

Improving Winter Wheat Varieties for Nebraska

P. S. Baenziger and Lan Xu, University of Nebraska

July 30, 2007

We successfully completed harvest on July 18, which is about one week earlier than usual. We were able to do this because the season was early and also because my two technologists devised a very efficient plan for harvesting. In the past we sent one combine west to harvest wheat. It is a long, tough week for the harvest crew. This year we sent both combines west to harvest wheat and it was a great success. Sidney and Alliance were both cut in one day and North Platte was cut in two days. We deliberately moved some of the genetics research to North Platte due to its proximity to us. Of course we kept all of our breeding nurseries at the statewide testing sites. The electronic weigh system was excellent and we cut a number of plots and binned the seed, which greatly reduced our need to bring seed home, gave the generous growers who allow us to be on their farms some grain from their trials, gave us immediate data, and included both grain moisture and test weight.

The trials were very high yielding at Lincoln and North Platte (highest yielding site in the state). Mead, Sidney and Hemingford (affected by drought) had good yields (see table below). Clay Center appeared to be affected by the last freeze more than we expected and was most likely heavily infected by scab (*Fusarium head blight*) and was the lowest yielding site in the state of our trials. Hence the state averages were run with and without Clay Center included. We (Dr. Wegulo and I) will send samples from Lincoln, Mead, Clay Center, and North Platte for vomitoxin analyses (the toxin associated with scab) to see how severe the disease was. Stinking smut was also found in some trials. Of the lines tested, Overland, Goodstreak, Infinity, and Wahoo had good years. Other lines with narrower adaptation did well in their adapted parts of Nebraska. Three experimental lines will be considered for release this fall, NE01604, NE02584, and NE01481. They can be generally released, licensed to NuPride Genetics, or added to our organic wheat releases. The following year, NH03614 (a new Clearfield wheat) and NI044221 (a good dryland wheat that has potential under irrigation) will be considered for release.

Though we have not had sufficient time to thoroughly study the data and we are still analyzing much of our data, a number of observations can be made. Leaf rust and other diseases really hurt the wheat this year. Lines with good leaf rust, drought tolerance, scab tolerance, etc. did well. Also, though the yields were not greatly different between Sidney and Hemingford, the lines that did well at one location generally did not do well at the other location (e.g. a line ranked in the top 10 best lines in Sidney might be ranked in 10 worst lines at Hemingford and vice versa). Results like this always concern plant breeders who are selecting lines for broad adaptation and want producers to have consistent performance (less risk in producing wheat). What is interesting in these trials are those few lines that seem to do well at both Sidney and Hemingford. Though rare, the lines that do well at both locations are exactly the consistent lines that should benefit producers.

Approximately 400 samples were sent to Lan Xu and the Plant Quality Laboratory for analysis as the first test in developing high quality wheat varieties. We hope to have the samples analyzed before planting to ensure only lines with reasonably quality are tested in future years.

The efforts of program technologists, Greg Dorn and Mitch Montgomery, in the field and greenhouse, respectively, have been essential to the continuity and excellence of the breeding program.

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

Variety	Mead	Lincoln	Clay Cen.	N. Platte	Sidney	RankS	Heming.	RankH	St.Avg.	Rank	State-CC	Rank-CC
	bu/a	bu/a	bu/a	bu/a	bu/a		bu/a				Avg.	
WESLEY	53.13	60.81	29.13	73.25	38.77	60	44.68	54	49.96	51	54.13	50
ALLIANCE	52.38	59.70	28.08	80.57	54.98	8	54.42	12	55.02	29	60.41	19
Overland	68.05	70.49	47.08	78.25	53.12	20	43.03	56	60.00	5	62.59	5
NE01481	60.75	77.01	44.68	76.47	55.03	7	39.17	58	58.85	7	61.69	11
NE01604	55.93	69.63	30.63	88.73	54.40	12	55.68	8	59.17	6	64.87	1
NE02513	56.98	65.84	42.27	83.93	52.17	22	49.78	31	58.50	10	61.74	10
NE02533	53.43	59.04	38.30	72.20	57.32	4	50.58	27	55.15	27	58.51	33
NE02558	49.50	65.14	31.97	81.15	49.47	33	50.98	26	54.70	32	59.25	26
NE02584	52.45	61.20	42.78	77.23	55.93	5	53.98	15	57.26	18	60.16	21
NE03458	46.37	62.65	28.87	60.45	51.77	24	56.20	6	51.05	45	55.49	45
NE03488	56.22	73.24	39.70	63.95	44.23	51	48.17	39	54.25	35	57.16	39
NE03490	49.08	70.08	35.42	85.95	53.68	14	53.83	16	58.01	12	62.52	6
NH03614	57.55	69.88	49.48	85.40	46.32	44	57.98	1	61.10	2	63.43	3
NI03427	53.60	59.93	35.35	69.00	49.10	35	53.10	18	53.35	41	56.95	40
NW03654	60.32	67.71	50.95	74.57	54.60	10	55.23	9	60.56	4	62.49	7
NW03666	51.62	63.98	29.67	75.90	54.45	11	48.52	36	54.02	38	58.89	30
NW03670	42.38	62.38	39.53	58.62	53.13	19	47.63	43	50.61	47	52.83	54
NW03681	53.12	65.38	32.57	68.65	51.63	25	48.25	38	53.27	42	57.41	38
NE04424	55.62	69.66	48.52	79.73	57.60	3	54.65	11	60.96	3	63.45	2
NE04449	51.57	64.88	38.25	68.00	43.00	54	50.37	28	52.68	44	55.56	43
NE04490	50.85	60.45	44.15	67.20	46.82	43	57.75	2	54.54	33	56.61	41
NE04550	39.42	65.26	32.95	54.45	46.90	42	34.65	60	45.61	57	48.14	58
NE04653	50.55	63.83	41.12	68.63	46.02	46	48.47	37	53.10	43	55.50	44
NI04420	51.80	70.35	41.83	81.25	48.53	37	52.97	19	57.79	14	60.98	13
NI04421	52.55	67.91	33.30	66.10	53.40	17	56.83	4	55.02	30	59.36	25
NI04427	49.85	61.30	36.57	71.10	55.18	6	51.62	21	54.27	34	57.81	35
NE03457	42.55	60.85	39.90	56.38	53.48	16	48.97	33	50.36	49	52.45	55
NE05403	62.82	77.33	44.45	67.95	48.47	38	47.90	40	58.15	11	60.89	15
HARRY	46.50	63.33	36.22	63.17	40.13	58	54.00	14	50.56	48	53.43	53
MILLENNIUM	59.00	70.69	45.88	61.58	48.97	36	48.68	35	55.80	23	57.78	36
Hallam	49.45	72.60	38.62	68.55	50.52	27	51.58	22	55.22	25	58.54	32
Infinity	58.18	72.79	41.12	67.27	51.80	23	54.75	10	57.65	16	60.96	14
WAHOO	60.15	67.44	31.93	70.02	53.28	18	57.50	3	56.72	21	61.68	12

NE05418	60.43	75.93	52.12	68.37	43.45	53	52.70	20	58.83	8	60.18	20
NE05425	56.27	74.43	41.85	77.27	47.43	40	48.93	34	57.70	15	60.87	16
NE05426	55.00	71.88	37.58	76.15	48.40	39	51.45	23	56.74	20	60.58	17
NE05427	51.95	70.73	34.50	77.03	43.93	52	46.10	50	54.04	37	57.95	34
NE05430	65.60	84.36	55.20	76.58	45.58	48	41.87	57	61.53	1	62.80	4
NE05495	48.83	63.64	40.58	65.72	50.45	28	53.62	17	53.81	40	56.45	42
NE05496	51.08	73.36	42.40	70.17	53.97	13	54.03	13	57.50	17	60.52	18
NW05518	40.05	58.55	27.68	60.13	45.88	47	51.40	24	47.28	56	51.20	56
NE05523	40.78	61.10	28.30	72.78	49.88	30	47.25	46	50.02	50	54.36	48
NE05537	51.90	65.28	28.87	79.05	52.18	21	47.52	44	54.13	36	59.19	28
NE05548	56.50	75.54	41.30	72.38	51.37	26	55.73	7	58.80	9	62.30	8
NE05549	44.33	71.15	31.12	82.00	58.95	1	43.37	55	55.15	26	59.96	23
NE05558	50.65	69.98	36.48	69.38	54.63	9	50.23	30	55.23	24	58.97	29
NE05578	47.15	65.66	30.50	62.02	46.25	45	47.30	45	49.81	52	53.68	52
NW05589	62.90	68.15	29.27	72.92	44.93	50	45.15	53	53.89	39	58.81	31
NW05643	45.30	65.51	17.97	61.48	45.30	49	56.55	5	48.69	55	54.83	47
NE05699	38.35	45.31	13.13	56.62	42.33	55	38.05	59	38.97	60	44.13	60
NI05713	51.95	62.85	25.02	67.50	39.78	59	46.68	48	48.96	54	53.75	51
NE05453	58.58	72.11	35.18	79.42	42.05	57	47.73	41	55.85	22	59.98	22
NE05459	52.03	70.16	50.88	73.32	53.52	15	47.13	47	57.84	13	59.23	27
NE05567	49.98	58.09	25.63	63.75	49.27	34	49.67	32	49.40	53	54.15	49
NE05568	53.58	59.36	41.53	74.42	49.88	31	51.20	25	55.00	31	57.69	37
NE05569	52.18	64.35	32.87	72.40	58.08	2	50.30	29	55.03	28	59.46	24
Millennium-27, ALS-	56.48	60.09	27.45	65.27	49.55	32	45.30	52	50.69	46	55.34	46
GOODSTREAK	61.35	70.51	32.12	82.02	50.30	29	46.48	49	57.13	19	62.13	9
SCOUT66	47.97	51.74	13.00	53.30	47.02	41	47.68	42	43.45	58	49.54	57
CHEYENNE	41.22	50.44	20.80	52.22	42.10	56	45.35	51	42.02	59	46.27	59
	52.44	66.22	36.08	70.82	49.68		49.84	30.5	54.18		57.80	