Wheat Producers Advantage
South Dakota Wheat, Inc.
August 2020

Winter wheat offers greater yield potential and crop diversity to South Dakota Producers

Winter wheat is one of the most important cereal food crops of economic importance for South Dakota and the Great Plains. Winter wheat typically yields 20-25% higher than spring wheat and also offers several other advantages to producers as it fits well with cover crop rotation, conserves soil moisture, improves water quality, reduces soil erosion, and builds soil structure. Winter wheat being fall-seeded into no-till fields helps maintaining the waterfowl habitat in the state translating into additional hunting revenue to South Dakota and its producers. Further studies have shown corn or sorghum following winter wheat get up to 35 bushels/ acre yield increase.

SDSU wheat breeding programs have been continuously working to provide producers in the northern Great Plains an opportunity, to select from a group of superior winter wheat varieties that have great agronomics, a good disease package, and marketability. Breeding and variety development is a slow and long term effort that takes 10-12 years from crossing date to release of a new variety. This involves years of selection for agronomic traits and disease and pest resistance, followed by intensive yield trials by the breeder at 8-9 locations. SDSU Crop Performance Testing (CPT) further evaluates yield potential and quality characteristics of the new experimental breeding lines along with 25-35 commercially released wheat cultivars at about 15 locations throughout South Dakota. Data collected includes grain yield, protein content, disease resistance, response to fungicides, heading, plant height, straw strength, and milling and baking characteristics. Finally, if the experimental line is superior to the check commercial varieties and if better adapted to the state or region, it is released as a new variety after intensive testing for about three years under CPT trials and a seed production increase during that last year prior to release.

In the last 17 years, SDWC investment had led to the release of 10 winter wheat varieties including the two new hard red winter wheat varieties 'Winner' and 'Draper', released in fall 2019. Release of new variety like 'Winner' (released 2019) offers producers approximate 11-bushel advantage when compared to 'Expedition' (released in 2002). This increase in yield potential can result in increased revenue of $40 per acre for the producers when compared to Expedition, demonstrating the economic impact of variety development.

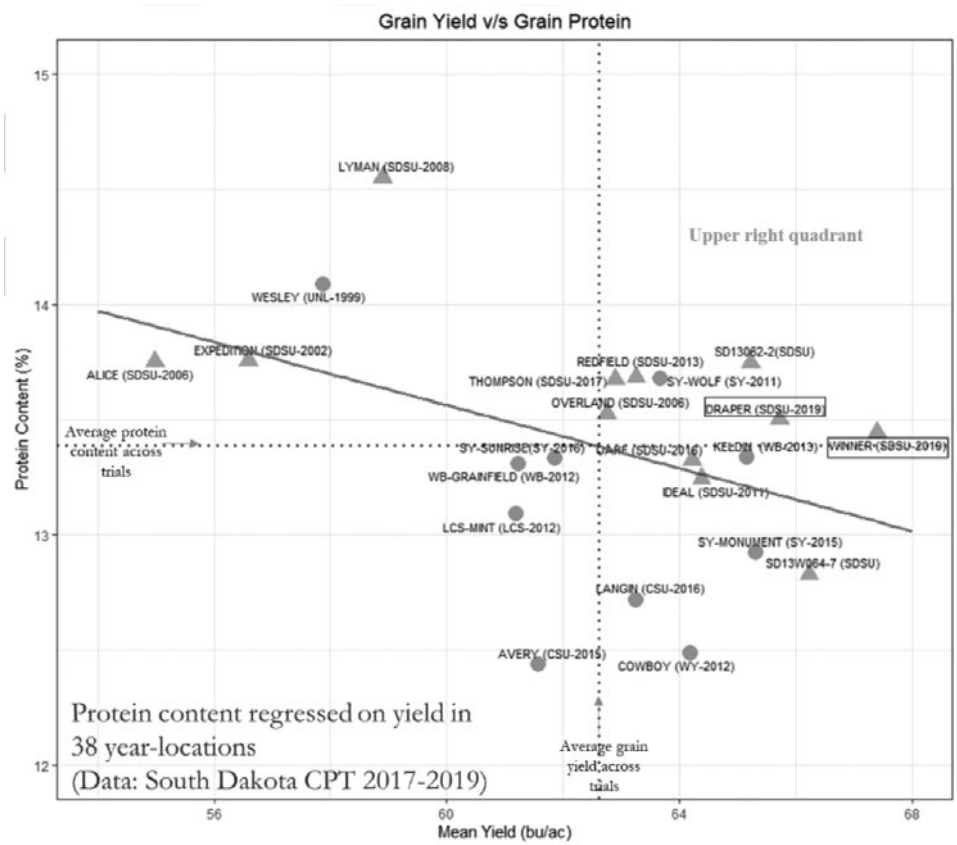

Figure 2. The grain yield and grain protein content in commercial wheat cultivars evaluated in the South Dakota Crop Performance Test (CPT) for three years (2017-2019). The green triangles show SDSU winter wheat cultivars and red dots show other commercial cultivars.

In addition to yield, the winter wheat varieties offer good end-use quality and marketability. Of course, the credit goes to the South Dakota wheat producer for excellent management of the wheat crop as the variability in protein among environments is generally much larger than variability among varieties. However, the inherent protein content of the variety also plays a crucial role in determining the bread baking quality and marketability of wheat. In order to maximize economic return, a producer would like to select a variety that maximizes grain yield and grain protein. However, grain yield and grain protein have a widely known inverse relationship, the higher-yielding varieties produce more kernels and thus each kernel proportionally has less protein. The producer should pick higher-yielding varieties that have comparatively higher protein (the varieties above the trend line). The newly released hard red winter wheat varieties Winner and Draper are very competitive and show a good yield potential while

Yield Potential (continued on page 8

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results
Hayes

Table 1. 2020 winter wheat variety performance trial results (average of 4 replications) at Hayes, SD.
Entries are sorted by overall 3-year yield. Varieties yielding in the top 1/3 of each trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	2-year (bu/a)	3-year (bu/a)
Winner	39	1.3	60.8	13.4	44.2	85.7	114.7	100.2	81.5
Keldin	39	1.0	61.9	13.6	42.6	81.1	113.0	97.1	78.9
Overland	41	2.0	61.8	13.5	41.8	88.5	100.9	94.7	77.1
Draper	36	1.0	60.3	13.4	39.9	81.4	106.0	93.7	75.8
WB4462	40	1.0	61.9	13.3	39.0	80.4	107.8	94.1	75.7
WB-Grainfield	35	1.0	60.9	13.1	41.4	77.2	107.1	92.1	75.2
SY Sunrise	34	1.0	61.6	12.5	39.2	81.9	104.5	93.2	75.2
Oahe	40	2.7	62.9	13.6	40.5	81.9	102.4	92.2	74.9
Redfield	36	1.0	62.0	13.8	41.9	80.1	102.1	91.1	74.7
Ideal	39	2.8	61.7	13.4	39.6	79.5	103.5	91.5	74.2
Langin	35	1.3	60.6	12.3	39.0	75.2	107.3	91.2	73.8
Expedition	38	1.0	61.4	13.2	41.7	81.0	97.7	89.3	73.5
Thompson	42	1.0	61.4	13.5	38.2	83.6	97.6	90.6	73.1
Cowboy	38	2.0	59.8	13.0	44.2	76.6	97.0	86.8	72.6
SY Monument	37	1.0	59.3	13.2	38.4	74.8	101.2	88.0	71.5
SY 517 CL	35	1.0	61.9	13.7	39.9	73.2	97.3	85.2	70.1
WB4595	39	1.0	62.9	12.4	-	72.9	106.9	89.9	-
SY Wolverine	36	1.0	61.5	13.2	-	72.1	103.0	87.6	-
NW13493	38	2.5	60.5	13.6	-	73.1	99.5	86.3	-
CP7017CAX	35	1.0	62.3	12.2	-	-	110.1	-	-
Crescent AX	39	1.7	62.3	12.4	-	-	109.0	-	-
CP7909	36	2.3	62.1	12.4	-	-	107.5	-	-
AP 18AX	37	1.0	61.0	12.8	-	-	106.8	-	-
LCS Helix AX	36	1.0	62.8	12.3	-	-	106.7	-	-
CP7010	36	1.0	63.1	12.6	-	-	103.8	-	-
Flathead	39	1.0	59.8	13.8	-	-	103.5	-	-
LCS Diesel	36	1.5	61.4	13.7	-	-	103.0	-	-
CP7050CAX	36	1.0	63.6	13.7	-	-	101.5	-	-
NE14696	42	2.8	60.7	13.8	-	-	100.3	-	-
Guardian	38	1.0	61.7	13.5	-	-	100.1	-	-
WB4309	40	2.0	61.3	13.5	-	-	97.8	-	-
14NORD-1	42	1.0	62.6	14.6	-	-	91.4	-	-
Northern	38	1.0	59.8	14.3	-	-	89.5	-	-
MTF 1435	47	1.0	59.9	14.1	-	-	74.6	-	-
Trial Average#	38.5	1.4	61.5	13.3	39.5	78.9	102.5	91.3	74.9
LSD (0.05)†	1.6	0.9	1.1	0.4	7.9	7.8	7.25	-	-
C.V. %‡	2.5	-	1.3	1.9	14.2	7.0	5.1	-	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results Brookings

Table 1. 2020 winter wheat variety performance trial results (average of 4 replications) at Brookings, SD. Entries are sorted by overall 3-year yield. Varieties yielding in the top 1/3 of the trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	3-year§ (bu/a)
Keldin	35	1.0	60.5	10.5	75.9	-	96.3	86.1
Winner	33	1.3	59.7	10.7	73.6	-	93.9	83.7
WB4462	36	1.5	60.4	11.1	75.9	-	90.4	83.1
Langin	33	2.3	59.5	10.1	75.5	-	89.8	82.6
Cowboy	34	2.5	59.5	10.2	72.3	-	90.9	81.6
Oahe	38	2.5	61.3	11.1	73.2	-	89.5	81.4
Ideal	35	1.3	58.9	11.2	77.9	-	84.8	81.4
Redfield	33	1.0	59.7	11.1	73.0	-	88.3	80.7
SY Sunrise	32	1.3	57.9	10.6	73.8	-	86.9	80.4
SY Monument	34	1.0	57.8	10.6	72.2	-	87.5	79.8
Draper	34	1.0	58.3	11.8	67.6	-	87.9	77.8
Overland	37	2.0	61.2	11.2	65.0	-	88.4	76.7
Expedition	38	2.5	60.4	11.9	63.3	-	87.1	75.2
SY 517 CL2	33	1.5	62.0	11.2	65.6	-	84.5	75.0
Thompson	37	1.3	60.0	10.3	69.3	-	79.6	74.5
WB-Grainfield	34	1.5	61.3	10.8	59.6	-	88.6	74.1
Crescent AX	35	2.3	61.4	11.5	-	-	91.2	-
LCS Helix AX	34	2.0	61.3	10.8	-	-	90.9	-
CP7909	34	2.8	59.8	10.5	-	-	90.7	-
WB4309	35	1.8	59.1	12.5	-	-	89.7	-
AP 18AX	35	1.5	58.8	10.6	-	-	88.6	-
NE14696	37	2.3	61.1	11.4	-	-	88.2	-
CP7017CA	33	1.8	58.2	10.5	-	-	88.1	-
NW13493	33	2.3	61.1	11.1	-	-	88.0	-
LCS Diesel	34	1.8	60.3	11.1	-	-	88.0	-
WB4595	32	1.3	61.4	10.8	-	-	87.5	-
CP7050CA	36	2.0	61.8	12.4	-	-	86.9	-
Guardian	35	1.5	60.9	10.4	-	-	85.4	-
Flathead	36	1.0	59.7	11.4	-	-	85.0	-
SY Wolverine	31	1.0	58.6	10.3	-	-	85.0	-
14NORD-1	36	1.3	62.7	11.6	-	-	83.7	-
CP7010	30	1.3	61.8	10.3	-	-	81.8	-
Northern	34	1.0	58.3	12.3	-	-	76.9	-
MTF 1435	42	1.0	56.8	12.3	-	-	68.6	-
Trial Average#	35	1.7	60.1	11.1	68.9	-	87.5	79.6
LSD (0.05)†	1.6	0.6	1.3	1.1	5.0	-	5.0	-
C.V. %‡	3.2	-	1.5	6.8	5.2	-	4.1	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.
§ Reported 3-year yields are actually an average of 2018 and 2020 as the location was not harvested in 2019.

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results Brookings with fungicide

Table 2. 2020 winter wheat variety performance trial results (average of 4 replications) at Brookings, SD. Entries are sorted by overall 3-year yield. Varieties yielding in the top 1/3 of the trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	3-year§ (bu/a)
Keldin	35	1.0	60.7	10.2	78.7	-	94.9	86.8
WB4462	36	1.5	60.9	11.2	79.7	-	92.4	86.0
Redfield	33	1.0	60.2	11.9	76.5	-	91.5	84.0
Winner	33	1.3	60.5	10.2	72.4	-	95.5	83.9
Cowboy	34	2.5	59.3	10.4	75.4	-	92.4	83.9
SY Sunrise	32	1.3	59.6	10.6	74.3	-	90.2	82.2
SY Monument	34	1.0	59.3	10.7	76.0	-	86.1	81.0
Draper	34	1.0	59.0	11.2	72.0	-	89.6	80.8
Ideal	35	1.3	58.2	10.5	73.5	-	86.0	79.8
Langin	33	2.3	59.9	10.7	68.0	-	91.0	79.5
Thompson	37	1.3	60.5	10.9	73.7	-	85.4	79.5
Oahe	38	2.5	62.0	11.3	71.6	-	87.1	79.4
Overland	37	2.0	61.5	11.0	67.8	-	88.9	78.4
SY 517 CL	33	1.5	61.3	11.0	61.6	-	84.7	73.2
WB-Grainfield	34	1.5	61.0	10.6	55.4	-	87.6	71.5
Expedition	38	2.5	61.2	11.1	60.0	-	82.0	71.0
WB4309	35	1.8	60.0	11.8	-	-	93.1	-
CP7909	34	2.8	59.7	10.7	-	-	92.8	-
Crescent AX	35	2.3	60.9	10.8	-	-	92.6	-
Guardian	35	1.5	60.7	10.8	-	-	91.9	-
AP 18AX	35	1.5	59.6	10.2	-	-	90.1	-
SY Wolverine	31	1.0	59.8	11.3	-	-	89.9	-
LCS Helix AX	34	2.0	61.5	10.6	-	-	89.9	-
CP7050CA	36	2.0	61.8	12.2	-	-	89.7	-
CP7017CA	33	1.8	58.6	10.5	-	-	89.1	-
LCS Diesel	34	1.8	60.0	11.3	-	-	88.5	-
WB4595	32	1.3	61.8	10.0	-	-	88.2	-
NE14696	37	2.3	60.2	10.6	-	-	88.2	-
Flathead	36	1.0	60.6	11.0	-	-	87.1	-
NW13493	33	2.3	61.1	10.8	-	-	86.5	-
CP7010	30	1.3	62.0	9.9	-	-	85.1	-
14NORD-1	36	1.3	62.5	11.4	-	-	81.0	-
Northern	34	1.0	59.7	11.7	-	-	80.7	-
MTF 1435	42	1.0	57.6	11.3	-	-	69.2	-
Trial Average#	35	1.7	60.5	10.9	70.4	-	88.5	80.1
LSD (0.05)†	1.6	0.6	1.1	1	5.7	-	4.9	-
C.V. %‡	3.2	-	1.3	6.8	5.7	-	3.9	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.
§ Reported 3-year yields are actually an average of 2018 and 2020 as the location was not harvested in 2019.

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results Mt. Vernon

Table 1. 2020 winter wheat variety performance trial results (average of 4 replications) at Mt. Vernon, SD. Entries are sorted by overall 2-year yield. Varieties yielding in the top 1/3 of the trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	2-year (bu/a)	3-year (bu/a)
Ideal	36	3.8	60.7	13.9	70.9	61.8	72.9	67.4	68.5
Winner	38	3.0	59.6	14.5	72.6	59.9	70.3	65.1	67.6
Cowboy	35	3.0	59.4	13.9	68.6	55.8	75.9	65.8	66.8
Redfield	35	3.0	59.9	15.1	65.4	59.9	70.8	65.4	65.4
Draper	36	2.5	58.6	14.7	66.3	54.3	70.8	62.6	63.8
Langin	36	3.3	58.3	14.5	65.1	50.5	75.0	62.8	63.5
Thompson	38	3.0	59.6	14.9	67.9	60.8	61.7	61.2	63.5
SY Monument	36	2.5	58.2	14.1	66.5	57.5	66.3	61.9	63.4
WB4462	39	3.8	56.3	15.5	66.9	54.4	67.9	61.1	63.1
Oahe	41	3.3	56.9	15.1	65.3	65.5	51.3	58.4	60.7
SY Sunrise	35	2.3	58.4	14.4	60.3	49.0	69.2	59.1	59.5
Keldin	35	3.5	58.8	15.0	68.0	43.6	66.4	55.0	59.3
Overland	39	3.0	58.2	15.1	61.4	52.8	62.1	57.5	58.8
WB-Grainfield	36	3.3	56.8	15.2	60.0	38.9	68.7	53.8	55.9
SY 517 CL	36	3.0	58.7	14.8	57.1	45.0	62.1	53.5	54.7
Expedition	38	3.0	58.8	15.2	57.7	39.7	59.8	49.8	52.4
WB4595	35	2.0	60.3	13.4	-	48.3	75.1	61.7	-
NW13493	37	2.5	59.2	15.3	-	56.8	62.0	59.4	-
SY Wolverine	34	2.5	58.5	15.3	-	31.2	76.4	53.8	-
LCS Helix AX	35	2.8	60.4	14.1	-	-	71.0	-	-
Guardian	36	2.5	59.0	14.9	-	-	71.0	-	-
LCS Diesel	38	3.8	58.2	15.2	-	-	70.5	-	-
CP7909	37	3.8	56.9	14.6	-	-	70.2	-	-
CP7010	33	1.8	60.9	13.7	-	-	70.1	-	-
CP7017CA	34	2.8	58.0	14.6	-	-	69.8	-	-
Northern	34	2.3	58.4	14.7	-	-	68.1	-	-
Flathead	38	3.0	57.7	14.7	-	-	67.3	-	-
Crescent AX	39	3.0	58.4	15.3	-	-	66.5	-	-
WB4309	37	2.8	58.2	16.1	-	-	65.2	-	-
AP 18AX	38	3.0	57.7	15.4	-	-	65.1	-	-
NE14696	41	3.8	59.0	15.8	-	-	62.5	-	-
14NORD-1	37	2.8	60.7	14.6	-	-	61.1	-	-
CP7050CA	38	2.5	58.0	16.1	-	-	51.2	-	-
MTF 1435	41	3.0	53.6	14.5	-	-	41.5	-	-
Trial Average#	37	3.0	58.6	14.9	63.5	51.3	66.1	59.7	61.7
LSD (0.05)†	1.8	0.6	0.9	0.4	3.8	7.5	4.3	-	-
C.V. %‡	3.4	-	1.1	2.0	4.3	10.5	4.7	-	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results Pierre

Table 1. 2020 winter wheat variety performance trial results (average of 4 replications) at Pierre, SD.
Entries are sorted by overall 3-year yield. Varieties yielding in the top 1/3 of each trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	2-year (bu/a)	3-year (bu/a)
WB4462	36	1.7	61.6	13.1	71.1	79.6	104.2	91.9	85.0
Ideal	33	1.7	61.9	12.8	65.4	77.8	93.6	85.7	78.9
SY Monument	32	1.0	60.2	12.6	55.7	79.3	94.5	86.9	76.5
Overland	36	1.0	61.5	12.9	48.5	79.8	99.1	89.4	75.8
Keldin	34	1.0	61.8	12.7	55.6	69.9	101.8	85.8	75.8
Thompson	34	1.0	61.4	13.1	51.6	81.0	94.1	87.5	75.5
SY Sunrise	31	1.3	61.2	12.1	51.2	71.1	104.3	87.7	75.5
Redfield	32	1.3	61.3	13.2	58.9	70.8	96.3	83.6	75.3
Oahe	38	2.0	62.0	12.7	53.6	76.4	95.7	86.0	75.2
Winner	33	1.0	61.0	12.9	46.6	76.4	101.6	89.0	74.8
Langin	30	2.0	60.5	12.0	47.4	72.2	103.2	87.7	74.2
Draper	30	1.2	60.8	13.0	43.9	77.8	99.0	88.4	73.5
Cowboy	31	1.0	60.6	11.9	52.3	73.4	91.9	82.6	72.5
Expedition	32	1.3	61.8	12.7	48.1	66.4	95.4	80.9	70.0
SY 517 CL	31	1.5	62.9	12.8	38.2	66.2	94.7	80.5	66.4
WB-Grainfield	31	1.5	61.4	12.8	37.7	66.5	93.1	79.8	65.8
WB4595	31	1.0	63.0	12.1	-	85.4	99.4	92.4	-
SY Wolverine	30	1.0	61.1	12.7	-	77.0	102.9	90.0	-
NW13493	31	2.2	62.0	12.7	-	76.6	92.0	84.3	-
CP7017CAX	31	1.7	60.2	11.9	-	-	105.8	-	-
WB4309	32	1.5	60.5	13.2	-	-	104.5	-	-
LCS Helix AX	31	2.2	61.9	11.6	-	-	104.1	-	-
CP7909	31	2.0	61.3	12.1	-	-	100.1	-	-
AP 18AX	33	1.0	60.5	12.4	-	-	99.5	-	-
LCS Diesel	30	1.7	62.2	13.2	-	-	99.0	-	-
Crescent AX	33	1.3	61.7	12.5	-	-	98.0	-	-
CP7010	31	1.0	63.1	12.1	-	-	95.8	-	-
NE14696	35	1.2	61.1	13.3	-	-	94.7	-	-
Guardian	32	1.0	61.3	13.0	-	-	94.6	-	-
Flathead	33	1.0	61.3	12.9	-	-	92.8	-	-
CP7050CAX	33	1.0	62.7	13.5	-	-	92.4	-	-
Northern	33	1.0	60.0	13.0	-	-	89.8	-	-
14NORD-1	37	1.0	62.9	13.3	-	-	83.6	-	-
MTF 1435	40	1.7	59.3	13.1	-	-	69.8	-	-
Trial Average#	33	1.3	61.4	12.8	51.5	72.8	96.6	86.3	74.4
LSD (0.05)†	1.9	0.7	0.6	0.3	12.0	7.9	6.0	-	-
C.V. %‡	3.5	-	0.7	1.6	15.3	7.8	4.5	-	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.

SDSU Extension

2020 South Dakota Winter Wheat Variety Trial Results Winner

Table 1. 2020 winter wheat variety performance trial results (average of 4 replications) at Winner, SD.
Entries are sorted by overall 3-year yield. Varieties yielding in the top 1/3 of each trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Protein %	2018 (bu/a)	2019 (bu/a)	2020 (bu/a)	2-year (bu/a)	3-year (bu/a)
Winner	32	1.0	60.3	11.9	91.2	75.9	94.6	85.2	87.2
WB4462	35	1.0	60.9	12.5	94.8	72.1	90.8	81.4	85.9
Draper	32	1.0	60.2	12.3	85.6	74.0	90.8	82.4	83.4
WB-Grainfield	32	1.0	60.0	12.6	85.9	70.7	90.0	80.3	82.2
Ideal	33	1.0	61.4	12.4	83.1	74.7	88.8	81.7	82.2
Keldin	34	1.0	61.1	12.3	78.3	72.4	93.3	82.8	81.3
Redfield	32	1.0	61.0	13.0	81.9	70.6	89.5	80.0	80.7
Overland	33	1.0	61.2	12.5	81.5	70.1	89.8	79.9	80.5
SY Monument	33	1.0	58.7	12.0	72.4	78.2	89.9	84.0	80.1
Cowboy	32	1.0	60.6	11.1	83.8	73.7	82.7	78.2	80.1
Oahe	38	1.5	62.0	12.2	80.1	70.8	87.4	79.1	79.4
Thompson	36	1.0	61.5	12.9	80.3	68.2	86.8	77.5	78.4
SY Sunrise	31	1.3	60.1	12.1	67.9	72.6	92.6	82.6	77.7
Langin	29	1.7	59.9	11.4	78.0	67.9	87.0	77.4	77.6
Expedition	34	1.0	59.9	12.7	73.9	56.2	83.4	69.8	71.2
SY 517 CL	30	2.2	62.1	12.9	69.7	60.3	82.9	71.6	71.0
WB4595	31	1.0	62.4	11.8	-	73.4	88.9	81.1	-
SY Wolverine	29	1.0	59.9	12.6	-	69.7	88.7	79.2	-
NW13493	31	1.3	61.0	12.3	-	71.6	85.5	78.5	-
WB4309	34	1.0	60.2	12.5	-	-	98.5	-	-
CP7909	32	1.8	60.6	11.1	-	-	90.2	-	-
NE14696	36	1.0	60.9	12.9	-	-	90.1	-	-
LCS Diesel	32	1.3	61.7	12.6	-	-	89.5	-	-
Guardian	30	1.0	61.5	12.3	-	-	89.2	-	-
Crescent AX	31	1.8	61.0	11.6	-	-	86.3	-	-
LCS Helix AX	29	1.0	60.3	11.9	-	-	86.2	-	-
CP7017CAX	31	1.3	59.8	11.2	-	-	85.3	-	-
CP7010	30	1.2	62.5	11.5	-	-	84.6	-	-
AP 18AX	30	1.0	59.4	11.4	-	-	84.1	-	-
Flathead	32	1.0	60.2	12.7	-	-	83.3	-	-
Northern	35	1.0	60.9	13.0	-	-	82.3	-	-
14NORD-1	38	1.0	63.1	13.1	-	-	80.4	-	-
CP7050CAX	31	1.0	62.0	12.2	-	-	78.6	-	-
MTF 1435	40	1.2	58.8	13.0	-	-	66.8	-	-
Trial Average#	33	1.2	60.9	12.3	80.1	70.4	87.1	79.6	79.9
LSD (0.05)†	1.9	0.9	0.8	0.7	10.1	7.2	7.0	-	-
C.V. %‡	3.6	-	0.9	4.2	9.0	7.4	5.8	-	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# Trial averages may include values from experimental lines that are not reported.
† Value required (≥LSD) to determine if varieties are significantly different from one another.
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maintaining a good grain protein content. The two new varieties also showed above-average to good baking quality in wheat quality council test.

The varieties in the upper right quadrant show both above-average grain yield and protein content. The cultivars above the trend line show a positive deviation for protein content at that yield and must be preferred (Table 1).

Other characteristics of Winner and Draper include medium height, medium-early heading, good straw strength, and a moderate disease resistance package.

The complete results of the 2020 South Dakota Crop Performance Trials are available at https://extension.sdstate.edu/winter-wheat-variety-trial-results. The producers should select a variety for 2021 growing season based on the 3-year results from locations near their farm (CPT locations: Brooking, Mt.Vernon, Watertown, Hayes, Faith, Martin, Ondia, Pierre, Platte, Selby, Sturgis, Vivian, Wall, Winner) and identify the best performing varieties in their region with tolerance to diseases.

With the Fall planting season is just four weeks away, the producers should select a variety and get clean and healthy seed for a healthy crop. The producers can get more information on certified seed availability at https://www.sdcrop.org/sddirectories. Further, the producers should manage the risk factors like Wheat Streak Mosaic Virus by planting no earlier than September 5 and control volunteer wheat and grassy weeds by spraying at least two weeks before the planting winter wheat.

Table1. Grain protein deviation (GPD) scores (1=good to 9=poor) of varieties tested in 2017-2019 SDSU Crop Performance and Testing variety trials across 38 year-locations (2017-19).

High Positive grain protein deviation (1-3)		Medium grain protein deviation (4-6)		High Negative grain protein deviation (7-9	
WINNER	1	KELDIN	4	LANGIN	7
DRAPER	1	OVERLAND	4	SD13W064-7	7
LYMAN	1	OAHE	4	COWBOY	7
WESLEY	1	IDEAL	4	AVERY	8
SD13062-2	1	SY SUNRISE	5		
SY WOLF	2	EXPEDITION	5		
THOMPSON	2	WB GRAINFIELD	5		
REDFIELD	2	ALICE	5		
		LCS MINT	6		
		SY MONUMENT	6		