

**2012 Crop
Advanced Milling and Baking Evaluation
Set 2012 A19**

2012 UESRWWN

Entries #: 1250941 - 1250969

A total of 35 samples were grown in a composite of nursery locations and submitted to the laboratory for milling and baking quality evaluations. The standard quality data were compared to the average for the cultivar checks given for this nursery and quality scores for all entries are adjusted to the check average. A table of observed and historical quality scores is given below.

Lab Number	Entry Number	ENTRY	From Advanced Milling Database Scoring						Predicted from Measured Data					
			Milling Quality Score		Baking Quality Score		Softness Equivalent Score		Milling Quality Score		Baking Quality Score		Softness Equivalent Score	
1251501	1	Branson	68.26	C	72.03	B	81.31	A	65.67	C	39.48	F	62.71	C
1251502	2	Bess	58.72	D	62.71	C	66.72	C	54.41	D	24.05	F	41.41	E
1251503	3	Shirley	67.58	C	67.51	C	66.95	C	65.37	C	44.49	E	47.25	E
1251504	4	MO 080104	57.55	D	42.58	E	66.95	C	50.63	D	19.23	F	52.81	D
		Average	63.03		61.21		70.48		59.02		31.81		51.05	
		Adjustment Bias for Trial	4.00		29.39		19.44							
		Diagnostics - Correlations	1.0		0.8		0.9							

The adjusted average values of the provided checks are predicted to have decreased milling, baking, and softness equivalent scores when compared to the historical average. The observed scores for the checks correlated to the historical scores for milling, baking, and softness equivalence at a level of $r=1.0$, $r>0.8$, and $r>0.9$, respectively. The relative rankings and correlations indicate that the results of the quality scores are likely predictive of future results.

Changes in 2012 Evaluations

After many years of use and buildup, our bake sheets have been replaced with newer ones. These new sheets produce a cookie with an average difference of 0.6 cm when compared to the old bake sheets. The cookie diameter was 96.8% (3.2% smaller) of the size of a cookie baked on the old sheets. This value was based on cookies made with 22 flour samples at the beginning of the evaluation process and resulted in a standard deviation of 1.36 and standard error of 0.29. We will be reporting the diameters using the new sheets for this year's samples, so you may need to adjust the baking quality score if comparing with test lines from previous years.

Additional Information on Analysis

This nursery contained seed that displayed very little Fusarium Head Blight, weathering, and black point. However, sprouting was observed in KY03C-1237-32. A probability of high alpha-amylase activity as well as increased starch damage may be present within this sample. The quality trait averages of the tested samples indicate that milling yield and flour protein were within the expected target range for soft wheat characteristics. The SRC's of lactic acid and sucrose demonstrated higher than normal results for these soft wheat traits, while softness equivalence had a reduced nursery average value.

Of the characteristics of quality we measure at the Soft Wheat Quality Laboratory, milling yield is the most reproducible and perhaps most important because it is genetically and environmentally associated with good soft wheat flour quality. Usually, the goal for the samples is to produce 70% or greater milling yield when ran through the Quadrumat Junior Flour Mill. This nursery produced an average of 68.9%. Sample KWS003 had the highest yield at 72.1%. Right behind KWS003 was KWS002 and IL06-14262, both at 71.1% yield.

After milling yield, the second trait that we recommend for use in selection is softness equivalent. It tends to have high heritability and is an important predictor of break flour yield. Larger values are preferred for most soft wheat manufactured goods, particularly cakes and other high sugar baked products. An average softness equivalence of 52% was acquired for this nursery, with the sample IL06-23571 exhibiting the most softness equivalence at 57.9%. Respectable softness equivalence can also be found in DAS1002 and OH08-180-48. The check, Bess, had softness equivalence similar to hard wheat. It is normally above 50%, but maybe harder due to environmental conditions. A total of 7 breeding lines had softness equivalence less than Bess (49.6%) and have poor softness equivalent quality. These lines should be considered for discarding unless they have some redeeming factor in field performance.

Sucrose SRC is probably the best predictor of cookie quality and is a measure of arabinoxylan content, which can strongly affect water absorption in baked products. Sucrose SRC typically increases in wheat samples with lower flour yield and lower softness equivalent. The cross hydration of gliadins by sucrose also causes sucrose SRC values to be correlated to flour protein and lactic acid SRC. Soft wheat flours for cookies typically also have a target of 95% or less. This trial displayed an average of 98.9% as IL06-14262 had the lowest sucrose absorption rate. This sample also had the largest baking quality score (94.6) amongst the test lines.

Lactic acid SRC is a good measure of gluten strength. It also correlates to flour protein concentration but the effect is dependent on genotypes and growing conditions. The average for this trial was 106.4% with an array of test lines that were considered both "strong" in gluten strength (above 105%) and "weak" in gluten strength (below 85%), suggesting that the trial has both genetic and internal environmental variances for gluten strength. There were 19 test lines that ranged from 107% to 128.6% that exhibit "strong" characteristics of gluten strength and may be of value for the manufacturing of crackers or other products requiring gluten strength. Contrary, 5 lines demonstrated "weak" gluten strength as the values ranged from 84% to 68%. Within these lines, KWS001 and DAS1001 generated gluten strength less than 70% lactic acid SRC and are very weak. Unless these lines have other redeeming soft wheat features, they may cause problems for many manufacturers.

To select the best lines for milling and baking quality, we sequentially sorted for flour yield and selected all lines with greater flour yield than the nursery average. We then repeated the operation for softness equivalent and the solvent retention capacities of sucrose and lactic acid, selecting the lines that were better than average in each case. Based on culling, the most prominent entries that were better or similar to that of the check Branson consist of G09528, OH08-180-48, IL06-14262, and DAS1002.

Please contact me if you have questions concerning this trial.

Best regards,
Tony Karcher