Summary of the 2007 Purdue University Wheat Improvement Program Performance Trials

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General growing conditions, 2007.

Trials were conducted at Evansville, Atlanta, Lafayette, Wabash and Woodburn, Indiana. The seedbed at seeding in fall 2006 was wet at all locations except Atlanta due to rainy weather throughout the fall wheat-seeding season. This resulted in variable wheat stands in plots, especially at Lafayette, Wabash and Woodburn; and most severely in short-straw lines like INW0303 and INW0411.

Weather temperatures were above normal and high enough for aphids to remain active until late November, resulting in severe fall infection of yellow dwarf (YD), a virus disease transmitted by aphids that move from corn and perennial grasses to wheat after wheat emergence, at Lafayette, Atlanta and Evansville, which reduced performance of susceptible lines like INW0411. There also was spring infection of YD at Evansville, transmitted by aphids that move with wind currents typically beginning in early April from southern USA northward. Other diseases including fusarium head blight (FHB) were negligible, reducing the yield advantage of FHB resistant lines like INW0411. Wheat survived the winter with little winterkill in all trials. The unusually low temperatures (low $20s^0$ F) during several nights in mid April fortunately did not result in observable freeze damage to trial plots at any of the locations, although some fields of wheat in southern Indiana and near the plot area at Evansville did show significant freeze damage. Temperatures were below normal until early-mid May, resulting in shorter than normal plant height in trial plots and in wheat fields at Wabash and Woodburn and in the northern 1/3 of the state, reducing yield potential especially of early lines. Temperatures were above normal and rainfall was below normal from about mid May to mid-late June, resulting in soil moisture stress and less than normal grain fill. In general, due to unfavorable growing conditions, wheat yields were below 'average'. Except for YD resistant lines, lines with resistance to important diseases, like FHB, could not show performance advantage for their resistance to diseases. Data for 2007, taken together with the very high performance data from 2005 and 2006, are informative.

Performance data from 2007 for a subset of 14 entries consisting of recently released cultivars are summarized in Tables 1 and 2. The YD resistance of INW0316, INW0731 was apparent. The large root volume (determined in separate tests in the greenhouse) of INW0731 also likely was an advantage due to the soil moisture stress in 2007. INW0731 has a demonstrated consistent high performance in previous years also. INW0412 again ranked near the top of the trial, and its normal tall growth was limited this year due to cool temperatures until mid May.

Table1. Performance of wheat in Purdue trials; means across Woodburn, Wabash, Lafayette, Atlanta and Evansville, IN, 2007.

Cultivar/line[1]	Grain yield	Rank	Test weight	Heading date	Plant height	Straw score	Yellow dwarf	FHB spikelets diseased
	bu/a		lb/bu	Julian	in.	0-9[2]	0-9[3]	%[4]
Patterson	73.6	9	60.3	130.6	33	4.5	6.0	92
PIO25R47	78.6	5	58.7	133.5	31	3.8	4.0	54
PIO25R54	68.6	14	60.0	134.8	30	2.8	2.0	20
Roane	73.8	8	61.0	131.9	30	3.3	3.0	17
INW 0301	68.7	13	59.5	131.3	30	3.3	5.0	58
INW 0302	71.7	10	61.3	132.1	30	2.8	4.0	53
INW 0303	74.4	7	59.6	131.3	28	1.5	5.0	24
INW 0304	69.1	11	59.9	129.2	29	3.8	2.0	14
INW 0316	84.0	1	60.0	132.9	30	2.8	0	16
INW 0411	68.8	12	58.3	132.3	29	3.0	7.0	10
INW 0412	82.4	3	62.4	133.1	36	4.0	1.0	15
INW 0731	83.8	2	60.3	132.5	31	3.5	2.0	30
AG2579	82.3	4	58.7	134.1	31	3.5	3.0	15
AG2581	77.9	6	60.9	131.9	31	3.5	5.0	15
Mean	75.5		60.1	132.2	30.6	3.3	3.6	31
No. locations	5		2	5	4	4	1	1
CV %	8.26		1.01	0.80	5.86	18.4		34.9
LSD $_{0.05}$	7.9		1.28	1.34	2.54	0.85		11.3

[1] Seeding rate was 1.5 M seeds/acre; no seed chemical treatments and no foliar fungicides were applied; NPK fertilizer with 30 lb N at seeding and 100 lb N topdress in mid March were applied. Herbicide for weed control was applied in late March.

[2] 0 = strong straw and no lodging to 9 = most of plot lodged flat.

[3] 0 = no plant stunting or leaf discoloration (yellowing and/or reddening) to 9 = severe plant stunting and leaf discoloration.

[4] Average percentage diseased spikelets in 10 spikes at 23 days after inoculation of one floret of the 3rd spikelet from the tip of the spikes. Inoculated spikes were covered with A plastic bag for 3 days after inoculation. Plots were misted on non-rainy days at 7 - 10 am and 5 - 8 pm.

Table 2. Grain yield of wheat in Purdue trials at Woodburn, Wabash, Lafayette, Atlanta and Evansville, IN, 2007.

Cultivar/line	Wood-burn	Wabash	ACRE	Atlanta	Evans-ville	Mean
Patterson	88.2	75.9	58.8	68.6	76.9	73.6
PIO25R47	80.1	83.2	62.9	76.0	91.0	78.6
PIO25R54	69.8	74.2	58.5	61.0	79.5	68.6
Roane	82.2	68.8	61.4	77.9	78.8	73.8
INW0301	81.7	70.2	56.6	67.6	67.6	68.7
INW0302	83.2	72.0	58.3	72.3	72.5	71.7
INW0303	79.2	74.7	68.0	75.2	75.1	74.4
INW0304	81.1	78.1	64.4	56.5	65.4	69.1
INW0316	89.6	84.0	79.2	87.8	79.4	84.0
INW0411	68.8	77.0	62.5	64.7	71.4	68.8
INW0412	78.2	87.3	84.0	84.3	78.3	82.4
INW0731	89.8	88.2	72.0	81.3	87.7	83.8
AG2579	92.0	85.0	71.3	83.8	79.7	82.3
AG2581	90.5	88.3	66.3	71.3	73.1	77.9
Mean	82.4	79.1	66.0	73.4	76.9	75.6
CV %	12.34	10.00	5.10	7.01	5.28	8.26
$LSD_{0.05}$	21.6	17.0	6.6	10.9	8.6	7.9