Nebraska Wheat Board Project

Project Title: Improved tolerance to preharvest sprouting in Nebraska wheats

Project Year/Time Period: 2008/2009

Principal Investigator: Robert Graybosch, USDA-ARS, Department of Agronomy and Horticulture

Final Report: Sprouting tolerance was assessed in more than 1000 lines obtained from the 2007 harvest year. Evaluation of samples from 2008 is nearing completion, with about 6 weeks of work still needed. Over 1000 samples were collected in June/July from the 2009 harvest year. These samples will be assayed for preharvest sprouting. The screen is an ongoing process which runs 12 months of the year, but growth chamber space and time necessary to run the assay limits the progress. Observed sprouting tolerances (from 2007 data) of Nebraska selected hard red and hard white adapted cultivars and advanced breeding lines are presented in Table 1. Camelot and Wesley were identified as highly tolerant HRW cultivars. The hard white wheat cultivars Nuplains and Trego were nearly as tolerant as Wesley and Camelot. An update will be provided when the 2008 samples are completed.

Table 1. Relative tolerance to preharvest sprouting of selected Nebraska adapted wheat varieties.

Entry	Class	No. obs.	Sprouting Index	std. dev.
NW04Y2188	HRW	6	0.45	0.24
NI04420	HRW	6	0.46	0.21
Wesley	HRW	6	0.49	0.33
Camelot	HRW	6	0.55	0.52
Trego	HWW	6	0.56	0.19
Jagalene	HRW	6	0.56	0.37
Nuplains	HWW	10	0.60	0.48
Pronghorn	HRW	6	0.63	0.28
Alliance	HRW	7	0.66	0.42
RioBlanco	HWW	17	0.69	0.40
NE02584	HRW	6	0.71	0.30
NI01481	HRW	6	0.71	0.16
Arrowsmith	HWW	8	0.72	0.54
Overland	HRW	6	0.74	0.31
Anton	HWW	6	0.74	0.22
Antelope	HWW	18	0.92	0.13
Platte	HWW	6	0.94	0.10
Arapahoe	HRW	6	0.96	0.62

*Higher values = greater susceptibility to preharvest sprouting.

Amongst experimental white wheats tested from the RICLs described in the proposal above, a wide range of response was observed (Figure 1). Approximately 100 lines with tolerances similar to Wesley were identified. These entries will be assessed again from both the

2008 and 2009 harvests, with the best being advanced to breeding trials. Hard white winter wheats with tolerances similar to Wesley were not uniformly distributed across the five populations (Table 2). More than ½ of the tolerant lines were observed in the two populations having Nuplains as a parent. Thus, while never widely grown, Nuplains may serve as an effective parent for future breeding efforts to develop preharvest sprouting tolerant wheats.

Table 2. Distribution of hard white wheats with tolerance to preharvest sprouting across five breeding populations.

Pop	Pedigree	No. of lines with tolerances similar to Wesley
6011	Nuplains/Arrowsmith	31
6012	Nuplains/RioBlanco	30
6014	NW98S061/RioBlanco	16
6015	NW97S186/RioBlanco	17
6016	NW97S186/RioBlanco	15
6018	RioBlanco/NW97S218	11

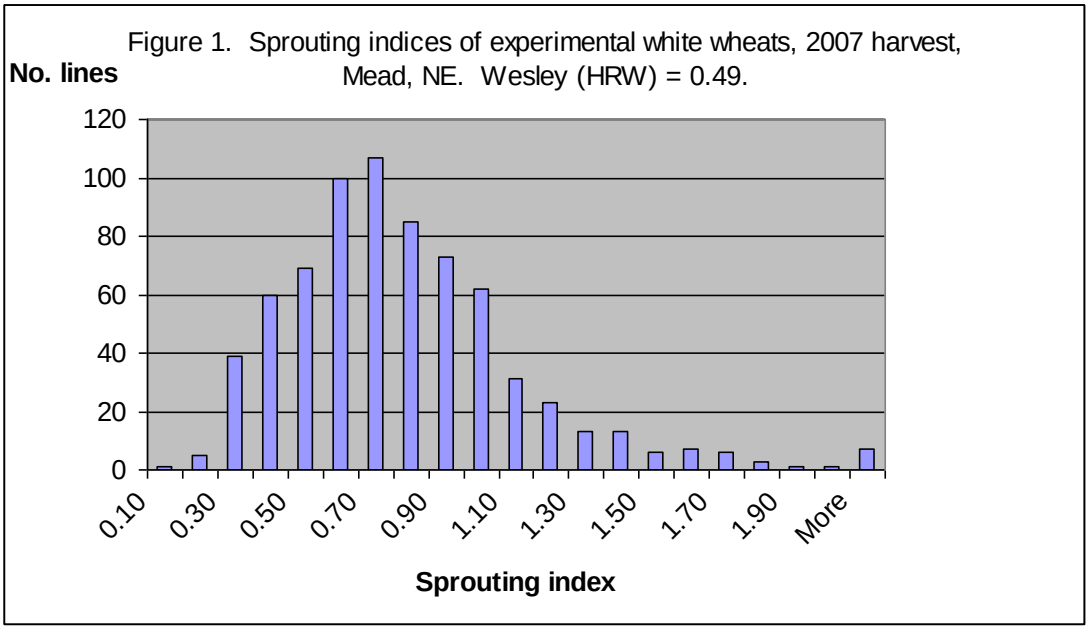

Figure 1. Sprouting indices of experimental white wheats, 2007 harvest, Mead, NE. Wesley (HRW) = 0.49.