 95 | 95 | 88 | 105 | 117 | 103 | 48.5 | 49.1 | 46.0 | 49.0 | 48.2 | 47.7 | 12.4 | 14.2 | 13.1 | 13.6 | 12.2 | 13.0 | 96 | 88 | 85 | 99 | 99 | 94 |
| Quest | 99 | 105 | 111 | 100 | 108 | 106 | 48.1 | 50.3 | 46.9 | 48.3 | 46.3 | 47.2 | 11.8 | 13.0 | 10.8 | 12.3 | 11.3 | 11.5 | 93 | 86 | 84 | 96 | 94 | 91 |
| Innovation | -- | -- | 113 | 101 | 122 | 112 | -- | -- | 47.9 | 48.6 | 49.0 | 48.5 | -- | -- | 11.0 | 12.4 | 12.0 | 11.8 | -- | -- | 90 | 98 | 99 | 96 |
| Rassmusson | 101 | 110 | -- | -- | -- | -- | 48.8 | 50.8 | -- | -- | -- | -- | 11.0 | 12.4 | -- | -- | -- | -- | 97 | 91 | -- | -- | -- | -- |
| Pinnacle* | 105 | 102 | -- | -- | -- | -- | 48.8 | 51.8 | -- | -- | -- | -- | 10.6 | 11.7 | -- | -- | -- | -- | 99 | 96 | -- | -- | -- | -- |
| LSD 5% | NS | 7.0 | 6.1 | NS | NS | | 0.5 | 0.8 | 0.5 | 0.6 | 0.7 | | 0.7 | 0.7 | 0.9 | 0.6 | NS | | 1.0 | 3.2 | 2.2 | 0.5 | 0.8 | |
| LSD 10% | -- | -- | 5.0 | NS | NS | | -- | -- | 1.4 | 0.5 | 0.5 | | -- | -- | 0.7 | 0.5 | NS | | -- | -- | 1.8 | 0.4 | 0.7 | |

*Two row barley

Barley trials are conducted in Pembina County in odd number years and Walsh County in even numbered years. 2011 and 2013 data is from Pembina County.

## Oat Summary, Langdon 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Days to Head | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| AC Pinnacle | 175 | 184 | 173 | 235 | 180 | 196 | 33.7 | 37.1 | 36.5 | 40.2 | 38.9 | 38.5 | 73 | 61 | 65 | 58 | 58 | 60 |
| Beach | 174 | 147 | 173 | 204 | 138 | 172 | 37.3 | 41.9 | 39.9 | 40.9 | 42.3 | 41.0 | 70 | 58 | 63 | 56 | 55 | 58 |
| CDC Dancer | 188 | 152 | 166 | 229 | 175 | 190 | 37.9 | 42.0 | 39.7 | 39.9 | 38.5 | 39.4 | 72 | 59 | 65 | 56 | 56 | 59 |
| HiFi | 204 | 177 | 170 | 216 | 171 | 185 | 40.1 | 40.7 | 39.2 | 38.7 | 40.1 | 39.3 | 71 | 58 | 64 | 57 | 56 | 59 |
| Hytest | 141 | 123 | 140 | 176 | 127 | 148 | 41.5 | 42.8 | 41.6 | 41.3 | 42.0 | 41.6 | 67 | 54 | 62 | 54 | 54 | 57 |
| Killdeer | 172 | 158 | 169 | 208 | 178 | 185 | 35.9 | 38.3 | 37.1 | 38.1 | 39.4 | 38.2 | 68 | 55 | 63 | 55 | 55 | 58 |
| Otana | 123 | 112 | 144 | 188 | 144 | 159 | 29.9 | 36.5 | 37.5 | 37.5 | 39.2 | 38.1 | 71 | 59 | 64 | 56 | 57 | 59 |
| Rockford | 191 | 180 | 166 | 211 | 152 | 176 | 40.6 | 42.0 | 40.6 | 39.5 | 41.3 | 40.5 | 71 | 59 | 64 | 58 | 56 | 59 |
| Souris | 197 | 162 | 167 | 202 | 184 | 184 | 39.4 | 41.1 | 38.7 | 38.7 | 40.7 | 39.4 | 70 | 57 | 64 | 57 | 55 | 59 |
| Stallion | 176 | 157 | 154 | 194 | 157 | 168 | 39.0 | 42.3 | 38.7 | 40.8 | 41.9 | 40.5 | 69 | 57 | 62 | 56 | 55 | 58 |
| Furlong | 157 | 141 | 158 | 218 | 186 | 187 | 34.4 | 38.4 | 38.2 | 38.5 | 38.8 | 38.5 | 73 | 62 | 65 | 59 | 58 | 61 |
| Minstrel CDC | 157 | 154 | 169 | 232 | 178 | 193 | 32.3 | 36.3 | 35.2 | 37.7 | 39.5 | 37.5 | 70 | 57 | 63 | 57 | 55 | 58 |
| Newburg | 216 | 177 | 168 | 228 | 176 | 191 | 38.8 | 40.1 | 38.2 | 38.2 | 40.0 | 38.8 | 69 | 58 | 63 | 56 | 55 | 58 |
| Leggett | 212 | 185 | 154 | 221 | 165 | 180 | 38.1 | 41.3 | 38.6 | 38.8 | 40.9 | 39.4 | 72 | 58 | 65 | 57 | 55 | 59 |
| Jury | 210 | 161 | 162 | 225 | 166 | 184 | 40.3 | 41.9 | 39.7 | 39.7 | 41.1 | 40.2 | 68 | 57 | 62 | 56 | 56 | 58 |
| Horsepower | -- | -- | 160 | 171 | 160 | 164 | -- | -- | 39.5 | 39.1 | 40.6 | 39.7 | -- | -- | 61 | 53 | 54 | 56 |
| Goliath | -- | -- | -- | 212 | 165 | -- | -- | -- | -- | 39.7 | 43.8 | -- | -- | -- | -- | 57 | 56 | -- |
| Paul* | 125 | -- | -- | -- | 134 | -- | 44.0 | -- | -- | -- | 43.9 | -- | 72 | -- | -- | -- | 58 | -- |
| Deon | -- | -- | -- | -- | 163 | -- | -- | -- | -- | -- | 40.5 | -- | -- | -- | -- | -- | 57 | -- |
| Morton | 143 | 130 | 149 | 195 | -- | -- | 37.4 | 40.5 | 39.8 | 39.2 | -- | -- | 70 | 57 | 63 | 57 | -- | -- |
| Stark* | 136 | 139 | 130 | 180 | -- | -- | 43.1 | 45.4 | 43.8 | 42.8 | -- | -- | 73 | 60 | 66 | 59 | -- | -- |
| Shelby 427 | 168 | 152 | 143 | 189 | -- | -- | 41.3 | 41.9 | 39.7 | 40.7 | -- | -- | 65 | 52 | 60 | 54 | -- | -- |
| Buff* | 132 | 104 | 108 | -- | -- | -- | 46.6 | 48.6 | 45.4 | -- | -- | -- | 65 | 52 | 60 | -- | -- | -- |
| Jerry | 140 | 121 | -- | -- | -- | -- | 38.4 | 40.2 | -- | -- | -- | -- | 67 | 55 | -- | -- | -- | -- |
| Youngs | 140 | 131 | -- | -- | -- | -- | 33.4 | 39.1 | -- | -- | -- | -- | 72 | 59 | -- | -- | -- | -- |
| Monida | 116 | 119 | -- | -- | -- | -- | 29.0 | 34.0 | -- | -- | -- | -- | 72 | 57 | -- | -- | -- | -- |
| Streaker | 120 | 113 | -- | -- | -- | -- | 48.7 | 49.5 | -- | -- | -- | -- | 65 | 53 | -- | -- | -- | -- |
| Maida | 152 | -- | -- | -- | -- | -- | 38.5 | -- | -- | -- | -- | -- | 70 | -- | -- | -- | -- | -- |
| LSD 5% | 18.1 | 13.4 | 10.1 | 14.3 | 15.5 | | 1.7 | 1.1 | 0.9 | 1.3 | 1.9 | | 1.0 | 1.1 | 0.7 | 1.2 | 0.9 | |
| LSD 10% | -- | -- | 8.5 | 12.0 | 13.0 | | -- | -- | 0.7 | 1.1 | 1.6 | | -- | -- | 0.6 | 1.0 | 0.8 | |

*Naked-hull variety

## Oat Summary, Langdon 2010-2014

| | Height (in) | | | | | | Protein (%) | | | | | | Lodging (0-9) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **08** | **09** | **10** | **11** | **12** | **3yr** |
| AC Pinnacle | 49 | 45 | 42 | 42 | 44 | 43 | 10.3 | 9.7 | 13.7 | 14.0 | 10.6 | 12.8 | 0.3 | 0.8 | 8.5 | 0.0 | 2.0 | 3.5 |
| Beach | 52 | 48 | 45 | 43 | 47 | 45 | 11.2 | 11.9 | 15.2 | 16.0 | 10.4 | 13.9 | 0.3 | 0.0 | 8.7 | 0.0 | 0.0 | 2.9 |
| CDC Dancer | 51 | 48 | 44 | 42 | 45 | 44 | 10.1 | 11.0 | 13.7 | 14.5 | 8.6 | 12.3 | 1.0 | 0.0 | 8.2 | 0.0 | 0.0 | 2.7 |
| HiFi | 54 | 45 | 42 | 42 | 44 | 43 | 12.8 | 14.4 | 15.3 | 15.6 | 9.7 | 13.5 | 0.0 | 0.0 | 6.3 | 0.0 | 1.7 | 2.7 |
| Hytest | 52 | 46 | 42 | 44 | 45 | 44 | 15.4 | 15.4 | 17.8 | 18.9 | 10.3 | 15.7 | 0.5 | 0.3 | 8.4 | 0.0 | 3.4 | 3.9 |
| Killdeer | 44 | 39 | 38 | 37 | 39 | 38 | 10.8 | 10.4 | 14.4 | 14.6 | 11.2 | 13.4 | 0.0 | 1.0 | 8.8 | 0.0 | 2.0 | 3.6 |
| Otana | 52 | 47 | 43 | 44 | 46 | 44 | 10.9 | 10.9 | 14.8 | 14.3 | 16.0 | 15.0 | 1.8 | 7.3 | 9.0 | 0.0 | 5.9 | 5.0 |
| Rockford | 53 | 46 | 43 | 42 | 44 | 43 | 13.0 | 13.6 | 16.4 | 16.4 | 11.4 | 14.7 | 0.0 | 1.0 | 6.8 | 0.0 | 0.2 | 2.3 |
| Souris | 48 | 42 | 39 | 39 | 40 | 39 | 12.5 | 13.1 | 14.8 | 15.2 | 10.1 | 13.4 | 0.0 | 0.0 | 6.5 | 0.0 | 0.0 | 2.2 |
| Stallion | 53 | 47 | 43 | 44 | 45 | 44 | 13.7 | 14.0 | 16.2 | 17.4 | 8.4 | 14.0 | 1.3 | 3.3 | 8.3 | 0.0 | 5.9 | 4.7 |
| Furlong | 49 | 44 | 41 | 42 | 46 | 43 | 12.2 | 11.3 | 16.0 | 17.8 | 10.6 | 14.8 | 1.3 | 1.8 | 9.0 | 0.0 | 1.2 | 3.4 |
| Minstrel CDC | 47 | 43 | 39 | 39 | 42 | 40 | 9.0 | 9.2 | 12.6 | 12.9 | 9.5 | 11.7 | 0.0 | 0.0 | 8.9 | 0.0 | 0.4 | 3.1 |
| Newburg | 55 | 49 | 44 | 45 | 48 | 46 | 11.7 | 13.0 | 14.9 | 14.7 | 9.5 | 13.0 | 0.0 | 0.8 | 7.5 | 0.0 | 2.6 | 3.4 |
| Leggett | 48 | 43 | 40 | 41 | 41 | 41 | 12.9 | 13.7 | 16.4 | 16.8 | 8.7 | 14.0 | -- | 1.8 | 7.3 | 0.0 | 0.5 | 2.6 |
| Jury | 55 | 50 | 42 | 47 | 49 | 46 | 12.3 | 13.0 | 15.5 | 15.5 | 9.2 | 13.4 | 0.5 | 1.5 | 7.8 | 0.0 | 4.2 | 4.0 |
| Horsepower | -- | -- | 38 | 36 | 36 | 37 | -- | -- | 15.2 | 15.9 | 10.1 | 13.7 | -- | -- | -- | -- | 0.1 | -- |
| Goliath | -- | -- | -- | 47 | 52 | -- | -- | -- | -- | 15.9 | 12.9 | -- | -- | -- | -- | -- | -- | -- |
| Paul* | 52 | -- | -- | -- | 46 | -- | 14.9 | -- | -- | -- | 8.5 | -- | 0.0 | 0.8 | 5.4 | -- | -- | -- |
| Deon | -- | -- | -- | -- | 46 | -- | -- | -- | -- | -- | 10.2 | -- | -- | -- | -- | -- | -- | -- |
| Morton | 54 | 48 | 45 | 44 | -- | -- | 12.0 | 13.3 | 16.4 | 15.5 | -- | -- | 0.0 | 0.5 | 6.0 | 0.0 | 0.0 | 2.0 |
| Stark* | 51 | 46 | 44 | 44 | -- | -- | 13.8 | 12.1 | 17.4 | 19.2 | -- | -- | 0.0 | 1.0 | 6.7 | 0.0 | 0.3 | 2.3 |
| Shelby 427 | 48 | 43 | 40 | 40 | -- | -- | 13.3 | 14.0 | 16.0 | 17.9 | -- | -- | -- | -- | 7.1 | 0.0 | 0.9 | 2.7 |
| Buff* | 47 | 40 | 38 | -- | -- | -- | 13.5 | 14.4 | 18.4 | -- | -- | -- | 0.0 | 0.0 | 7.8 | 0.0 | 0.0 | 2.6 |
| Jerry | 50 | 46 | -- | -- | -- | -- | 11.6 | 12.0 | -- | -- | -- | -- | 0.0 | 1.5 | 8.9 | 0.0 | -- | -- |
| Youngs | 53 | 47 | -- | -- | -- | -- | 12.7 | 13.8 | -- | -- | -- | -- | 1.5 | 0.0 | 7.7 | 0.0 | -- | -- |
| Monida | 50 | 45 | -- | -- | -- | -- | 10.7 | 10.1 | -- | -- | -- | -- | -- | -- | 9.1 | 0.0 | -- | -- |
| Streaker | 49 | 44 | -- | -- | -- | -- | 16.3 | 14.4 | -- | -- | -- | -- | -- | -- | 8.8 | 0.0 | -- | -- |
| Maida | 50 | -- | -- | -- | -- | -- | 12.0 | -- | -- | -- | -- | -- | 0.0 | 2.3 | 9.1 | -- | -- | -- |
| LSD 5% | 2.0 | 2.4 | 2.1 | 1.9 | 2.1 | | 0.8 | 1.0 | 0.5 | -- | -- | | NS | 2.0 | 1.2 | NS | 2.6 | |
| LSD 10% | -- | -- | 1.8 | 1.6 | 1.8 | | -- | -- | 0.5 | -- | -- | | -- | -- | -- | -- | 2.2 | |

*Naked-hull variety

## Oat Disease Summary, 2010-2014 *

| | Crown Rust % | | | | | Crown Rust % | | | | | Crown Rust % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **12** | **14** | **3yr** | **Variety** | **10** | **12** | **14** | **3yr** | **Variety** | **10** | **12** | **14** | **3yr** |
| Beach | 12 | 1 | 1 | 5 | Hytest | 14 | 1 | 2 | 5 | AC Pinnacle | 4 | 1 | 1 | 2 |
| CDC Dancer | 5 | 3 | 2 | 3 | Jury | 0 | 0 | 1 | 0 | Paul | -- | -- | 0 | -- |
| Deon | -- | -- | 0 | -- | Killdeer | 28 | 6 | 2 | 12 | Rockford | 0 | 0 | 2 | 1 |
| Furlong | 15 | 4 | 1 | 6 | Leggett | 0 | 0 | 0 | 0 | Souris | 1 | 0 | 2 | 1 |
| Goliath | -- | -- | 0 | -- | Minstrel CDC | 47 | 14 | 2 | 21 | Stallion | 0 | 0 | 0 | 0 |
| HiFi | 0 | 0 | 1 | 0 | Newburg | 0 | 0 | 1 | 0 | LSD 5% | 8 | 11 | 1 | |
| Horsepower | -- | 0 | 1 | -- | Otana | 73 | 25 | 20 | 39 | | | | | |

Crown Rust - % flag leaf

* Disease levels were low in 2011 and 2013, no notes were recorded.

# Flax Summary, Langdon 2010-2014

| | Yield (bu/a) | | | | | | Test Weight (lbs/bu) | | | | | | Lodging (0-9) | | | Height (in) | | | | | | Days to Flower | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **09** | **10** | **2yr** | **10** | **11** | **12** | **13** | **14** | **3yr** | **10** | **11** | **12** | **13** | **14** | **3yr** |
| Carter* | 47 | 41 | 37 | 38 | 40 | 38 | 53.0 | 53.5 | 52.9 | 53.4 | 52.1 | 52.8 | 1.5 | 0.0 | 0.8 | 29 | 28 | 25 | 19 | 25 | 23 | 42 | 50 | 58 | 50 | 49 | 52 |
| CDC Arras | 48 | 40 | 33 | 40 | 40 | 38 | 52.6 | 53.0 | 52.5 | 53.6 | 51.8 | 52.6 | 3.3 | 0.5 | 1.9 | 32 | 28 | 25 | 21 | 26 | 24 | 43 | 50 | 57 | 51 | 49 | 52 |
| CDC Bethune | 51 | 37 | 32 | 39 | 39 | 37 | 53.2 | 52.8 | 52.6 | 53.8 | 52.3 | 52.9 | 2.0 | 0.0 | 1.0 | 32 | 28 | 25 | 20 | 26 | 24 | 43 | 50 | 58 | 51 | 48 | 52 |
| Hanley | 51 | 41 | 35 | 41 | 37 | 38 | 53.0 | 53.1 | 52.0 | 53.7 | 52.0 | 52.6 | 2.5 | 0.5 | 1.5 | 30 | 29 | 26 | 20 | 25 | 24 | 41 | 50 | 57 | 51 | 48 | 52 |
| Lightning | 48 | 40 | 35 | 40 | 38 | 38 | 52.9 | 53.3 | 52.5 | 53.6 | 52.3 | 52.8 | 0.5 | 0.3 | 0.4 | 31 | 27 | 25 | 20 | 27 | 24 | 43 | 50 | 57 | 51 | 48 | 52 |
| Linott | 46 | 44 | 33 | 39 | 39 | 37 | 52.9 | 53.4 | 52.7 | 53.5 | 52.2 | 52.8 | 3.3 | 0.0 | 1.7 | 32 | 29 | 26 | 21 | 25 | 24 | 43 | 50 | 58 | 51 | 49 | 53 |
| McGregor | 51 | 44 | 34 | 37 | 40 | 37 | 53.2 | 53.4 | 52.5 | 53.4 | 51.7 | 52.5 | 2.8 | 0.0 | 1.4 | 31 | 28 | 25 | 21 | 25 | 24 | 43 | 50 | 59 | 51 | 49 | 53 |
| Neche | 50 | 37 | 33 | 40 | 38 | 37 | 52.8 | 53.0 | 52.5 | 53.8 | 52.2 | 52.8 | 2.0 | 0.2 | 1.1 | 33 | 29 | 25 | 21 | 27 | 24 | 43 | 51 | 58 | 51 | 48 | 52 |
| Nekoma | 49 | 38 | 34 | 38 | 38 | 37 | 53.2 | 53.1 | 52.7 | 53.7 | 52.3 | 52.9 | 2.8 | 0.2 | 1.5 | 30 | 28 | 25 | 20 | 26 | 24 | 42 | 49 | 57 | 50 | 48 | 52 |
| Omega* | 45 | 42 | 32 | 39 | 36 | 36 | 52.9 | 53.5 | 52.8 | 53.7 | 52.4 | 53.0 | 4.3 | 0.0 | 2.2 | 28 | 28 | 24 | 20 | 25 | 23 | 42 | 51 | 58 | 51 | 50 | 53 |
| Pembina | 49 | 45 | 33 | 38 | 38 | 36 | 52.7 | 53.1 | 52.6 | 53.3 | 52.0 | 52.6 | 1.0 | 0.3 | 0.7 | 32 | 29 | 25 | 21 | 26 | 24 | 42 | 50 | 57 | 50 | 51 | 53 |
| Prairie Blue | 50 | 44 | 35 | 34 | 40 | 36 | 52.6 | 53.0 | 52.2 | 53.2 | 51.7 | 52.4 | 1.5 | 0.7 | 1.1 | 31 | 27 | 24 | 19 | 25 | 23 | 43 | 51 | 58 | 51 | 49 | 53 |
| Prairie Thunder | 51 | 41 | 37 | 45 | 42 | 41 | 52.1 | 53.3 | 53.0 | 53.9 | 52.0 | 53.0 | 2.0 | 0.7 | 1.4 | 28 | 25 | 26 | 22 | 27 | 25 | 41 | 48 | 59 | 50 | 50 | 53 |
| Rahab 94 | 50 | 40 | 35 | 32 | 40 | 36 | 52.5 | 53.0 | 52.0 | 53.0 | 51.5 | 52.2 | 2.0 | 0.0 | 1.0 | 29 | 25 | 24 | 20 | 24 | 23 | 43 | 50 | 58 | 50 | 48 | 52 |
| Webster | 54 | 43 | 35 | 45 | 39 | 40 | 53.6 | 53.6 | 52.7 | 54.0 | 52.1 | 52.9 | 3.3 | 0.0 | 1.7 | 33 | 30 | 25 | 21 | 27 | 24 | 43 | 52 | 59 | 51 | 50 | 53 |
| York | 48 | 44 | 35 | 39 | 38 | 37 | 52.4 | 53.3 | 52.5 | 53.6 | 52.0 | 52.7 | 2.5 | 0.0 | 1.3 | 30 | 28 | 24 | 19 | 25 | 23 | 42 | 50 | 56 | 50 | 48 | 51 |
| CDC Sorrel | 45 | 41 | 33 | 38 | 38 | 36 | 52.5 | 52.9 | 51.9 | 53.0 | 51.8 | 52.2 | 5.0 | 1.0 | 3.0 | 34 | 30 | 25 | 22 | 27 | 25 | 44 | 52 | 57 | 52 | 52 | 54 |
| Prairie Grande | 51 | 38 | 33 | 31 | 35 | 33 | 52.3 | 53.0 | 52.0 | 53.3 | 51.4 | 52.2 | 2.8 | 0.7 | 1.8 | 25 | 24 | 23 | 18 | 22 | 21 | 40 | 48 | 55 | 51 | 47 | 51 |
| CDC Glas | -- | -- | 39 | 42 | 43 | 41 | -- | -- | 51.8 | 52.5 | 51.2 | 51.8 | -- | -- | -- | -- | -- | 26 | 21 | 26 | 24 | -- | -- | 60 | 51 | 51 | 54 |
| CDC Sanctuary | -- | -- | 32 | 42 | 38 | 38 | -- | -- | 52.0 | 53.3 | 51.5 | 52.3 | -- | -- | -- | -- | -- | 24 | 21 | 25 | 23 | -- | -- | 59 | 51 | 52 | 54 |
| Prairie Sapphire | -- | -- | 36 | 47 | 38 | 40 | -- | -- | 51.5 | 52.7 | 51.0 | 51.7 | -- | -- | -- | -- | -- | 25 | 22 | 26 | 24 | -- | -- | 58 | 51 | 51 | 53 |
| Shape | -- | -- | 37 | 45 | 38 | 40 | -- | -- | 51.8 | 53.0 | 51.3 | 52.0 | -- | -- | -- | -- | -- | 25 | 22 | 25 | 24 | -- | -- | 58 | 50 | 49 | 52 |
| GoldND | -- | -- | -- | -- | 37 | -- | -- | -- | -- | -- | 52.2 | -- | -- | -- | -- | -- | -- | -- | -- | 27 | -- | -- | -- | -- | -- | 50 | -- |
| Neela | -- | -- | -- | -- | 39 | -- | -- | -- | -- | -- | 51.9 | -- | -- | -- | -- | -- | -- | -- | -- | 25 | -- | -- | -- | -- | -- | 52 | -- |
| LSD 5% | 3.3 | 5.9 | 3.3 | 6.0 | NS | | 0.9 | 0.3 | 0.3 | 0.4 | 0.4 | | 2.2 | 0.8 | | 3.5 | 1.9 | 1.1 | 1.8 | 1.5 | | 0.8 | 1.1 | 0.6 | 1.2 | 1.5 | |
| LSD 10% | -- | -- | 2.8 | 5.0 | NS | | -- | -- | 0.2 | 0.3 | 0.3 | | -- | -- | | -- | -- | 1.0 | 1.5 | 1.3 | | -- | -- | 0.5 | 1.0 | 1.3 | |

*Yellow seeded.

## Canola - Liberty Link, Clearfield Varieties - 2013-2014

| Company/Brand | Variety | Type[1] | Blackleg Rating[2] | Status[3] | Clubroot Resistant | Days to First Flower | | | Days to End Flower | | | Days to Mature | | | % Cover[4] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 13 | 14 | 2yr | 13 | 14 | 2yr | 13 | 14 | 2yr | 13 | 14 | 2yr |
| Bayer CropScience | InVigor L130 | H,LL,TR | R | CA | No | 41 | 45 | 43 | 60 | 64 | 62 | 90 | 89 | 90 | 83 | 80 | 82 |
| Bayer CropScience | InVigor 5440 | H,LL,TR | R | CA | No | 41 | 46 | 44 | 60 | 65 | 63 | 92 | 91 | 92 | 85 | 79 | 82 |
| Bayer CropScience | InVigor L156 | H,LL,TR | R | CA | No | 41 | 45 | 43 | 61 | 64 | 63 | 93 | 91 | 92 | 86 | 84 | 85 |
| Bayer CropScience | InVigor L252 | H,LL,TR | R | CA | No | 42 | 46 | 44 | 61 | 64 | 63 | 93 | 91 | 92 | 85 | 80 | 83 |
| Bayer CropScience | InVigor L160s | H,LL,TR | R | CA | No | -- | 48 | -- | -- | 66 | -- | -- | 93 | -- | -- | 80 | -- |
| Bayer CropScience | InVigor L135c | H,LL,TR | R | CA | Yes | -- | 44 | -- | -- | 63 | -- | -- | 90 | -- | -- | 81 | -- |
| Bayer CropScience | InVigor L140p | H,LL,TR | R | CA | No | -- | 45 | -- | -- | 62 | -- | -- | 87 | -- | -- | 80 | -- |
| Mycogen Seeds | Nexera 2012 CL | H,CL,HO | MR | CA | No | 40 | 45 | 43 | 59 | 62 | 61 | 91 | 88 | 90 | 80 | 74 | 77 |
| Mycogen Seeds | Nexera 2020 CL | H,CL,HO | R | CA | Yes | -- | 45 | -- | -- | 65 | -- | -- | 92 | -- | -- | 75 | -- |
| Mycogen Seeds | CL2537382H | H,CL,HO | R | EXP | No | -- | 46 | -- | -- | 65 | -- | -- | 92 | -- | -- | 79 | -- |
| Mycogen Seeds | CL2537385H | H,CL,HO | R | EXP | No | -- | 44 | -- | -- | 64 | -- | -- | 91 | -- | -- | 79 | -- |
| RR Check[5] | DKL 30-42 | H,RR,TR | R | CA | No | 40 | 40 | 40 | 58 | 61 | 60 | 89 | 84 | 87 | 86 | 81 | 84 |
| RR Check[5] | HyClass 955 | H,RR,TR | R | CA | Yes | 41 | 41 | 41 | 60 | 61 | 61 | 92 | 86 | 89 | 83 | 84 | 84 |
| LSD 5% | | | | | | 1.1 | 0.6 | | 1.6 | 1.1 | | 2.1 | 3.1 | | 8.6 | 3.3 | |
| LSD 10% | | | | | | 0.9 | 0.5 | | 1.3 | 0.9 | | 1.8 | 2.6 | | 7.2 | 2.7 | |

[1]H-Hybrid, LL-Liberty Link, CL-Clearfield System.

TR-Traditional Oil Type, HO-High Oleic Oil Type.

[2]Blackleg Rating: S-Susceptible, MS-Moderately Susceptible, MR-Moderately Resistant, R-Resistant, Provided by company.

[3]Status: CA-Commercially available, EXP-Experimental.

[4]% Cover-Visual rating of percent area of plot covered by plant growth. This is a measure of stand and vigor. Plants were at 5-6 leaf stage.

[5]Roundup Ready check variety.

## Canola - Liberty Link, Clearfield Varieties - 2012-2014

| Company/Brand | Variety | Height (in) | | | Lodging (0-9) | Oil[1] (%) | | | Yield[1] (lbs/a) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 13 | 14 | 2yr | 13 | 13 | 14 | 2yr | 2012 | 2013 | 2014 | 2yr | 3yr |
| Bayer CropScience | InVigor L130 | 48 | 46 | 47 | 0.5 | 44.4 | 43.0 | 43.7 | 2163 | 3714 | 3522 | 3618 | 3133 |
| Bayer CropScience | InVigor 5440 | 48 | 51 | 50 | 0.3 | 44.0 | 42.6 | 43.3 | -- | 4094 | 3545 | 3820 | -- |
| Bayer CropScience | InVigor L156h | 45 | 49 | 47 | 1.5 | 44.1 | 44.1 | 44.1 | -- | 3739 | 3651 | 3695 | -- |
| Bayer CropScience | InVigor L252 | 47 | 49 | 48 | 1.3 | 46.5 | 45.4 | 46.0 | -- | 3968 | 4121 | 4045 | -- |
| Bayer CropScience | InVigor L160s | -- | 48 | -- | -- | -- | 42.9 | -- | -- | -- | 3616 | -- | -- |
| Bayer CropScience | InVigor L135c | -- | 48 | -- | -- | -- | 43.3 | -- | -- | -- | 3714 | -- | -- |
| Bayer CropScience | InVigor L140p | -- | 48 | -- | -- | -- | 43.6 | -- | -- | -- | 3721 | -- | -- |
| Mycogen Seeds | Nexera 2012 CL | 42 | 47 | 45 | 0.3 | 45.9 | 45.7 | 45.8 | 2386 | 3435 | 3185 | 3310 | 3002 |
| Mycogen Seeds | Nexera 2020 CL | -- | 48 | -- | -- | -- | 46.3 | -- | -- | -- | 3445 | -- | -- |
| Mycogen Seeds | CL2537382H | -- | 48 | -- | -- | -- | 46.2 | -- | -- | -- | 3385 | -- | -- |
| Mycogen Seeds | CL2537385H | -- | 45 | -- | -- | -- | 45.0 | -- | -- | -- | 3296 | -- | -- |
| RR Check | DKL 30-42 | 39 | 42 | 41 | 2.8 | 46.3 | 47.4 | 46.9 | -- | 3430 | 3439 | 3435 | -- |
| RR Check | HyClass 955 | 43 | 42 | 43 | 2.8 | 46.6 | 49.3 | 48.0 | 2327 | 3551 | 3873 | 3712 | 3250 |
| LSD 5% | | 3.7 | 3.0 | | 0.8 | 1.2 | 1.5 | | 249 | 491 | 421 | | |
| LSD 10% | | 3.1 | 2.5 | | 0.7 | 1.0 | 1.3 | | 208 | 408 | 351 | | |

[1] 8.5% moisture

## Canola - Roundup Ready - 2013-2014

| Company | Variety | Type[1] | Blackleg Rating[2] | Status[3] | Clubroot Resistant | Days to First Flower | | | Days to End Flower | | | Days to Mature | | | % Cover[4] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 13 | 14 | 2yr | 13 | 14 | 2yr | 13 | 14 | 2yr | 13 | 14 | 2yr |
| Brett Young | 6070RR | H,TR | R | CA | No | 40 | 41 | 41 | 60 | 62 | 61 | 90 | 88 | 89 | 84 | 82 | 83 |
| Brett Young | 6044RR | H,TR | R | CA | No | 41 | 46 | 44 | 64 | 64 | 64 | 91 | 90 | 91 | 73 | 80 | 77 |
| Brett Young | 6056CR | H,TR | R | CA | Yes | -- | 44 | -- | -- | 63 | -- | -- | 89 | -- | -- | 82 | -- |
| Cargill | V12-1 | H,HO | R | CA | No | 42 | 46 | 44 | 61 | 64 | 63 | 91 | 89 | 90 | 87 | 86 | 87 |
| Cargill | 09H7757 | H,TR | R | CA | No | -- | 46 | -- | -- | 64 | -- | -- | 90 | -- | -- | 83 | -- |
| Cargill | 08H0004 | H,HO | R | EXP | No | -- | 48 | -- | -- | 67 | -- | -- | 94 | -- | -- | 79 | -- |
| Cargill | 09H7763 | H,TR | R | EXP | No | -- | 44 | -- | -- | 62 | -- | -- | 88 | -- | -- | 81 | -- |
| Croplan | HyClass 930 | H,TR | R | CA | No | 39 | 40 | 40 | 58 | 61 | 60 | 89 | 85 | 87 | 78 | 80 | 79 |
| Croplan | HyClass 955 | H,TR | R | CA | Yes | 41 | 42 | 42 | 59 | 60 | 60 | 89 | 85 | 87 | 78 | 84 | 81 |
| Croplan | HyClass 969 | H,TR | R | CA | No | 40 | 44 | 42 | 60 | 61 | 61 | 90 | 86 | 88 | 78 | 79 | 79 |
| Dekalb | DKL30-42 | H,TR | R | CA | No | 38 | 40 | 39 | 57 | 61 | 59 | 88 | 84 | 86 | 81 | 83 | 82 |
| Dekalb | DKL55-55 | H,TR | R | CA | No | 39 | 41 | 40 | 58 | 60 | 59 | 89 | 84 | 87 | 75 | 82 | 79 |
| Dekalb | DKL70-07 | H,TR | R | CA | No | 41 | 42 | 42 | 61 | 61 | 61 | 90 | 85 | 88 | 73 | 83 | 78 |
| Dekalb | DKL38-48 | H,TR | MR | CA | No | 41 | 43 | 42 | 61 | 61 | 61 | 89 | 85 | 87 | 73 | 82 | 78 |
| Dekalb | DKL30-03 | H,TR | R | CA | No | -- | 39 | -- | | 60 | -- | -- | 83 | -- | -- | 82 | -- |
| Dekalb | DKL70-50CR | H,TR | R | CA | Yes | -- | 42 | -- | -- | 62 | -- | -- | 85 | -- | -- | 83 | -- |
| DL Seeds | 13DL30507 | H,TR | R | CA | No | -- | 46 | -- | -- | 63 | -- | -- | 88 | -- | -- | 74 | -- |
| Integra | 7150 R | H,TR | R | CA | No | 39 | 40 | 40 | 57 | 60 | 59 | 91 | 85 | 88 | 80 | 79 | 80 |
| Mycogen | 1012 RR | H,HO | R | CA | No | 43 | 47 | 45 | 67 | 66 | 67 | 93 | 89 | 91 | 81 | 83 | 82 |
| Mycogen | 1016 RR | H,HO | R | CA | No | 42 | 45 | 44 | 61 | 63 | 62 | 91 | 88 | 90 | 79 | 79 | 79 |
| Mycogen | G2537367H | H,HO | R | EXP | Yes | -- | 46 | -- | -- | 65 | -- | -- | 89 | -- | -- | 79 | -- |
| Proseed | 44 Mag | H,TR | R | CA | No | -- | 43 | -- | -- | 62 | -- | -- | 87 | -- | -- | 73 | -- |
| Proseed | 300 Mag | H,TR | R | CA | No | -- | 42 | -- | -- | 61 | -- | -- | 87 | -- | -- | 82 | -- |
| Star | Star 402 | H,TR | R | CA | No | 41 | 41 | 41 | 60 | 60 | 60 | 92 | 85 | 89 | 78 | 81 | 80 |
| LSD 5% | | | | | | 1.1 | 1.0 | | 1.7 | 1.5 | | 1.6 | 1.4 | | 8.1 | 4.1 | |
| LSD 10% | | | | | | 1.0 | 0.8 | | 1.4 | 1.3 | | 1.4 | 1.2 | | 6.8 | 3.4 | |

[1]H-Hybrid, TR-Traditional Oil Type, HO-High Oleic Oil Type.

[2]Blackleg Rating: S=Susceptible, MS=Moderately Susceptible, MR=Moderately Resistant, R=Resistant. Rating provided by company.

[3] Status: CA-Commercially Available, EXP-Experimental.

[4] % Cover- Visual rating of percent area of plot covered by plant growth. This is a measure of stand and vigor. Plants were at 5-6 leaf stage.

# Canola - Roundup Ready - 2012-2014

| Company | Variety | Height (in) | | | Lodging (0-9) | Oil[1] (%) | | | Yield[1] (lbs/a) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 13 | 14 | 2yr | 13 | 13 | 14 | 2yr | 12 | 13 | 14 | 2yr | 3yr |
| Brett Young | 6070RR | 43 | 46 | 45 | 0.3 | 45.9 | 42.9 | 44.4 | 2123 | 3504 | 3158 | 3331 | 2928 |
| Brett Young | 6044RR | 43 | 44 | 44 | 0.0 | 46.3 | 42.1 | 44.2 | -- | 3464 | 3140 | 3302 | -- |
| Brett Young | 6056CR | -- | 46 | -- | -- | -- | 42.9 | -- | -- | -- | 3256 | -- | -- |
| Cargill | V12-1 | 44 | 45 | 45 | 0.2 | 45.3 | 41.7 | 43.5 | 2236 | 3938 | 3463 | 3701 | 3212 |
| Cargill | 09H7757 | -- | 46 | -- | -- | -- | 42.2 | -- | -- | -- | 3339 | -- | -- |
| Cargill | 08H0004 | -- | 48 | -- | -- | -- | 41.3 | -- | -- | -- | 3354 | -- | -- |
| Cargill | 09H7763 | -- | 45 | -- | -- | -- | 43.8 | -- | -- | -- | 3185 | -- | -- |
| Croplan | HyClass 930 | 39 | 40 | 40 | 0.8 | 49.5 | 46.1 | 47.8 | 2280 | 3781 | 3424 | 3603 | 3162 |
| Croplan | HyClass 955 | 41 | 41 | 41 | 1.3 | 49.0 | 45.0 | 47.0 | 2286 | 3481 | 3337 | 3409 | 3035 |
| Croplan | HyClass 969 | 42 | 42 | 42 | 1.2 | 48.3 | 45.1 | 46.7 | -- | 3426 | 3067 | 3247 | -- |
| Dekalb | DKL30-42 | 38 | 37 | 38 | 0.8 | 48.7 | 43.9 | 46.3 | 2413 | 3336 | 2783 | 3060 | 2844 |
| Dekalb | DKL55-55 | 40 | 42 | 41 | 1.3 | 49.1 | 44.4 | 46.8 | 2269 | 3248 | 3173 | 3211 | 2897 |
| Dekalb | DKL70-07 | 41 | 44 | 43 | 1.2 | 47.9 | 44.4 | 46.2 | 2314 | 3433 | 3291 | 3362 | 3013 |
| Dekalb | DKL38-48 | 41 | 42 | 42 | 1.0 | 47.4 | 43.4 | 45.4 | -- | 3280 | 3334 | 3307 | -- |
| Dekalb | DKL30-03 | -- | 39 | -- | -- | -- | 44.6 | -- | -- | -- | 2360 | -- | -- |
| Dekalb | DKL70-50CR | -- | 44 | -- | -- | -- | 44.0 | -- | -- | -- | 3555 | -- | -- |
| DL Seeds | 13DL30507 | -- | 45 | -- | -- | -- | 43.9 | -- | -- | -- | 2828 | -- | -- |
| Integra | 7150 R | 41 | 40 | 41 | 1.9 | 47.9 | 45.4 | 46.7 | 2177 | 3310 | 3138 | 3224 | 2875 |
| Mycogen | 1012 RR | 47 | 52 | 50 | 0.0 | 44.3 | 40.8 | 42.6 | 2275 | 3514 | 3237 | 3376 | 3009 |
| Mycogen | 1016 RR | 43 | 47 | 45 | 0.0 | 45.9 | 41.0 | 43.5 | 1897 | 3407 | 2937 | 3172 | 2747 |
| Mycogen | G2537367H | -- | 48 | -- | -- | -- | 40.4 | -- | -- | -- | 3018 | -- | -- |
| Proseed | 44 Mag | -- | 40 | -- | -- | -- | 43.5 | -- | -- | -- | 2857 | -- | -- |
| Proseed | 300 Mag | -- | 43 | -- | -- | -- | 44.3 | -- | -- | -- | 3330 | -- | -- |
| Star | Star 402 | 41 | 43 | 42 | 0.3 | 50.4 | 46.7 | 48.6 | 2168 | 3545 | 3600 | 3573 | 3104 |
| LSD 5% | | 3.9 | 3.4 | | 1.0 | 1.3 | 1.4 | | 254 | 465 | 322 | | |
| LSD 10% | | 3.3 | 2.9 | | 0.9 | 1.1 | 1.2 | | 213 | 390 | 269 | | |

[1] 8.5% Moisture

| Langdon - Dry Bean - 2012-2014 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Yield | | | | |
| Variety | Type | Days to Maturity | 100 Seed Weight | 2012 | 2013 | 2014 | 2 yr Avg. | 3 yr Avg. |
| | | | (gram) | (lb/a) | | | | |
| Eclipse | Black Turtle | 103 | 19.8 | 2,503 | 2,568 | 2,415 | 2,491 | 2,495 |
| Loreto | Black Turtle | f | 18.2 | 2,788 | 2,332 | 1,944 | 2,138 | 2,355 |
| Zorro | Black Turtle | 104 | 20.0 | 2,166 | 2,580 | 2,275 | 2,428 | 2,340 |
| Montcalm | Dark Red Kidney | f | 31.6 | -- | -- | 1,672 | -- | -- |
| Talon | Dark Red Kidney | 101 | 45.1 | -- | -- | 1,754 | -- | -- |
| Pink Panther | Light Red Kidney | f | 55.5 | -- | -- | 1,849 | -- | -- |
| Rosie | Light Red Kidney | f | 46.9 | -- | -- | 1,607 | -- | -- |
| Avalanche | Navy | 103 | 18.9 | 3,092 | 1,952 | 2,101 | 2,026 | 2,382 |
| Ensign | Navy | f | 20.5 | 3,524 | 2,852 | 2,703 | 2,777 | 3,026 |
| HMS Medalist | Navy | f | 17.8 | 2,996 | 2,292 | 2,286 | 2,289 | 2,525 |
| Nautica | Navy | f | 16.7 | -- | 2,372 | 1,944 | 2,158 | -- |
| Norstar | Navy | 103 | 16.7 | -- | 1,612 | 1,941 | 1,777 | -- |
| Rexeter | Navy | f | 18.8 | 2,224 | 2,424 | 1,995 | 2,210 | 2,214 |
| T9905 | Navy | f | 20.6 | 3,208 | 2,616 | 2,571 | 2,593 | 2,798 |
| Vista | Navy | f | 16.4 | 2,094 | 2,584 | 2,513 | 2,548 | 2,397 |
| Rosetta | Pink | 104 | 32.9 | -- | -- | 2,547 | -- | -- |
| Sedona | Pink | 100 | 34.4 | 2,587 | 1,800 | 2,306 | 2,053 | 2,231 |
| 23ST27 | Pinto | 100 | 40.0 | -- | -- | 2,524 | -- | -- |
| La Paz | Pinto | 101 | 36.1 | 3,510 | 3,324 | 2,900 | 3,112 | 3,245 |
| Lariat | Pinto | f | 39.1 | 3,697 | 2,832 | 2,445 | 2,639 | 2,991 |
| Maverick | Pinto | f | 41.9 | 3,079 | 2,860 | 2,848 | 2,854 | 2,929 |
| ND-307 | Pinto | 102 | 42.5 | 3,257 | 2,792 | 3,113 | 2,953 | 3,054 |
| SF103-8 | Pinto | 104 | 37.6 | -- | -- | 2,297 | -- | -- |
| Sinaloa | Pinto | 102 | 34.5 | -- | -- | 3,285 | -- | -- |
| Stampede | Pinto | 101 | 37.2 | 3,423 | 2,720 | 3,020 | 2,870 | 3,054 |
| Windbreaker | Pinto | f | 42.2 | 3,457 | 2,328 | 2,822 | 2,575 | 2,869 |
| Merlot | Small Red | f | 34.5 | -- | 2,224 | 2,180 | 2,202 | -- |
| Rio Rojo | Small Red | 103 | 29.8 | -- | 2,252 | 2,656 | 2,454 | -- |
| Mean | | 103 | 30.9 | 2,975 | 2,466 | 2,375 | 2,512 | 2,682 |
| C.V. % | | 1.3 | -- | 10.1 | 11.9 | 9.3 | -- | -- |
| LSD 10% | | 2.3 | -- | 381 | 398 | 388 | -- | -- |

A freeze occurred on September 12 with temperatures ranging from 28$^{o}$ to 32$^{o}$ F for five hours.

A "f" indicates the variety did not reach the R9 stage prior to the freeze.

However, all varieties were harvestable and had no distinctly damaged kernels in the sample.

| Pembina County - Dry Bean - 2012-2014 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Yield | | | | |
| Variety | Type | 100 Seed Weight | 2012[1] | 2013 | 2014 | 2 yr Avg. | 3 yr Avg. |
| | | (gram) | (lb/a) | | | | |
| Eclipse | Black Turtle | 19.1 | 1,904 | 3,436 | 1,655 | 2,545 | 2,332 |
| Loreto | Black Turtle | 18.0 | 2,304 | 3,392 | 1,472 | 2,432 | 2,389 |
| Zorro | Black Turtle | 20.3 | 2,244 | 3,576 | 1,131 | 2,354 | 2,317 |
| Montcalm | Dark Red Kidney | 42.1 | -- | -- | 795 | -- | -- |
| Talon | Dark Red Kidney | 41.4 | -- | -- | 726 | -- | -- |
| Pink Panther | Light Red Kidney | 50.5 | -- | -- | 646 | -- | -- |
| Rosie | Light Red Kidney | 47.1 | -- | -- | 976 | -- | -- |
| Avalanche | Navy | 18.6 | 2,412 | 3,440 | 1,493 | 2,467 | 2,448 |
| Ensign | Navy | 18.7 | 2,164 | 3,728 | 1,426 | 2,577 | 2,439 |
| HMS Medalist | Navy | 17.5 | 2,696 | 3,420 | 1,793 | 2,607 | 2,636 |
| Nautica | Navy | 15.5 | -- | 3,204 | 1,419 | 2,312 | -- |
| Norstar | Navy | 16.5 | -- | 3,092 | 1,295 | 2,194 | -- |
| Rexeter | Navy | 18.7 | 1,760 | 3,516 | 1,655 | 2,585 | 2,310 |
| T9905 | Navy | 22.3 | 2,220 | 3,484 | 1,697 | 2,590 | 2,467 |
| Vista | Navy | 18.1 | 2,164 | 3,432 | 1,773 | 2,603 | 2,456 |
| Rosetta | Pink | 32.8 | -- | -- | 1,858 | -- | -- |
| Sedona | Pink | 41.2 | 1,816 | 2,700 | 1,444 | 2,072 | 1,987 |
| 23ST27 | Pinto | 37.1 | -- | -- | 1,442 | -- | -- |
| La Paz | Pinto | 35.2 | 2,104 | 3,820 | 2,039 | 2,929 | 2,654 |
| Lariat | Pinto | 37.0 | -- | 3,460 | 1,790 | 2,625 | -- |
| Maverick | Pinto | 38.6 | 1,824 | 3,456 | 1,783 | 2,620 | 2,354 |
| ND-307 | Pinto | 39.8 | 1,720 | 3,540 | 1,947 | 2,743 | 2,402 |
| SF103-8 | Pinto | 37.4 | -- | -- | 1,415 | -- | -- |
| Sinaloa | Pinto | 34.9 | -- | -- | 1,977 | -- | -- |
| Stampede | Pinto | 39.1 | 2,012 | 3,348 | 1,579 | 2,463 | 2,313 |
| Windbreaker | Pinto | 39.7 | 2,256 | 3,392 | 1,812 | 2,602 | 2,487 |
| Merlot | Small Red | 35.7 | 1,212 | 2,968 | 1,558 | 2,263 | 1,913 |
| Rio Rojo | Small Red | 27.8 | -- | 2,972 | 1,890 | 2,431 | -- |
| Mean | | 30.7 | 2,051 | 3,369 | 1,517 | 2,501 | 2,369 |
| CV % | | -- | 9.6 | 6.9 | 12.3 | -- | -- |
| LSD 10% | | -- | 280 | 319 | 262 | -- | -- |

Lariat is not included in 2012 results due to seed problems.

[1]A fairly significant hail storm occurred on July 4 causing some damage. Drybeans were mostly in the R1 stage. Drybeans recovered nicely but were later maturing than normal.

# Field Pea - Langdon - 2014

| Variety | Days to 1st Flower | Days to Mature | Vine Length | Canopy Ht at Harvest | Height Index[1] | Harvest Ease[2] | Protein | 1000 KWT | Test Weight | Yield | | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 2012 | 2013 | 2014 | 2 year | 3 year |
| | | | in | in | % | 0-9 | % | gms | lb/bu | bu/a | | | | |
| **Yellow Cotyledon Type** | | | | | | | | | | | | | | |
| Agassiz | 51 | 89 | 32 | 26 | 80 | 3.0 | 24.2 | 264 | 63.6 | 65.1 | 90.7 | 80.2 | 85.5 | 78.7 |
| DS Admiral | 51 | 84 | 31 | 21 | 69 | 4.5 | 23.9 | 264 | 64.8 | 62.5 | 69.0 | 72.9 | 71.0 | 68.1 |
| CDC Meadow | 49 | 87 | 30 | 20 | 67 | 5.0 | 23.9 | 238 | 64.3 | -- | 73.0 | 81.6 | 77.3 | -- |
| Mystique | 53 | 88 | 29 | 25 | 85 | 3.0 | 24.8 | 284 | 64.0 | -- | 79.9 | 69.2 | 74.6 | -- |
| Nette | 49 | 86 | 30 | 20 | 68 | 4.8 | 24.0 | 284 | 64.8 | -- | 64.2 | 80.4 | 72.3 | -- |
| Abarth | 48 | 85 | 31 | 21 | 69 | 4.5 | 23.5 | 323 | 63.8 | -- | -- | 73.0 | -- | -- |
| Korando | 47 | 84 | 29 | 21 | 73 | 4.3 | 25.5 | 281 | 63.8 | -- | -- | 65.7 | -- | -- |
| PUSA 11002 | 49 | 85 | 28 | 20 | 70 | 6.0 | 25.0 | 228 | 64.6 | -- | -- | 77.5 | -- | -- |
| PUSA EXP 13 | 52 | 88 | 34 | 30 | 88 | 1.3 | 25.0 | 267 | 64.3 | -- | -- | 76.9 | -- | -- |
| **Green Cotyledon Type** | | | | | | | | | | | | | | |
| CDC Striker | 50 | 85 | 24 | 19 | 79 | 7.0 | 22.4 | 251 | 64.2 | 65.1 | 67.6 | 71.8 | 69.7 | 68.2 |
| Cruiser | 51 | 86 | 28 | 17 | 60 | 5.5 | 24.3 | 239 | 63.7 | 59.0 | 67.5 | 77.4 | 72.5 | 68.0 |
| Majoret | 54 | 86 | 28 | 25 | 90 | 2.5 | 25.3 | 276 | 64.3 | 62.3 | 74.4 | 68.7 | 71.6 | 68.5 |
| Mean | 50 | 86 | 30 | 22 | 75 | 4.3 | 24.3 | 267 | 64.2 | 62.9 | 71.1 | 74.6 | -- | -- |
| C.V. % | 2.2 | 1.5 | 9.2 | 16.8 | 16.1 | 43.7 | 3.1 | 4 | 0.9 | 6.3 | 8.7 | 10.1 | -- | -- |
| LSD 10% | 1.3 | 1.6 | 3.2 | 4.4 | 14.5 | 2.2 | 0.9 | 12.7 | 0.7 | 4.8 | 7.4 | 9.0 | -- | -- |
| LSD 5% | 1.6 | 1.9 | 3.9 | 5.4 | 17.4 | 2.7 | 1.1 | 15.3 | NS | 5.7 | 8.9 | NS | -- | -- |

[1] Height Index: Plant height at time of harvest relative to plant height at the end of bloom.

[2] Harvest Ease: 1=plants standing erect, 9=plants laying horizontal.

## Langdon - Conventional Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. |
|---|---|---|---|---|---|---|---|---|
| | | | Date[2] | in | % | % | --------bu/a-------- | |
| NDSU | Ashtabula | 0.4 | f | 24 | 30.6 | 16.6 | 42.1 | 46.9 |
| NDSU | Cavalier | 00.9 | 9/5 | 21 | 33.8 | 15.8 | 35.6 | 41.8 |
| NDSU | Traill | 0.0 | 9/9 | 23 | 34.2 | 15.3 | 34.3 | 39.4 |
| Richland IFC | MK0205 | 0.2 | f | 25 | 31.5 | 15.5 | 29.8 | -- |
| Richland IFC | MK0249 | 0.2 | f | 21 | 31.0 | 15.3 | 35.8 | 39.4 |
| Trial Mean | | | 9/8 | 23 | 32.2 | 15.6 | 37.6 | -- |
| C.V. % | | | 1.2 | 8.9 | 0.7 | 1.3 | 5.5 | -- |
| LSD 10% | | | 1.7 | NS | 0.4 | 0.4 | 2.5 | -- |
| LSD 5% | | | 2.2 | NS | 0.5 | 0.4 | 3.0 | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]Roundup Ready check variety.

A freeze occurred on September 12 with temperatures ranging from 28° to 32° F for five hours. A "f" indicates the variety did not reach the R7 stage in 3 of 4 replications prior to the freeze. However, all varieties were harvestable and had no distinctly green seeds in the sample.

## Walsh County - Conventional Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Lodging | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-Site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | date[2] | in | 0-9 | % | % | ----------bu/a--------- | | |
| NDSU | Ashtabula | 0.4 | 9/16 | 31 | 0 | 31.4 | 17.7 | 66.1 | 59.3 | 54.1 |
| NDSU | Cavalier | 00.9 | 9/4 | 28 | 0 | 33.5 | 16.3 | 56.5 | 54.4 | 46.1 |
| NDSU | Traill | 0.0 | 9/6 | 30 | 0 | 33.9 | 15.9 | 58.9 | 54.6 | 46.6 |
| Richland IFC | MK0249 | 0.2 | 9/19 | 29 | 0 | 31.1 | 16.1 | 56.4 | 50.9 | 46.1 |
| Richland IFC | MK0205 | 0.2 | 9/19 | 35 | 3.3 | 33.2 | 16.5 | 52.4 | -- | 41.1 |
| Trial Mean | | | 9/14 | 30 | 0.3 | 32.1 | 16.6 | 62.6 | -- | -- |
| C.V. % | | | 1.8 | 11.4 | 134.1 | 1.2 | 1.4 | 8.6 | -- | -- |
| LSD 10% | | | 2.3 | NS | 0.4 | 0.7 | 0.4 | 6.5 | -- | -- |
| LSD 5% | | | 2.8 | NS | 0.5 | 0.8 | 0.5 | 7.8 | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of conventional trials at Langdon REC and Walsh County (Park River).

Yield, oil and protein reported at 13% moisture.

## Langdon - Liberty Link Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity Date[2] | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. |
|---|---|---|---|---|---|---|---|---|
| | | | | in | % | % | ---------bu/a-------- | |
| Hefty | H008L3 | 00.8 | 9/9 | 21 | 33.5 | 16.0 | 37.3 | 37.3 |
| Hefty | H0212L | 0.2 | f | 22 | 32.6 | 16.2 | 35.2 | -- |
| Integra | 30080LL | 00.8 | 9/10 | 21 | 33.8 | 16.3 | 38.7 | 38.7 |
| Northstar | NS 0095LL | 00.9 | 9/10 | 21 | 33.6 | 16.2 | 38.3 | 45.1 |
| Northstar | NS 0129LL | 0.1 | f | 22 | 32.4 | 16.4 | 39.1 | -- |
| Stine Seed | 01LE06 | 0.1 | f | 22 | 33.0 | 16.2 | 41.4 | -- |
| Thunder Seed | 5401LL | 0.1 | f | 22 | 32.5 | 15.9 | 34.8 | -- |
| Trial Mean | | | 9/10 | 22 | 33 | 16.1 | 37.8 | -- |
| C.V. % | | | 1.6 | 5.6 | 0.9 | 0.7 | 4.4 | -- |
| LSD 10% | | | NS | NS | 0.6 | 0.2 | 2.1 | -- |
| LSD 5% | | | NS | NS | 0.7 | NS | 2.5 | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

Yield, oil and protein reported at 13% moisture.

A freeze occurred on September 12 with temperatures ranging from 28° to 32° F for five hours. A "f" indicates the variety did not reach the R7 stage in 3 of 4 replications prior to the freeze. However, all varieties were harvestable and had no distinctly green seeds in the sample.

## Walsh County - Liberty Link Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity Date[2] | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-Site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | in | % | % | ---------bu/a-------- | | |
| Hefty | H008L3 | 00.8 | 9/7 | 30 | 33.0 | 17.1 | 65.9 | 57.9 | 51.6 |
| Hefty | H0212L | 0.2 | 9/18 | 28 | 33.0 | 16.7 | 60.8 | -- | 48 |
| Integra | 30080LL | 00.8 | 9/7 | 31 | 33.0 | 16.5 | 64.1 | 57.3 | 51.4 |
| Northstar | NS 0095LL | 00.9 | 9/8 | 31 | 33.1 | 16.8 | 64.4 | -- | 51.4 |
| Northstar | NS 0129LL | 0.1 | 9/14 | 31 | 32.4 | 16.5 | 67.9 | 66.8 | 53.5 |
| Thunder Seed | 5401LL | 0.1 | 9/15 | 32 | 32.0 | 16.6 | 59.9 | -- | 47.4 |
| Thunder Seed | 5303LL | 0.3 | 9/19 | 31 | 34.5 | 16.5 | 67.4 | -- | -- |
| Trial Mean | | | 9/13 | 31 | 33 | 16.6 | 64.4 | -- | -- |
| C.V. % | | | 1.0 | 5.2 | 1.8 | 1.5 | 5.9 | -- | -- |
| LSD 10% | | | 1.4 | 2.0 | 1.2 | NS | 4.7 | -- | -- |
| LSD 5% | | | 1.6 | NS | NS | NS | NS | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of LL trials at Langdon REC and Walsh County (Park River).

Yield, oil and protein reported at 13% moisture.

# Langdon - Roundup Ready Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | date[2] | in | % | % | bu/a | bu/a | bu/a |
| Croplan | R2T0041 | 00.4 | f | 24 | 32.9 | 15.4 | 38.7 | 43.4 | -- |
| Croplan | R2T0091 | 00.9 | f | 24 | 32.2 | 15.7 | 39.4 | 47.7 | -- |
| Croplan | R2T00800 | 00.8 | f | 22 | 32.7 | 16.0 | 40.9 | -- | -- |
| Dyna-Gro | 30RY04 | 00.4 | 9/8 | 20 | 32.6 | 16.2 | 37.7 | 44.4 | 45.6 |
| Dyna-Gro | S006RY75 | 00.6 | 9/7 | 23 | 31.8 | 15.4 | 34.8 | -- | 42.6 |
| Dyna-Gro | S007RY44 | 00.7 | 9/9 | 20 | 32.4 | 15.8 | 40.1 | 45.7 | 44.8 |
| Dyna-Gro | S02RY74 | 0.2 | f | 23 | 32.8 | 14.9 | 44.4 | 50.0 | 52.2 |
| Hefty | H007Y12 | 00.7 | 9/8 | 21 | 33.1 | 16.3 | 39.6 | 45.6 | 48.5 |
| Hefty | H007R4 | 00.7 | 9/9 | 22 | 32.9 | 15.3 | 41.0 | -- | 46.9 |
| Hefty | H008R3 | 00.8 | f | 21 | 31.3 | 15.9 | 37.5 | 45.2 | 45.5 |
| Hefty | H009R3 | 00.9 | f | 22 | 33.1 | 14.6 | 46.8 | -- | 53.5 |
| Hefty | H01R4 | 0.1 | f | 24 | 33.0 | 14.4 | 37.1 | -- | 46.7 |
| Integra | 20031 | 00.7 | f | 25 | 32.2 | 15.2 | 39.8 | 48.2 | 45.9 |
| Integra | 20076N | 00.7 | 9/7 | 23 | 32.3 | 15.0 | 35.5 | -- | 41.7 |
| Integra | 20090 | 00.9 | f | 26 | 31.3 | 15.6 | 39.2 | 48.2 | 47.5 |
| Integra | 20215 | 0.0 | f | 24 | 32.1 | 15.2 | 43.0 | -- | 52.1 |
| Legacy Seed | LS00734 NRR2 | 00.7 | 9/8 | 27 | 32.0 | 15.6 | 35.3 | -- | 42.0 |
| Legacy Seed | LS00834 RR2 | 00.8 | 9/10 | 20 | 32.9 | 15.4 | 37.6 | -- | 44.1 |
| Legacy Seed | LS0214 RR2 | 0.2 | f | 28 | 32.7 | 15.1 | 41.9 | -- | 50.9 |
| Legacy Seed | LS0134 RR2 | 0.1 | f | 21 | 32.7 | 15.0 | 41.9 | -- | 51.5 |
| Legend Seeds | LS 003R21 | 00.3 | 9/11 | 20 | 32.1 | 15.9 | 34.0 | -- | -- |
| Legend Seeds | LS 007R550N | 00.7 | 9/8 | 25 | 32.2 | 15.0 | 36.5 | -- | -- |
| Legend Seeds | LS 005R24 | 00.5 | 9/10 | 25 | 33.6 | 14.5 | 41.8 | -- | -- |
| Legend Seeds | LS 003R24N | 00.3 | 9/9 | 25 | 32.7 | 15.4 | 40.1 | -- | -- |
| Mycogen | 5B005R2 | 00.5 | 9/8 | 21 | 33.2 | 16.2 | 40.2 | 47.9 | 47.2 |
| Mycogen | 5G009R2 | 00.9 | 9/12 | 25 | 32.5 | 15.1 | 43.9 | 49.7 | 50.2 |
| Mycogen | X54J009R2 | 00.9 | 9/9 | 21 | 32.6 | 14.9 | 42.3 | -- | 50.7 |
| Mycogen | X54G007R2 | 00.7 | f | 20 | 32.8 | 15.5 | 38.7 | -- | 46.2 |
| Northstar | NS 0060NR2 | 00.6 | 9/8 | 26 | 32.2 | 15.4 | 38.0 | -- | 42.4 |
| Northstar | NS 0080R2 | 00.6 | 9/12 | 23 | 32.7 | 15.1 | 39.1 | 50.0 | 48.2 |
| Nuseed | 0074 RR2YN | 00.7 | 9/6 | 23 | 31.8 | 15.5 | 36.6 | -- | 42.6 |
| NuTech/G2 | 6007 | 00.7 | f | 21 | 33.4 | 15.7 | 38.9 | -- | 46.7 |
| NuTech/G2 | 6000 | 0.0 | f | 21 | 32.3 | 16.2 | 42.7 | -- | 48.1 |
| PFS | 15R006N | 00.6 | 9/8 | 24 | 31.1 | 15.4 | 35.2 | -- | 41.9 |
| PFS | 14R008 | 00.8 | 9/11 | 19 | 32.5 | 15.7 | 39.1 | 44.8 | 45.5 |
| PFS | 14R02 | 0.2 | f | 22 | 32.9 | 14.5 | 42.0 | 45.4 | 48.5 |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

A freeze occurred on September 12 with temperatures ranging from 28° to 32° F for five hours. A "f" indicates the variety did not reach the R7 stage in 3 of 4 replications prior to the freeze. However, all varieties were harvestable and had no distinctly green seeds in the sample.

## Langdon - Roundup Ready Soybean - 2014 (continued)

| Brand | Variety | Maturity Group[1] | Maturity date[2] | Plant Height in | Protein % | Oil % | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ----------bu/a---------- | | |
| Prairie Brand | PB-00766R2 | 00.7 | 9/8 | 25 | 31.9 | 15.6 | 39.6 | -- | 45.0 |
| Prairie Brand | PB-00844R2 | 00.8 | f | 23 | 31.7 | 16.1 | 43.0 | 47.5 | 50.3 |
| Prairie Brand | PB-00950R2 | 00.9 | f | 25 | 32.7 | 15.5 | 40.6 | 50.2 | 48.5 |
| Prairie Brand | PB-0240R2 | 0.1 | f | 25 | 33.2 | 15.3 | 43.3 | -- | 51.4 |
| Prairie Brand | PB-0291R2 | 0.1 | f | 22 | 33.4 | 14.2 | 35.9 | 43.7 | 46.2 |
| Proseed | P2 11-05 | 00.5 | 9/10 | 22 | 32.2 | 16.1 | 39.4 | 44.6 | 46.0 |
| Proseed | P2 11-07 | 00.7 | 9/11 | 21 | 32.1 | 16.4 | 42.4 | 45.2 | 49.0 |
| Proseed | 30-07 | 00.7 | 9/11 | 21 | 32.2 | 15.2 | 35.9 | -- | 43.9 |
| Proseed | P2 10-08 | 00.8 | 9/12 | 25 | 32.5 | 15.5 | 40.4 | 48.5 | 50.5 |
| Proseed | P2 20-08 | 00.8 | f | 22 | 31.7 | 16.0 | 39.8 | 47.2 | 49.8 |
| REA | 0140 | 0.1 | 9/11 | 24 | 32.2 | 15.3 | 42.6 | -- | 50.1 |
| REA | 53G32 | 00.3 | 9/8 | 18 | 32.2 | 16.2 | 31.7 | 39.5 | 35.9 |
| REA | 55G14 | 00.5 | f | 24 | 31.8 | 15.6 | 38.5 | 42.6 | 40.7 |
| REA | 58G82 | 00.8 | f | 26 | 31.6 | 14.8 | 35.4 | 41.6 | 41.1 |
| REA | 61G24 | 0.1 | f | 22 | 33.4 | 14.6 | 43.2 | -- | 49.7 |
| Stine Seed | 01RE00 | 0.1 | f | 24 | 32.6 | 14.9 | 43.8 | -- | -- |
| Syngenta | NK S007-Y4 | 00.7 | 9/9 | 20 | 31.6 | 16.4 | 41.1 | -- | 45.2 |
| Syngenta | NK S009-J1 | 00.9 | f | 19 | 33.1 | 16.2 | 36.6 | -- | 44.1 |
| Thunder Seed | 32005 R2Y | 00.5 | 9/10 | 19 | 32.5 | 16.0 | 35.1 | -- | 42.3 |
| Thunder Seed | Astro | 00.8 | f | 25 | 32.4 | 14.6 | 43.8 | -- | 49.5 |
| Thunder Seed | 35007 R2YN | 00.7 | 9/10 | 23 | 32.6 | 14.9 | 39.0 | -- | 44.9 |
| Thunder Seed | 31009 R2Y | 00.9 | 9/11 | 22 | 32.6 | 15.3 | 40.6 | -- | 48.9 |
| Thunder Seed | 33009 R2YN | 00.9 | f | 20 | 30.3 | 16.0 | 35.7 | -- | 43.1 |
| Wensman | W 30061NR2 | 00.6 | 9/8 | 24 | 31.6 | 15.4 | 38.8 | -- | 42.3 |
| Wensman | W 30084R2 | 00.8 | f | 25 | 31.8 | 15.5 | 43.7 | 52.2 | 49.5 |
| Wensman | W 30099R2 | 00.9 | f | 24 | 31.9 | 15.6 | 39.5 | 46.4 | 49.8 |
| Wensman | W 3024R2 | 0.2 | f | 22 | 33.1 | 14.8 | 43.6 | 50.8 | 50.2 |
| Wensman | W 3030R2 | 0.2 | f | 27 | 32.9 | 15.1 | 39.7 | 47.6 | -- |
| Trial Mean | | | 9/9 | 23 | 32.4 | 15.4 | 39.6 | -- | -- |
| C.V. % | | | 0.9 | 9.0 | 1.6 | 1.8 | 8.2 | -- | -- |
| LSD 10% | | | 1.1 | 2.4 | 0.9 | 0.5 | 3.8 | -- | -- |
| LSD 5% | | | 1.3 | 2.9 | 1.0 | 0.6 | 4.5 | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

A freeze occurred on September 12 with temperatures ranging from 28° to 32° F for five hours. A "f" indicates the variety did not reach the R7 stage in 3 of 4 replications prior to the freeze. However, all varieties were harvestable and had no distinctly green seeds in the sample.

# Nelson County - Roundup Ready Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | date[2] | in | % | % | bu/a | bu/a | bu/a |
| Dairyland | DSR-C905/R2Y | 00.9 | 9/18 | 30 | 32.8 | 15.7 | 60.1 | 53.5 | -- |
| Dairyland | DSR-C918/R2Y | 00.9 | 9/20 | 27 | 33.1 | 15.3 | 62.8 | -- | -- |
| Dairyland | DST02-001/R2Y | 0.2 | 9/21 | 28 | 34.2 | 14.9 | 57.9 | -- | -- |
| Dairyland | DSR-0305/R2Y | 0.3 | 9/21 | 33 | 34.3 | 14.9 | 66.5 | 61.6 | -- |
| Dairyland | DSR-404/R2Y | 0.4 | 9/22 | 31 | 34.3 | 14.2 | 57.1 | 56.9 | -- |
| Dyna-Gro Seed | 30RY04 | 00.4 | 9/15 | 29 | 34.3 | 15.5 | 57.7 | 50.5 | 55.5 |
| Dyna-Gro Seed | S006RY75 | 00.6 | 9/10 | 29 | 34.7 | 14.8 | 54.3 | -- | 54.2 |
| Dyna-Gro Seed | S007RY44 | 00.7 | 9/13 | 27 | 33.9 | 15.2 | 57.9 | 49.5 | 58.4 |
| Dyna-Gro Seed | S02RY74 | 0.2 | 9/20 | 28 | 34.9 | 14.6 | 57.1 | 54.6 | 59.9 |
| Hefty | H009R3 | 00.9 | 9/21 | 30 | 34.4 | 14.6 | 60.3 | -- | 62.3 |
| Hefty | H01R4 | 0.1 | 9/21 | 28 | 34.5 | 14.4 | 52.1 | -- | 56.2 |
| Hefty | H02R3 | 0.2 | 9/21 | 32 | 33.6 | 14.4 | 54.4 | 55.2 | -- |
| Integra | 20031 | 00.7 | 9/16 | 31 | 32.9 | 15.4 | 57.3 | 53.0 | 57.9 |
| Integra | 20076N | 00.7 | 9/10 | 28 | 33.6 | 15.3 | 50.3 | -- | 52.3 |
| Integra | 20215 | 0.0 | 9/18 | 28 | 34.8 | 14.8 | 57.4 | -- | 60.0 |
| Integra | 20126 | 0.1 | 9/20 | 36 | 33.3 | 15.5 | 64.8 | -- | 64.0 |
| Integra | 20109 | 0.2 | 9/20 | 28 | 34.2 | 14.8 | 57.9 | -- | 61.1 |
| Legacy Seed | LS00734 NRR2 | 00.7 | 9/10 | 28 | 33.4 | 15.3 | 48.8 | -- | 48.1 |
| Legacy Seed | LS00834 RR2 | 00.8 | 9/13 | 24 | 33.4 | 15.5 | 54.7 | -- | 55.2 |
| Legacy Seed | LS0214 RR2 | 0.2 | 9/19 | 34 | 33.8 | 15.1 | 64.3 | -- | 65.3 |
| Legacy Seed | LS0334 RR2 | 0.3 | 9/24 | 34 | 35.2 | 14.5 | 64.9 | -- | 64.3 |
| Legacy Seed | LS0134 RR2 | 0.1 | 9/21 | 30 | 34.2 | 14.7 | 62.7 | -- | 63.6 |
| Mycogen | 5G009R2 | 00.9 | 9/15 | 31 | 33.9 | 15.2 | 58.3 | -- | 59.9 |
| Mycogen | X54J009R2 | 00.9 | 9/19 | 28 | 34.5 | 14.7 | 59.1 | -- | 60.9 |
| Mycogen | 5B012R2 | 0.1 | 9/17 | 30 | 33.7 | 15.8 | 54.4 | 51.9 | 57.6 |
| Mycogen | 5B024R2 | 0.2 | 9/18 | 32 | 34.1 | 15.3 | 59.2 | 52.4 | -- |
| Northstar | NS 0088R2 | 00.9 | 9/17 | 27 | 33.6 | 15.3 | 55.7 | 49.1 | 55.8 |
| Northstar | NS 0096R2 | 00.9 | 9/16 | 31 | 32.7 | 16.0 | 55.2 | 51.6 | 58.5 |
| Nuseed | 0074 RR2YN | 00.7 | 9/7 | 26 | 32.9 | 15.4 | 47.8 | -- | 48.0 |
| Nuseed | 2034 RR2YN | 0.3 | 9/20 | 34 | 34.3 | 14.8 | 56.4 | -- | 60.4 |
| NuTech/G2 | 6007 | 00.7 | 9/15 | 24 | 33.9 | 15.7 | 49.4 | -- | 53.2 |
| NuTech/G2 | 6000 | 0.0 | 9/19 | 25 | 33.5 | 15.8 | 54.2 | -- | 55.4 |
| NuTech/G2 | 6021 | 0.2 | 9/19 | 24 | 34.6 | 15.4 | 55.4 | 49.8 | 56.7 |
| PFS | 14R02 | 0.2 | 9/21 | 29 | 34.1 | 14.6 | 58.6 | 58.2 | 60.1 |
| PFS | 15R04 | 0.4 | 9/23 | 35 | 34.0 | 14.9 | 63.6 | -- | 63.8 |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

## Nelson County - Roundup Ready Soybean - 2014 (continued)

| Brand | Variety | Maturity Group[1] | Maturity date[2] | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | in | % | % | bu/a | bu/a | bu/a |
| Prairie Brand | PB-00766R2 | 00.7 | 9/9 | 29 | 33.4 | 15.5 | 49.0 | -- | 52.2 |
| Prairie Brand | PB-00844R2 | 00.8 | 9/17 | 27 | 31.9 | 16.3 | 57.4 | 48.8 | 59.1 |
| Prairie Brand | PB-00950R2 | 00.9 | 9/16 | 29 | 32.8 | 15.4 | 59.5 | 58.2 | 59.1 |
| Prairie Brand | PB-0240R2 | 0.1 | 9/16 | 33 | 34.6 | 15.0 | 61.5 | -- | 59.4 |
| Prairie Brand | PB-0291R2 | 0.1 | 9/22 | 29 | 35.3 | 14.0 | 55.8 | 53.9 | 60.3 |
| Proseed | 30-20 | 0.2 | 9/22 | 30 | 33.3 | 15.5 | 57.8 | -- | 62.9 |
| Proseed | P2 20-30 | 0.3 | 9/19 | 33 | 34.5 | 15.1 | 64.4 | 59.3 | 65.6 |
| REA | 0140 | 0.1 | 9/16 | 30 | 32.9 | 15.3 | 59.5 | -- | 60.5 |
| REA | 58G82 | 00.8 | 9/18 | 26 | 33.2 | 14.9 | 45.9 | 46.4 | 49.6 |
| REA | 61G24 | 0.1 | 9/21 | 27 | 34.7 | 14.6 | 61.1 | -- | 61.8 |
| REA | 62G22 | 0.2 | 9/18 | 34 | 34.4 | 15.0 | 55.8 | 52.0 | 57.5 |
| REA | 64G94 | 0.4 | 9/22 | 36 | 33.4 | 15.8 | 53.3 | -- | 56.3 |
| Syngenta | NK S007-Y4 | 00.7 | 9/15 | 27 | 32.7 | 15.9 | 57.7 | -- | 53.8 |
| Syngenta | NK S009-J1 | 00.9 | 9/15 | 24 | 33.3 | 16.5 | 53.7 | -- | 56.7 |
| Thunder Seed | 32005 R2Y | 00.5 | 9/13 | 26 | 33.0 | 16.2 | 48.5 | -- | 50.0 |
| Thunder Seed | Astro | 00.8 | 9/17 | 30 | 33.4 | 15.0 | 60.0 | -- | 60.9 |
| Thunder Seed | 35007 R2YN | 00.7 | 9/8 | 28 | 33.1 | 15.8 | 50.8 | -- | 51.1 |
| Thunder Seed | 31009 R2Y | 00.9 | 9/16 | 32 | 32.6 | 15.7 | 60.2 | -- | 61.5 |
| Thunder Seed | 33009 R2YN | 00.9 | 9/18 | 27 | 32.3 | 15.6 | 52.5 | -- | 52.4 |
| Wensman | W 30084R2 | 00.8 | 9/16 | 32 | 33.0 | 15.3 | 62.7 | -- | 59.9 |
| Wensman | W 30099R2 | 00.9 | 9/20 | 32 | 32.7 | 15.7 | 59.3 | 52.9 | 63.3 |
| Wensman | W 3024R2 | 0.2 | 9/17 | 25 | 34.0 | 15.1 | 58.2 | 56.8 | 59.1 |
| Wensman | W 3030R2 | 0.2 | 9/18 | 31 | 34.1 | 15.0 | 52.7 | 49.9 | 54.9 |
| Trial Mean | | | 9/17 | 29 | 33.7 | 15.2 | 55.8 | -- | -- |
| C.V. % | | | 1.8 | 9.3 | 2.0 | 2.0 | 7.8 | -- | -- |
| LSD 10% | | | 2.3 | 3.2 | 1.1 | 0.5 | 5.1 | -- | -- |
| LSD 5% | | | 2.8 | 3.8 | 1.4 | 0.6 | 6.1 | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

# Pembina County - Roundup Ready Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity date[2] | Plant Height in | Protein % | Oil % | Yield 2014 bu/a | Yield 2 yr Avg. bu/a | Yield 2-site Avg.[3] bu/a |
|---|---|---|---|---|---|---|---|---|---|
| Dyna-Gro Seed | 30RY04 | 00.4 | 9/15 | 23 | 33.3 | 16.1 | 53.5 | 55.5 | 45.6 |
| Dyna-Gro Seed | S006RY75 | 00.6 | 9/9 | 23 | 33.8 | 14.9 | 50.3 | -- | 42.6 |
| Dyna-Gro Seed | S007RY44 | 00.7 | 9/15 | 23 | 33.1 | 15.4 | 49.6 | 54.1 | 44.8 |
| Dyna-Gro Seed | S02RY74 | 0.2 | 9/22 | 27 | 33.6 | 15.0 | 60.1 | 63.0 | 52.2 |
| Hefty | H007Y12 | 00.7 | 9/14 | 24 | 34.0 | 16.1 | 57.5 | 59.4 | 48.5 |
| Hefty | H007R4 | 00.7 | 9/14 | 22 | 33.3 | 15.6 | 52.8 | -- | 46.9 |
| Hefty | H008R3 | 00.8 | 9/19 | 21 | 32.4 | 15.8 | 53.4 | 56.1 | 45.5 |
| Hefty | H009R3 | 00.9 | 9/24 | 28 | 34.2 | 14.4 | 60.1 | -- | 53.5 |
| Hefty | H01R4 | 0.1 | 9/24 | 28 | 33.5 | 14.9 | 56.2 | -- | 46.7 |
| Integra | 20031 | 00.7 | 9/21 | 27 | 32.7 | 15.3 | 52.0 | 58.6 | 45.9 |
| Integra | 20076N | 00.7 | 9/11 | 23 | 33.1 | 15.3 | 47.9 | -- | 41.7 |
| Integra | 20090 | 00.9 | 9/20 | 24 | 33.4 | 15.5 | 55.8 | 57.2 | 47.5 |
| Integra | 20215 | 0.0 | 9/22 | 27 | 33.7 | 14.8 | 61.3 | -- | 52.1 |
| Legacy Seed | LS00734 NRR2 | 00.7 | 9/10 | 25 | 33.1 | 15.4 | 48.6 | -- | 42.0 |
| Legacy Seed | LS00834 RR2 | 00.8 | 9/16 | 22 | 33.3 | 15.5 | 50.6 | -- | 44.1 |
| Legacy Seed | LS0214 RR2 | 0.2 | 9/23 | 30 | 33.5 | 15.5 | 59.8 | -- | 50.9 |
| Legacy Seed | LS0134 RR2 | 0.1 | 9/25 | 30 | 33.5 | 14.9 | 61.2 | -- | 51.5 |
| Mycogen | 5B005R2 | 00.5 | 9/16 | 25 | 33.0 | 16.4 | 54.3 | 55.7 | 47.2 |
| Mycogen | 5G009R2 | 00.9 | 9/19 | 29 | 32.4 | 15.7 | 56.5 | 58.6 | 50.2 |
| Mycogen | X54J009R2 | 00.9 | 9/22 | 26 | 33.6 | 15.1 | 59.1 | -- | 50.7 |
| Mycogen | X54G007R2 | 00.7 | 9/17 | 21 | 33.0 | 15.5 | 53.7 | -- | 46.2 |
| Mycogen | 5B012R2 | 0.1 | 9/22 | 27 | 33.7 | 15.6 | 61.5 | -- | -- |
| Northstar | NS 0060NR2 | 00.6 | 9/10 | 26 | 32.6 | 15.4 | 46.7 | -- | 42.4 |
| Northstar | NS 0080R2 | 00.6 | 9/21 | 29 | 33.0 | 15.5 | 57.3 | 60.1 | 48.2 |
| Nuseed | 0074 RR2YN | 00.7 | 9/11 | 26 | 32.7 | 15.2 | 48.6 | -- | 42.6 |
| NuTech/G2 | 6007 | 00.7 | 9/19 | 24 | 33.8 | 16.2 | 54.6 | -- | 46.7 |
| NuTech/G2 | 6000 | 0.0 | 9/22 | 23 | 34.0 | 15.9 | 53.5 | -- | 48.1 |
| PFS | 15R006N | 00.6 | 9/9 | 25 | 32.5 | 15.4 | 48.7 | -- | 41.9 |
| PFS | 14R008 | 00.8 | 9/16 | 22 | 33.2 | 15.7 | 52.0 | 53.5 | 45.5 |
| PFS | 14R02 | 0.2 | 9/25 | 30 | 34.9 | 14.3 | 55.0 | 60.3 | 48.5 |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

## Pembina County - Roundup Ready Soybean - 2014 (continued)

| Brand | Variety | Maturity Group[1] | Maturity date[2] | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | in | % | % | bu/a | bu/a | bu/a |
| Prairie Brand | PB-00766R2 | 00.7 | 9/10 | 27 | 34.0 | 14.9 | 50.3 | -- | 45.0 |
| Prairie Brand | PB-00844R2 | 00.8 | 9/18 | 23 | 32.4 | 16.1 | 57.7 | 56.9 | 50.3 |
| Prairie Brand | PB-00950R2 | 00.9 | 9/21 | 28 | 33.1 | 15.4 | 56.3 | 62.1 | 48.5 |
| Prairie Brand | PB-0240R2 | 0.1 | 9/20 | 29 | 33.9 | 15.6 | 59.6 | -- | 51.4 |
| Prairie Brand | PB-0291R2 | 0.1 | 9/23 | 30 | 34.6 | 14.3 | 56.5 | 59.4 | 46.2 |
| Proseed | P2 11-05 | 00.5 | 9/15 | 24 | 33.2 | 15.7 | 52.7 | 53.5 | 46.0 |
| Proseed | P2 11-07 | 00.7 | 9/17 | 25 | 33.7 | 16.0 | 55.6 | 57.4 | 49.0 |
| Proseed | 30-07 | 00.7 | 9/18 | 25 | 33.1 | 15.7 | 51.9 | -- | 43.9 |
| Proseed | P2 10-08 | 00.8 | 9/20 | 28 | 32.9 | 15.7 | 60.6 | 59.7 | 50.5 |
| Proseed | P2 20-08 | 00.8 | 9/17 | 25 | 32.4 | 16.0 | 59.9 | 61.0 | 49.8 |
| REA | 0140 | 0.1 | 9/21 | 26 | 33.5 | 15.4 | 57.6 | -- | 50.1 |
| REA | 53G32 | 00.3 | 9/15 | 22 | 32.5 | 16.3 | 40.2 | 46.4 | 35.9 |
| REA | 55G14 | 00.5 | 9/16 | 24 | 33.3 | 15.1 | 42.8 | 49.9 | 40.7 |
| REA | 58G82 | 00.8 | 9/21 | 26 | 33.2 | 15.0 | 46.8 | 52.4 | 41.1 |
| REA | 61G24 | 0.1 | 9/25 | 28 | 34.6 | 14.5 | 56.1 | -- | 49.7 |
| Syngenta | NK S007-Y4 | 00.7 | 9/12 | 19 | 31.4 | 16.9 | 49.3 | -- | 45.2 |
| Syngenta | NK S009-J1 | 00.9 | 9/15 | 20 | 33.2 | 16.9 | 51.5 | -- | 44.1 |
| Thunder Seed | 32005 R2Y | 00.5 | 9/15 | 24 | 32.7 | 16.3 | 49.4 | -- | 42.3 |
| Thunder Seed | Astro | 00.8 | 9/21 | 27 | 33.8 | 14.9 | 55.2 | -- | 49.5 |
| Thunder Seed | 35007 R2YN | 00.7 | 9/10 | 25 | 32.5 | 15.5 | 50.8 | -- | 44.9 |
| Thunder Seed | 31009 R2Y | 00.9 | 9/20 | 28 | 32.9 | 15.5 | 57.2 | -- | 48.9 |
| Thunder Seed | 33009 R2YN | 00.9 | 9/20 | 22 | 32.5 | 15.9 | 50.4 | -- | 43.1 |
| Wensman | W 30061NR2 | 00.6 | 9/10 | 26 | 32.9 | 15.4 | 45.7 | -- | 42.3 |
| Wensman | W 30084R2 | 00.8 | 9/21 | 27 | 33.1 | 15.6 | 55.3 | 57.7 | 49.5 |
| Wensman | W 30099R2 | 00.9 | 9/21 | 29 | 33.2 | 15.8 | 60.2 | 62.3 | 49.8 |
| Wensman | W 3024R2 | 0.2 | 9/22 | 27 | 33.8 | 14.9 | 56.7 | 60.7 | 50.2 |
| Trial Mean | | | 9/18 | 25 | 33.3 | 15.5 | 53.9 | -- | -- |
| C.V. % | | | 1.6 | 8.5 | 1.5 | 1.7 | 6.3 | -- | -- |
| LSD 10% | | | 2.1 | 2.5 | 0.9 | 0.4 | 4.0 | -- | -- |
| LSD 5% | | | 2.5 | 3.0 | 1.0 | 0.5 | 4.8 | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our northern region. Langdon REC and Pembina County (Cavalier).

Yield, oil and protein reported at 13% moisture.

# Walsh County - Roundup Ready Soybean - 2014

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Protein | Oil | Yield 2014 | Yield 2 yr Avg. | Yield 2-site Avg.[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | | date[2] | in | % | % | bu/a | bu/a | bu/a |
| Dyna-Gro | S006RY75 | 00.6 | 9/2 | 31 | 32.3 | 16.2 | 54.2 | -- | 54.2 |
| Dyna-Gro | 30RY04 | 00.4 | 9/2 | 25 | 32.9 | 16.8 | 53.3 | 48.1 | 55.5 |
| Dyna-Gro | S007RY44 | 00.7 | 9/5 | 24 | 31.6 | 17.0 | 59.0 | 51.0 | 58.4 |
| Dyna-Gro | S02RY74 | 0.2 | 9/10 | 29 | 32.3 | 16.3 | 62.7 | 55.4 | 59.9 |
| Hefty | H007Y12 | 00.7 | 9/3 | 25 | 33.1 | 17.0 | 51.6 | 49.3 | -- |
| Hefty | H008R3 | 00.8 | 9/5 | 27 | 31.0 | 17.0 | 56.8 | 52.5 | -- |
| Hefty | H009R3 | 00.9 | 9/18 | 26 | 32.5 | 16.2 | 64.4 | -- | 62.3 |
| Hefty | H01R4 | 0.1 | 9/16 | 26 | 33.0 | 15.6 | 60.4 | -- | 56.2 |
| Hefty | H007R4 | 00.7 | 9/3 | 23 | 32.1 | 17.0 | 56.2 | -- | -- |
| Integra | 20031 | 00.7 | 9/7 | 29 | 31.5 | 16.6 | 58.5 | 53.3 | 57.9 |
| Integra | 20076N | 00.7 | 9/2 | 31 | 32.3 | 16.0 | 54.2 | -- | 52.3 |
| Integra | 20215 | 0.0 | 9/10 | 27 | 32.0 | 16.4 | 62.5 | -- | 60.0 |
| Integra | 20126 | 0.1 | 9/14 | 33 | 31.7 | 16.8 | 63.1 | -- | 64.0 |
| Integra | 20109 | 0.2 | 9/18 | 27 | 32.7 | 15.9 | 64.3 | 58.6 | 61.1 |
| Legacy Seed | LS00734 NRR2 | 00.7 | 9/2 | 27 | 32.7 | 15.6 | 47.4 | -- | 48.1 |
| Legacy Seed | LS00834 RR2 | 00.8 | 9/4 | 24 | 32.0 | 16.4 | 55.7 | -- | 55.2 |
| Legacy Seed | LS0214 RR2 | 0.2 | 9/17 | 34 | 32.2 | 16.6 | 66.3 | -- | 65.3 |
| Legacy Seed | LS0334 RR2 | 0.3 | 9/19 | 30 | 32.3 | 16.0 | 63.8 | -- | 64.3 |
| Legacy Seed | LS0134 RR2 | 0.1 | 9/18 | 26 | 32.7 | 16.0 | 64.5 | -- | 63.6 |
| Mycogen | 5G009R2 | 00.9 | 9/6 | 30 | 30.9 | 16.7 | 61.5 | 55.2 | 59.9 |
| Mycogen | X54J009R2 | 00.9 | 9/9 | 25 | 32.2 | 16.1 | 62.8 | -- | 60.9 |
| Mycogen | X54G007R2 | 00.7 | 9/4 | 25 | 32.1 | 16.7 | 57.1 | -- | -- |
| Mycogen | 5B012R2 | 0.1 | 9/5 | 28 | 32.7 | 16.8 | 60.7 | 55.0 | 57.6 |
| Northstar | NS 0088R2 | 00.9 | 9/6 | 25 | 30.9 | 16.7 | 56.0 | 53.2 | 55.8 |
| Northstar | NS 0096R2 | 00.9 | 9/6 | 31 | 31.0 | 16.9 | 61.9 | 56.7 | 58.5 |
| Nuseed | 0074 RR2YN | 00.7 | 9/1 | 28 | 32.0 | 16.2 | 48.1 | -- | 48.0 |
| Nuseed | 2034 RR2YN | 0.3 | 9/16 | 36 | 31.7 | 16.3 | 64.4 | -- | 60.4 |
| NuTech/G2 | 6007 | 00.7 | 9/6 | 26 | 32.4 | 16.7 | 57.0 | -- | 53.2 |
| NuTech/G2 | 6000 | 0.0 | 9/12 | 23 | 31.3 | 17.2 | 56.7 | -- | 55.4 |
| NuTech/G2 | 6021 | 0.2 | 9/13 | 24 | 32.8 | 16.4 | 58.0 | 54.7 | 56.7 |
| PFS | 14R02 | 0.2 | 9/18 | 27 | 33.1 | 15.3 | 61.6 | 56.9 | 60.1 |
| PFS | 15R04 | 0.4 | 9/19 | 30 | 31.5 | 16.1 | 63.9 | -- | 63.8 |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

## Walsh County - Roundup Ready Soybean - 2014 (continued)

| Brand | Variety | Maturity Group[1] | Maturity | Plant Height | Protein | Oil | Yield | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2014 | 2 yr Avg. | 2-site Avg.[3] |
| | | | date[2] | in | % | % | bu/a | | |
| Prairie Brand | PB-00766R2 | 00.7 | 9/1 | 28 | 32.3 | 16.1 | 55.4 | | 52.2 |
| Prairie Brand | PB-00844R2 | 00.8 | 9/6 | 26 | 31.3 | 16.5 | 60.8 | 54.9 | 59.1 |
| Prairie Brand | PB-00950R2 | 00.9 | 9/5 | 29 | 31.1 | 17.1 | 58.8 | 54.1 | 59.1 |
| Prairie Brand | PB-0240R2 | 0.1 | 9/6 | 31 | 32.0 | 16.5 | 57.2 | -- | 59.4 |
| Prairie Brand | PB-0291R2 | 0.1 | 9/18 | 27 | 32.9 | 15.1 | 64.9 | 59.2 | 60.3 |
| Proseed | P2 10-08 | 00.8 | 9/5 | 30 | 31.8 | 16.8 | 60.9 | 56.3 | -- |
| Proseed | 30-20 | 0.2 | 9/14 | 32 | 32.1 | 16.6 | 68.0 | -- | 62.9 |
| Proseed | P2 20-30 | 0.3 | 9/15 | 32 | 31.7 | 16.7 | 66.8 | 59.2 | 65.6 |
| REA | 0140 | 0.1 | 9/6 | 31 | 31.5 | 16.8 | 61.6 | -- | 60.5 |
| REA | 58G82 | 00.8 | 9/12 | 29 | 30.7 | 16.8 | 53.3 | 54.2 | 49.6 |
| REA | 61G24 | 0.1 | 9/18 | 26 | 32.3 | 15.8 | 62.5 | -- | 61.8 |
| REA | 62G22 | 0.2 | 9/7 | 32 | 31.2 | 17.0 | 59.2 | 52.3 | 57.5 |
| REA | 64G94 | 0.4 | 9/17 | 28 | 29.6 | 18.0 | 59.3 | -- | 56.3 |
| Stine Seed | 01RE00 | 0.1 | 9/12 | 28 | 31.5 | 16.4 | 62.6 | -- | -- |
| Syngenta | NK S007-Y4 | 00.7 | 9/1 | 25 | 31.2 | 17.4 | 49.9 | -- | 53.8 |
| Syngenta | NK S009-J1 | 00.9 | 9/8 | 24 | 31.8 | 17.3 | 59.8 | -- | 56.7 |
| Thunder Seed | 32005 R2Y | 00.5 | 9/3 | 26 | 32.2 | 16.8 | 51.6 | -- | 50.0 |
| Thunder Seed | Astro | 00.8 | 9/9 | 30 | 31.8 | 16.2 | 61.7 | -- | 60.9 |
| Thunder Seed | 35007 R2YN | 00.7 | 9/1 | 28 | 32.5 | 16.2 | 51.4 | -- | 51.1 |
| Thunder Seed | 31009 R2Y | 00.9 | 9/7 | 30 | 31.2 | 16.7 | 62.8 | -- | 61.5 |
| Thunder Seed | 33009 R2YN | 00.9 | 9/6 | 27 | 31.5 | 16.9 | 52.3 | -- | 52.4 |
| Wensman | W 30061NR2 | 00.6 | 9/1 | 27 | 32.6 | 16.1 | 50.9 | -- | -- |
| Wensman | W 30084R2 | 00.8 | 9/5 | 29 | 30.8 | 16.7 | 57.1 | -- | 59.9 |
| Wensman | W 30099R2 | 00.9 | 9/9 | 29 | 31.4 | 16.8 | 67.2 | 61.1 | 63.3 |
| Wensman | W 3024R2 | 0.2 | 9/9 | 27 | 32.2 | 16.6 | 60.0 | 56.8 | 59.1 |
| Wensman | W 3030R2 | 0.2 | 9/7 | 31 | 32.2 | 16.6 | 57.0 | 52.6 | 54.9 |
| Trial Mean | | | 9/9 | 28 | 32.0 | 16.5 | 58.1 | -- | -- |
| C.V. % | | | 1.5 | 8.1 | 1.6 | 1.7 | 7.1 | -- | -- |
| LSD 10% | | | 1.8 | 2.7 | 0.8 | 0.5 | 4.8 | -- | -- |
| LSD 5% | | | 2.2 | 3.2 | 1.0 | 0.6 | 5.7 | -- | -- |

[1]Maturity Group provided by company.

[2]Days to physiological maturity at R7 stage (one brown pod on the main stem obtains mature brown or tan color).

[3]A 2-site average of our southern region. Walsh County (Park River) and Nelson County (Pekin).

Yield, oil and protein reported at 13% moisture.

# Langdon - Confection (non-oil) Sunflower - 2014

| Brand | Hybrid | Status[3] | Days to Flower | Plant Height | Test Weight | Harvest Moist. | Seed over screen 22/64 | Seed over screen 20/64 | Seed over screen 18/64 | Yield @ 10% moisture 2012 | Yield @ 10% moisture 2013 | Yield @ 10% moisture 2014 | Average 2 yr | Average 3 yr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | days | in | lbs/bu | % | ----------% over---------- | | | ----------lbs/a---------- | | | | |
| CanSun LLC | EX 8255 | EXP | 73 | 58 | 22.8 | 13.3 | 72 | 85 | 91 | -- | 4044 | 3124 | 3584 | -- |
| CanSun LLC | EX 5255 | EXP | 71 | 57 | 23.7 | 11.9 | 74 | 84 | 91 | -- | 4013 | 3132 | 3573 | -- |
| CanSun LLC | EX 755 | EXP | 76 | 56 | 22.6 | 14.9 | 67 | 82 | 92 | -- | -- | 3010 | -- | -- |
| Mycogen | 8C451CP[1] | CA | 77 | 57 | 21.5 | 17.6 | 82 | 91 | 95 | 1789 | 3306 | 3185 | 3246 | 2760 |
| NuSeed | NHW12706[2] | EXP | 77 | 60 | 23.3 | 25.4 | 77 | 90 | 94 | -- | 3364 | 2950 | 3157 | -- |
| NuSeed | 6946 DMR[2] | CA | 73 | 51 | 24.5 | 9.7 | 9 | 45 | 86 | -- | -- | 2812 | -- | -- |
| NuSeed | Panther DMR[2] | CA | 71 | 54 | 24.3 | 10.1 | 75 | 89 | 95 | -- | -- | 3026 | -- | -- |
| NuSeed | NHW12739 | EXP | 70 | 57 | 23.0 | 8.9 | 86 | 93 | 97 | -- | -- | 3234 | -- | -- |
| NuSeed | x5334[1] | EXP | 78 | 61 | 22.6 | 21.8 | 87 | 93 | 95 | -- | -- | 3181 | -- | -- |
| NuSeed | x4334[1] | EXP | 75 | 56 | 21.6 | 19.1 | 88 | 95 | 97 | -- | -- | 3392 | -- | -- |
| NuSeed | NSK12M044[1] | EXP | 70 | 51 | 23.2 | 9.6 | 91 | 95 | 98 | -- | -- | 3356 | -- | -- |
| NuSeed | NSK12M045[1] | EXP | 74 | 58 | 20.8 | 12.0 | 83 | 88 | 92 | -- | -- | 2918 | -- | -- |
| NuSeed | NHW12732 | EXP | 72 | 55 | 22.6 | 11.1 | 91 | 95 | 97 | -- | -- | 2949 | -- | -- |
| NuSeed | Jag DMR[1,2] | CA | 70 | 53 | 23.6 | 8.1 | 82 | 93 | 96 | -- | -- | 2900 | -- | -- |
| NuSeed | x9180[2] | CA | 73 | 58 | 23.4 | 14.4 | 66 | 85 | 93 | -- | 3929 | 2753 | 3341 | -- |
| NuSeed | NSK12N069[1] | EXP | 74 | 57 | 25.1 | 11.0 | 79 | 89 | 94 | -- | 3555 | 2865 | 3210 | -- |
| RRC | 2215 | CA | 73 | 56 | 22.4 | 10.8 | 83 | 90 | 95 | 2124 | 4552 | 3170 | 3861 | 3282 |
| RRC | 2215-CL[1] | CA | 76 | 57 | 22.3 | 17.0 | 78 | 90 | 94 | 1785 | 4003 | 2939 | 3471 | 2909 |
| RRC | 8015 | CA | 72 | 53 | 20.0 | 13.8 | 89 | 93 | 96 | -- | 3670 | 2633 | 3152 | -- |
| RRC | 2217-CP[1] | CA | 77 | 57 | 21.3 | 20.0 | 80 | 89 | 93 | -- | 3542 | 3017 | 3280 | -- |
| SunOpta/Dahlgren | 9521 | CA | 74 | 56 | 22.7 | 12.8 | 83 | 89 | 94 | -- | 4683 | 3299 | 3991 | -- |
| SunOpta/Dahlgren | EX-0041 | CA | 75 | 57 | 20.7 | 20.1 | 76 | 94 | 94 | -- | -- | 3154 | -- | -- |
| USDA | 924 | CK | 72 | 52 | 26.7 | 10.4 | 7 | 39 | 73 | 1413 | 3666 | 3093 | 3380 | 2724 |
| Trial Mean | | | 74 | 56 | 22.8 | 14.0 | -- | -- | -- | 1775 | 3640 | 3074 | -- | -- |
| C.V. % | | | 1.4 | 5.8 | 3.2 | 15.3 | -- | -- | -- | 19.7 | 8.3 | 9.6 | -- | -- |
| LSD 10% | | | 1.4 | 4.5 | 1.0 | 2.9 | -- | -- | -- | 484 | 414 | NS | -- | -- |
| LSD 5% | | | 1.7 | NS | 1.2 | 3.5 | -- | -- | -- | 583 | 496 | NS | -- | -- |

[1] Clearfield hybrid, [2] Downy mildew resistant.

[3] Status: CA-Commercially available, Exp-experimental, CK-long term hybrid check.

## Langdon - Oil Sunflower - 2014

| Brand | Hybrid | Hybrid Type[1] | Status[2] | Days to Flower | Plant Height | Oil[3] | Test Weight | Harvest Moist. | Yield @ 10% moisture 2012 | 2013 | 2014 | Average 2yr | 3yr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | days | in | % | lb/bu | % | lbs/a | | | | |
| Croplan | 432 E | NS,EX,DMR | CA | 73 | 54 | 42.4 | 29.9 | 13.3 | 2184 | 3827 | 2822 | 3325 | 2944 |
| Croplan | 559 CL | NS,CL,DMR | CA | 77 | 59 | 44.5 | 28.2 | 19.7 | 1769 | 3736 | 2198 | 2967 | 2568 |
| Croplan | 545 CL | NS,CL,DMR | CA | 79 | 57 | 42.3 | 26.8 | 26.8 | -- | 3700 | 2625 | 3163 | -- |
| Croplan | 13-652 CL | HO,CL,DMR | EXP | 79 | 57 | 41.9 | 25.6 | 24.4 | -- | -- | 1999 | -- | -- |
| Croplan | 458 E HO | HO,EX,DMR | EXP | 75 | 56 | 42.1 | 27.9 | 19.4 | -- | -- | 2303 | -- | -- |
| Croplan | 14-572 | HO,CL,DMR | EXP | 73 | 57 | 44.2 | 30.5 | 13.0 | -- | -- | 2780 | -- | -- |
| Genosys | 11G08 | NS | CA | 76 | 60 | 42.1 | 31.5 | 11.1 | 1642 | 3268 | 2510 | 2889 | 2473 |
| Genosys | 12E12 | HO,CL,DMR | CA | 75 | 62 | 38.7 | 31.8 | 18.8 | 1421 | 3243 | 2528 | 2886 | 2397 |
| Genosys | 12E13 | HO,CL,DMR | CA | 75 | 57 | 39.4 | 29.0 | 13.0 | 1989 | 3577 | 2971 | 3274 | 2846 |
| Genosys | 12E14 | HO,CL,DMR | CA | 76 | 62 | 39.5 | 27.4 | 15.7 | 1521 | 3437 | 2657 | 3047 | 2538 |
| Genosys | 12G20 | HO,CL | CA | 77 | 57 | 41.4 | 28.2 | 15.0 | -- | 3812 | 2679 | 3246 | -- |
| Genosys | 12E06 | HO,DMR | CA | 75 | 61 | 41.3 | 32.2 | 12.9 | -- | 3714 | 2993 | 3354 | -- |
| Genosys | 12G25 | HO,CL | CA | 76 | 57 | 41.3 | 29.1 | 21.9 | -- | -- | 2664 | -- | -- |
| Mycogen | 8N358CLDM | NS,CL | CA | 74 | 54 | 44.9 | 29.9 | 19.2 | 1522 | 3308 | 2626 | 2967 | 2485 |
| Mycogen | 8D310CL | NS,CL | CA | 75 | 63 | 36.6 | 25.6 | 14.8 | -- | 3775 | 2794 | 3285 | -- |
| Proseed | E-21 CL | HO,CL,DMR | CA | 75 | 57 | 38.6 | 31.8 | 19.5 | 1512 | 3230 | 2684 | 2957 | 2475 |
| Proseed | E-362436 | HO,DMR | CA | 76 | 61 | 40.3 | 31.4 | 15.3 | 1989 | 4070 | 2787 | 3429 | 2949 |
| Proseed | E-85 CL | HO,CL,DMR | CA | 76 | 65 | 39.2 | 26.2 | 16.9 | -- | 3618 | 2341 | 2980 | -- |
| Proseed | E-31 CL | HO,CL,DMR | CA | 75 | 58 | 38.8 | 29.8 | 11.6 | -- | 3540 | 2770 | 3155 | -- |

[1]Type: HO = High Oleic, NS = NuSun, Trad = Traditional, CL = Clearfield, EX= Express, DMR = Downy Mildew Resistant.

[2]Status: CA-Commercially available, EXP-Experimental, CK-Long term hybrid check.

[3]Oils were adjusted to 10% moisture. Oil % of Traditional hybrids were adjusted for oil type.

Maturity Checks: Days to Flower; 8N270=71.0, Falcon=76.0, 559CL=77.3

## Langdon - Oil Sunflower - 2014 (continued)

| Brand | Hybrid | Hybrid Type[1] | Status[2] | Days to Flower | Plant Height | Oil[3] | Test Weight | Harvest Moist. | Yield @ 10% moisture 2012 | 2013 | 2014 | Average 2yr | 3yr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | days | in | % | lb/bu | % | lbs/a | | | | |
| NuSeed | Falcon | NS,EX | CA | 76 | 53 | 43.8 | 30.1 | 13.6 | 1626 | 2984 | 2475 | 2730 | 2362 |
| NuSeed | Camaro II | NS,CL,DMR | CA | 76 | 58 | 42.4 | 31.2 | 19.3 | 2160 | 3841 | 2956 | 3399 | 2986 |
| NuSeed | Cobalt II | HO,CL,DMR | CA | 74 | 54 | 41.0 | 30.3 | 18.9 | 1918 | 3127 | 2656 | 2892 | 2567 |
| NuSeed | Hornet | HO,CL,DMR | CA | 79 | 55 | 41.3 | 26.0 | 26.0 | -- | 3532 | 2305 | 2919 | -- |
| NuSeed | Talon | NS,EX | CA | 73 | 52 | 42.0 | 29.3 | 15.2 | -- | -- | 2619 | -- | -- |
| NuSeed | Badger | Trad,CL | CA | 74 | 57 | 39.4 | 28.7 | 11.0 | -- | -- | 2630 | -- | -- |
| NuSeed | Badger DMR | Trad,CL,DMR | CA | 71 | 56 | 38.5 | 30.9 | 12.3 | -- | -- | 3005 | -- | -- |
| NuSeed | Badger HO | HO,CL,DMR | CA | 70 | 59 | 39.4 | 29.2 | 8.7 | -- | -- | 3228 | -- | -- |
| NuTech | 68H7 | HO,EX,DMR | CA | 75 | 61 | 41.8 | 32.9 | 20.4 | -- | -- | 3117 | -- | -- |
| NuTech | 69M2 | Trad,EX,DMR | CA | 78 | 62 | 42.1 | 29.2 | 17.5 | -- | -- | 3071 | -- | -- |
| Syngenta | 7111 HO/CL/DM | HO,CL,DMR | CA | 72 | 51 | 41.7 | 32.0 | 13.4 | -- | 3059 | 2399 | 2729 | -- |
| Syngenta | 7717 HO/CL/DM | HO,CL,DMR | CA | 75 | 57 | 41.9 | 30.7 | 13.9 | -- | -- | 2607 | -- | -- |
| Syngenta | 3495 NS/CL/DM | NS,CL,DMR | CA | 76 | 58 | 40.9 | 31.2 | 13.2 | -- | -- | 2661 | -- | -- |
| Syngenta | NX34240 | HO,CL,DMR | EXP | 77 | 55 | 40.7 | 27.2 | 19.3 | -- | -- | 2275 | -- | -- |
| USDA | 894 | Trad | CK | 73 | 56 | 41.5 | 29.4 | 11.2 | 1663 | 3443 | 2500 | 2972 | 2535 |
| Trial Mean | | | | 75 | 58 | 41.2 | 29.6 | 16.4 | 1723 | 3479 | 2667 | -- | -- |
| C.V. % | | | | 1.1 | 5.4 | 2.5 | 4.0 | 17.0 | 16.5 | 9.0 | 9.7 | -- | -- |
| LSD 10% | | | | 1.1 | 4.2 | 1.4 | 1.6 | 3.8 | 386 | 430 | 354 | -- | -- |
| LSD 5% | | | | 1.4 | 5.1 | 1.7 | 1.9 | 4.5 | 462 | 516 | 425 | -- | -- |

[1]Type: HO = High Oleic, NS = NuSun, Trad = Traditional, CL = Clearfield, EX= Express, DMR = Downy Mildew Resistant.

[2]Status: CA-Commercially available, EXP-Experimental, CK-Long term hybrid check.

[3]Oils were adjusted to 10% moisture. Oil % of Traditional hybrids were adjusted for oil type.

Maturity Checks: Days to Flower; 8N270=71.0, Falcon=76.0, 559CL=77.3

## Langdon - Betaseed Energy Sugarbeet Trial - 2011

| Variety Entry ID | Sugar Content | Sugar Content | Root Yield | Sugar Yield | Sugar Yield |
|---|---|---|---|---|---|
| | % | % check | tons/a | lb/a | % check |
| Check | 20.1 | 100 | 26.0 | 10,433 | 100 |
| EAR122 | 21.2 | 106 | 28.3 | 11,996 | 115 |
| EAR133 | 20.5 | 102 | 28.4 | 11,655 | 112 |
| EAR155 | 21.4 | 107 | 24.9 | 10,634 | 102 |
| EGR199 | 20.5 | 102 | 23.7 | 9,724 | 93 |
| EHR144 | 20.4 | 102 | 27.4 | 11,210 | 107 |
| Mean | 20.7 | -- | 26.5 | 10,942 | -- |
| CV% | 3.4 | -- | 5.5 | -- | -- |
| LSD 5% | NS | -- | 3.4 | -- | -- |

Date Planted : 5/26/2011
Date Harvested: 10/10/2011

## Langdon - Betaseed Energy Sugarbeet Trial - 2012

| Variety Entry ID | Sugar Content | Sugar Content | Root Yield | Sugar Yield | Sugar Yield |
|---|---|---|---|---|---|
| | % | % check | tons/a | lb/a | % check |
| Check | 17.9 | 100 | 34.1 | 12,164 | 100 |
| EGR229 | 18.1 | 101 | 30.3 | 10,954 | 90 |
| EMR231 | 18.4 | 103 | 30.3 | 11,141 | 92 |
| ENR242 | 18.9 | 106 | 30.3 | 11,418 | 94 |
| EMR232 | 17.8 | 100 | 27.9 | 9,960 | 82 |
| EAR233 | 17.5 | 98 | 34.9 | 12,233 | 101 |
| Mean | 18.1 | -- | 31.3 | 11,311 | -- |
| CV% | 4.2 | -- | 15.7 | -- | -- |
| LSD 5% | NS | -- | NS | -- | -- |

Date Planted : 4/30/2012
Date Harvested: 10/12/2012

## Langdon - Betaseed Energy Sugarbeet Trial - 2013

| Variety Entry ID | Sugar Content | Sugar Content | Root Yield | Sugar Yield | Sugar Yield |
|---|---|---|---|---|---|
| | % | % check | tons/a | lb/a | % check |
| ENR221 | 18.4 | 100 | 29.3 | 10,735 | 100 |
| ENR224 | 18.2 | 99 | 28.6 | 10,376 | 97 |
| EMR231 | 18.4 | 100 | 28.8 | 10,593 | 99 |
| EAR234 | 19.1 | 104 | 29.5 | 11,243 | 105 |
| ERR223 | 17.9 | 97 | 29.4 | 10,505 | 98 |
| Mean | 18.4 | -- | 29.1 | 10,690 | -- |
| CV% | 1.9 | -- | 5.3 | -- | -- |
| LSD 5% | 0.9 | -- | NS | -- | -- |

Date Planted : 5/16/2013
Date Harvested: 10/17/2013

## Langdon - Energy Sugarbeet Trial - 2014

| Company | Variety | Sugar Content | Root Yield | Sugar Yield |
|---|---|---|---|---|
| | | % | tons/a | lb/a |
| Syngenta | HM 173RR | 18.7 | 24.0 | 9,106 |
| Syngenta | HM4300RR | 19.9 | 26.6 | 10,556 |
| Syngenta | HM4022RR | 19.4 | 29.6 | 11,511 |
| SES Vanderhave | SV RR1141E | 18.0 | 23.6 | 8,439 |
| SES Vanderhave | SV RR1142E | 20.0 | 23.1 | 9,222 |
| SES Vanderhave | SV RR1143E | 19.4 | 24.8 | 9,616 |
| Betaseed | x402 | 20.3 | 33.1 | 13,370 |
| Betaseed | x403 | 19.3 | 27.5 | 10,563 |
| Betaseed | x406 | 19.7 | 27.5 | 10,813 |
| Mean | | 19.4 | 27 | 10,355 |
| CV% | | 4.3 | 15.9 | 18.6 |
| LSD 10% | | NS | NS | NS |

Date Planted : 5/16/2014
Date Harvested: 10/8/2014

## Cando - Energy Sugarbeet Trial - 2014

| Company | Variety | Sugar Content | Root Yield | Sugar Yield |
|---|---|---|---|---|
| | | % | tons/a | lb/a |
| Syngenta | HM 173RR | 15.8 | 26.6 | 8,331 |
| Syngenta | HM4300RR | 17.1 | 31.0 | 10,596 |
| Syngenta | HM4022RR | 16.3 | 31.8 | 10,358 |
| SES Vanderhave | SV RR1141E | 15.5 | 37.1 | 11,432 |
| SES Vanderhave | SV RR1142E | 15.5 | 36.2 | 11,152 |
| SES Vanderhave | SV RR1143E | 16.5 | 30.9 | 10,191 |
| Betaseed | x402 | 15.5 | 37.5 | 11,584 |
| Betaseed | x403 | 16.2 | 39.7 | 12,829 |
| Betaseed | x406 | 16.4 | 32.7 | 10,653 |
| Mean | | 16.1 | 33.7 | 10,792 |
| CV% | | 3.9 | 7.8 | 8.0 |
| LSD 10% | | NS | 4.9 | 1,599 |

Date Planted : 5/28/2014
Date Harvested: 10/10/2014

## Seeding Rate Effect on Yield and other Agronomic Traits of Soybean-2014

Bryan Hanson, Travis Hakanson, Lawrence Henry, NDSU Langdon Research Extension Center

Seeding rate trials were embedded in soybean variety trials at two off-station locations in 2014. Populations ranged from 125,000 to 225,000 pure live seed per acre (pls/a). Seeding rates were adjusted for seed size and germination (90%). The variety Asgrow AG00632 (maturity group 00.6) was seeded at Park River (Walsh County) and Pekin (Nelson County). Seeding dates were May 27 and 28 for Park River and Pekin, respectively. Row spacing was six inches.

The LSD 10% and CV% were determined using data from the entire variety trial at each location. Means are calculated from the five seeding rates. Seeding rate appeared to have little effect on maturity dates, with a slight delay in Park River. Plant height, protein and oil differences among seeding rates were small and mostly non-significant at the various locations. Seeding rate effects on yield at Park River were non-significant while the 175,000 pls/a seeding rate at Pekin was significantly higher than the two lower seeding rates. In both trials, the 175,000 pls/a seeding rate had the numerically highest yield. Combined results from studies conducted in 2011, 2012 and 2014 would seem to indicate that a seeding rate between 175 and 200,000 pls/a would result in optimum yields.

**Nelson County - Pekin 2014**

| Seeding Rate pls/a | Maturity Date | Height (in) | Protein % | Oil % | Plant Stand Plts/ft$^2$ | Yield bu/a |
|---|---|---|---|---|---|---|
| 125,000 | 17-Sep | 28 | 33.9 | 15.0 | 3.2 | 42.6 |
| 150,000 | 16-Sep | 26 | 33.3 | 15.2 | 3.1 | 43.1 |
| 175,000 | 17-Sep | 27 | 33.3 | 15.4 | 4.3 | 48.8 |
| 200,000 | 15-Sep | 29 | 33.9 | 14.9 | 3.8 | 46.6 |
| 225,000 | 16-Sep | 28 | 33.9 | 14.6 | 5.6 | 48.1 |
| Mean | 16-Sep | 28 | 33.7 | 15.0 | 4.0 | 45.8 |
| CV % | 1.8 | 9.3 | 2.0 | 2.0 | 23.1 | 7.8 |
| LSD 10% | 2.3 | 3.2 | 1.1 | 0.5 | 1.2 | 5.1 |

**Walsh County - Park River 2014**

| Seeding Rate pls/a | Maturity Date | Height (in) | Protein % | Oil % | Plant Stand Plts/ft$^2$ | Yield bu/a |
|---|---|---|---|---|---|---|
| 125,000 | 6-Sep | 29 | 32.6 | 16.5 | 3.2 | 47.5 |
| 150,000 | 6-Sep | 29 | 33.0 | 16.6 | 3.0 | 48.9 |
| 175,000 | 4-Sep | 30 | 32.3 | 16.5 | 4.4 | 50.7 |
| 200,000 | 5-Sep | 28 | 33.0 | 16.3 | 4.8 | 51.1 |
| 225,000 | 5-Sep | 29 | 32.3 | 16.7 | 4.5 | 50.7 |
| Mean | 5-Sep | 29 | 32.6 | 16.5 | 4.0 | 49.8 |
| CV % | 1.5 | 8.1 | 1.6 | 1.7 | 19.7 | 7.1 |
| LSD 10% | 1.8 | 2.7 | 0.8 | 0.5 | 1.0 | 4.8 |

**Combined soybean yield data from various locations in 2011, 2012 and 2014.**

| | Yield (bu/a) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Seeding Rate pls/a | Vesley-ville 2012 | Lakota 2012 | Langdon 2012 | Park River 2014 | Pekin 2014 | Voss 2011 | Langdon 2011 | 7-site Avg | 6-site Avg | 4-site Avg | 2-site Avg |
| 125,000 | | 56.0 | 38.5 | 47.5 | 42.6 | 46.2 | 59.4 | | 48.4 | 48.9 | 52.8 |
| 150,000 | 49.1 | 60.8 | 44.3 | 48.9 | 43.1 | 46.4 | 61.0 | 50.5 | 50.7 | 49.8 | 53.7 |
| 175,000 | 47.7 | 62.7 | 42.1 | 50.7 | 48.8 | 48.9 | 63.6 | 52.1 | 52.8 | 53.0 | 56.3 |
| 200,000 | 52.5 | 64.0 | 42.5 | 51.1 | 46.6 | 50.6 | 64.7 | 53.1 | 53.2 | 53.2 | 57.7 |
| 225,000 | | | | 50.7 | 48.1 | 50.5 | 65.2 | | | 53.6 | 57.9 |
| 250,000 | | | | | | 50.5 | 65.7 | | | | 58.1 |


# Canola Seeding Rate and Hybrid Influence on Spring Canola Performance in Northeast North Dakota, 2013-14.

Bryan Hanson, Travis Hakanson and Lawrence Henry- NDSU Langdon Research Extension Center

Spring canola has become a viable economic alternative for many producers in North Dakota. Previous research conducted on seeding rates in North Dakota focused on open pollinated and hybrid non-herbicide tolerant lines. Advances in canola breeding have lead producers to favor seeding herbicide tolerant Roundup Ready (RR) and Liberty Link (LL) hybrids. Rising seed prices have resulted in producer consideration of lower seeding rates to reduce costs. This field study examined the effects of seeding rates on yield and agronomic traits of a RR and LL hybrid. The study was conducted at Langdon in a randomized complete block design in a split plot arrangement with hybrids as main plots and seeding rates as subplots. Plots consisted of seven rows with a six inch spacing. Seeding rates were 3, 6, 9, 12 and 15 pure live seed (pls)/ft$^2$. The seeding rates, in lbs/a, for the different years and hybrid seed lots are given in Table 1. The trial was planted on May 24 and 21 in 2013 and 2014, respectively. Trials were planted later than normal both years due to wet and/or cold soil conditions. Precipitation and temperatures were nearly ideal to produce very high yields in both growing seasons. The trial was conducted using best management practices for canola including fertility, fungicide and harvest management. Each hybrid was sprayed with its corresponding herbicide trait for weed control. Two hybrids cultivars were used; Liberty Link InVigor L130 and Roundup Ready HyClass 955.

Various environment x hybrid and seeding rate interactions occurred for days to first flower, days to end flower, flower duration, plant height, harvest plant stand, and net return but the differences (data not shown) generally would not be of any practical significance to canola production. For this reason, seeding rate and hybrid cultivar comparisons are averaged over hybrids and seeding rates, respectively. The two canola hybrids were similar to each other in yield and all other traits observed except for oil percent where HyClass 955 had a significantly higher oil level than InVigor L130.

Plant emergence in 2013 and 2014 was excellent for both hybrids averaging over 90 percent for the seeding rates. This was somewhat atypical as emergence rates usually range from 60-80 percent. Days to flower, end flower, and maturity were all significantly delayed at the 3 pls/ft$^2$ seeding rate compared to other seeding rates. This was probably a result of increased branching from the lower plant density.

The higher the seeding rate the faster percent ground cover was attained. Plant height was greater at the lower seeding rates while lodging increased slightly with increasing seeding rates although the differences were not significant. No lodging was observed in the 2014 trial. Seeding rate had no effect on percent oil which supports previous research.

Yield generally increased with higher seeding rates. The 3 pls/ft$^2$ seeding rate yielded significantly less than the 6, 9, 12, or 15 pls/ft$^2$ seeding rate. There was no significant difference in yield between the 6 and 9, 9 and 15, and 12 and 15 pls/ft$^2$ seeding rates. The data would suggest that seeding between 9 and 12 pls/ft$^2$ would result in optimum yields. If seed bed conditions resulted in an emergence of 60 percent, plant stands of between 5 and 7 plants/ft$^2$ would still be attained . This population should still maintain a yield higher than the 3 pls/ft$^2$ seeding rate where significant losses were observed. Seeding rates could be reduced with ideal seedbed conditions of adequate moisture and warm soil temperatures. Net return was calculated by multiplying yield times a market price of $ 0.17/lb minus seed cost. Seed cost for the two years was $10.72/lb for both hybrids. There was no significant differences in net return at P≤0.10 level. The significant F value for net return was P≤0.21. Numerically, the optimum seeding rate for net return was between 9 and 12 pls/ft$^2$ . The 3 seeds/ft$^2$ seeding rate was $22/a less than the 6 pls/ft$^2$ seeding rate , although this was not significant.

**Table 1. Seeding rates in pls/ft$^2$ vs lbs/a for InVigor L130 and HyClass 955 in 2013-2014.**

| Seeding Rate | 2013 - L130 | 2014 - L130 | 2013 - 955 | 2014 - 955 |
|---|---|---|---|---|
| | Seedlot size in seeds/lb | | | |
| | 108,000 | 89,000 | 114,000 | 107,000 |
| Seeds/ft$^2$ | lbs/a | | | |
| 3 | 1.2 | 1.5 | 1.2 | 1.3 |
| 6 | 2.4 | 3.0 | 2.3 | 2.5 |
| 9 | 3.5 | 4.5 | 3.5 | 3.8 |
| 12 | 4.7 | 6.0 | 4.7 | 5.0 |
| 15 | 5.9 | 7.5 | 5.8 | 6.3 |

**Table 2. Seeding rate effect on canola yield and other agonomic traits averaged over cultivars, Langdon 2013-2014.**

| Seeding Rate | Yield | Emergence | | Harvest | | 1st Flower | End Flower | Flower Duration | Maturity | Cover | HT | Lodging | Oil | Net Return |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PLS/ft$^2$ | lbs/a | plts/ft$^2$ | % | plts/ft$^2$ | % | DAP[1] | DAP | Days | DAP | %[2] | in | 0-9 | % | $ |
| 3 | 3334 | 2.6 | 84 | 2.9 | 95 | 43.6 | 61.7 | 18.1 | 91.6 | 29.4 | 48.6 | 0.4 | 46.0 | 553 |
| 6 | 3543 | 5.7 | 94 | 5.8 | 96 | 42.1 | 60.1 | 18.0 | 90.3 | 61.6 | 47.5 | 0.4 | 46.3 | 575 |
| 9 | 3689 | 8.7 | 96 | 8.5 | 94 | 41.6 | 59.6 | 18.1 | 89.9 | 77.5 | 47.3 | 0.8 | 46.4 | 586 |
| 12 | 3898 | 12.0 | 100 | 10.7 | 89 | 42.0 | 60.0 | 18.0 | 89.6 | 83.3 | 45.6 | 0.9 | 46.1 | 608 |
| 15 | 3812 | 14.6 | 98 | 13.4 | 89 | 41.1 | 59.4 | 18.3 | 89.5 | 88.3 | 45.3 | 1.0 | 46.0 | 579 |
| LSD 10% | 181 | 0.9 | NS | 0.9 | NS | 0.4 | 0.5 | NS | 0.6 | 3.0 | 1.1 | NS | NS | NS |
| C.V. % | 8.4 | 17.4 | 18.3 | 17.6 | 17.7 | 1.5 | 1.4 | 4.6 | 1.1 | 7.5 | 4.0 | 93.8 | 1.7 | 9.0 |

**Table 3. Comparison of two canola cultivars averaged over seeding rates, Langdon 2013-2014.**

| Variety | YIELD | ES | ES% | HS | HS% | 1STF[1] | END | FD | DM | Cover[2] | HT | LGD | OIL | Net Return |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HyClass 955 | 3657 | 8.6 | 91.9 | 8.1 | 90.6 | 41.2 | 59.4 | 18.2 | 89.6 | 68.6 | 44.1 | 1.0 | 48.1 | 583 |
| InVigor L130 | 3653 | 8.8 | 96.6 | 8.4 | 94.0 | 43.0 | 61.0 | 18.0 | 90.8 | 67.5 | 49.6 | 0.4 | 44.2 | 578 |
| LSD 10% | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | * | NS |

[1]DAP=Days after planting.

[2]Visual rating of percent area of plot covered by plant growth. Rated at 5-6 leaf stage.

* Significant at P≤ 0.10.

# EFFECT OF A HOMOGENEOUS BLEND OF UREA + AMMONIUM SULFATE VERSUS TWO PHYSICAL BELENDS AND STRAIGHT FERTILIZERS ON THE YIELD AND QUALITY OF CANOLA SEED IN NORTHEAST NORTH DAKOTA

**By**

Naeem Kalwar (Extension Area Specialist/Soil Health)

## Introduction

Nitrogen and sulfur are two out of the thirteen essential plant nutrients, which plant roots absorb from the soil. Nitrogen is not only an essential component of all proteins, but is also taken up by the plants in large quantities. Its deficiency often results in stunted and slow growth as well as chlorosis. Being a secondary plant nutrient, sulfur is also required in higher quantities by the plants. Apart from being a structural component of the amino acids, proteins, vitamins and enzymes, sulfur is also essential for the production of chlorophyll.

General North Dakota State University fertilizer recommendations for nitrogen and sulfur are 130 lbs of nitrogen and 10 to 15 lb of sulfur in sulfate ($SO_4^{--}$) form/acre for a yield potential of 2000 lb of canola seed per acre (North Dakota Fertilizer Recommendation Tables and Equations, 2010. SF-882, Revised).

In order to fulfill these nutritional requirements, producers often apply a physical blend of urea and ammonium sulfate. While a physical blend may have the nutrient quantities applicators would be aiming for, once spread on the field it may result in uneven nutrient streaking. One option could be a homogeneous mix of Urea and Ammonium Sulfate fertilizers having the required composition of nitrogen and sulfur.

## Objectives

Considering the high nitrogen and sulfur requirements of canola versus most crops, a fertilizer study was started in 2014 on behalf of Yara North America, Inc. The objective of the study was to compare the effects of “Amidas”; a homogeneous mix of Urea + Ammonium Sulfate, on the yield and quality of canola seed versus two physical blends of Urea + Ammonium Sulfate and Agrotain treated Urea + Ammonium Sulfate and straight fertilizers.

### Trial Locations

Trial site was located at the NDSU Langdon Research Extension Center, Langdon, Cavalier County, North Dakota.

### Treatments and Replications

Treatment 1 (control) only received a uniform rate of phosphorous and potassium/acre based on the soil analysis report with no nitrogen and sulfur application. T2, T3 and T4 received 93, 113 and 133 lb of nitrogen + no sulfur + uniform rates of phosphorous and potassium/acre through straight fertilizers. T5 to T13 received same rates of nitrogen + 11, 13.75 and 16.5 lb of sulfate sulfur + uniform rates of phosphorous and potassium/acre applied through physical blends of Urea + Ammonium Sulfate and Agrotain treated Urea + Ammonium Sulfate, and Amidas. Overall there were thirteen treatments and four replications. As Mono Ammonium Phosphate was applied to apply phosphorous due to the unavailability of Single Super Phosphate or Triple Super Phosphate, Urea, AS, Amidas and Agrotain treated Urea rates were adjusted accordingly. This also resulted in control receiving 13 lb of nitrogen/acre versus the original plan of no nitrogen application. To fulfill potassium requirements, Potassium Chloride was applied. Agrotain treated Urea was treated with AGROTAIN ULTRA stabilizer at the rate of 3 quarts/ton. Details of the treatments, fertilizer/blend type and nutrients quantities/acre are in the below table.

| Treatment | Fertilizer/Blend | Nitrogen (lb/acre) | Sulfur (lb/acre) | Phosphorus (lb/acre) | Potassium (lb/acre) |
|---|---|---|---|---|---|
| T1 | Control | 13 | 0 | 60 | 37 |
| T2 | Urea | 93 | 0 | 60 | 37 |
| T3 | Urea | 113 | 0 | 60 | 37 |
| T4 | Urea | 133 | 0 | 60 | 37 |
| T5 | Urea + AS blend | 93 | 11 | 60 | 37 |
| T6 | Urea + AS blend | 113 | 13.75 | 60 | 37 |
| T7 | Urea + AS blend | 133 | 16.5 | 60 | 37 |
| T8 | Amidas | 93 | 11 | 60 | 37 |
| T9 | Amidas | 113 | 13.75 | 60 | 37 |
| T10 | Amidas | 133 | 16.5 | 60 | 37 |
| T11 | Agrotain treated Urea + AS blend | 93 | 11 | 60 | 37 |
| T12 | Agrotain treated Urea + AS blend | 113 | 13.75 | 60 | 37 |
| T13 | Agrotain treated Urea + AS blend | 133 | 16.5 | 60 | 37 |

**Note:** No fall-nitrogen was applied. Full rates of nitrogen, phosphorous, potassium and sulfur were broadcasted by hand in spring-2014 before planting on May 23, 2014.

## Design and Plot Size

Trial was planted in a randomized complete block design. Plot size was 13 X 25 feet.

## Planting Data

| Location | Variety | Planting Date | Seed Rate (lbs./acre) | Drilling Space |
|---|---|---|---|---|
| Langdon REC | DKL72-40 Canola | May 23, 2014 | 7 | 7” with 1” depth |

## Harvesting Data

Trial was harvested on September 3rd, 2014. No desiccant was applied.

## Results and Discussion

Data was analyzed using SAP statistical package with F-test protected LSD to determine the treatment effect only.

For yield in lb/acre, Treatment 1 (control) was found significantly lower than rest of the treatments at 90% and 95% confidence intervals. T4, 6, 7, 8, 9, 10, 12 and 13 were found significantly higher than T5 at 90% confidence interval, whereas, T2, 3 and 11 were numerically higher than T5. For the same parameter, T6, 7, 8, 10, 12 and 13 were significantly higher than T5 at 95% confidence interval, whereas, T2, 3, 4, 9 and 11 were numerically higher than T5. T6, 7 and 13 were found significantly higher than T2 and 11 at 90% and 95% confidence intervals. T12 was significantly higher than T11 at 90% confidence interval and higher than T2 at 95% confidence interval. T10 was significantly higher than T2 at 90% confidence interval. Numerically, T7 was the highest yielding treatment. There was no statistically significant yield difference between T3, 4, 6, 7, 8, 9, 10, 12 and 13.

For the test weight too, T1 (control) was found significantly lower than rest of the treatments at 90% and 95% confidence intervals. T3 was significantly higher than T2, 11 and 12 at 90% confidence interval, whereas, T10 was significantly higher than 2, 4, 11 and 12 at 95% confidence interval. T10 recorded the highest statistically significant test weight versus rest of the treatments.

For the oil %, T10 was significantly lower than T3, 4 and 6 at 90% confidence interval, whereas, T8, 9, 12 and 13 were numerically higher than T10. T1, 2, 5, 7 and 11 were significantly higher than T10 at 95% confidence interval. T2 was significantly higher than T8 and 12 at 90% confidence interval, whereas, T1 was significantly higher than T2, 3, 4, 5, 6, 7, 8, 9, 11, 12 and 13 at 95% confidence interval.

1000 seed weight and seed per pound showed no statistically significant differences at 90% as well as 95% confidence intervals.

| Treatments | Yield/acre (lb) | Test Weight (lb/bushel) | 1000 Seed Weight (g) | Seed / Pound | Oil Percentage |
|---|---|---|---|---|---|
| 1 | 2467 | 49.4 | 3.0 | 151,579 | 46.7 |
| 2 | 3235 | 50.6 | 3.1 | 146,531 | 43.7 |
| 3 | 3412 | 51.5 | 2.9 | 156,225 | 41.6 |
| 4 | 3469 | 50.8 | 2.9 | 155,636 | 41.8 |
| 5 | 3150 | 51.2 | 2.9 | 157,042 | 42.3 |
| 6 | 3689 | 51.3 | 3.0 | 152,712 | 41.7 |
| 7 | 3716 | 51.2 | 3.0 | 151,062 | 42.1 |
| 8 | 3532 | 51.3 | 3.0 | 152,382 | 40.8 |
| 9 | 3525 | 51.1 | 3.0 | 152,788 | 41.2 |
| 10 | 3553 | 51.8 | 3.0 | 153,927 | 39.1 |
| 11 | 3277 | 50.7 | 2.9 | 157,372 | 42.7 |
| 12 | 3613 | 50.6 | 2.9 | 154,621 | 40.9 |
| 13 | 3670 | 51.2 | 2.9 | 155,634 | 41.0 |
| **HIGH MEAN** | 3716 | 51.8 | 3.1 | 157,372 | 46.7 |
| **LOW MEAN** | 2467 | 49.4 | 2.9 | 146,531 | 39.1 |
| **EXP MEAN** | 3408 | 51.0 | 3.0 | 153,655 | 42.0 |
| **C.V. %** | 7.7 | 1.3 | 3.2 | 3.2 | 4.6 |
| **LSD 5%** | 313 | 0.8 | NS | NS | 2.3 |
| **LSD 1%** | 376 | 1 | NS | NS | 2.8 |
| **No. OF REPS** | 4 | 4 | 4 | 4 | 4 |
| **F-TRT** | 6.5 | 2.9 | 1.5 | 1.5 | 3.4 |

**Note:** Zero yield was recorded for plot-204, as while harvesting more than half of the canola seed was lost due to a ripped bag.

## Summary

Highest canola seed yields/acre were recorded at 133 lb of nitrogen and 16.5 lb of sulfate sulfur combined with 60 lb of phosphorous and 37 lb of potassium/acre by applying the two physical blends of Urea + AS (T7) and Agrotain treated Urea + AS (T13). Best returns on yield were obtained at the rate of 113 lb of nitrogen and 13.75 lb of sulfate sulfur with 60 lb of phosphorous and 37 lb of potassium/acre again by applying Urea + AS (T6)and Agrotain treated Urea + AS (T12).

Highest test weight (51.8 lb/bu) was recorded for T10, by applying Amidas at the rate of 133 lb of nitrogen, 16.5 lb of sulfate sulfur with 60 lb of phosphorous and 37 lb of potassium/acre.

Highest oil % was observed in control treatment with only 13 lbs of nitrogen and no application of sulfur with 60 lb of phosphorous and 37 lb of potassium/acre.

# Effect of Different Sulfur Fertilizer Types, Rates and Timings on the Quality and Yield of Canola Seed in Northeast North Dakota

**By**

Naeem Kalwar (Extension Area Specialist/Soil Health)

John Lukach (Extension Area Specialist/Winter Cereals Agronomist)

## Objectives

Considering the high sulfur requirements of canola versus most crops, a sulfur fertilizer study was started in 2012 on behalf of Sulvaris Inc. of Calgary, Alberta. Year 2014 was the continuation of the same study. The objective of the study was to compare different sulfur fertilizers, containing sulfur in sulfate ($SO_4^{--}$) and elemental sulfur ($S^o$) forms, applied at different rates/acre in fall-2013 and spring-2014 on the yield and quality of canola. Sulvaris Inc. provided Carbon Ammonium Sulfate (CAS) and Vitasul (marketed as Rapid Release Sulfur in 2012), whereas, Ammonium Sulfate (AS) and Tiger-90 were obtained from the market.

### Trial Locations

Similar to 2012 and 2013, trial locations were NDSU Langdon Research Extension Center, Langdon, Cavalier County, ND and Bina Farm, 5 miles Southwest of Lankin, Walsh County, ND. Planting sites were changed at both locations due to the crop rotation practices.

### Treatments and Replications

Treatment 1 to T4 included a uniform rate of 30 lb of sulfur/acre for the four sulfur products and recommended rate of NPK based on the soil analysis reports. Treatment 5 was control (no sulfur) with maximum rate of NPK. The input for the first five treatments was provided by the Sulvaris Inc. In order to broaden the scope of research, four more treatments were added based on the results of the previously conducted NDSU studies. T6 and T7 received 20 lb of sulfur/acre and T8 and T9 included an application of 10 lb of sulfur/acre through AS and CAS plus recommended rates of NPK. Recommended rates for NPK remained uniform for all treatments except control. Overall there were nine treatments and four replications (details in the below table).

| | | Sulfur lb/acre | | | |
|---|---|---|---|---|---|
| **Treatment** | **Sulfur Product** | **Sulfate Sulfur ($SO_4$)** | **Elemental Sulfur ($S^o$)** | **Total Sulfur** | **NPK/acre** |
| T1 | Vitasul (90% S) | 0 | 30 | 30 | Recommended rate |
| T2 | Tiger-90 (90% S) | 0 | 30 | 30 | Recommended rate |
| T3 | AS (26% S) | 30 | 0 | 30 | Recommended rate |
| T4 | CAS (21% S) | 30 | 0 | 30 | Recommended rate |
| T5 | Control | 0 | 0 | 0 | Maximum rate |
| **Additional Treatments** | | | | | |
| T6 | AS (26% S) | 20 | 0 | 20 | Recommended rate |
| T7 | CAS (21% S) | 20 | 0 | 20 | Recommended rate |
| T8 | AS (26% S) | 10 | 0 | 10 | Recommended rate |
| T9 | CAS (21% S) | 10 | 0 | 10 | Recommended rate |

Unlike 2012 and 2013, Vitasul and Tiger-90 were applied in fall-2013. This was done to increase the efficiency of these products by providing more time for the conversion of elemental sulfur ($S^o$) into sulfate sulfur ($SO_4^{--}$) form. At both sites, T1 and T2 received full rates of Vitasul and Tiger-90 on October 4, 2013. Both of the products were first broadcasted by hand and then harrowed in. As both sites received no nitrogen application in fall-2013, full NPK rates were applied on T1 and T2 in spring-2014 before planting. Treatments T3 to T9, received full rates of sulfur fertilizers and NPK in spring-2014 before planting at both sites.

For the Langdon REC site, nitrogen and phosphorous application rates were revised due to the incidental application of 125 lb of nitrogen and 50 lb of phosphorous/acre on May 11, 2014. Remaining quantities of nitrogen and sulfur were applied through CAS and AS and harrowed in on May 17, 2014 at the Langdon REC site. At the Lankin site, full rates of sulfur (except T1 and T2), nitrogen and phosphorous were applied to T3 to T9 on May 15th and then harrowed in. Urea and Mono Ammonium Phosphate fertilizers were applied to fulfill the nitrogen and phosphorous requirements.

Based on the soil analysis reports for both sites, following sulfur, nitrogen and phosphorous rates were applied in lb/acre.

| Langdon REC Site | | | | | |
|---|---|---|---|---|---|
| **Treatment** | **Sulfur Product** | **Sulfur (lb/acre)** | **N (lb/acre)** | **P2O5 (lb/acre)** | **K2O (lb/acre)** |
| T1 | Vitasul (90% S) | 30 | 162 | 50 | 0 |
| T2 | Tiger-90 (90% S) | 30 | 162 | 50 | 0 |
| T3 | AS (21% N + 24% S) | 30 | 162 | 50 | 0 |
| T4 | CAS (18% N + 21% S) | 30 | 162 | 50 | 0 |
| T5 | Control | 0 | 170 | 60 | 0 |
| T6 | AS (21% N + 24% S) | 20 | 162 | 50 | 0 |
| T7 | CAS (18% N + 21% S) | 20 | 162 | 50 | 0 |
| T8 | AS (21% N + 24% S) | 10 | 162 | 50 | 0 |
| T9 | CAS (18% N + 21% S) | 10 | 162 | 50 | 0 |
| Lankin (Bina Farm) Site | | | | | |
| **Treatment** | **Sulfur Product** | **Sulfur (lb/acre)** | **N (lb/acre)** | **P2O5 (lb/acre)** | **K2O (lb/acre)** |
| T1 | Vitasul (90% S) | 30 | 120 | 28 | 0 |
| T2 | Tiger-90 (90% S) | 30 | 120 | 28 | 0 |
| T3 | AS (21% N + 24% S) | 30 | 120 | 28 | 0 |
| T4 | CAS (18% N + 21% S) | 30 | 120 | 28 | 0 |
| T5 | Control | 0 | 150 | 35 | 0 |
| T6 | AS (21% N + 24% S) | 20 | 120 | 28 | 0 |
| T7 | CAS (18% N + 21% S) | 20 | 120 | 28 | 0 |
| T8 | AS (21% N + 24% S) | 10 | 120 | 28 | 0 |
| T9 | CAS (18% N + 21% S) | 10 | 120 | 28 | 0 |

## Design and Plot Size

Both trials were planted in a randomized complete block design. Plot sizes at both locations were 13 X 25 feet.

## Planting Data

| Location | Variety | Planting Date | Seed Rate (lbs./acre) | Drilling Space |
|---|---|---|---|---|
| Lankin | DKL72-40 Canola | May 18, 2014 | 7 | 7” with 1” depth |
| Langdon REC | DKL72-40 Canola | May 23, 2014 | 7 | 7” with 1” depth |

## Harvesting

Lankin site was harvested on September 2nd, whereas, Langdon REC site was harvested on September 3rd. No desiccant was sprayed in 2014 at either sites.

## Results and Discussion

Data from both sites was analyzed using SAP statistical package with F-test protected LSD to determine the treatment effect only. At Lankin and Langdon REC locations, yield, test weight, 1000 seed weight, seed per pound and oil

percentage showed no statistically significant differences at 90% as well as 95% confidence intervals. Data for both sites is given below.

**Lankin Location:**

| Treatments | Yield/acre (lb) | Test Weight (lb/bushel) | 1000 Seed Weight (g) | Seed / Pound | Oil Percentage |
|---|---|---|---|---|---|
| 1 | 3146 | 50.4 | 3.3 | 137,238 | 45.9 |
| 2 | 3025 | 50.6 | 3.1 | 144,652 | 46.1 |
| 3 | 3121 | 51.0 | 3.4 | 133,989 | 46.0 |
| 4 | 3208 | 50.9 | 3.5 | 131,417 | 45.5 |
| 5 | 3458 | 50.6 | 3.3 | 135,959 | 45.7 |
| 6 | 3099 | 50.8 | 3.4 | 134,874 | 45.8 |
| 7 | 3411 | 50.9 | 3.4 | 131,981 | 45.8 |
| 8 | 2969 | 50.6 | 3.4 | 132,481 | 46.4 |
| 9 | 2910 | 50.5 | 3.4 | 134,041 | 45.6 |
| **HIGH MEAN** | 3458 | 51.0 | 3.5 | 144,652 | 46.4 |
| **LOW MEAN** | 2910 | 50.4 | 3.1 | 131,417 | 45.5 |
| **EXP MEAN** | 3150 | 50.7 | 3.4 | 135,181 | 45.9 |
| **C.V. %** | 8.6 | 0.7 | 5.4 | 5.5 | 1.5 |
| **LSD 10%** | NS | NS | NS | NS | NS |
| **LSD 5%** | NS | NS | NS | NS | NS |
| **No. OF REPS** | 4 | 4 | 4 | 4 | 4 |
| **F-TRT** | 1.9 | 1.7 | 1.1 | 1.2 | 0.6 |

**Langdon REC Location:**

| Treatments | Yield/acre (lb) | Test Weight (lb/bushel) | 1000 Seed Weight (g) | Seed / Pound | Oil Percentage |
|---|---|---|---|---|---|
| 1 | 3782 | 51.2 | 3.4 | 133,377 | 42.4 |
| 2 | 3738 | 50.6 | 3.4 | 132,033 | 42.7 |
| 3 | 3890 | 50.7 | 3.5 | 131,200 | 40.8 |
| 4 | 3723 | 50.0 | 3.5 | 128,331 | 40.5 |
| 5 | 3823 | 48.9 | 3.4 | 135,621 | 41.1 |
| 6 | 3748 | 50.4 | 3.4 | 133,024 | 43.0 |
| 7 | 3757 | 51.1 | 3.4 | 133,524 | 42.1 |
| 8 | 3917 | 50.7 | 3.4 | 131,882 | 41.6 |
| 9 | 3943 | 50.4 | 3.4 | 132,439 | 42.4 |
| **HIGH MEAN** | 3943 | 51.2 | 3.5 | 135,621 | 43.0 |
| **LOW MEAN** | 3723 | 48.9 | 3.4 | 128,331 | 40.5 |
| **EXP MEAN** | 3813 | 50.4 | 3.4 | 132,381 | 41.8 |
| **C.V. %** | 15.0 | 2.1 | 3.7 | 3.8 | 4.1 |
| **LSD 10%** | NS | NS | NS | NS | NS |
| **LSD 5%** | NS | NS | NS | NS | NS |
| **No. of REPS** | 4 | 4 | 4 | 4 | 4 |
| **F-TRT** | 0.1 | 1.7 | 0.6 | 0.6 | 1.1 |

# DEMONSTRATING SOIL SODICITY REMEDIATION IN NORTH DAKOTA


## BY

## Naeem Kalwar (Extension Area Specialist)

## Duaine Marxen (Hettinger County Extension Agent)


Often confused with soil salinity, soil sodicity persists without getting noticed. Its remediation requires an extra step of applying calcium ($Ca^{++}$) supplements (commonly gypsum) followed by salinity remediation practices of improving soil drainage and lowering down the water-table level. This is done to displace the excessive sodium ($Na^{+}$) from the cation exchange sites with the help of calcium. Once displaced, sodium ($Na^{+}$) converts into a salt ($Na_2SO_4$) and leaches out of the rooting zone.

## Differences between Soil Salinity and Sodicity:

Saline soils will have excessive levels of soluble salts in the soil water (soil solution), high enough to negatively affect plant growth, resulting in reduced crop yields and even plant death under severe conditions.

The primary effect of excessive soluble salts on plants is to limit the ability of plant roots to absorb soil water even under wet soil conditions. Soil water flows from higher osmotic potential (low salt concentration) to lower osmotic potential (high salt concentration). A soil solution with low osmotic potential due to the higher concentration of soluble salts compared to the plant root cell membranes, will not allow plant roots to extract water from soil, causing drought-like symptoms in the plants (Seelig, 2000). That process is called “osmotic effect”.

In contrast to saline soils, sodic soils have excessive levels of sodium ions (Na+) adsorbed at the cation exchange sites. Soil sodicity causes degradation of soil structure. That process is called “soil dispersion”.

The forces that hold clay particles together are greatly weakened when excessive sodium is adsorbed at the negative charges of soil clay particles, forming sodium-clay particles (Seelig, 2000). When wet, sodium-clay particles get easily disintegrated or dispersed from the larger soil aggregates. Once dry, sodium-clay particles clog the soil pores (especially macro-pores) and settle down in dense layers (The Nature and Properties of Soils, 14th Edition, revised).

Poor physical structure then results in soils difficult to till, poor seed germination and restricted plant root growth. Due to the poor structure, sodic soils are also susceptible to wind and water erosion compared to saline soils. Soil dispersion effect will be more severe on expanding-type of clays as their degree of swelling increases, causing further shrinking/clogging of the larger soil pores. In saline and saline-sodic soils, however, higher concentration of soluble salts result in higher amounts of positively charged ions like calcium ($Ca^{++}$) and magnesium ($Mg^{++}$) that promote flocculation (opposite of dispersion) by moving in close to the negatively charged particles, thereby reducing their tendency to disintegrate or disperse from each other (The Nature and Properties of Soils, Nyle C. Brady and Ray R. Weil, 14th Edition, Revised).

## Main Causes:

The causes for saline and sodic soils in North Dakota are natural, but can be affected by management. The primary natural cause for salinity and sodicity is the parent material of the soils and the underlying sodium-rich shale in the bedrock. The main carrier for bringing excessive salts/sodium is the groundwater. When groundwater moves towards the soil surface, through capillary action or shallower water-table depth, it also brings excessive salts/sodium with it.

## Indicators:

In soils suspected as being saline or affected by sodicity, the extent of the problem and its management are difficult to determine unless soils are analyzed using laboratory procedures. Soils should be sampled to at least 2 feet depth in 1-foot increments. Keeping in view the ongoing wet weather cycle and resulting trend of installing tile drainage systems along with the fluctuations in the soil salt and sodium levels, it may not be a bad idea to sample soils up to 3 or 4 feet depth after every couple of years.

Soil salinity can be diagnosed by measuring the salt concentration in soil water (solution) by analyzing it for "Electrical Conductivity (EC)". EC is the ability of a material to transmit electrical current, which in the case of a soil is the result of salt concentration. A soil is classified as saline once its saturated paste extract EC will reach 4.00 deciSiemens/meter (dS/m), which will be equal to 4.00 milliemhos/centimeter (mmhos/cm) using the same saturated paste extract method. EC values measured through 1:1 by weight soil-to-water slurry method are less precise and will result in lower values versus the saturated paste extract method. Variation among the EC values measured through these two methods will also differ for different soil textural types.

The extent of soil sodicity is measured either through its "Exchangeable Sodium Percentage (ESP)" or "Sodium Adsorption Ratio (SAR)". Both measure the sodium content of the soils in relation to calcium and magnesium using specific mathematical formulas. Sodic soils are low in total soluble salts but high in exchangeable sodium, which tends to disperse soil particles and destroys soil structure. A soil will be interpreted as sodic if it has an Exchangeable Sodium Percentage of 15 or more or have Sodium Adsorption Ratio of 13 or more. Sodic soils often have a pH level of 8.5 or more in carbonate-rich soils, such as in northeastern North Dakota, but may also have very low pH, perhaps as low as 4.0 in southeastern North Dakota in soils with no carbonates. Carbonates ($CO_3^{--}$) and bicarbonate ($HCO_3^-$) react with soil water to form hydroxyl ($OH^-$) ions that cause high pH. The soil pH is also a good measurement to check east of the Missouri River to confirm potential sodium problems. However, in the far west of the state, pH of 5.00 or below can be associated with soils high in sodium. Soils having both, salinity as well sodicity problems are considered as saline-sodic soils and will have the characteristics of both.

## Soil Reaction to Different Amendment Applications:

The most effective way to displace the excessive sodium ($Na^+$) from the soil exchange complex is to replace it through calcium ($Ca^{++}$) or hydrogen ($H^+$) ions. Gypsum ($CaSO_4.2H_2O$) is the most widely used amendment (containing calcium) available in both natural and industrial by-products forms and is easy to handle. Elemental sulfur ($S^o$) and sulfuric acid ($H_2SO_4$) can also be used on sodic soils to supplement hydrogen ($H^+$) ions, especially where soil sodium bicarbonate levels are high.

## Situation:

In Fall-2012, Duaine Marxen, Hettinger County Extension Agent was contacted by a Mott, ND area producer "Garrett Swindler" who tiled two of his sites (Site-1 and Site-2) on his own in spring-2012, which were high for salts with high water-table level issues without being able to improve drainage at both sites. Garret tiled those sites, thinking not only he would be able to drain the excess soil water but that will also facilitate the leaching of excessive soluble salts out of the plant root zone. Since he was not able to get the desired results, he sought Duaine's advice to improve soil drainage.

## Extension Response:

After consultations, it was decided to take soil and water samples from site-1 and site-2 separately in order to verify the web soil survey data. Samples were analyzed for EC/TDS, pH and SAR in fall-2012 to lookout for potential causes which may had been inhibiting the drainage improvement process even after tiling.

According to web soil survey, site-1 soil series was a Regent-Janesbug complex (clayey residuum from shale), whereas, site-2, it was Belfield-Daglum complex (clayey alluvium from the sedimentary rocks). Both sites had moderate crop

productivity index (61 and 63) and organic matter level (0.91 and 1.49). Site-1 showed saturated paste extract EC of 1.0 dS/m with a SAR value of 0.6. Site-2 on the other hand showed an EC value of 3.3 dS/m and SAR value of 6.

Soil samples were taken from site-1 and site-2 for 3 feet depth in 1 foot increments along with water samples. Lab results showed that both sites were high for salts (salinity) with increasing levels of sodium (sodicity). Based on the soil analysis results, calcium supplements in the form of 100% pure gypsum ($CaSO_4$) were calculated as 7.04 and 6.11 tons/acre foot for site-1 and site-2 respectively to counter soil dispersion and improve soil water infiltration.

Since the gypsum available in the market at that time was 98% pure, quantities for both sites were adjusted accordingly as 7.18 and 6.23 tons/acre foot.

The landowner, however, "**applied 5 tons of 98% pure gypsum/acre foot on 5 acres, on site-1 only**" in Spring-2013 instead of applying full rates at both sites. Once spread on the surface, gypsum was mixed thoroughly into the upper soil layers by disking. This was performed as "field demonstration only" without the inclusion of any replications. Considering that, the data can only be referred to as demonstration, not from a research trial.

## Results:

Soil and water samples were taken from both sites again in fall-2013 and fall-2014, to record any changes in soil salt (EC) and sodium (SAR) levels between site-1 where gypsum was applied (in spring-2013) versus site-2 where no gypsum was applied.

Soil and water analysis reports from both sites showed remarkable differences between site-1 (before and after gypsum application) and site-2 (with no gypsum application), especially in fall-2013.

### Site-1

Site-1 results showed that the soil SAR level dramatically dropped in the 1st foot from 10.0 in fall-2012 to 5.53 in fall-2013 within 6 months of applying gypsum in spring-2013 even after not using the recommended rate/acre (Table 1). For the second feet, SAR level remained roughly the same (4.74 in fall-2012 versus 4.05 in fall-2013), whereas, for the third feet it actually increased in fall-2013 to 3.39 versus 1.82 in fall-2012. The increase in soil SAR for the 3rd foot was a clear indication that the excessive sodium ($Na^+$) in the 1st and 2nd feet was getting converted into a salt ($Na_2SO_4$) and was moving down the soil profile. With the same principle, once the displaced sodium ($Na^+$) converted into a soluble salt (sodium sulfate; $Na_2SO_4$), soil EC levels doubled in the 3rd foot in fall-2013 to 3.7 dS/m versus 1.94 dS/m in fall-2012. First and the 2nd feet EC levels remained roughly the same in fall-2013 versus fall-2012. Also, conversion of $Na^+$ into $Na_2SO_4$ and salt leaching process were greatly facilitated by a considerably wet 2013 (24.11" of rainfall) compared to the normal average of 13-14"/year.

**Table 1. Soil analysis results for Site-1 for Fall-2012, Fall-2013 and Fall-2014:**

| Depth (in) | pH | EC (dS/m) | SAR | S (lb/A) | Cl (lb/A) | CCE % |
|---|---|---|---|---|---|---|
| **Fall-2012 (Before Gypsum Application)** | | | | | | |
| 0-12 | 6.3 | 4.26 | 10.0 | 832 | 64.9 | 0.3 |
| 12-24 | 7.9 | 4.00 | 4.74 | 832 | 27.5 | 1.1 |
| 24-36 | 6.7 | 1.94 | 1.82 | 832 | 21.0 | 0.7 |
| **Fall-2013 (Gypsum Applied in Spring-2013)** | | | | | | |
| 0-12 | 6.6 | 4.59 | 5.53 | 832 | 75.3 | 0.1 |
| 12-24 | 7.8 | 4.56 | 4.05 | 832 | 58.7 | 1.9 |
| 24-36 | 7.5 | 3.7 | 3.39 | 832 | 31.9 | 0.4 |
| **Fall-2014 (Gypsum Applied in Spring-2013)** | | | | | | |
| 0-12 | 6.22 | 8.78 | 4.9 | 832 | 40.5 | 0.1 |
| 12-24 | 6.93 | 8.56 | 4.8 | 832 | 132 | 4.1 |
| 24-36 | 6.70 | 7.41 | 3.1 | 832 | 112.3 | 0.7 |

Fall-2014 SAR results showed slight decrease of 0.63 in the 1st foot (4.9 in fall-2014 versus 5.53 in fall-2013), however, for the 2nd and 3rd feet SAR levels remained more or less the same in fall-2014 versus fall-2013. Soil EC levels almost doubled for all three feet in fall-2014 versus fall-2013. The SAR and EC difference between fall-2014 and fall-2013 could be due to the following reasons.

- Lower rate of gypsum (5 tons of 98% pure gypsum/acre foot) was applied in spring-2013 versus the recommended rate of 7.18 tons of 98% pure gypsum/acre foot.
- In 2013, Mott area received 24" of rainfall resulting in enhanced leaching of soluble salts, whereas, in 2014, 17" were recorded leading to slightly drier condition in 2014 versus 2013.
- Both sites were under prevent planting in 2014. Considering the drier weather with no vegetative cover, it may have led to the capillary rise of soil water, thus higher EC values.

Water sample analysis results for fall-2012, fall-2013 and fall-2014 were also mostly in line with the soil analysis reports in regards to sodium ($Na^+$) getting converted into a salt ($Na_2SO_4$). The TDS level increased to 9608 mg/L in fall-2013 versus 7892 mg/L in fall-2012. SAR levels dropped to 2.58 in fall-2013 versus 5.13 in fall-2012 after the gypsum application in spring-2013 (Table 2). This was consistent with the concept that after reacting with gypsum ($CaSO_4$), sodium ($Na^+$) converted into a salt ($NaSO_4$) which resulted in higher TDS and lower SAR in fall-2013 versus a lower TDS and higher SAR in fall-2012. Fall-2014 results showed a slight increase in SAR (3.14) and decrease in TDS (5817 mg/L) levels versus fall-2013. Since the conversion of sodium into a salt is a reversible reaction thus under conditions not conducive for salt leaching, some sodium based salts may have led to the increased attraction of sodium ions at the cation exchange sites leading to a higher SAR level.

**Table 2. Water analysis results for Site-1 for Fall-2012 versus Fall-2013 with and without gypsum application:**

| pH | SAR | TDS (mg/L) | Ca (meq/L) | Mg (meq/L) | Na (meq/L) |
|---|---|---|---|---|---|
| | | **Fall-2012 (Before Gypsum Application)** | | | |
| 3.7 | 5.13 | 7892.39 | 22.85 | 64.72 | 33.93 |
| | | **Fall-2013 (Before Gypsum Application)** | | | |
| 4.2 | 2.58 | 9608 | 29.44 | 75.68 | 29.14 |
| | | **Fall-2014 (Before Gypsum Application)** | | | |
| 7.1 | 3.14 | 5817 | 23.45 | 47.71 | 18.70 |

## Site-2

Site-2 showed a steady increase in EC and SAR levels for all three feet (Table 3) in fall-2013 versus fall-2012.

**Table 3. Soil analysis results for Site-2 for Fall-2012 versus Fall-2013 with no Gypsum Application:**

| Depth (in) | pH | EC (dS/m) | SAR | S (lb/A) | Cl (lb/A) | CCE % |
|---|---|---|---|---|---|---|
| | | | **Fall-2012** | | | |
| 0-12 | 7.6 | 4.11 | 9.83 | 832 | 63.5 | 0.9 |
| 12-24 | 7.9 | 4.02 | 10.2 | 708 | 30.3 | 0.3 |
| 24-36 | 8.3 | 3.82 | 10.9 | 708 | 22.0 | 1.8 |
| | | | **Fall-2013** | | | |
| 0-12 | 7.6 | 4.30 | 13.2 | 832 | 51.3 | 1.0 |
| 12-24 | 7.9 | 4.32 | 13.9 | 832 | 49.9 | 0.6 |
| 24-36 | 8.0 | 5.07 | 15.5 | 832 | 51.7 | 3.2 |
| | | | **Fall-2014** | | | |
| 0-12 | 6.35 | 7.82 | 7.75 | 708 | 10.5 | 0.5 |
| 12-24 | 6.59 | 11.57 | 13.4 | 708 | 46.8 | 0.2 |
| 24-36 | 6.70 | 13.54 | 13.2 | 708 | 120.6 | 0.8 |

Considering the 24" of rainfall in 2013, it could be a contribution from the weathering of soil parent material and high water-table level (in the wake of impeded soil drainage due to soil dispersion).

Like site-1, at site-2 too soil EC levels doubled in fall-2014 versus fall-2013 and fall-2012. Drier weather with no vegetative cover in 2014 may have also led to higher salt (EC) levels at site-2 due to the capillary rise of soil water. Soil SAR levels more or less remained the same for the 2$^{nd}$ and 3$^{rd}$ feet in fall-2014 versus fall-2013, except in the 1$^{st}$ foot. Surprisingly, SAR level dropped in the 1$^{st}$ foot to 7.75 in fall-2014 versus 13.2 in fall-2013 without any application of gypsum or any other amendment. Depending upon the salt type, higher calcium and magnesium based salt levels may be the reason for the lower SAR value in the 1$^{st}$ foot.

At Site-2, water sample analysis results showed increase in TDS and SAR levels in Fall-2013 versus Fall-2012 with no gypsum application (Table 4). These findings again were in line with the soil analysis reports of Site-2, which showed slight increase in soil EC and SAR levels in fall-2013 versus fall-2012. Fall-2014 TDS and SAR results remained roughly the same versus fall-2013 except a slight increase in SAR and a slight decrease in TDS levels.

**Table 4. Water analysis results for Site 2 for Fall-2012 versus Fall-2013 with no gypsum application:**

| pH | SAR | TDS (mg/L) | Ca (meq/L) | Mg (meq/L) | Na (meq/L) |
|---|---|---|---|---|---|
| | | | **Fall-2012** | | |
| 4.6 | 3.93 | 8231.05 | 23.95 | 82.50 | 28.71 |
| | | | **Fall-2013** | | |
| 8.3 | 9.05 | 12398 | 26.95 | 91.31 | 69.59 |
| | | | **Fall-2014** | | |
| 8.0 | 10.1 | 11528 | 22.41 | 80.62 | 72.64 |

## Summary:

Site-1 results showed that gypsum application displaced sodium ($Na^+$) from the soil cation exchange sites and converted it into a salt ($Na_2SO_4$) even with slightly lower application rate versus the recommendation, especially in the first year (2013). Higher than normal rainfall in 2013 (24" versus a normal average of 13-14") also greatly helped the movement of salts deeper into the soil profile. Effect of the rainfall water was evident in 2014 as lower rainfall (17" in 2014 versus 24" in 2013) resulted in slower conversion of sodium into a salt as well as movement down the soil profile. Absence of a vegetative cover in 2014 may have also led to capillary rise of soil water leading to the buildup of excessive salts/sodium close to the soil surface. Based on the water analysis reports, the most pointing difference between Site-1 and Site-2 in fall-2013 was that at Site-1, SAR level actually decreased after gypsum application, whereas, at Site-2, SAR level increased dramatically in Fall-2013 versus Fall-2012 with no gypsum application.

Future recommendation should emphasize not only on applying sufficient quantities of gypsum/acre but should also consider the rainfall predictions for that year under the dry land farming system. Establishment of a salt-tolerant crop/grass should also be a priority. In case of higher sodium levels in the deeper soil depths, injection of gypsum even 6" deep in dry or liquid forms would be better than spreading it on the surface as it will take less time for it to move to the desired depth.

## Langdon REC Foundation Seed Stocks Program

The Langdon REC supports a Foundation Seed Stocks Program to help increase and distribute the newest NDSU varieties of HRSW, Durum, Barley and Flax. Each year approximately 350 acres is planted into the FSS program. The harvested acreage is available for sale to producers and seedsmen in the region. The varieties of crops that are available for the 2015 growing season are listed below:

**HRSW** – Glenn, Faller, Prosper, Elgin-ND
**Barley** – Lacey

Growers who have grown seed for certification in one of the last four years who request seed prior to December 1 will be guaranteed an allocation. Any seed inventories available after December 1 will be sold on a first come, first serve basis. Seed availability and prices may be obtained by calling the Langdon Research Extension Center.

# Visit our website at www.ag.ndsu.edu/langdonrec/

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| Dr. Pravin Gautam | Plant Pathologist |
| John Lukach | Area Extension Specialist/Winter Cereals |
| Naeem Kalwar | Area Extension Specialist/Soil Health |
| Lesley Lubenow | Area Extension Specialist/Agronomy |
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| Lawrence Henry | Research Specialist/Agronomy |
| Kevin Beauchamp | Research Technician – Small Plot/Foundation Seed |
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