Project Title:	Evaluation of polyphenol oxidase (PPO) content for resistance to the Orange Wheat Blossom Midge
Objectives:	To determine if midge populations would be affected by differences in PPO content

Materials and Methods:

Near isogenic lines that varied in polyphenol oxidase content were evaluated for resistance to the OWBM. Experimental materials were derived from crosses between the low PPO variety Clear White and the high PPO varieties Choteau and Hank. The treatment design consisted of two recurrent parents, Hank and Choteau, and two PPO levels, high and low, for a total of eight treatments. The experiment was established as a randomized complete block design with three replications in a field which had been in spring wheat for the previous five years and had a history of moderate to high midge densities. The study was conducted using conventional tillage and was fertilized with 97-30-120-24 lb/A of N-P-K-S. The nursery was plant on May 17 where individual hill plots consisted of 10 seeds per entry. Heading was recorded when 50 percent of the plants in a plot had half the spike exposed. Plant height measurements and stripe rust disease ratings were taken the first week of August. Three spikes were sampled from each plot on August 9. Each spike was dissected and the number of larvae and seeds counted.

Results:

Midge pressures were high for the nursery and averaged about 160 larvae per spike (Table 1). However, polyphenol oxidase content had no effect on any of the parameters measured. Although no differences were detected with regard to PPO content, treatment effects were observed for two recurrent parents. Experimental lines that were derived from Hank had a higher incidence of stripe rust and greater midge densities as compared to materials derived from Choteau.

Table 1. Effect of ploy phenol oxidase (PPO) content on OWBM density. Kalispell, MT 2010.

Pedigree	ppo	Heading	Height	Stripe rust	owbm No/spike	owbm No/seed
Choteau/CW	high	193.00	32.28	0.00	149.67	3.09
Choteau/CW	high	193.00	28.61	0.00	140.00	2.38
Choteau/CW	low	192.00	33.60	0.00	83.67	1.75
Choteau/CW	low	195.00	32.81	1.67	176.44	2.94
Hank/CW	high	192.00	32.02	20.00	195.55	3.12
Hank/CW	high	193.67	29.92	23.33	185.11	3.09
Hank/CW	low	193.67	31.89	21.67	145.89	2.44
Hank/CW	low	192.33	29.79	20.00	207.11	3.46
Entry	TRT Pr>F	0.4569	0.1927	0.0001	0.0879	0.1073
n=8	LSD	NA	NA	4.25	79.04	1.14
PPO	TRT Pr>F	0.6058	0.2091	0.8095	0.5467	0.4174
n=8	LSD	NA	NA	NA	NA	NA
	High	192.91	30.71	11.81	167.58	2.91
	Low	193.25	32.02	10.83	153.28	2.64
CV	TRT Pr>F	0.6665	0.4077	0.0001	0.0236	0.1046
n=8	LSD	NA	NA	1.97	39.05	0.60
	Choteau	193.25	31.82	0.45	137.45	2.53
	Hank	192.91	30.90	21.25	183.42	3.02