

MARYLAND GRAIN PRODUCERS UTILIZATION BOARD RESEARCH

Falling Number Research on Wheat (pre-harvest sprouting)

José M. Costa, Aaron R. Cooper, Robert Kratochvil, University of Maryland at College Park, Plant Science and Landscape Architecture.

Edward Souza, USDA-ARS, Soft Wheat Quality Laboratory, Wooster, OH.

OBJECTIVE

To evaluate the level of resistance or susceptibility to field pre-harvest sprouting, measured by the *Falling Number test*, among varieties of soft red winter wheat currently grown in Maryland. This test is used by grain buyers to determine the baking quality of the grain. This information is valuable for MGPUB to aid in the planting choice of varieties of soft red winter wheat currently available to Maryland wheat growers.

PROCEDURE USED:

Alpha-amylase is an enzyme found in sprout-damaged wheat. If germination occurs there is a dramatic increase of this enzyme. The *Falling Number* is the time in seconds for a stirrer to fall through a hot slurry of ground wheat. The greater the amount of alpha-amylase in the wheat, the thinner the gelatinized starch paste and the faster the plunger will fall through the slurry. **A high falling number** or the longer it takes the stirrer to fall **indicates the wheat is sound** and satisfactory for most baking processes.

Wheat grain with a score below 250 is discounted by grain buyers (Midstate Mills, NC).

Snyder's of Hanover (PA) requires a minimum of 275 for pretzel manufacturing.

The *Falling Number* test was evaluated among samples of soft red winter wheat from the **2006 MD state variety test** harvested at 3 locations:

- 1) **Poplar Hill (Conventional till test)**. Grain harvested before heavy rain (most sound, average was 399).
- 2) **Keedysville (Conventional till test)**. Harvested after some rain. We expected this set to have an intermediate falling number overall (average was 306).
- 3) **Wye, Queenstown (No-till test)**. Harvested after the heavy rains. We expected this set to have the lowest falling number overall (least sound, average was 212).

Detailed results from the 2006 harvest are presented in Table 1.

Table 1. 2006 Maryland State Wheat Variety Performance Trials-Falling Number values.

Wheat Cultivar	Poplar Hill	Keedysville	Wye	Average
McCormick	436	369	401	402
SS 560	453	385	267	368
Sisson	439	354	295	362
Becker	447	333	299	360
Coker 9511	426	371	279	358
GA-951216-2E26	411	333	317	354
USG 3665	433	337	283	351
IMI 95053-1A-11-6	412	344	292	349
Coker 9184	443	317	270	343
USG 3412	427	362	238	342
Branson	408	335	280	341
Coker 9553	349	346	326	340
Tribute	421	320	275	339
FS 652	399	342	239*	327
USG 3209	434	292	251	326
USG 3910	393	328	258	326
SS 550	453	256	260	323
IMI 95047-6-3-18	395	305	263	321
GA-96229-3A41	424	326	210*	320
SS MPV 57	385	308	267	320
FS 8302	411	316	230*	319
Dominion	368	349	238*	318
Renwood 3260	384	325	245*	318
FS 300	417	295	242*	318
Roane	416	338	194*	316
USG 3706	410	302	226*	313
Cooper	409	343	183*	311
USG 3137	452	307	165*	308
Choptank	439	282	191*	304
B990133	404	269	227*	300
Exp. 604	392	359	136*	296
SS 520	392	362	130*	295
SS 8302	376	344	163*	294
V9412	320	309	247*	292
SS 8404	321	280	250	284
GA-951079-2E31	435	296	100*	277
26R15	401	247*	165*	271
26R31	413	261	127*	267
FS 621	343	301	154*	266
USG 3342	450	232*	77*	253
Benton	304	321	132*	252
Chesapeake	295	293	164*	251
SS 8309	312	278	164*	251
GA-951395-3E25	482	171*	86*	246
V9510	399	235*	93*	242
FS 627	385	226*	107*	239
USG 3592	231*	290	138*	220
V9713 (WX2502)	398	127*	66*	197
Average	399	306	212*	306
LSD (0.05)	NA	50	74	60
CV(%)	NA	8.1	16.9	16.8

*These samples would be discounted (<250) by grain buyers for low Falling number.

In 2007, we tested the wheat varieties McCormick and Chesapeake from the state variety test at the Wye (conventional tillage) and no-till studies to verify the “basal” level for the Falling Number test.

Table 2. 2007 Falling number values at the Wye of selected entries.

Wheat cultivar	Wye-Conv.	Wye-NT
McCormick	397	417
Chesapeake	339	378
Average	368	397
LSD (0.05)	40	42
CV (%)	3.1	3.4

Differences between McCormick and Chesapeake were significant in both experiments.

The rest of the entries in the 2007 test will be evaluated for Falling Number in the Fall of 2007.

Additionally, weathered samples of all the 2007 entries will also be tested (harvested in August 2007).