N EXTENSION

2019 Nebraska Dry Bean Variety Trials

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In 2019, the PHREC Dry Bean Breeding program conducted six replicated field trials at two locations, the Scottsbluff Ag Lab (Scotts80-Field-1) and the Mitchell Ag lab (Field W2), to evaluate which dry bean entries (varieties/experimental lines) are best suited for western Nebraska. These trials have been ongoing for 38 years as a service to the Nebraska dry bean industry. Information about dry bean variety performance is available on the web at http://cropwatch.unl./varietytest-Drybeans/2019. The trials at the Scottsbluff Ag lab were harvested, but the data are not reported because damage from multiple hailstorms (August 15 [golf ball size], 16, and 20) reduced yield by almost 80% and resulted in very poor seed quality. Therefore, we only report results from the Mitchell Ag lab variety trials.

Locations and Germplasm

Six replicated trials (one great northern [25 entries], one pinto [50 entries], one light red kidney [LRK, 19 entries], one dark red kidney [DRK, 9 entries], one black [18 entries], and one navy [8 entries]) were planted at the Mitchell Ag Lab on June 5.

Soil at the Mitchell site (41°56.6′ N, 103°41.9′ W, 1240 m elevation) is a silt loam (Typic Ustorthents).

Agronomic Management

The field at the Mitchell Ag Lab was plowed on June 3 and sprayed/roller harrowed with Eptam @ 2.5 pts/acre and Sonalan @ 2 pts/acre on June 4.

The field at the Mitchell Ag Lab had 52# residual N and 83# N manure credit.

It was sprayed with Badge SC @ 1.5 pts/acre on July 9 and with Oxidae on July 25. This site received hail and wind damage on August 15.

The field at the Mitchell Ag Lab was irrigated 10 times (7.4 inches) using sprinkler irrigation. It received an additional 6.12 inches of precipitation.

The entries were assigned to experimental units using a randomized complete block design with four replications. Each plot consisted of four 22-foot rows spaced 22 inches apart. The target plant population was 80,000 plants/acre for all market classes except the LRK/DRK which had a target population of 100,000 plants/acre. The trials were planted with a Hege cone planter. At the end of the growing season, a plot combine (Wintersteiger Classic) was used to harvest 18 feet of the middle two rows of each plot. Variety/line trials at the Mitchell Ag lab were undercut and combined on September 12.

Response Variables

Data collected were: yield (lbs/acre adjusted to 14% Moisture), DTF (days to flowering, actual number of days from planting to when 50% of the plants had at least one flower opened), DTM (days to harvest maturity, actual days from planting to when 80% of the plants were ready to be harvested), 100-seed counts (weight of 100 seeds in grams, adjusted to 14% Moisture), and Test Weight (lbs/bushel). Data are presented in Tables 1 to 6.

Statistical Analysis

Data were analyzed using PROC MIXED (SAS, 2004). Means were separated using a F-protected LSD. All tests were considered significant at $P \leq 0.05$.

The, GRAND MEAN (bottom of each table) refers to the mean of the experiment. The Coefficient of Variation, expressed as a percentage (CV %), measures the variability of the experiment; large CVs indicate that a large amount of

variation cannot be attributed to differences among entries. The LSD (Least Significance Difference) was used to evaluate differences among entries. If the difference between two entries exceeds the LSD value for a particular response variable, the higher value is significantly greater with 95% probability (0.05 level). If the difference between two entries is less than the LSD value, the values are considered similar.

List of Tables

Acknowledgments

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Table 1. 2019 Great Northern Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
11	15215	2563	47	90	34.1	10.2	61.6	Kelley Bean/ADM
9	14164	2473	46	85	37.4	10.1	59.3	Kelley Bean/ADM
14	NE1-17-9	2355	47	87	34.5	10.0	60.1	UNL
5	Andromeda (13151)	2320	45	84	39.5	10.2	60.5	Kelley Bean/ADM
17	NE1-17-29	2307	47	86	34.9	9.7	59.8	UNL
19	NE1-17-10	2299	47	87	32.9	9.7	60.5	UNL
24	NE1-17-31	2201	47	90	36.8	9.9	57.9	UNL
6	Virgo (13172)	2177	47	90	33.1	9.9	60.8	Kelley Bean/ADM
20	NE1-17-36	2172	47	90	36.2	10.1	60.2	UNL
18	NE1-17-45	2082	47	89	36.9	10.3	61.6	UNL
7	12134	2065	46	90	34.5	9.9	59.3	Kelley Bean/ADM
4	Draco	2043	48	89	31.0	10.0	60.9	Kelley Bean
16	NE1-17-27	2024	46	90	37.6	10.2	60.4	UNL
10	14172	2003	47	89	33.5	9.7	60.6	Kelley Bean/ADM
21	NE1-17-41	1938	45	89	36.4	10.2	61.5	UNL
2	Aries	1925	47	86	31.9	10.0	61.4	Kelley Bean
8	13150	1914	47	91	34.2	10.1	62.0	Kelley Bean/ADM
12	Powderhorn	1894	46	88	33.8	9.9	60.9	MSU
25	NE3-17-18	1824	48	90	36.2	10.1	60.6	UNL
15	NE1-17-19	1796	46	92	37.2	10.3	60.0	UNL
3	Hydra	1768	47	86	36.9	9.9	60.9	Kelley Bean
13	Panhandle Pride	1718	45	87	33.0	10.1	62.6	UNL
1	Taurus	1656	49	91	33.2	9.9	62.6	Kelley Bean
22	NE1-17-43	1441	45	90	36.7	10.1	61.1	UNL
23	NE1-17-22	1362	45	90	37.3	9.7	61.4	UNL
	MEAN	2013	47	89	35.2	10.0	60.7	
	LSD 0.05	399	1	2	2.2	0.3	0.7	
	CV %	9.9	1.4	1.1	3.1	1.7	0.6	

Table 2. 2019 Pinto Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
12	18–376	2547	47	89	35.2	10.4	62.8	ADM
14	Windbreaker	2414	47	85	37.2	9.9	58.2	Seminis
8	Cowboy (11278)	2372	48	85	33.9	10.0	60.2	ADM
13	18–589	2337	51	90	33.7	9.6	61.2	ADM
6	Vibrant	2291	47	87	33.5	10.1	61.0	ADM
15	SV6139GR	2211	47	85	31.9	9.7	61.1	Seminis
5	Torreon	2207	48	86	34.5	10.3	61.1	ADM
7	Radiant (12324)	2180	47	88	34.1	9.3	60.4	ADM
11	Gleam (14455)	2180	49	88	29.1	10.2	62.6	ADM
1	La Paz	2175	48	89	31.1	9.9	61.6	ADM
21	41767–15	2137	44	87	41.4	9.8	61.8	TVS
33	Montrose	2131	46	83	34.4	9.6	60.0	CSU
3	Monterrey	2127	50	88	32.4	10.1	61.3	ADM

Table 2. 2019 Pinto Dry Bean Variety Trial—Mitchell Ag Lab (Continued).

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
27	52646–14	2125	46	84	36.8	10.1	58.5	TVS
16	SV6533GR	2122	46	83	37.3	10.0	60.7	Seminis
4	Santa Cruz	2113	48	88	31.6	10.1	60.8	ADM
47	NE4-18-45	2061	47	90	38.8	9.6	58.9	UNL
10	Lumen (14451)	2028	47	90	31.5	10.1	63.7	ADM
18	GTS-907	2017	46	85	34.5	9.6	58.7	Gentec
20	Palomino	2012	45	85	37.4	9.6	59.9	NDSU
2	Sinaloa	1994	48	87	33.7	10.0	60.3	ADM
45	NE4-17-6	1985	45	89	38.9	9.8	58.8	UNL
49	NE4-18-40	1962	45	91	38.6	9.3	58.4	UNL
38	NE2-17-20	1946	47	88	34.1	9.6	59.0	UNL
9	18–283	1945	50	88	38.5	9.8	59.0	ADM
17	GTS-904	1936	48	90	37.0	9.8	58.8	Gentec
22	30903–6	1890	45	83	33.7	9.7	60.3	TVS
44	NE4-17-10	1836	44	85	38.9	9.6	56.0	UNL
26	32330–14	1822	49	91	36.7	9.6	58.6	TVS
50	NE2-17-44	1800	43	89	38.9	9.5	57.1	UNL
43	NE2-17-41	1792	45	88	37.7	9.7	56.7	UNL
40	NE2-17-38	1734	42	86	34.6	9.7	58.4	UNL
28	42732–15	1719	49	92	36.9	10.0	60.3	TVS
46	NE4-18-6	1693	47	90	39.7	9.8	59.9	UNL
19	Staybright	1670	45	91	35.7	10.0	58.6	TVS
29	43732–1	1654	48	91	36.6	9.8	60.9	TVS
39	NE2-17-37	1654	45	90	32.9	9.8	58.9	UNL
24	33503–5	1649	48	90	37.9	9.6	59.5	TVS
32	Croissant	1632	46	87	32.5	9.3	60.5	CSU
37	NE2-17-18	1630	47	91	40.0	9.6	59.9	UNL
25	34628–5	1590	49	91	35.8	9.9	60.5	TVS
23	30993–27	1552	49	91	33.4	9.8	62.0	TVS
42	NE2-17-40	1542	47	90	34.6	9.9	60.7	UNL
48	NE4-18-55	1459	47	92	45.0	10.3	59.5	UNL
36	Centennial	1459	48	92	34.6	10.0	61.4	CSU
41	NE2-17-39	1458	41	85	36.0	9.6	58.4	UNL
31	Bill Z	1432	46	84	31.9	9.7	59.1	CSU
30	53676–3	1375	51	92	34.7	9.7	57.2	TVS
35	Long's Peak	1323	49	91	35.2	9.7	59.4	CSU
34	DR Wood	1303	49	93	34.4	9.7	60.8	CSU
	MEAN	1884	47	88	35.6	9.8	59.9	
	LSD 0.05	345	2	2	2.3	0.4	0.9	
	CV %	9.3	2.0	1.1	3.3	1.9	0.8	

Table 3. 2019 Light Red Kidney Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
9	15916	1478	39	82	43.3	10.1	57.2	TVS
11	Pink Panther	1434	39	83	46.6	10.2	54.8	Seminis
4	Red Dawn (09363)	1422	39	76	47.5	11.1	53.7	TVS
1	Big Red	1388	38	84	44.0	10.1	56.8	TVS
14	Closseau	1272	39	81	45.3	10.4	54.4	Seminis
19	NE10-18-7	1117	37	86	42.7	10.0	55.5	UNL
3	Ronnie's Red	1111	42	90	45.6	9.2	56.5	TVS
13	Panhandle Red	992	39	87	42.2	9.4	57.3	Jack's Bean
8	15907	987	45	90	43.2	9.2	55.6	TVS
12	CELRK	937	37	76	43.8	10.2	55.4	
2	Red Zone	924	45	90	41.2	9.2	56.6	TVS
18	NE10-18-2	779	38	78	39.1	10.2	57.2	UNL
7	15898	731	46	89	36.4	9.0	55.0	TVS
10	15926	696	44	87	42.1	9.1	54.9	TVS
17	NE10-18-1	656	38	84	38.4	9.8	55.4	UNL
6	15897	631	48	90	38.7	9.0	55.0	TVS
5	15892	609	45	86	37.5	9.8	56.3	TVS
	GRAND MEAN	1010	41	84	42.2	9.8	55.7	
	LSD 0.05	315	3	2	3.1	0.7	1.8	
	CV %	15.5	3.2	1.4	3.7	3.5	1.6	

Table 4. 2019 Dark Red Kidney Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
3	Spire (09431)	1696	43	92	42.0	9.3	58.7	Trinity Genetics
7	151011	1673	40	89	37.2	9.6	58.7	Trinity Genetics
8	Montcalm	1520	41	92	45.9	9.4	57.6	MSU
5	15978	1399	45	91	39.6	9.3	59.2	Trinity Genetics
2	Epic (09430)	1379	42	91	47.0	9.2	58.4	Trinity Genetics
4	Rampart (09434)	1332	42	89	40.7	9.4	58.5	Trinity Genetics
1	Chaparral (07323)	1310	42	91	37.7	9.2	57.2	Trinity Genetics
9	Red Hawk	1262	41	89	38.4	9.1	56.2	MSU
6	15981	829	45	90	46.1	8.9	54.1	Trinity Genetics
	MEAN	1378	42	90	41.6	9.2	57.6	
	LSD 0.05	256	2	3	2.6	0.3	1.1	
	CV %	9.0	2.6	1.7	3.0	1.6	0.9	

Table 5. 2019 Small Blacks Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
14	NE14-18-3	2002	47	90	19.9	9.3	62.0	UNL
15	NE14-18-4	1690	47	84	20.9	9.3	61.0	UNL
10	Ace	1578	51	88	15.8	9.0	63.2	ADM
5	Black Tails (13489)	1561	51	89	15.5	9.0	63.9	Coop. Elevator
4	Black Bear (12576)	1554	51	90	14.2	9.4	64.0	Coop. Elevator
16	NE14-18-7	1475	50	91	20.4	8.6	62.6	UNL
3	Eclipse	1466	51	90	15.4	8.9	63.3	NDSU
12	B13SR1–1	1441	50	88	16.8	8.9	62.1	Gentec
13	NE14-18-2	1426	49	89	18.6	9.4	61.7	UNL
1	Loreto	1398	51	90	16.0	8.6	63.4	ADM
2	Black Cat	1340	51	89	14.5	9.2	62.7	ADM
7	13505	1272	51	89	14.0	8.9	62.4	Coop. Elevator
11	GTS-1103	1222	51	91	16.1	8.8	64.1	Gentec
8	BlackBeard (14506)	1161	51	91	17.0	9.0	63.7	Coop. Elevator
6	Spectre (14497)	1112	51	89	15.2	8.9	64.6	Coop. Elevator
9	14500	1091	51	91	16.3	8.5	64.1	Coop. Elevator
18	Zenith	1053	48	90	15.7	8.8	63.1	MSU
17	Zorro	964	51	89	15.8	8.9	63.3	MSU
	MEAN	1378	50	89	16.6	9.0	63.1	
	LSD 0.05	212	1	2	0.8	0.5	0.5	
	CV %	7.7	1.0	1.0	2.3	2.5	0.4	

Table 6. 2019 Navies Dry Bean Variety Trial—Mitchell Ag Lab.

Entry (NO)	ID	Yield (LBS/A)	Days to Flowering	Days to Maturity	100-SeedWeight (GR)	Moisture (%)	Test Weight (LBS/BU)	Owner
8	Apex	1867	47	91	19.4	9.7	63.5	TVS
3	Blizzard (08072)	1448	50	90	15.4	9.5	62.4	Coop. Elevator
5	13068	1349	51	91	17.0	9.4	61.8	ADM
1	HMS Medalist	1315	51	90	14.6	9.3	62.8	ADM
7	15095	1280	51	91	16.2	9.6	63.5	ADM
6	15094	1260	51	89	15.9	9.4	62.7	ADM
2	Merlin	1086	50	91	14.3	9.5	64.1	Coop. Elevator
4	12047	851	50	92	13.6	9.6	63.8	ADM
	MEAN	1307	50	90	15.8	9.5	63.1	
	LSD 0.05	204	1	1	1.1	0.3	0.4	
	CV %	7.6	0.9	0.6	3.3	1.3	0.3	