

Improving Winter Wheat Varieties for Nebraska

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The 2009-2010 wheat season was one of contrasts. The 2010 crop was 64,100,000 bushels and was harvested from 1,490,000 acres. The average yield was 43 bu/a. This crop was one of the smallest planted crops in recent history and indicates how sensitive wheat production is to weather related conditions as much of eastern NE was unable to plant wheat after soybeans because cool weather prevented early soybean maturation and harvest, and then rains prevented wheat planting.

As for the breeding nurseries, many of our locations started in good moisture, went through a hard winter, grew well in the early spring, but then had a short period of drought followed by ample to often excessive rainfall at harvest. Lincoln was infected with soilborne mosaic virus. Mead suffered from ample moisture at harvest. North Platte, for undefined reasons, was severely damaged which we think may be due to a later than normal planting and the hard winter. Winterkilling was only seen at this site among lines that normally survive our winter. However, North Platte never looked good throughout the season. A contrast was that McCook (sponsored by ConAgra) was our best nursery in part because it was sprayed with fungicide and had excellent growing conditions. Alliance was also sprayed with fungicide and did very well; however it was partially damaged by hail and suffered from the early drought. That the grain yields at Sidney were slightly superior to Lincoln is an indication of how good the moisture was in parts of western NE this season. Unfortunately, all of the irrigated breeding nurseries were severely damaged by hail, so there was little data (or seed) collected from those sites.

The main foliar diseases were leaf and stripe rust and some of the leaf blotch diseases. As mentioned above, soilborne mosaic virus was prevalent in parts of eastern NE, as was barley yellow dwarf virus (transmitted by an aphid). Stem rust was found on late winter wheat, some barleys and a few triticals. Commercially, stem rust was minor, whereas leaf rust and stripe caused economic losses.

The released cultivar and experimental line data from Nebraska Intrastate Nursery are given in table 1. Goodstreak, Settler CL, Overland, Camelot, and the newly released Robidoux (formerly NI04421) performed well state-wide. The recently released cultivar McGill (NE01481) performed well where it is adapted, but has a narrower region of adaptation than the above cultivars. Settler CL seems to be a remarkable new Clearfield® wheat in that it is very well adapted to western NE, but was co-released with WY and SD where it continues to do well. It also does well in CO, so it is having an excellent sales year. It is rare for wheat cultivars to be that broadly adapted. Overland is similar in that it is broadly adapted to the upper Great Plains. All indications are that wheat seed is being sold out across Nebraska, most likely due to good harvest weather for crops and adequate moisture for planting. However, many parts of NE are in need of rain to ensure good future growth. Hence, with favorable weather, the 2011 crop should be larger than the 2010 crop. No new lines were released since Robidoux and McGill due to the previous releases having excellent productivity and the variable conditions in 2010 made it difficult to select new lines with confidence. However, a number of new lines are under increase for future release and it is apparent that progress continues to be made.

Commercial companies continue to work with our breeding program and each provides unique opportunities. The major effort and goal in all of our public-private relationships will be how to optimize our collaborations for the improved health and sustainability of the Nebraska wheat industry with its diverse and various constituents. The University of Nebraska remains the "Peoples' University" and we remain dedicated to serving our constituents.

Support from the Nebraska Wheat Board is gratefully acknowledged and critical to the continued success of this program.

Table 1.

								St. AVG.	
	Yield MD	Yield LN	Yield CC	Yield NP	Yield SD	Yield All.	Yield MC	Convent.	Rank
name	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	bu/a	
WESLEY	37.45	52.88	43.31	34.25	52.04	47.24	76.68	44.53	55
ALLIANCE	31.23	53.24	45.83	48.73	60.92	58.69	80.36	49.77	19
Overland	45.49	56.48	52.46	37.03	54.79	58.77	92.82	50.84	10
McGill	36.97	61.26	52.04	34.46	57.33	50.55	91.74	48.77	25
NE02558	43.13	53.41	47.90	43.96	58.29	53.23	83.74	49.99	17
NE03490	33.32	57.38	52.79	33.23	53.51	49.32	81.11	46.59	42
NW03666	43.67	60.67	49.04	36.02	53.57	57.84	87.57	50.14	16
NE04490	35.41	57.10	39.48	37.47	50.02	58.15	77.05	46.27	44
NI04420	45.28	60.23	53.65	34.91	65.10	53.11	89.75	52.05	6
Robidoux	41.17	56.39	46.26	35.28	63.87	58.71	89.78	50.28	15
NE05426	38.39	63.79	40.63	32.61	50.37	48.51	82.49	45.72	49
NE05430	38.35	59.20	47.92	26.91	57.17	45.55	85.88	45.85	48
NE05496	38.51	54.45	47.03	46.01	58.03	52.53	87.01	49.43	22
NE05548	28.17	56.02	45.13	41.28	61.71	58.56	80.32	48.48	26
NE06430	33.03	55.70	48.03	39.99	64.20	52.66	88.73	48.94	24
NE06469	39.70	58.72	48.07	46.72	53.10	47.42	84.21	48.96	23
NE06545	31.75	58.98	39.98	39.09	51.90	61.43	90.98	47.19	37
NE06607	43.71	58.86	54.17	44.47	63.39	58.86	88.61	53.91	1
NE07444	33.61	55.15	49.52	37.91	53.29	54.69	85.46	47.36	35
NE07486	40.00	66.27	54.44	34.52	60.24	62.67	88.54	53.02	3
NE07487	30.35	55.45	48.92	31.32	60.13	63.66	83.31	48.31	27
NW07505	40.70	59.50	55.46	43.58	63.11	59.42	78.72	53.63	2
NE07520	30.75	57.87	48.41	32.84	61.91	56.97	88.49	48.13	29
NE07521	39.67	56.79	47.46	35.52	50.75	50.71	85.64	46.82	41
NE07531	31.79	49.89	42.31	45.05	52.14	51.94	92.05	45.52	51
NW07534	35.49	55.38	38.41	34.14	44.41	46.88	81.67	42.45	58
NE07627	36.39	49.52	37.42	35.81	55.47	57.30	91.79	45.32	52
NE07668	31.35	56.54	43.68	34.32	56.17	48.89	82.33	45.16	53
NI07703	37.70	46.59	36.41	24.80	58.64	54.23	83.79	43.06	57
Camelot	43.66	57.36	49.89	39.06	64.93	53.15	81.74	51.34	8
Settler CL	38.48	56.92	43.89	45.53	61.09	57.46	83.17	50.56	11
Infinity CL	34.12	56.51	48.84	31.24	60.72	57.27	80.93	48.12	30
MILLENNIUM	39.13	54.08	49.46	30.48	58.75	57.44	82.00	48.22	28
NE08402	41.54	64.19	48.59	22.66	54.76	50.52	81.27	47.04	39
NE08407	46.06	63.22	46.25	29.22	52.83	47.77	82.66	47.56	32
NE08410	41.33	63.72	43.83	27.56	54.54	52.47	84.75	47.24	36
NE08435	39.09	60.81	44.32	23.21	55.93	49.83	85.18	45.53	50
NE08452	27.16	55.65	45.30	35.18	63.44	60.71	84.82	47.91	31
NE08457	42.60	60.12	44.11	40.91	55.93	54.59	84.49	49.71	20
NE08459	38.75	57.86	38.21	33.29	55.07	53.95	79.68	46.19	46
NE08470	35.19	51.82	43.01	32.73	58.77	46.08	83.80	44.60	54
NE08476	37.50	59.28	54.32	43.05	62.53	59.59	82.61	52.71	4
NE08499	33.30	61.89	52.73	38.39	61.75	60.85	83.31	51.49	7
NE08509	30.71	47.92	45.89	41.47	58.66	58.11	85.55	47.13	38
NE08523	31.39	59.39	62.56	37.19	60.49	50.73	76.21	50.29	14
NE08527	31.09	58.48	57.79	36.61	62.13	57.11	81.46	50.54	12
NE08531	36.12	54.00	53.52	40.81	55.73	44.20	79.78	47.40	34

NE08555	39.26	55.93	49.58	38.94	57.45	55.95	84.13	49.52	21
NE08651	35.30	51.81	43.56	43.35	56.16	50.94	81.57	46.85	40
NE08659	38.83	54.74	54.10	47.42	65.77	55.39	74.62	52.71	5
NW08460	29.76	58.86	42.24	30.65	60.80	56.77	84.98	46.51	43
NW08463	38.74	59.07	38.19	39.27	50.39	50.88	85.51	46.09	47
NI06731	36.77	59.99	45.28	33.01	56.10	54.03	78.76	47.53	33
NI06736	38.83	60.20	47.88	31.40	50.78	48.16	76.71	46.21	45
NI06737	31.83	62.37	45.75	29.07	50.36	45.46	74.78	44.14	56
NE07409	39.40	62.32	54.24	33.44	58.07	51.68	88.97	49.86	18
NI08708	38.20	61.21	51.52	41.90	62.04	47.59	90.00	50.41	13
GOODSTREAK	43.82	49.39	50.36	40.52	62.38	60.33	69.77	51.13	9
SCOUT66	28.65	40.77	37.28	29.68	50.31	40.52	57.63	37.87	59
CHEYENNE	27.67	23.55	33.06	37.02	47.06	44.18	51.98	35.42	60
CV	18.21	7.05	6.44	14.32	7.70	7.60	5.33		
Average	36.78	56.45	47.03	36.44	57.19	53.54	82.72		
LSD	9.09	4.66	4.11	7.09	5.98	5.52	7.44		