Collaborator Results

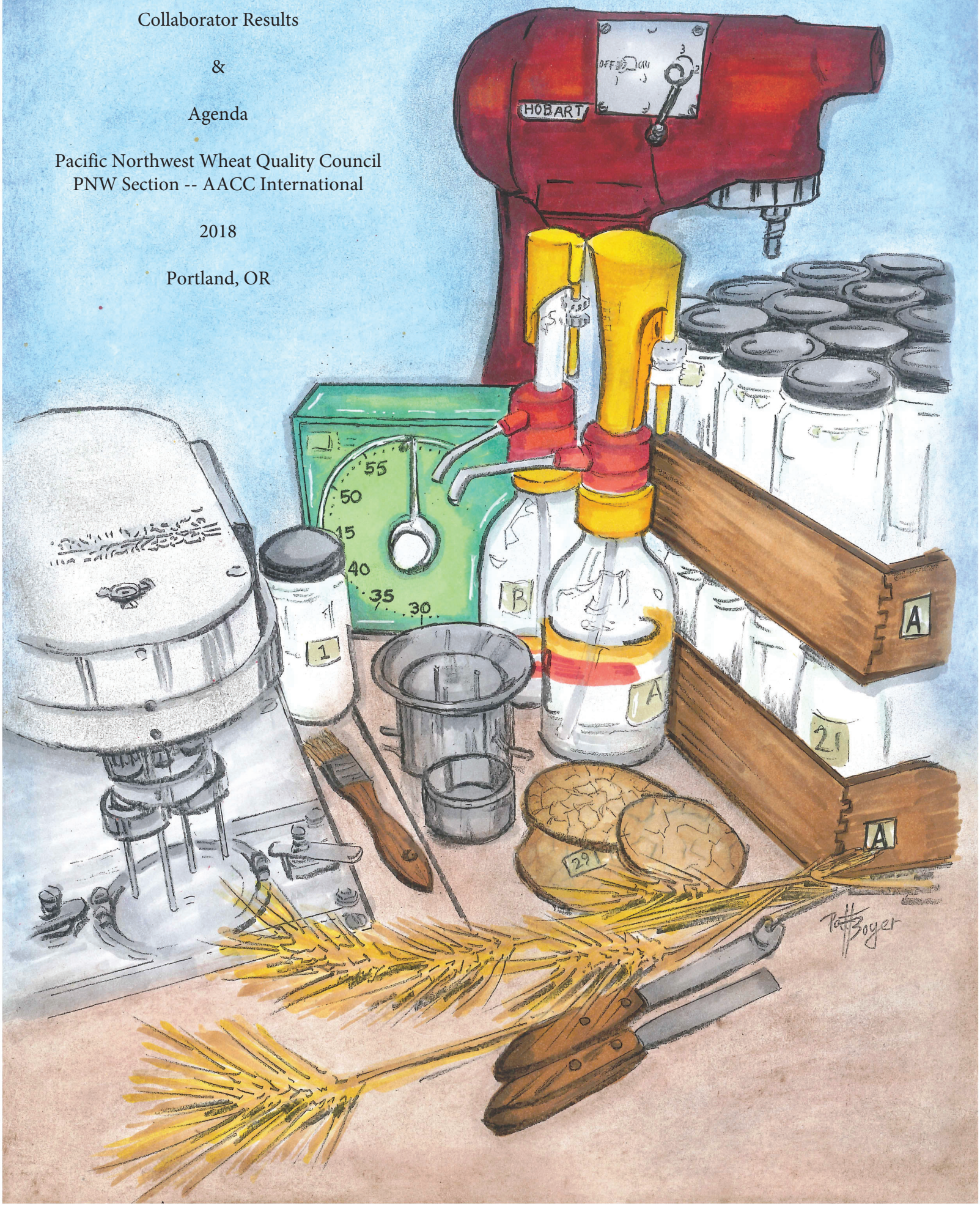
&

Agenda

Pacific Northwest Wheat Quality Council
PNW Section -- AACC International

2018

Portland, OR



Keep a-Goin' Wheat (my rendition of Stanton's Keep a-Goin' poem)

If you find you broke your NIR or mill
Keep a-goin!
When making money with wheat is a battle uphill
Keep a -goin!
If your drill is down and your pant legs are covered in spores
Know that your competitors are fighting the same fungus wars
Keep a-goin!
'taint no use to sit and pine
When your loaf volumes are not fine
Talk to your colleagues or get-online
Keep a-goin!
S'pose you reorganized three times
Wheat price swinging is not a crime
Let's tell the world we're feeling fine
Keep a-goin!
See the technology excel
Don't let your passion for wheat go to hell
When you feel like our industry is not well---remember
Keep a-goin!

- Hayley Butler
Limagrain Cereal Seeds Quality Manger

Cover art depicting 5th in the 'tools of the trade' of wheat quality analysis series courtesy drawing by Pat Boyer, former technician at the USDA-ARS Western Wheat Quality Lab. Colorized by Renee Engle.

Pacific Northwest Wheat Quality Council

Serving the Needs of the Wheat Industry

Mission Statement

To enhance the quality of wheat produced in the Western States by promoting the development of superior cultivars

The PACIFIC NORTHWEST WHEAT QUALITY COUNCIL is a not-for-profit organization comprised of wheat breeders, cereal chemists, and producers, marketers, inspectors, processors and users of wheat. Through its Technical Committee of volunteer collaborators, the Council aims to solicit and evaluate advanced-generation wheat breeding lines, thereby providing direct feed-back as to the merits of individual breeding lines and more general information as to the technical requirements of wheat end-users. In this way, longer-term breeding objectives are defined.

first convened in Portland, Oregon, 1995

Agenda
Pacific Northwest Wheat Quality Council
PNW Section AACCI
Falling Number Workshop

January 29th through February 1st 2019
Red Lion Hotel
Portland, Oregon

Tuesday, January 29th — Falling Number Workshop — *Clark Room*

1:00 pm — Welcome and introductions

Review of Research Objectives from The Falling Numbers Summit, Spokane WA, Feb 2016
Camille Steber, USDA-ARS Wheat Health, Genetics And Quality Research Unit

1:15-1:40 — Falling Number: The Test, Alternatives, Frames of Reference, and Inertia
Andrew Ross, Crop and Soil Science Dept. & Food Science and Technology Dept, Oregon State University

1::40-2:05 — An Industry Perspective on The Low Falling Number Problem
Paul Katovich, Highline Grain Growers Inc.

2:05- 2:30 — Barometric Pressure Correction for Falling Number
Steve Delwiche, USDA-ARS Food Quality Laboratory

2:30-3:00 — Break

3:00-3:25 — Grain to Cake: Further Explorations into the Relationship Between Falling Number and Quality
Alecia Kiszonas, USDA-ARS Western Wheat Quality Laboratory

3:25-3:50 — Developing an Immunoassay for LMA and PHS Detection in Wheat
Amber Hauvermale, Crop and Soil Science Dept., Washington State University

3:50-4:15 — Environmental Complications Leading to Low Falling Number
Stephanie Sjoberg, Crop and Soil Science Dept., Washington State University

4:30-5:00 — Panel Discussion

Wednesday, January 30th — Falling Number Workshop — *Clark Room*

7:30-8:00 am — Breakfast and Welcome
Kim Garland Campbell, USDA-ARS Wheat Health, Genetics and Quality Research

8:00-8:25 — Screening for Late Maturity Alpha Amylase Resistance
Camille Steber, USDA-ARS Wheat Health, Genetics and Quality Research

8:25-8:50 — Improving Falling Numbers in Spring Wheat
Jianli Chen, Dept. of Plant Sciences, University of Idaho

8:50-9:15 — Camille Steber: Breeding for LMA resistance, setting up screening Environments

9:15-9:40 — CRISPR Approaches to Improving Falling Numbers
Bob Zemetra, Crop and Soil Sciences Dept., Oregon State University

9:40-10:05 Wheat Mutagenesis and Transformation to Improve Falling Numbers
Daolin Fu, Dept. of Plant Sciences, University of Idaho

10:05-10:30 Breeding Strategies to Improve Falling Number and Emergence
Kim Garland Campbell: USDA-ARS Wheat Health, Genetics and Quality Research

10:30-11:00 Discussion and wrap up

Wednesday, January 30th Wheat Industry Tours

12:00-12:15 pm Meet in the lobby of the Red Lion Hotel & board bus

12:45-2:30 Tour Wheat Marketing Center 1200 N.W. Naito Pkwy Suite 230

3:00-5:00 Tour Dave's Killer Bread 5209 SE International Way, Milwaukie
Bob's Red Mill self-tour 5000 SE International Way, Milwaukie

5:30-6:30 Reception at McMenamins Edgefield 2126 SW Halsey, Troutdale

6:30-7:30 Dinner at McMenamins Edgefield 2126 SW Halsey, Troutdale

7:30 Return to Red Lion Hotel

Thursday, January 31st

6:45-8:15 am Breakfast Buffet Featuring Kellogg's "Happy Inside" cereal

7:30-8:00 Registration *Clark-Clackamas-Multnomah Room*

7:30-4:00 Student Poster Viewing *Clark-Clackamas-Multnomah Room*

8:00-8:05 Welcome & Opening Remarks *Craig Morris*
USDA-Agricultural Research Service

State Reports on Research & Program Activity

8:05-8:15 Falling Number Workshop Recap *Camille Steber*
USDA-Agricultural Research Service

8:15-10:00 State Reports

10:00-10:30 Break

PNW AACCI Technical Presentations

10:30-10:35 PNW AACCI Section- Opening Remarks Hayley Butler, *Section Chair*
Limagrain Cereal Seeds

10:35-12:00	Observations of US Wheat in Overseas Markets	Steve Wirsching *US Wheat Associates* *Portland, Oregon* *Hyo Suk Kim* *Daesun Flour Mills* *Koji Ishizuka* *Nisshin Flour Milling* *Sho Nakajima* *Nippn Company*
12:00-1:00 pm	Lunch	*Clark-Clackamas-Multnomah Room*
1:00-2:45	Hard Red Winter Baking Quality for the 21st Century	*Andrew Ross, Moderator* *Oregon State University*
	Hayden Wands	*Grupo Bimbo* *Dallas, Texas*
	Steve Wirsching	*US Wheat Associates* *Portland, Oregon*
	Reuben McLean	*Grain Craft* *Blackfoot, ID*
	Arron Carter	*Washington State University* *Wheat Breeding*
	Doug Engle	*Western Wheat Quality Lab*
2:45-3:15	Break	
3:15-4:00	So what is falling number, and is it here to stay?	*Steve Delwiche* *USDA-ARS Food Quality Lab*
4:00-4:15	PNW WQC Collaborator's Meeting	
4:15-5:00	PNW AACCI Section Meeting	
5:30-6:30	Attended Student Poster Viewing	*Grand Ballroom East Salon*
5:30-7:00	Sponsor's Reception	*Grand Ballroom East Salon*
7:00-8:30	Dinner Buffet	*Grand Ballroom East Salon*

Friday, February 1st

6:45-8:15 am	Breakfast Buffet	Featuring Kellogg's "Happy Inside" cereal
7:30-8:00	Registration	*Clark-Clackamas-Multnomah Room*

Pacific Northwest Wheat Quality Council

8:00	Welcome & Opening Remarks	*Hayley Butler* *Chair, PNW WQC*
	USDA-FGIS Grain Grading Report	*Scott Cooley* *Federal Grain Inspection Service*
	PNW-WQC Quality Roundtable (* denotes check)	
	Group 1 Soft White Spring (08PN2001-07, SY Saltese*)	
	Group 2 Soft White Spring (11PN2532-195, 11PN2532-507, WB1035CL2*)	
	Group 3 Soft White Winter (WA8290, Madsen*)	
	Group 4 Soft White Winter (UIL09-15702A, UI WSU Huffman*)	
	Group 5 Soft White Winter (06PN212-25, SY Ovation*)	
	Group 6 Soft White Winter (LCS Sonic, LCS Shark, LCS Hulk)	
10:00-10:30	Break	
10:30-12:00	PNW-WQC Quality Roundtable	
	Group 7 Soft White Winter (ORI2150031C1, ORI2161250, ORCF 102*)	
	Group 8 Hard Red Spring (WB9662*)	
	Group 9 Hard Red Spring (10PN3039-02, SY605CL*)	
	Group 10 Hard Red Spring (WA8280, Kelse*)	
	Group 11 Hard Red & White Spring (IDO 1801S, IDO 1805S, IDO 1704S, UI Platinum*)	
	Group 12 Hard White Spring (12SB0224, Dayn*)	
12:00-1:00 pm	Lunch	*Clark-Clackamas-Multnomah Room*
1:00-2:15	Group 13 Hard White Winter (Irv*, OR2130118H)	
	Group 14 Hard White Winter (WA8252)	
	Group 15 Hard White Winter (IDO1506, IDO1706, IDO1806, UI Silver*)	
2:15-2:45	Finalize meeting site for 2020 meeting & election of new Secretary	
2:45	Adjourn & Break	

Table of Contents

	Pages
List of Registrants	1-3
List of Collaborators	4
A History of Lines Evaluated by PNW WQC	5-11
2018 PNW WQC Sample Organization	12
Variety Descriptions	13-17
Milling Procedure & Flow Sheet	18
Ash Curves	19-33
Collaborator Data	34-98
End-Use Product Evaluation Summary	99-101

APPENDIX

End-Use Quality Targets	102-107
Production Statistics	108-116
Cultivar List Cross Reference Guide	117-128
Officers	129
Charter & Mission Amendment	130-134

Thank you Pacific Northwest Wheat Quality Council 2018 Crop Year Sponsors!

Kellogg's

OWC
Oregon Wheat Commission

ADM

Megazyme

Limagrain
Cereal Seeds

GRAIN CRAFT

Mondelēz International

Ardent Mills

Idaho Wheat
QUALITY WHEAT SIMPLY GROWN

CM
Continental Mills
FOOD PRODUCTS OF CHOICE

Washington Grain Commission

WestBred®
IMPROVING NATURE'S GRAINS®

U.S. Wheat Associates

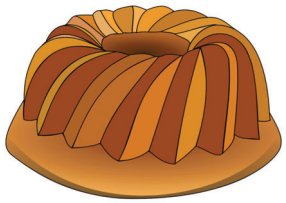
syngenta

PNW WHEAT QUALITY COUNCIL

THANK YOU HAPPY HOUR SPONSORS:

Brabender® CWB

...where quality is measured.



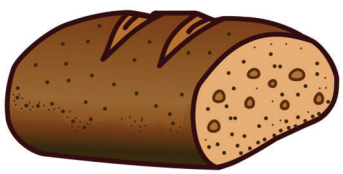
GRAIN CRAFT

LECO®

Delivering the Right Results

Perten INSTRUMENTS

a PerkinElmer company



syngenta

THANK YOU

Student Sponsors

ADM

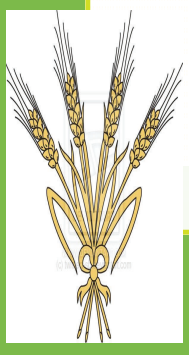
Limagrain Cereal Seeds

GRAIN CRAFT

The SHEPHERD'S Grain

WestBred®
IMPROVING NATURE'S GRAINS®

syngenta



First	Last	Organization	Street Address	City	State	Zip Code	Phone	E-mail
Liam	Dixon	Washington State University	340 S Grand Avenue #3	Pullman	WA	99163	209 914-1604	liam.dixon@wsu.edu
Koji	Ishizuka	Nisshin Flour Milling	c/o US Wheat Associates	Chuo-ku, Tokyo	Japan	103-0026	81-3-5614-0798	ishizuka.koji@nisshin.com
Emily	Klarquist	Washington State University	540 SE High St	Pullman	WA	99163	937-902-6172	emily.klarquist@wsu.edu
Nathan	Nielson	Washington State University	2290 NE Westwood Dr Apt R103	Pullman	WA	99163	208 412-3978	nathan.nielsen@wsu.edu
Alejandra	Andrade	California Wheat Commission	1240 Commerce Ave Ste A	Woodland	CA	95776	530 661-1292	aandrade@californiawheat.org
Tim	Aschbrenner	Grain Craft	701 E. 17th Street	Wichita	KS	67214	316 267-7311 x 20115	taschbrenner@graincraft.com
Scott	Baker	Ardent Mills	1875 Lawrence St	Denver	CO	80202	402 332-6278	scott.baker@ardentmills.com
Mary	Baldridge	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	mlbaldrg@wsu.edu
Carmen	Barkley	Washington State University	105 SE South St Upper	Pullman	WA	99163	509 499-9769	carmen.swannack@wsu.edu
Joy	Battistone	Syngenta	806 N. 2nd St	Berthoud	CO	80513	970 532-3721 ext 1240	joy.battistone@syngenta.com
Michael	Belanger	Kellogg Cp	2 East Hamblin Ave	Battle Creek	MI	49017		
Art	Bettge	ADB Consulting	2503 White Ave	Moscow	ID	83843	208 301-5161	adbwheat@gmail.com
Jacob	Bevan	University of Idaho	1693 S 2700 W	Aberdeen	ID	83210	208 680-7978	jgbevan@uidaho.edu
Jayne	Bock	Wheat Marketing Center	1200 N.W. Naito Pkwy Suite 230	Portland	OR	97209	503 295-0823	
Daniel	Brabec	USDA-ARS Stored Products, Insects & Engineering	1515 College Ave.	Manhattan	KS	66502	785 776-2731	Daniel.Brabec@ARS.USDA.GOV
Kali	Brandt	Oregon State University	3050 SW Campus Way	Corvallis	OR	97333		Kali.Brandt@oregonstate.edu
Seth	Bryan	Unity Scientific	12418 W 100th St	Lenexa	KS	66215-1950		
Jeremy	Bunch	Shepherd's Grain	609 N. Almon St SPC 1009	Moscow	ID	83843	208 830-0448	jeremy@shepherdsgrain.com
Luke	Burger	ADM Milling Company	601 1st St	Cheney	WA	99004	509 879-9637	luke.burger@adm.com
Hayley	Butler	Limagrain Cereal Seeds	2040 SE Frontage Road	Fort Collins	CO	80525	970 498 2205	hayley.butler@limagrain.com
Cathy	Butti	Syngenta	806 N. 2nd St	Berthoud	CO	80513	970 532-3721x1239	cathy.butti@syngenta.com
Arron	Carter	Washington State University	291D Johnson Hall	Pullman	WA	99164-6420	509 335-6198	ahcarter@wsu.edu
Claudia	Carter	California Wheat Commission	1240 Commerce Ave Ste A	Woodland	CA	95776	530 661-1292	carter@californiawheat.org
Brady	Carter	Perten Instruments	3200 Robbins Road Suite 100A	Springfield	IL	62704		bcarter@perten.com
Dale	Case	Oregon Wheat Commission	63136 Wallsinger Road	Cove	OR	97824	541 663-1806	sandridgeag@hotmail.com
Chloe	Chang Liu	Washington State University	2290 NE Westwood Dr. L203	Pullman	WA	99163	224 622-6950	chang.liu9@wsu.edu
Rangan	Chinnaswamy	USDA-GIPSA-TSD	10383 N. Ambassador Dr	Kansas City	MO	64153-1377	816 891-0477	Rangan.Chinnaswamy@USDA.gov
Dale R.	Clark	Northern Seed	324 Sunterra Drive	Idaho Falls	ID	83404	406 223-7336	dclark@northernseedmontana.com
David	Cobertera	Oregon State University	NA					coberted@oregonstate.edu
Scott	Cooley	USDA-Federal Grain Inspection Service	3939 Cleveland Ave	Olympia	WA	98501	360 753-9072	scott.j.cooley@usda.gov
Janice	Cooper	Wheat Marketing Center	1200 N.W. Naito Pkwy Suite 230	Portland	OR	97209	503 295-0823	cooper@wmcinc.org
Heather	Davis	ADM Milling Company	2301 East Trent St	Spokane	WA	99202	509 534-2636 x. 201	Heather.Davis@adm.com
Steve	Delwiche	USDA-ARS Food Quality Lab	10300 Baltimore Avenue	Beltsville	MD	20705-2350	301 504-8450 ext. 236	stephen.delwiche@ars.usda.gov
Lingzhu	Deng	Wheat Marketing Center	1200 N.W. Naito Pkwy Suite 230	Portland	OR	97209	503 295-0823	
Aichatou	Djibo Waziri	Washington State University	775 SE Forest Way, Apt 721	Pullman	WA	99163	315 372-2169	a.djibowaziri@wsu.edu
Pat	Donahue	Mondelēz International	Three Parkway North, Suite 300	Deefield	IL	60015	847 943-4837	Pat.Donahue@mdlz.com
Tony	Elwess	Grain Craft	11040 N Lombard St	Portland	OR	97203	503 286-1656	telwess@graincraft.com
Erin	Endres	Syngenta AgriPro	29128 S Wells Rd	Cheney	WA	99004-9325		
Doug	Engle	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	Douglas.Engle@ars.usda.gov

- 1 -

First	Last	Organization	Street Address	City	State	Zip Code	Phone	E-mail
Renee	Engle	PNW WQC Meeting Coordinator		Pullman	WA	99163	509 432-4982	eenerlou@hotmail.com
Scott	Frazer	Perten Instruments	3200 Robbins Road Suite 100A	Springfield	IL	62704	217 585-9440	
Zach	Gaines	Limagrain Cereal Seeds	2040 SE Frontage Road	Fort Collins	CO	80525	970 498-2204	Zach.gaines@limagrain.com
Lisa	Godkin	Ardent Mills	9493 Leyton Dr	Harrisburg	NC	28075-5629	704 942-8139	Lisa.Godkin@ArdentMills.com
Jesse	Grelle	USDA-Federal Grain Inspection Service	1100 NW Naito Parkway	Portland	OR	97209	503 326-7887	Jesse.W.Grelle@usda.gov
Kyall	Hagermeyer	Washington State University	131 Johnson Hall	Pullman	WA	99164-6420		khagermeyer@wsu.edu
Tracy	Harris	USDA-ARS	209 Johnson Hall	Pullman	WA	99164-6420	509 335-5886	Tracy.Harris@wsu.edu
Jory	Harris	Perten Instruments	9230 Elm Ct	Mokena	IL	60448-8341	217 971-6045	jharris@perten.com
Amber	Hauvermale	Washington State University	253 Johnson Rd	Pullman	WA	99163-8831		ahauvermale@wsu.edu
Yuezhen	He	University of Idaho	606 Rayburn Street Room 123	Moscow	ID	83843-2313	765 421-5326	he7863@vandals.uidaho.edu
Jim	Helmerick	Syngenta Cereals	29128 S Wells Road	Cheney	WA	99004	509 245-3840	Jim.Helmerick@syngenta.com
Riley	Hille	Agri-Pro Syngenta	678 N Kramer Rd	Ritzville	WA	99169	509 347-6165	riley.nelson@syngenta.com
David	Hoffman	Bayer Crop Science AB	800 N Lindbergh Blvd	St Louis	MO	63141-7800		david.hoffman@bayer.com
Sal	Iaquez	C.W Brabender Instruments	50 E Wesley St	South Hackensack	NJ	07606	201 343-8425	siaquez@cwbrabender.com
Kyle	Isham	University of Idaho	202 N Aurthur Ave Apt 3	Pocatello	ID	83204	208 530-1552	isha7549@vandals.uidaho.edu
Koji	Ishizuka	Nisshin Flour Milling	25, Kanda Nishiki-Cho 1-Chome, Chiyoda-Ku	Tokyo	Japan	101-8441	81 3-5282-6313	ishizuka.koji@nisshin.com
Worapong	Jeerapun	Washington State University	E 202 Food Quality Bldg	Pullman	WA	66164-6394	509 335-4062	tong.worapong@wsu.edu
Emma	Jobson	Montana State University	119 Plant Bioscience Building	Bozeman	MT	59717	970 217-4098	emma.jobson@msu.montana.edu
Rachel	Johnston	Montana State University	119 Plant Bioscience Building	Bozeman	MT	59717	406 209-3594	rachel.johnston@montana.edu
Jay	Kalous	Limagrain Cereal Seeds	2040 SE Frontage Road	Fort Collins	CO	80525	509 540-0636	Jay.KALOUS@limagrain.com
Rich	Kendrick	Great Plains Analytical Laboratory	9503 N Congress Avenue	Kansas City	MO	64153	316 617-7883	rkendrick@gpalab.com
Hyo Suk	Kim	Daesun Flour Mills	680, Asanho-Ro, Yeongin-myeon, Asan-S1	Chungcheonanam-Do	Korea		82 70-8706-8301	hyosuk@daesunfm.co.kr
Vitaly	Kirkpatrick	Foss North America	8091 Wallace Rd	Eden Prarie	MN	55344	952-646-1020 ext 305	vmahidov@fossna.com
Alecia	Kiszonas	Western Wheat Quality Laboratory	E202 Food Quality Bldg	Pullman	WA	99164-6394	509335-4062	alecia.kiszonas@ars.usda.gov
Kevin	Kloberdanz	Grain Craft	220 West 30th Street	Ogden	UT	84401-3510	406 781-0926	kkloberdanz@graincraft.com
Teepakorn	Kongraksawech	Oregon State University	Crop Science Bldg #109	Corvallis	OR	97331-3002	541 737-9886	Teepakorn.Kongraksawech@oregonstate.edu
Karl	Kupers	Shepherd's Grain	4105 S Anastacia Ct	Green Valley	AZ	85622-5616		karlkupers@gmail.com
Shelle	Lensson	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	Shelle.Lenssen@ARS.USDA.GOV
Amy Hui-Mei	Lin	University of Idaho	875 Perimeter Drive MS-2312	Moscow	ID	83843-2312	208 885-4661	amylin@uidaho.edu
Cassidy	Marn	Montana Wheat & Barley Commission	P.O. Box 3024	Great Falls	MT	59403-3024	406 761-7732	cmarn@mt.gov
Elliott	Marston	Washington State University	2200 NE Westwood Dr Apt U102	Pullman	WA	99163-5957		Elliott.J.Marston@wsu.edu
Shantel	Martinez	Cornell Foods	113 Glen Place Apt 4A	Ithica	NY	14850-4462	509 846-6276	Shantel.A. Martinez@gmail.com
Reuben	McLean	Grain Craft	463 W. US Hwy 26	Blackfoot	ID	83221	208 785-2800	rmclean@graincraft.com
Galina	Mikhaylenko	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	wheatgirl2010@gmail.com
Peter	Miller	Leco Corporation	7325 NE Imbrie Drive PMB#323	Hillsboro	OR	07124	800 292-6141	pete_miller@leco.com
Nikki	Morgan	Miller Milling Company						NMorgan@millermilling.com
Craig	Morris	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	Craig.Morris@ars.usda.gov
Dan	Mullan	InterGrain	19 Ambitious Link	Bibra Lake	Western A	6163	0403 595 141	dmullan@intergrain.com
Sho	Nakajima	Nippn Company	2-19-11-304, Nishioi, Shinagawa-Ku	Tokyo	Japan	140-0015		sho-nakajima@nippn.co.jp
Deanna	Nash	MSU Cereal Quality Lab	119 Plant BioScience Building (PBB)	Bozeman	MT	59717-3150	406 994-5377	deanna@montana.edu

- 2 -

First	Last	Organization	Street Address	City	State	Zip Code	Phone	E-mail
Dennis	Nicuh Lozada	Washington State University	NA	Pullman	WA	99163	479 304-8557	den.lozada@wsu.edu
Victor	Nieto	Grain Craft	463 W. US Hwy 26	Blackfoot	ID	83221	208 680-3626	vnieto@pfmills.com
Katherine	O'Brien	University of Idaho WQL	1693 S. 2700 West	Aberdeen	ID	83210-1749	208 397-4181	katho@uidaho.edu
Andy	Ping	USDA-Federal Grain Inspection Service	1100 NW Naito Parkway	Portland	OR	97209		Andrew.Ping@usda.gov
Deidrea	Power	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	
Samuel	Prather	Washington State University	Johnson Hall Rm 235B	Pullman	WA	99164-6420	573 823-1650	samuel.prather@wsu.edu
Mike	Pumphrey	Washington State University	ZIP 6420	Pullman	WA	99164-6420	509 335-0509	m.pumphrey@wsu.edu
Zory	Quinde-Axtell	Continental Mills	18100 Andover Park West Suite 200	Seattle	WA	98188	206 816-7122	zory.quinde-axtell@continentalmills.com
Colette	Richter	Oregon State University	NA					colette.richter@oregonstate.edu
Andrew	Ross	Oregon State University	Crop Science Bldg #107	Corvallis	OR	97331-3002	541 737-9149	andrew.ross@orst.edu
Blake	Rowe	Oregon Wheat Commission	1200 NW Naito Parkway, Ste 370	Portland	OR	97239	503 467-2161	browe@oregonwheat.org
Mostafa	Sakr	Ardent Mills	1875 Lawrence St Suite 1400	Denver	CO	80202	970 581-4027	mostafa.sakr@ardentmills.com
Deven	See	Western Regional Small Grains Genotyping	209 Johnson Hall	Pullman	WA	99164	509-335-8662	Deven.See@ARS.USDA.GOV
Tana	Simpson	Oregon Wheat Commission	1200 NW Naito Pkwy. Suite 370	Portland	OR	97209-2800	509 467-2161	tsimpson@oregonwheat.org
Stephanie	Sjoberg	Washington State University	1510 NW Turner Dr Apt 4	Pullman	WA	99163	425 501-3480	stephanie.sjoberg@wsu.ed
Camille	Steber	USDA-ARS Wheat Genetics Quality and Pl	209 Johnson Hall	Pullman	WA	99164-6420	509 335-2887	camille.steber@ars.usda.gov
Nikayla	Strauss	Washington State University	209 Johnson Hall	Pullman	WA	99164	702 988-8218	nikayla.strauss@wsu.edu
Bobby	Talley	Syngenta Cereals	29128 S Wells Road	Cheney	WA	99004-9325	509 979-6573	robert.talley_jr@syngenta.com
Yohanes	Temteme	Ardent Mills	1875 Lawrence St Suite 1400	Denver	CO	80202	225 405-4086	yohanes.temteme@ardentmills.com
Christian	Tobias	USDA-ARS	800 Buchanan St #2101	Berkley	CA	94710		Christian.Tobias@ars.usda.gov
Tina	Tran	Wheat Marketing Center	1200 N.W. Naito Pkwy Suite 230	Portland	OR	97209	503 295-0823	
Susanne	Trittinger	Oregon State University	NA					susanne.trittinger@oregonstate.edu
Teng	Vang	California Wheat Commission	1240 Commerce Ave Ste A	Woodland	CA	95776	530 661-1292	tvang@californiawheat.org
Jennifer	Vonderwell	Syngenta	8917 S Thomas Mallen Rd	Cheney	WA	99004	765 412-5420	jennifer.vonderwell@syngena.com
Brian	Walker	Miller Milling Company	7808 Creekridge Circle Suite 100	Minneapolis	MN	55349	952-562-2310	Bwalker@millermilling.com
Hayden	Wands	Grupo Bimbo	755 Regent Blvd #300	DFW Airport	TX	75261		HWands@BBUmail.com
Glen	Weaver	Ardent Mills	1875 Lawrence St	Denver	CO	80202	402 240-4370	glen.weaver@ArdentMills.com
Tom	Weber	USDA-GIPSA-TSD	10383 N. Ambassador Dr	Kansas City	MO	64153-1377		Thomas.A.Weber@ams.usda.gov
Eric	Wegner	Western Wheat Quality Laboratory	E 202 Food Quality Bldg	Pullman	WA	99164-6394	509 335-4062	eric.a.wegner@gmail.com
Justin	Wheeler	University of Idaho	1693 S. 2700 West	Aberdeen	ID	83210	208 397-4181	jwheeler@uidaho.edu
Cathy	Wilson	Idaho Wheat Commission	821 W. State Street	Boise	ID	83702-5832	208 334-2353	cathy.wilson@idahowheat.org
Lori	Wilson	Kellogg Company WKKI	2 East Hamblin Ave	Battle Creek	MI	49017	269 961-9145	lori.wilson@kellogg.com
Zhuping	Yang	Mondelēz International	No.1 Songxiang, Yangpu Road, Xinglong Street, SIP	Suzhou	China	215126	86)18251104712	zhuping.yang@mdlz.com
Scott	Yates	Washington Grain Commission	2702 W. Sunset Blvd	Spokane	WA	99224-1112	509 456-2481	syates@wagrains.org
Bob	Zemetra	Oregon State University	231 Crop Science Bldg	Corvallis	OR	97331-3002	541 737-4278	Robert.Zemetra@oregonstate.edu

- 3 -

Pacific Northwest Wheat Quality Council

These collaborative flour tests are supported by the wheat commissions of Washington, Oregon, and Idaho in cooperation with the USDA-ARS Western Wheat Quality Laboratory. The purpose is to maintain and improve the milling and baking quality of wheat in the Western region. It is an attempt to keep current with the needs of wheat processors and flour users. The information gained from the data and opinions of the collaborators is of significant value to the wheat breeding programs of the region. The project aims to provide each collaborator an opportunity to express their opinion as to whether or not the tested selections would satisfy the end-use demands of their industry.

We would like to thank each of the collaborators for their participation in this annual project.

Collaborators
2018 Crop Year

ADM Milling

Ardent Mills

California Wheat Commission

Colorado State University

Daesun Flour Mills

Grain Craft

Krusteaz-Continental Mills

Japan Flour Millers Association

Limagrain Cereal Seeds

Mondelēz International

Montana State University Cereal Quality Laboratory

Oregon State University

Syngenta

University of Idaho

USDA-ARS Hard Red Spring Wheat Quality Laboratory

CGAHR, USDA-ARS Hard Winter Wheat Quality Laboratory

USDA-ARS Soft Wheat Quality Laboratory

USDA-ARS Western Wheat Quality Laboratory

USDA-GIPSA Federal Grain Inspection Service

USDA-GIPSA Technical Services Division

Washington State University Wheat Quality Program

WestBred

Wheat Marketing Center

- 4 -

1995 Portland, OR

WA7663	SWW	
WA7690	SWW	PI 597665
WA7717	SWW	
WA7622	W.Club	Rulo
IDO392	SWS	Whitebird
IDO421	HRW	Bonneville

1996 Park City, UT

IDO448	SWS	Pomerelle
IDO488	SWS	PI 592986
OR880494	SWW	
OR880510	SWW	
OR880525	SWW	
OR870012	SWW	
OR870337	SWW	
OR870831	SWW	
OR898120	SWW	Weatherford
OR908377	SWW	
WA7677	SWS	Alpowa
WA7712	SWS	Wawawai
WA7806	SWS	
IDO447	HRW	
IDO467	HRW	Boundary
WA7802	HRS	Scarlet
OR850513	HWW	Ivory
OR889176	HWW	

1997 Coeur d'Alene, ID

UC896	HWS	
OR870082	SWW	
OR939515	SWW	
IDO462	HRS	Jefferson
IDO492	HRS	Iona
ID14502B	SWW	Brundage
WA7802	HRS	Scarlet
WA7805	SWS	
WA7831	SWS	
WA7752	W.Club	Coda

1998 Portland, OR

OR00542	SWW	
OR880172	SWW	Foote
XWH1020	SWW	
XWH1017	SWW	Quantum 7817
OR92CL0054	W.Club	Temple
UC1085	HRW	
Q542	HRW	Quantum 542
MT7811	HWW	NuWest

1999 Bozeman, MT

WA7850	SWS	Zak
ID10420A	SWW	Hubbard
OR939476	SWW	
OR933528	SWW	
WA7824	HRS	Tara
IDO533	HWS	Lolo
IDO523	HWS	
IDO509	HRW	
UT1944-158	HWW	Golden Spike
BZ991-408	HWS	Pristine
ML455	HWS	ML455

2000 Honolulu, HI

WA7839	HRS	Rosa
OR4870453	HWS	Winsome
MT9432	HRW	BigSky
MTW9441	HWW	NuSky
IDO525	SWS	Jubilee
IDO526	SWS	Alturas
BZ692-108	SWS	Challis
S9700459	S.Club	
WA7833	W.Club	Bruehl
ID87-52814A	SWW	
OR939526	SWW	Tubbs
XWH5019	Q5019	
XWH7415	Q7415	

- 5 -

2001 Seattle, WA

IDO513	HRW	DW
IDO550	HWW	Gary
WA7899	HWS	Macon
ID-B-96	SWW	Brundage 96
BZ96W93-477-D	SWW	Mohler
BZ96W93-481-B	SWW	Beamer
OR941904	SWW	
OR941899	SWW	
OR9443560	SWW	
KW943683	SWW	
WA7902	S.Club	Eden

2002 Carson City, NV

ARS96105	SWW	
ARS96277	SWW	
Chukar	W.Club	
Finch	SWW	
960195p7007	SWW	
OR900553	SWW	
OR941550	SWW	
OR951431	SWW	
IDO556	S.Club	PI 620633
MT9426	HRW	Paul
UT203032	HRW	Deloris
WA7859	HRS	Hollis
IDO517	HRW	Moreland
BZ998-447W	HWS	Waikea
BZ992-463W	HWS	Not Released
Kern	HRS	

2003 Oakland, CA

IDO566	HRS	Jerome
IDO545	HRS	PI 632710
ML18A-3-38	HWS	
BZ992-632	HRS	Not Released
BZ698-31	SWS	Nick
WA7905	SWS	Not Released
WA7906	SWS	Not Released
IDO576	SWW	PI 620637
OR2010051	SWW	ORCF-101
OR9900553	SWW	
ID9120503A	SWW	Dune
ID9134302A	SWW	Simon

Overseas Varietal Analysis Program:

Edwin	W.Club
Finch	SWW

2004 Coeur d'Alene, ID

WA7936	HWW	MDM
WA7939	HRW	Bauermeister
WA7931	HWS	Otis
WA7925	HRS	tabled
IDO587	SWW	Idaho 587
WA7921	SWS	Louise
OR2010007	SWW	ORCF-102
BZ698-528	SWW	WB-528
WA7916	SWW	Masami

Overseas Varietal Analysis Program:

Brundage 96	SWW
OR9900553	SWW
Zak	SWS
Weatherford	SWW
Finch	SWW
Jubilee	SWS

2005 Portland, OR

IDO597	HWS	Lochsa
IDO575	HRW	Juniper
IDO573	HRW	
MTS0031	HRW	Genou
MT00159	HRW	Yellowstone
MT00097	HRW	
W96-355	HRW	AgriPro Paladin
BU6W99-456	SWW	WB-456
KW9016	SWW	
KW9043	SWW	PI 639106
ORH01092	SWW	Goetze

- 6 -

2005 Portland, OR (continued)

Overseas Varietal Analysis Program:		
Stephens	SWW	
OR9801757	SWW	
Jubilee	SWS	
Finch	SWW	
Zak	SWS	
ORCF-101	SWW	
Simon	SWW	

2006 San Diego, CA

MTCL0316	HRW	Norris
MTCL0318	HRW	Bynum
BZ9W02-2060	HRW	Carter
IDO604	HWW	UI Darwin
BZ6WM02-1154	SWW	
ID99-435	SWW	UICF Lambert
ID92-22407A	SWW	Bitterroot
ID99-419	SWW	UICF Orca
OR2010239	SWW	
KSW3017	SWW	
WA7964	SWS	
IDO632	SWS	UI Pettit

Overseas Varietal Analysis Program:		
Finch	SWW	
Simon	SWW	
Alturas	SWS	
Zak	SWS	
ORSS-1757	SWW	
ORCF-101	SWW	

2007 Salt Lake City, UT

IDO2-859	SWW	
ORH010085	SWW	Skiles
WA8008	SWS	Whit
ACS52610	HRS	Volt
BZ999-592	HRS	ONeal
BZ9M03-1024	HRS	Not Released
IDO578	HRS	UI Winchester
ORN00B553	HRW	Norwest 553
Palomino	HWW	
IDO641	HWW	
Patwin	HWS	

Overseas Varietal Analysis Program:		
Alturas	SWS	
Louise	SWS	
Masami	SWW	
ORCF-101	SWW	
Simon	SWW	
ORSS-1757	SWW	

2008 Portland, OR

Cataldo	SWS	
WA8039	SWS	Babe
OR2050910	SWW	
ID93-64901A	SWW	Bruneau
WA7975	HRW	Farnum
IDO621	HRW	
UT9325-55	HRW	Curlew
Cabernet	HRS	
WA7954	HRS	Kelse
BZ903-445WP	HWS	Hartline
BZ904-336WP	HWS	WB-Idamax
Snowcrest	HWS	

Overseas Varietal Analysis Program:		
Bitterroot	SWW	
ORCF-102	SWW	
ORSS-1757	SWW	
Alturas	SWS	
Masami	SWW	
Louise	SWS	

- 7 -

2009 Sacramento, CA

IDO671	SWS	UI Whitmore
IDO655	SWW	IDO 655
Xerpha	SWW	
OR2050293	SWW	
OR2060324	SWW	
OR2040726	SWW	Mary
KW05W02370	SWW	
Cara	Club	
WA8047	Club	JD
UT9743-42	HRW	Greenville
IDO653	HRW	
IDO651	HWW	UICF Grace
APB02-0081	HRS	Bullseye
10348W	HWS	RSI10348W
Blanca Royale	HWS	
BZ902-413W	HWS	
BZ903-461W	HWS	Prestea
BZ903-464W	HWS	Not Released

Overseas Varietal Analysis Program:

Bitterroot	SWW
Skiles	SWW
Cataldo	SWS
ORCF-102	SWW
Louise	SWS
Cara	Club

2010 Phoenix, AZ

WA8090	SWS	Diva
BZ604-002	SWS	Not Released
BZ6M06-1001CL2	SWS	
WB-1035CL2		
IDO599	SWS	Stone
IDO644	SWS	
OR2040726	SWW	Mary
OR2060395	SWW	
ID9364901A	SWW	Bruneau
KW006	SWW	
KW7003	HRW	
IDO658	HWW	UI Silver
IDO660	HWW	Not Released
SJ908-203W	HWS	

Overseas Varietal Analysis Program:

Bitterroot	SWW
Skiles	SWW
ORCF102	SWW
Xerpha	SWW
UI Cataldo	SWS
Cara	Club

2011 Seattle, WA

IDO686	SWS	
IDO687	SWS	
WA8092	SWW	Otto
9616702A	SWW	
03PN-107#3	SWW	SY 107
03PN-108#20	SWW	Not Released
03PN-108#21	SWW	SY Ovation
ARS960277L	SWW	Amber
ARS970075-3C	Club	Chrystal
ARS970163-4C	Club	Crescent
IDO656	HRW	UI SRG
WB Quake	HRW	
Esperia	HRW	
IDO835	HWW	LHS
IDO702	HRS	Not Released
BZ906-491R	HRS	Not Released
BZ906-491W	HWS	Not Released

Overseas Varietal Analysis Program:

Bruneau	SWW
ORCF103	SWW
Skiles	SWW
Xerpha	SWW
UI Cataldo	SWS
Cara	Club

- 8 -

2012 San Diego, CA

IDO669	SWS	
WA8124	SWS	
OR2070870	SWW	
OR2071628	SWW	
OR208047P94	SWW	
WA8134	SWW	
99-06202A	SWW	
BZ6W07-436	SWW	
NSA2350A	SWW	
WA8074	HRS	Glee
B04-1418	HRS	Not Released
97S0621-05	HRS	SY Steelhead
IDO862	HRS	
IDO694	HWS	
WA8118	HRW	
WA8119	HRW	

Overseas Varietal Analysis Program:

Diva	SWS	
ORCF103	SWW	
Xerpha	SWW	
Bruneau	SWW	
Goetze	SWW	
AP Legacy	SWW	

2013 Scottsdale, AZ

Dayn	HWS	
ID862E	HRS	
BZ6W03-414	SWW	
BZ6W07-436	SWW	
BZ6W07-427	SWW	WB 1529
BZ6W07-458	SWW	WB 1604
WA8151	SWW	
Rosalyn	SWW	
KWAW010	SWW	
WA8143	SWW	Curiosity CL+
ORCF102	SWW	
LWW04-4009	SWW	
ID02-10606A	SWW	
Selbu	SWW	

Overseas Varietal Analysis Program:

Diva	SWS	
Stone	SWS	
Bruneau	SWW	
Goetze	SWW	
AP Legacy	SWW	
ORCF103	SWW	
Chrystal	Club	

2014 Portland, OR

Blanca Grande	HWS	
LCS Star	HWS	
BZ908-418	HRS	
BZ908-552	HRS	WB 9668
WB9229	HRS	
IDO1203S	HRS	
Jefferson	HRS	
SY240R	HRS	SY Basalt
Solano	HRS	
WA8165	HRS	Chet
WA8166	HRS	Alum
DAS001	HRW	
DAS002	HRW	
Whetstone	HRW	
IDO1108DH	SWW	
Stephens	SWW	

Overseas Varietal Analysis Program:
Due to 2013 U.S. Government shutdown no OVA varieties will be available for analysis.

- 9 -

2015 San Francisco, CA

SY3001-2	HRS	SY Selway
SY40292R	HRS	SY Coho
SY0136	HWS	SY Teton
IDO1101	HWW	
WA8158	HWW	
WA8184	HWW	Earl
WA8162	SWS	Seahawk
WA8189	SWS	Tekoa
WA8177	SWW	
WA8169	SWW	Jasper
WA8212	SWW	
LCS Biancor	SWW	
WB1376CLP	SWW	
BZ6W06-440	SWW	

Overseas Varietal Analysis Program:

UI Stone	SWS
Whit	SWS
Bobtail	SWW
Otto	SWW
WB Trifecta	SWW
Kaseberg	SWW
LCS Artdeco	SWW
ARS Chrystal	Club

2016 Scottsdale, AZ

KWHR001	HRS	
K070526	HRS	
10SB0087-B	HRS	LCS Luna
SY3051-9	HRS	
Eagan	HRS	
IDO1203S-A	HWS	
WB7328	HWS	
WB7589	HWS	
OR2100081H	HWW	
OR2110679	HWW	Irv
OR2111025	HWW	
IDO1101	HWW	
WA8180	HRW	Sequoia
LCS Jet	HRW	
SY3024-2	SWS	
WA8187	SWW	
Huffman	SWW	
Melba	Club	

Overseas Varietal Analysis Program:

Whit	SWS
Otto	SWW
Huffman	SWW
WB Trifecta	SWW
Kaseberg	SWW
LCS Artdeco	SWW
Bobtail	SWW
ARS Crescent	Club

This concludes the U.S. Wheat Associates OVA program in this format. Beginning in 2017, selected overseas collaborators will be included as PNW WQC cooperators.

2017 San Antonio, TX

WB9200	HRS	
IDO1603S	HRS	
SY3015-8	HRS	SY Gunsight
IDO1602S	HWS	
IDO1604S	HWS	
MT1348	HRW	
SY Touchstone	HRW	
Ryan	SWS	
LCS Silk	SWS	
WB6430	SWS	
IDO1403S	SWS	
UI Sparrow	SWW	
WA8232	SWW	
UI Castle	SWW	
UI Magic	SWW	
OR2101043	SWW	
SY Assure	SWW	
09PN046#16	SWW	
09PN066-7	SWW	SY Dayton
04PN066-7	SWW	SY Command
09PN005#25	SWW	SY Banks

- 10 -

2018 San Diego, CA		
SY09PN3017-09	HRS	SY Renegade
IDO1701S	HRS	
IDO1703S	HRS	
WA8268	HRW	
Rocket	HRW	
IDO1607	HRW	
SY09PN008#72	SWW	SY Candor
SY09PN046#57	SWW	
SY09PN062#04	SWW	
M-Press	SWW	
WA8270	SWW	
WA8271	SWW	
WA8275	SWW	
IDN07-28017B	SWW	
WB1783	SWW	
UI Palouse	SWW	
UI Drive	SWW	
Norwest Tandem	SWW	
Norwest Duet	SWW	
OR212086	SWW	
ARS Pritchett	Club	
Castella	Club	
IDO1405S	SWS	

2019 Portland, OR	
WB9662	HRS
10PN3039-02	HRS
WA8280	HRS
IDO1801S	HRS
IDO1805S	HRS
IDO1704S	HWS
12SB0224	HWS
OR2130118H	HWW
WA8252	HWW
IDO1506	HWW
IDO1706	HWW
IDO1806	HWW
08PN2001-07	SWS
11PN2532-195	SWS
11PN2532-507	SWS
WA8290	SWW
UIL09-15702A	SWW
06PN212-25	SWW

NB: the 1995 meeting evaluated 1993-crop samples; at the subsequent meeting (1996) both 1994- and 1995-crop samples were evaluated. Since the 1997 meeting, "current" crop samples have been evaluated.

Disclaimer: these lists are subject to correction; variety names may be added to experimental line designations at future times.

Sample	Variety	Group	Breeder	Institution/Company	Location	Class	Check
1	08PN2001-07	1	Jim Helmrick	Syngenta	Walla Walla	SWS	
2	SY Saltese	1	Jim Helmrick	Syngenta	Walla Walla	SWS	X
3	11PN2532-195	2	Jim Helmrick	Syngenta	Colfax	SWS	
4	11PN2532-507	2	Jim Helmrick	Syngenta	Colfax	SWS	
5	WB1035CL2	2	Jim Helmrick	Syngenta	Colfax	SWS	X
6	WA8290	3	Arron Carter	Washington State University	Pullman	SWW	
7	Madsen	3	Arron Carter	Washington State University	Pullman	SWW	X
8	UIL09-15702A	4	Yueguang Wang	University of Idaho	Moscow	SWW	
9	UI WSU Huffman	4	Yueguang Wang	University of Idaho	Moscow	SWW	X
10	06PN212-25	5	Jennifer Vonderwell	Syngenta	Moses Lake/Colfax	SWW	
11	SY Ovation	5	Jennifer Vonderwell	Syngenta	Moses Lake/Colfax	SWW	X
12	Sonic	6	Jay Kalous	Limagrain	Waitsberg	SWW	
13	Shark	6	Jay Kalous	Limagrain	Waitsberg	SWW	
14	Hulk	6	Jay Kalous	Limagrain	Waitsberg	SWW	no check
15	ORI2150031C1	7	Zemetra	Oregon State University	Corvallis	SWW	
16	ORI2161250	7	Zemetra	Oregon State University	Corvallis	SWW	
17	ORCF102	7	Zemetra	Oregon State University	Corvallis	SWW	X
18	WB9662	8	Lindsay Crigler	WestBred	Stanfield	HRS	no check
19	10PN3039-02	9	Jim Helmrick	Syngenta	Moses Lake/Colfax	HRS	
20	SY-605CL	9	Jim Helmrick	Syngenta	Moses Lake/Colfax	HRS	X
21	WA8280	10	Mike Pumphrey	Washington State University	Pullman/Palouse/Plaza	HRS	
22	Kelse	10	Mike Pumphrey	Washington State University	Pullman/Palouse/Plaza	HRS	X
23	IDO 1801S	11	Jianli Chen	University of Idaho	Aberdeen	HRS	
24	IDO 1805S	11	Jianli Chen	University of Idaho	Aberdeen	HRS	
25	IDO 1704S	11	Jianli Chen	University of Idaho	Aberdeen	HWS	
26	UI Platinum	11	Jianli Chen	University of Idaho	Aberdeen	HWS	X
27	12SB0224	12	Jay Kalous	Limagrain	Waitsberg	HWS	
28	Dayn	12	Jay Kalous	Limagrain	Waitsberg	HWS	X
29	Irv	13	Bob Zemetra	Oregon State University	Hermiston/LaGrande	HWW	X
30	OR2130118H	13	Bob Zemetra	Oregon State University	Hermiston/LaGrande	HWW	
31	WA8252	14	Arron Carter	Washington State University	Pullman	HWW	no check
32	IDO 1506	15	Jianli Chen	University of Idaho	Aberdeen	HWW	
33	IDO 1706	15	Jianli Chen	University of Idaho	Aberdeen	HWW	
34	IDO 1806	15	Jianli Chen	University of Idaho	Aberdeen	HWW	
35	UI Silver	15	Jianli Chen	University of Idaho	Aberdeen	HWW	X

- 12 -

08PN2001-07 *Soft White Spring*

Soft White Spring Wheat developed by Syngenta Seeds, Inc. 08PN2001-07 was derived from a single cross between Louise/Nick. It has high yield potential, good test weight and straw strength. It has a resistant reaction to the predominate races of Hessian fly in Washington. This experimental is a semi-dwarf with plant height comparable to SY Saltese and maturity similar to Seahawk. It has white chaff with a tapering awned head type. 08PN2001-07 has a good general foliar disease package which includes moderate resistance reaction to current stripe rust races. The primary targeted area for 08PN2001-07 is the soft spring wheat production areas of Washington, Oregon and Idaho. Breeder Seed production was produced 2018 and will be reviewed by Syngenta's release committee first quarter of 2019 for release to Foundation seed production. The variety summited as a quality check is SY Saltese. Both samples were produced in the same production regions.

11PN2532-195 & 11PN2532-507 *Soft White Spring*

Soft White Spring wheat with tolerance to Imazamox (IMI) molecule, the lines were developed by Syngenta Seeds, Inc. The cross 11PN2532 was derived from a three way cross between Louise / 03S0427-7 (HRS IMI) and F1 single crossed with OR4071004 (SWS). Marker assisted selection of an F3 population and field testing thereafter was used to identify two sister lines, 11PN2532-195 and 507. The two sister lines have high yield potential, good test weight and straw strength. They both have a resistant reaction to the predominate races of Hessian fly in Washington. The most significant difference between the two sisters is plant height, about 6 cm. with 11PN2532-195 shorter in height. They bracket Diva for height and similar in maturity as well. Both are white chaff with a tapering awned head type. Both have a good general foliar disease package which includes resistance reaction to current stripe rust races. More expanded testing will be needed to determine potential differences in performance across the soft spring wheat production areas of Washington, Oregon and Idaho. Breeder Seed production was produced in 2018 and they will be reviewed by Syngenta's release committee first quarter of 2019 for release to Foundation seed production. The variety summited as a quality check is WB1035CL2, the only commercial Clearfield (IMI) soft white spring in PNW spring market. All samples were produced in the same regions.

WA8290 *Soft White Winter*

WA8290 is a soft white winter wheat line targeted for the low rainfall production zones of Central Washington. The pedigree of WA8290 is IDO-859//Finch/Eltan. WA8290 has an average plant height when compared to the current cultivars grown in the target production region. WA8290 heading date is about three days earlier than Otto and two days earlier than Xerpha. WA9290 has excellent emergence and yield potential in the deep furrow production system in Central Washington. WA8290 has very good resistance to stripe rust, containing Yr17, an unnamed gene from Eltan, and other uncharacterized resistance genes.

UIL09-15702A *Soft White Winter*

UIL 09-15702A is a soft white winter wheat line targeted for the intermediate and low rainfall environments. It is a Brundage 96 derivative. The cross was made in 2009 by the University of Idaho. Plant height is similar to Otto but it is about one week earlier heading than Otto. UIL 09-15702A has good stripe rust resistance. 2017 WSU SVT data shows it is also tolerant to snow mold. UIL 09-15702A has high yield potential and consistently good test weights.

06PN212-25 *Soft White Winter*

06PN212-25 is an awned, white chaff Soft White Winter Wheat developed by Syngenta Seeds, Inc. 06PN212-25 originated with a single cross between Salute/Brundage 96. 06PN212-25 is earlier maturing than SY Ovation with good test weight. This experimental has a good general foliar disease package which includes resistance reaction to current stripe rust races. 06PN212-25 appears to be very broadly adapted but is best suited for intermediate to high rainfall production areas and also well suited to irrigated production in Washington and Southern Idaho. It is moderately susceptible to Snow Mold which will limit production in highly effected areas. 06PN212-25 was on Breeder Seed production in 2018. The samples submitted to WQC were produced in dryland production areas of Washington and submitted with SY Ovation as a check produced in the same environment.

LCS Sonic *Soft White Winter*

LCS Sonic is a new soft white winter wheat from Limagrain Cereal Seeds. LCS Sonic is an awned, medium maturity variety with good winterhardiness and good straw strength. It has excellent yield in the intermediate rainfall regions of eastern Washington and northern Idaho where it is best adapted. The taller plant type and is moderate resistance to soil diseases such as Cephalosporium Stripe, fusarium Crown Rot, and Strawbreaker foot rot makes LCS Sonic and excellent choice for early and/or deep furrow planting.

LCS Shark *Soft White Winter*

LCS Shark is a new soft white winter wheat from Limagrain Cereal Seeds. LCS Shark is an awned, early maturing variety with good winterhardiness and very good straw strength. It has excellent yield potential and is best adapted for the eastern Oregon and southeastern Washington wheat growing regions. LCS Shark is moderately resistant to stripe rust and resistant to soil borne wheat mosaic virus.

LCS Hulk *Soft White Winter*

LCS hulk is a new soft white winter wheat variety from Limagrain Cereal Seeds. LCS Hulk is an awned, medium maturity variety with good winterhardiness and very good straw strength. It has excellent yield potential and high test weight across a wide range of environments. LCS Hulk is best adapted to the intermediate to high rainfall regions as well as the irrigated production regions in eastern Oregon, eastern Washington and northern and southern Idaho. LCS Hulk is moderately resistant to stripe rust, Fusarium crown rot and Cephalosporium stripe.

ORI2150031CL+ *Soft White Winter*

Two-gene herbicide resistant soft white wheat carrying resistance to Beyond herbicide with ORCF-102 in its pedigree. The line has an intermediate to late heading date similar to ORCF-101. It has good stripe rust resistance and carries two genes (Pch1 and Pch2) for strawbreaker foot rot resistance. ORI2150031 CL+ has good yield potential in intermediate to high rainfall growing regions in eastern Oregon and southeastern Washington. End-use quality is good / acceptable falling between ORCF-101 and ORCF-102 for milling and baking quality.

ORI2161250CL+ *Soft White Winter*

Two gene herbicide resistant soft white wheat carrying resistance to Beyond herbicide with ORCF-101 in its pedigree. The line has an earlier heading date than current 2-gene Clearfield cultivars making it better adapted to low to intermediate rainfall regions in Oregon. ORI2161250 CL+ has good stripe rust resistance and good yield potential. End-use quality of ORI2161250 CL+ is good, equal to or better than ORCF-101 and UI-Magic for milling and baking quality.

WB9662 *Hard Red Spring*

- Excellent Protein Potential and Milling and Baking Quality
- Excellent Yellow (Stripe) and Leaf Rust Resistance
- Very Good Hessian Fly Resistance
- Excellent Dual-Season Potential for Winter Planted Markets

10PN3039-02 *Hard Red Spring*

SY 10PN30039-02 is a Hard Red Spring wheat developed by Syngenta Seeds, Inc with tolerance to Imazamox (IMI) molecule. 10PN3039-02 was derived from a single cross between Syngenta Northern plains experimental 03S0398-5(IMI) and Bullseye. It has high yield potential, high protein with very good test weight. It has a semi-dwarf, plant height similar to SY Selway with very good straw strength, and maturity similar to SY 605CL. This experimental has a good general foliar disease package which includes moderate resistance reaction to current stripe rust races. It has a susceptible reaction to the predominate races of Hessian fly in Washington. 10PN3039-02 is white chaff with a tapered awed head type. The primary targeted area for 10PN3039-02 is the intermediate to high rain fall (12 to < 18 inch) areas of Washington, Idaho and Oregon. Breeder Seed production was produced 2018 and will be reviewed by Syngenta's release committee first quarter of 2019 for release to Foundation seed production. The variety summited as a quality check is SY 605CL2, the only commercial Clearfield (IMI) hard red spring in PNW spring market. All samples were produced in the same regions.

WA8280CL+ *Hard Red Spring*

WA8280CL+ is a broadly-adapted hard red spring wheat with two-gene tolerance to Beyond™ herbicide for use in rotation in Clearfield™ production systems in all production zones of the Pacific Northwest. It has an excellent yield record, with above average grain protein, good adult resistance to stripe rust, medium height with very good straw strength, very good test weight, and Hessian fly resistance in low, intermediate, high rainfall production areas. WA8280Cl+ combines top-end yield potential, high test weight, and above average grain protein compared to most hard red spring wheat varieties including Alum, Glee, Kelse, SY Selway, and comparison Clearfield varieties including SY 605 CL and WB9879 CL+.

IDO 1801S *Hard Red Spring*

IDO1801S hard red spring wheat was derived from the cross Lassik x Jefferson. It has high grain yield, excellent end-use quality, resistance to Hessian fly, and improved stripe rust resistance compared to Jefferson. IDO1801S was developed to replace Jefferson.

IDO 1805S *Hard Red Spring*

IDO1805S hard red spring wheat was derived from the cross Lassik//Jefferson*2/Alsen. It has high grain yield, excellent end-use quality, and improved stripe rust resistance compared to Jefferson. IDO1805S also has tolerance to fusarium head blight. IDO1805S was developed to replace Jefferson.

IDO 1704S *Hard White Spring*

IDO1704S hard white spring wheat was derived from the cross IDO694 / Blanca Royale. It has high grain yield and test weight, excellent end-use quality. Compared to UI Platinum, IDO1704S has very good resistance to stripe rust and Hessian fly.

12SB0224 *Hard White Spring*

12SB0224 is an experimental hard white spring wheat from Limagrain Cereal Seeds. 12SB0224 is an awned, medium to late maturity variety. It has excellent yield potential and is best adapted to the irrigated production regions of southern Idaho. 12SB0224 is moderately resistant to stripe rust.

OR2130118H *Hard White Winter*

Hard white winter wheat with good stripe rust resistance and good to excellent yield potential across a range of moisture regimes. It has an intermediate heading date and good straw strength allowing OR2130118H to perform well under irrigation. The line has also performed well under low and intermediate rainfall conditions in Oregon. End-use quality of OR2130118H is good, similar to 'Irv' for milling and baking quality.

WA8252 *Hard White Winter*

WA8252 is a hard white winter wheat line targeted for the high rainfall production zones of Eastern Washington, Northern Idaho and the irrigated production regions of Southern Idaho. The pedigree of WA8252 is OR2050331H/2*CO1W171-t, which originated from the USDA Winter Wheat Breeding and Genetics program in Pullman, WA. WA8252 plant height is six inches taller than Norwest 553 with an average heading that is equal to Norwest 553 and Keldin when tested in Eastern Washington. WA8252 has excellent yield potential and higher than average test weight in the high rainfall production region of Eastern Washington. WA8252 has very good resistance to stripe rust, containing Yr18 and other uncharacterized resistance genes.

IDO 1506 *Hard White Winter*

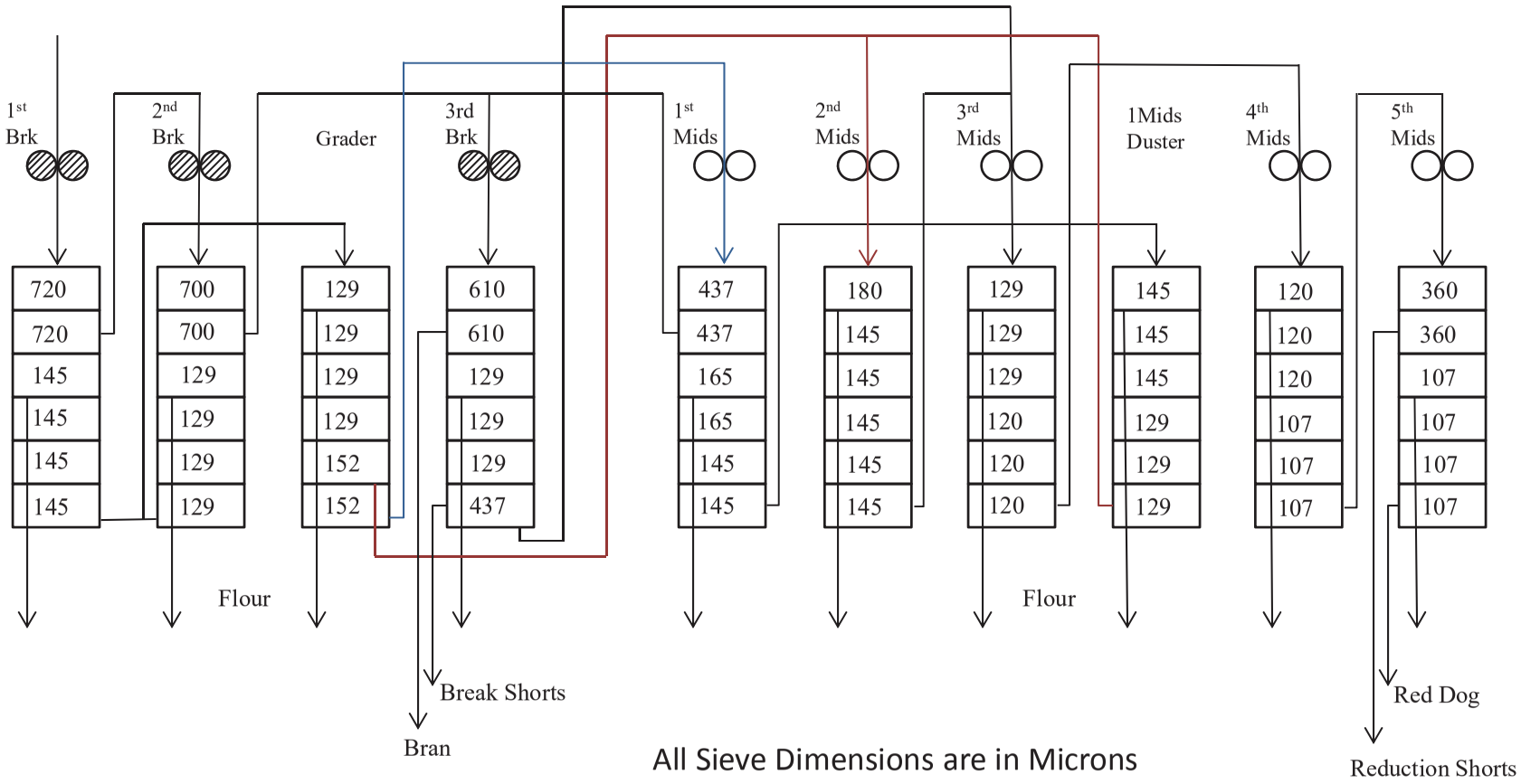
IDO1506 (DB44, Dongxuan3 x DWred) hard white winter wheat was developed for intensive irrigation management, especially for wheel line irrigation. It is shorter than Norwest 553. IDO1506 has very good resistance to stripe rust and dwarf bunt. IDO1506 also survive well in acid soil (pH < 4.5). Grain yield of IDO1506 is in average of current grown cultivar. Breeder seed was harvested in summer 2018.

IDO 1706 *Hard White Winter*

IDO1706 (A0709W-44, UI Silver x IDO660) hard white winter wheat was developed to replace UI Silver for high rainfall dryland and irrigation production. IDO1706 has brown chaff color. It is medium tall, but shorter and much stronger than UI Silver. IDO1706 has highest grain yield in the University of Idaho Irrigated Variety Trials in Southern Idaho in 2018. It also has excellent bread baking quality, HTAP resistance to stripe rust, and very good resistance to dwarf bunt. Pre-foundation seed were planted in the fall of 2018. This cultivar will be released before 2019 fall planting.

IDO 1806 *Hard White Winter*

IDO1806 (A0701W-29, IDO621 x IDO660) hard white winter wheat was developed for irrigated production. The height of IDO1806 is like SY Ovation. It is shorter than IDO1706, but taller than IDO1506. IDO1806 has excellent bread baking quality, HTAP resistance to stripe rust, moderate resistance to dwarf bunt. Breeder seed was planted in the fall of 2018.



All Sieve Dimensions are in Microns

	# of Teeth	α	β	Land	Radius	Spiral	Break Setting Targets
1st Break	14	40	70	0.004”	0.024”	8% = 1”	43% Through 707 micron
2nd Break	20	40	75	0.002”	0.012”	10% = 1¼”	64% Through 707 micron
3rd Break	24	35	75	0.002”	0.008”	10% = 1¼”	Bran Appearance

Western Wheat Quality Laboratory,
MIAG MULTOMAT

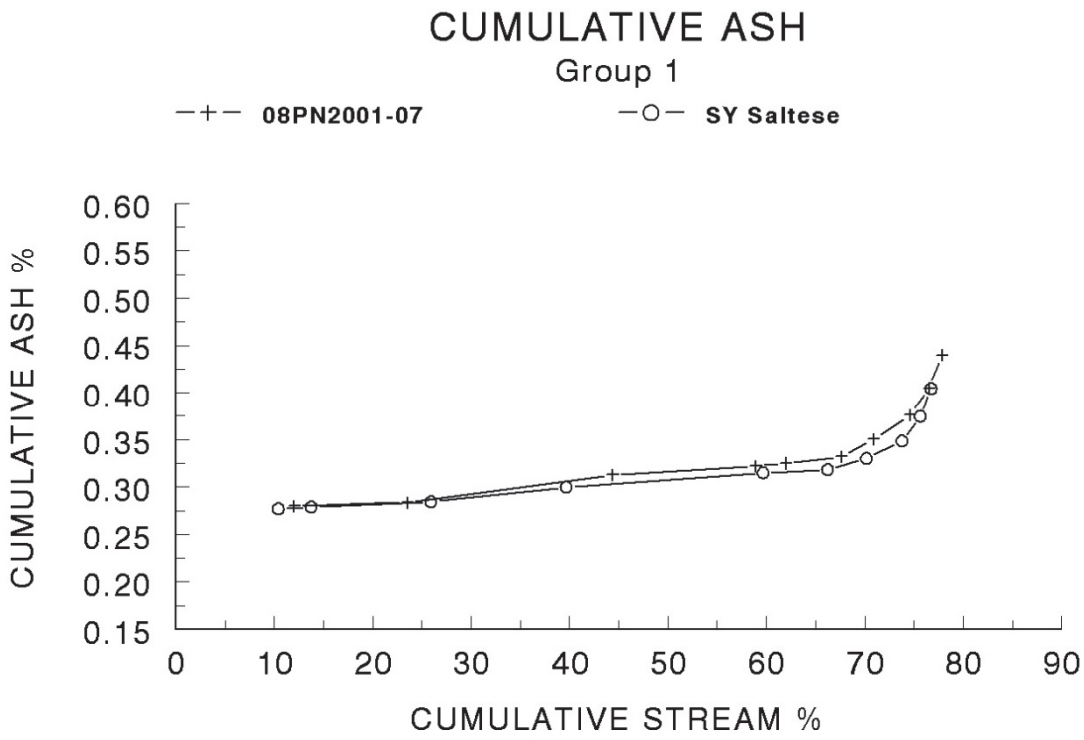
Break Roll Speed
Fast Rolls: 340rpm
Slow Rolls: 145rpm
Differential: 2.34 : 1

Reduction Roll Speed
Fast Rolls: 340rpm
Slow Rolls: 250rpm
Differential: 1.36 : 1

Temper
14% Soft Wheat
16% Hard Wheat
0.5% Pre-Temper

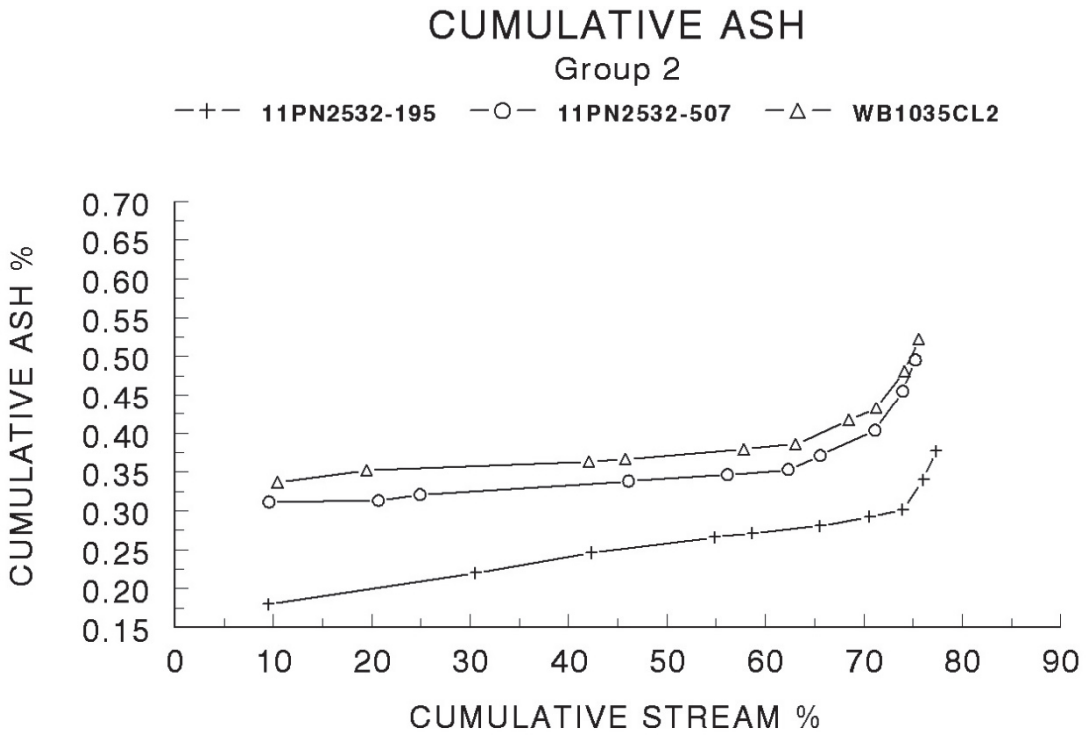
- 18 -

Flour Milling Ash Curves

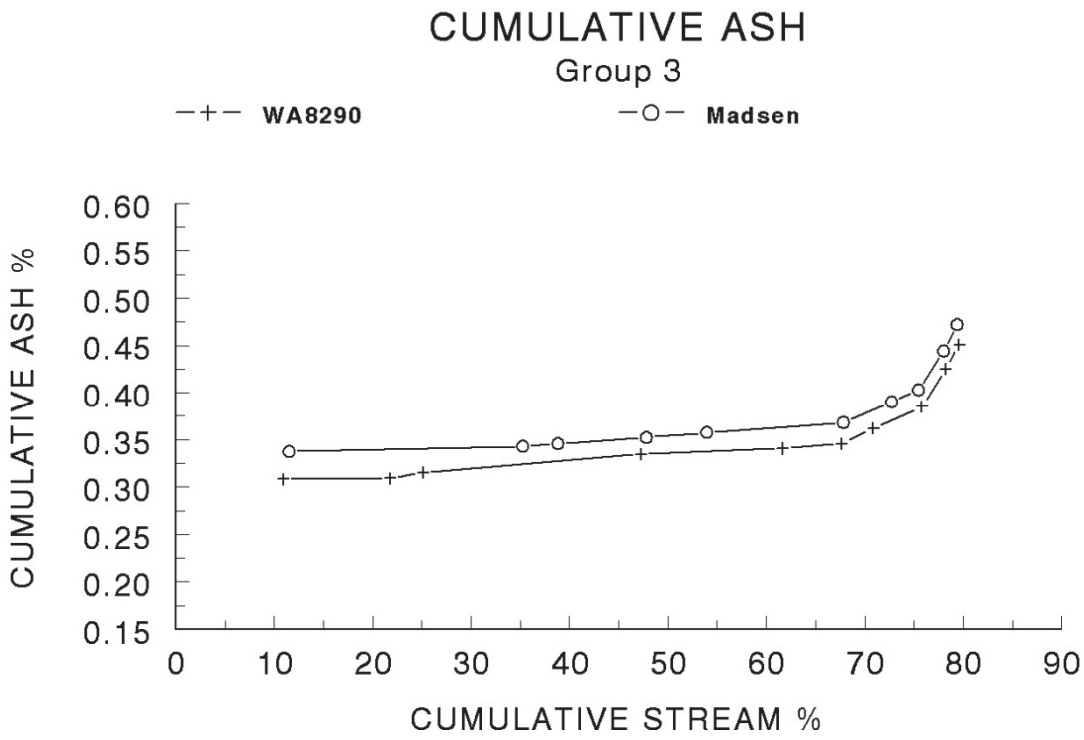


	08PN2001-07					SALTESE			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
B1	12.0	0.28	12.0	0.28	M1	10.4	0.28	10.4	0.28
M1	11.5	0.29	23.5	0.28	M1RD	3.3	0.29	13.8	0.28
M2	20.8	0.35	44.4	0.31	B1	12.2	0.29	25.9	0.28
B2	14.6	0.35	58.9	0.32	B2	13.7	0.33	39.7	0.30
M1RD	3.0	0.38	62.0	0.33	M2	20.0	0.34	59.7	0.31
GR	5.7	0.41	67.6	0.33	GR	6.6	0.35	66.3	0.32
B3	3.3	0.73	70.9	0.35	B3	3.9	0.53	70.2	0.33
M3	3.7	0.86	74.6	0.38	M3	3.6	0.71	73.8	0.35
M4	1.9	1.54	76.5	0.41	M4	1.9	1.39	75.7	0.37
M5	1.3	2.43	77.9	0.44	REDDOG	0.7	2.35	76.4	0.39
REDDOG	1.0	2.62	78.9	0.47	M5	1.1	2.46	77.5	0.42
REDSH	1.3	3.27	80.2	0.51	REDSH	0.9	2.85	78.4	0.45
BKSH	3.0	3.58	83.2	0.62	BKSH	3.0	3.09	81.4	0.55
BRAN	16.8	4.06	100.0	1.20	BRAN	18.6	3.51	100.0	1.10
Whole Wheat Ash		1.57			Whole Wheat Ash		1.54		
Break Flour Yield		20.5			Break Flour Yield		17.4		

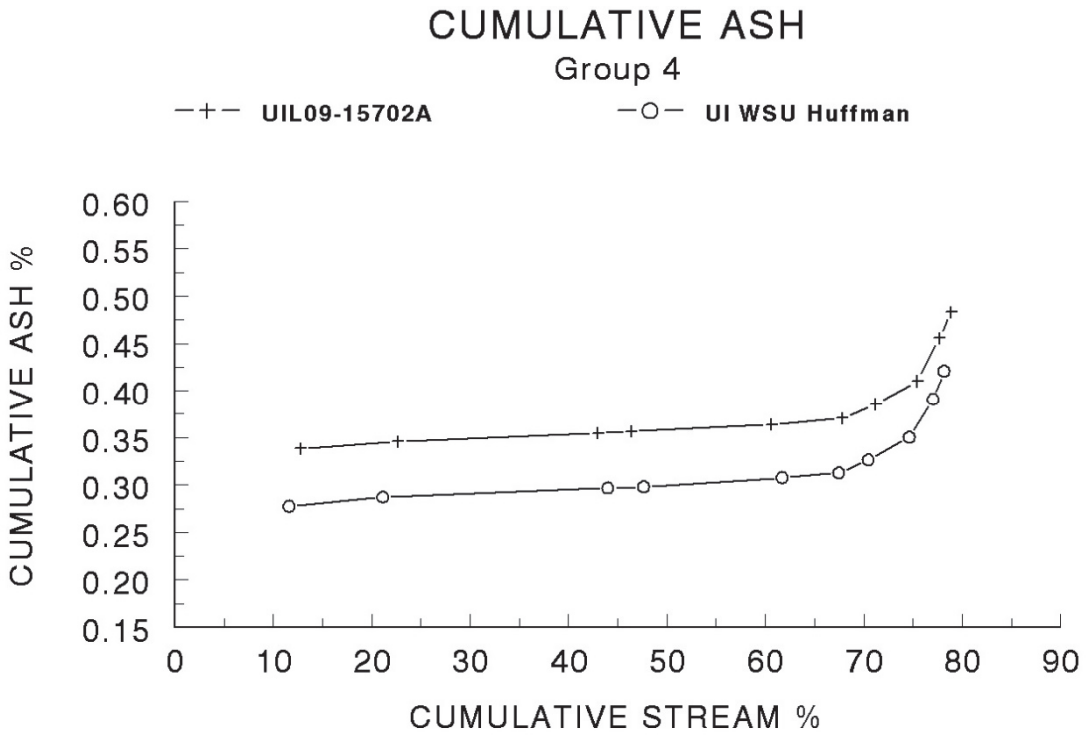
- 19 -



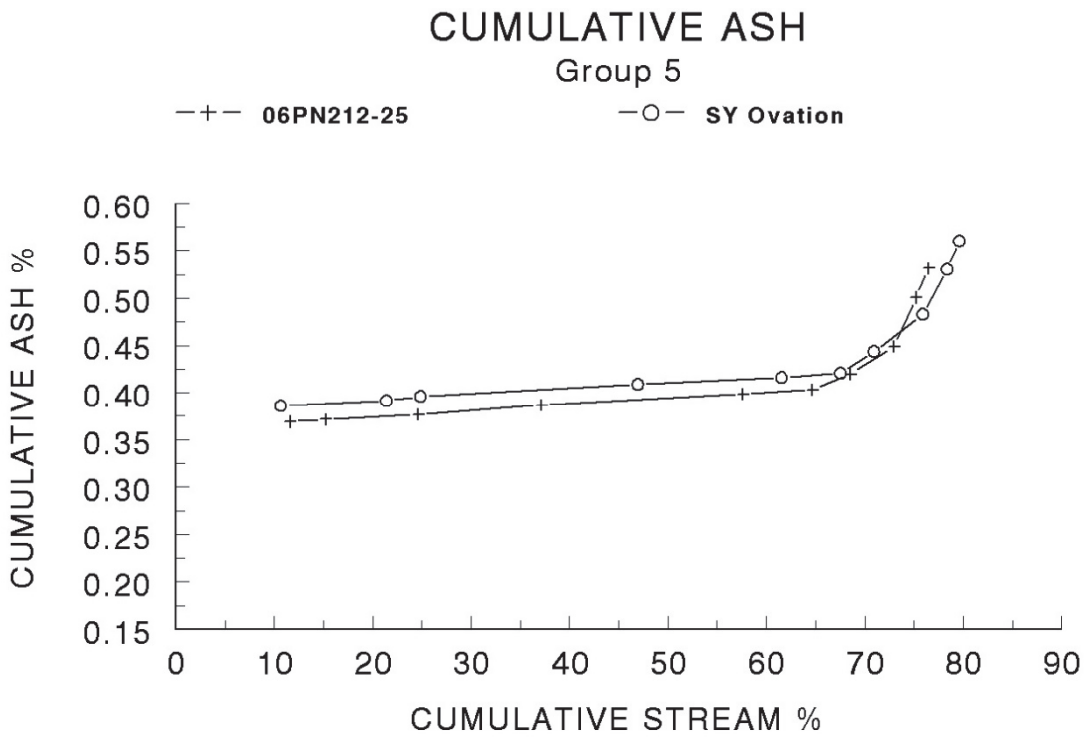
	11PN2532-195					11PN2532-507					WB1035CL2			
			Cumulative					Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M1	9.5	0.18	9.5	0.18	M1	9.6	0.31	9.6	0.31	M1	10.4	0.34	10.4	0.34
M2	21.1	0.24	30.6	0.22	B1	11.1	0.32	20.7	0.31	B1	9.1	0.37	19.5	0.35
B1	11.8	0.31	42.3	0.25	M1RD	4.2	0.36	24.9	0.32	M2	22.6	0.37	42.1	0.36
B2	12.5	0.33	54.8	0.27	M2	21.2	0.36	46.1	0.34	M1RD	3.7	0.40	45.8	0.37
M1RD	3.9	0.35	58.7	0.27	B2	10.0	0.38	56.2	0.35	B2	12.0	0.43	57.8	0.38
GR	6.9	0.36	65.6	0.28	GR	6.2	0.41	62.3	0.35	GR	5.2	0.46	63.1	0.39
M3	5.0	0.44	70.6	0.29	B3	3.2	0.72	65.6	0.37	M3	5.4	0.78	68.5	0.42
B3	3.4	0.49	74.0	0.30	M3	5.6	0.79	71.1	0.40	B3	2.7	0.82	71.2	0.43
M4	2.1	1.70	76.1	0.34	M4	2.9	1.73	74.0	0.45	M4	2.9	1.67	74.1	0.48
M5	1.3	2.58	77.3	0.38	M5	1.3	2.83	75.3	0.50	M5	1.5	2.61	75.6	0.52
REDDOG	0.7	3.06	78.0	0.40	REDDOG	0.5	2.99	75.8	0.51	REDDOG	0.6	2.83	76.2	0.54
REDSH	0.9	4.03	78.9	0.44	REDSH	0.7	3.67	76.5	0.54	REDSH	0.9	3.61	77.1	0.58
BKSH	2.8	4.67	81.7	0.59	BKSH	2.7	3.93	79.2	0.66	BKSH	2.8	4.27	79.9	0.71
BRAN	18.3	5.89	100.0	1.56	BRAN	20.8	5.30	100.0	1.62	BRAN	20.1	5.73	100.0	1.71
Whole Wheat Ash		1.85			Whole Wheat Ash		1.42			Whole Wheat Ash		1.59		
Break Flour Yield		19.4			Break Flour Yield		20.0			Break Flour Yield		19.9		



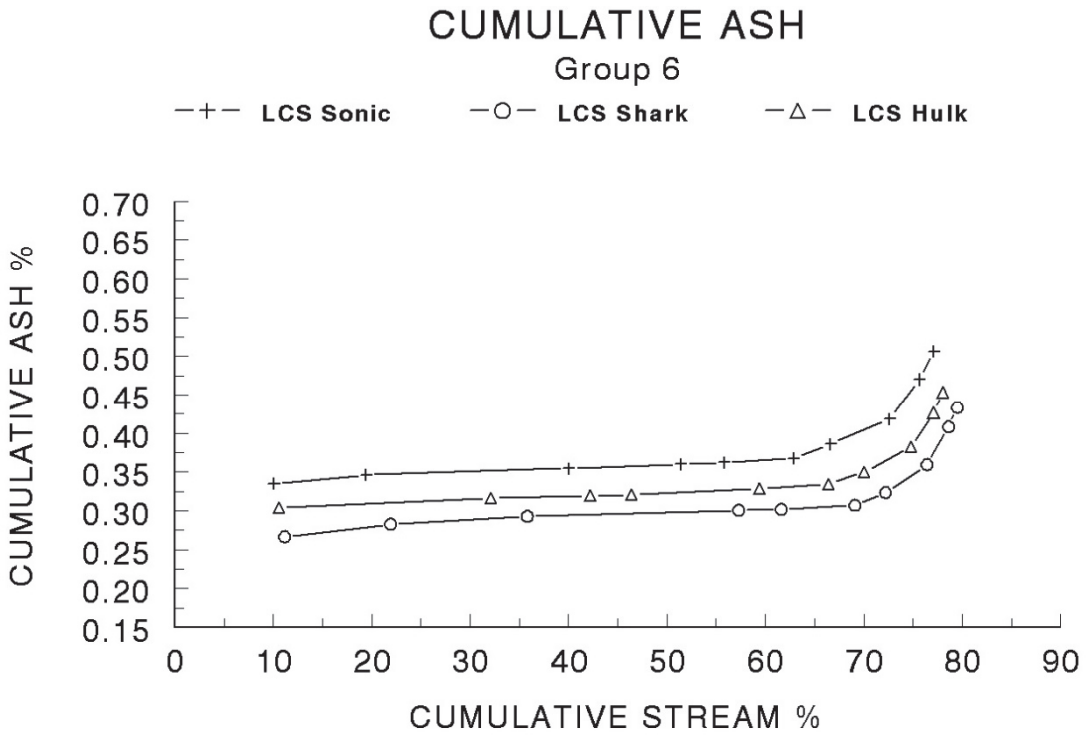
	WA8290					MADSEN			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M1	10.9	0.31	10.9	0.31	M1	11.5	0.34	11.5	0.34
B1	10.8	0.31	21.8	0.31	M2	23.7	0.35	35.2	0.34
M1RD	3.4	0.36	25.1	0.32	M1RD	3.6	0.37	38.8	0.35
M2	22.1	0.36	47.3	0.33	B1	9.0	0.38	47.8	0.35
B2	14.4	0.36	61.6	0.34	GR	6.1	0.40	53.9	0.36
GR	6.0	0.40	67.6	0.35	B2	13.9	0.41	67.8	0.37
B3	3.2	0.70	70.9	0.36	M3	4.9	0.70	72.7	0.39
M3	4.9	0.72	75.8	0.39	B3	2.7	0.74	75.5	0.40
M4	2.4	1.68	78.2	0.43	M4	2.6	1.65	78.0	0.44
M5	1.4	1.94	79.6	0.45	M5	1.4	2.09	79.4	0.47
REDDOG	0.6	2.68	80.2	0.47	REDDOG	0.6	2.56	80.0	0.49
REDSH	1.0	3.21	81.1	0.50	REDSH	1.1	3.24	81.1	0.52
BKSH	2.7	3.92	83.8	0.61	BKSH	2.7	4.00	83.8	0.64
BRAN	16.2	4.53	100.0	1.24	BRAN	16.2	4.78	100.0	1.31
Whole Wheat Ash		1.84			Whole Wheat Ash		1.34		
Break Flour Yield		22.9			Break Flour Yield		22.2		



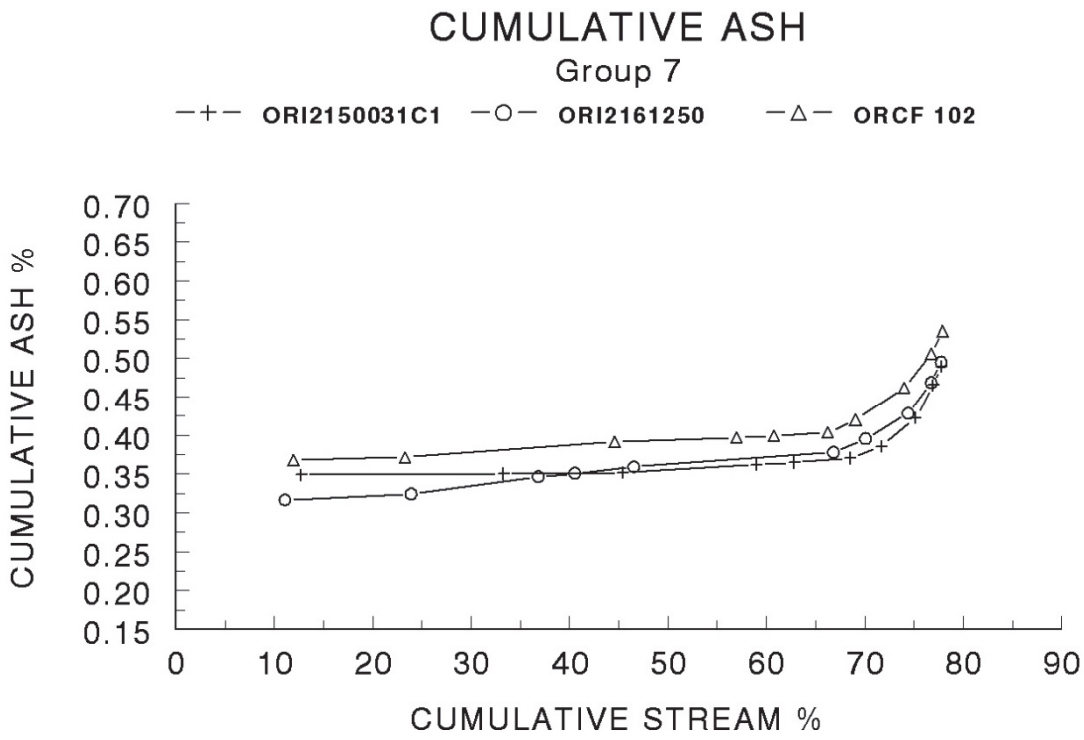
	UIL09-15702A						HUFFMAN			
			Cumulative						Cumulative	
Stream	Yield	Ash	Yield	Ash		Stream	Yield	Ash	Yield	Ash
B1	12.8	0.34	12.8	0.34		M1	11.6	0.28	11.6	0.28
M1	9.9	0.36	22.7	0.35		B1	9.5	0.30	21.2	0.29
M2	20.3	0.36	43.0	0.35		M2	22.9	0.31	44.0	0.30
M1RD	3.4	0.38	46.4	0.36		M1RD	3.6	0.31	47.7	0.30
B2	14.2	0.39	60.6	0.36		B2	14.1	0.34	61.7	0.31
GR	7.2	0.43	67.8	0.37		GR	5.8	0.37	67.5	0.31
B3	3.4	0.68	71.2	0.39		B3	3.0	0.64	70.5	0.33
M3	4.2	0.83	75.5	0.41		M3	4.2	0.75	74.6	0.35
M4	2.2	1.98	77.7	0.46		M4	2.4	1.64	77.1	0.39
M5	1.2	2.30	78.9	0.48		M5	1.1	2.50	78.2	0.42
REDDOG	0.5	2.60	79.4	0.50		REDDOG	0.5	2.58	78.7	0.43
REDSH	0.8	3.39	80.2	0.53		REDSH	0.8	3.30	79.5	0.46
BKSH	2.7	3.90	82.9	0.64		BKSH	3.0	3.89	82.5	0.59
BRAN	17.1	4.96	100.0	1.37		BRAN	17.5	4.63	100.0	1.30
Whole Wheat Ash		1.26				Whole Wheat Ash		1.37		
Break Flour Yield		18.3				Break Flour Yield		22.8		



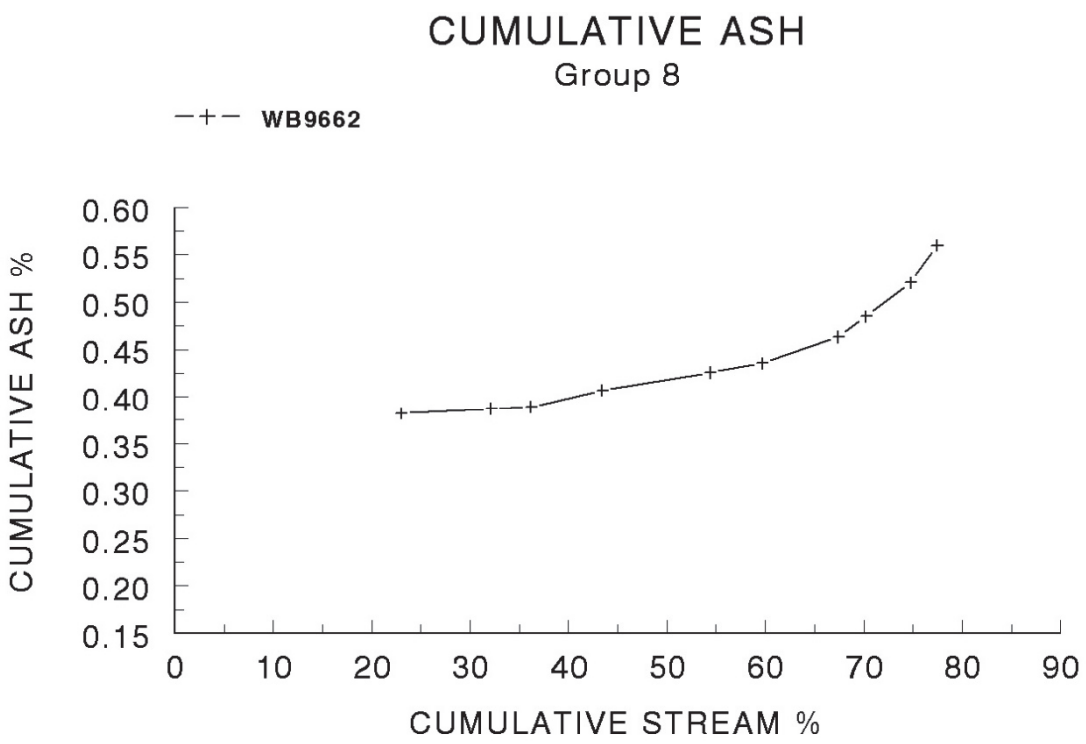
	06PN212-25					OVATION			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
B1	11.6	0.37	11.6	0.37	M1	10.7	0.39	10.7	0.39
M1RD	3.6	0.38	15.2	0.37	B1	10.8	0.40	21.4	0.39
M1	9.4	0.38	24.6	0.38	M1RD	3.5	0.42	24.9	0.40
B2	12.5	0.41	37.2	0.39	M2	22.1	0.42	47.0	0.41
M2	20.5	0.42	57.6	0.40	B2	14.6	0.44	61.6	0.42
GR	7.1	0.44	64.7	0.40	GR	6.0	0.47	67.5	0.42
B3	3.9	0.70	68.6	0.42	B3	3.4	0.89	70.9	0.44
M3	4.4	0.90	73.0	0.45	M3	4.9	1.05	75.9	0.48
M4	2.2	2.21	75.2	0.50	M4	2.5	1.99	78.4	0.53
M5	1.3	2.33	76.5	0.53	M5	1.3	2.40	79.6	0.56
REDDOG	0.9	2.89	77.4	0.56	REDDOG	0.9	3.16	80.6	0.59
REDSH	1.1	3.70	78.5	0.60	REDSH	1.2	4.14	81.8	0.64
BKSH	3.2	4.49	81.8	0.76	BKSH	3.2	4.59	85.0	0.79
BRAN	18.2	5.17	100.0	1.56	BRAN	15.0	5.53	100.0	1.50
Whole Wheat Ash		1.33			Whole Wheat Ash		1.49		
Break Flour Yield		20.4			Break Flour Yield		18.2		



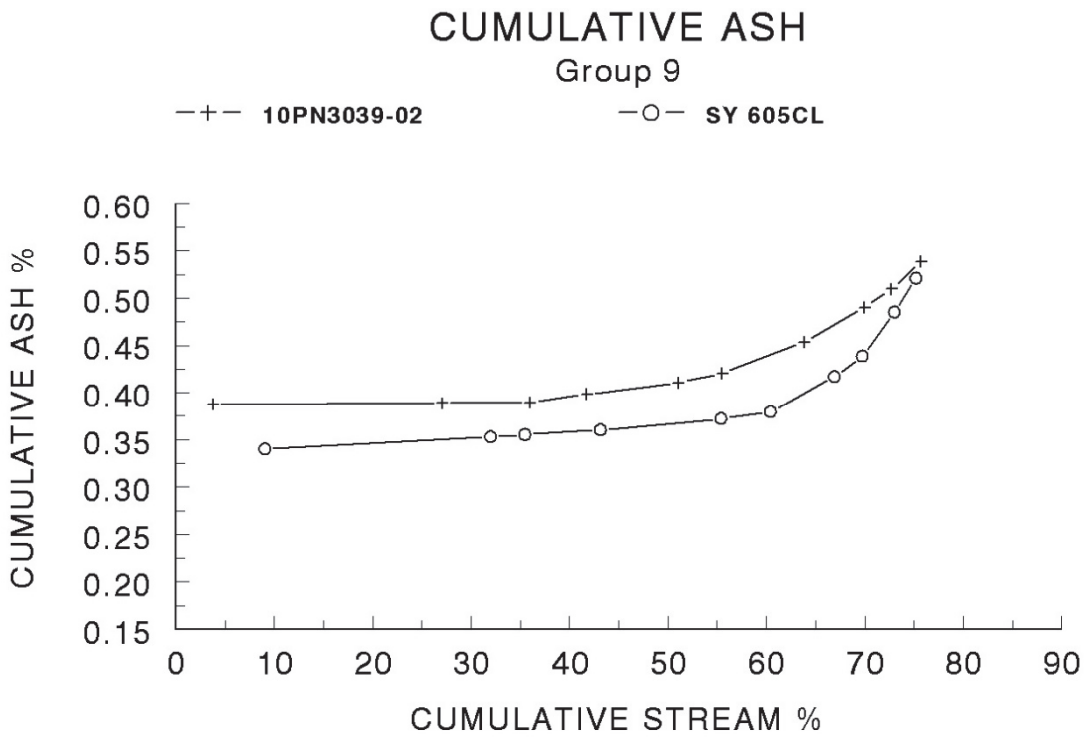
	SONIC					SHARK					HULK			
			Cumulative					Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M1	10.1	0.33	10.1	0.33	M1	11.2	0.27	11.2	0.27	M1	10.6	0.30	10.6	0.30
B1	9.4	0.36	19.4	0.35	B1	10.7	0.30	21.9	0.28	M2	21.6	0.32	32.1	0.32
M2	20.6	0.36	40.1	0.35	B2	13.9	0.31	35.8	0.29	B1	10.1	0.33	42.2	0.32
B2	11.4	0.38	51.4	0.36	M2	21.5	0.31	57.3	0.30	M1RD	4.2	0.33	46.4	0.32
M1RD	4.4	0.39	55.8	0.36	M1RD	4.3	0.32	61.6	0.30	B2	13.0	0.36	59.4	0.33
GR	7.1	0.41	62.9	0.37	GR	7.5	0.35	69.1	0.31	GR	7.0	0.39	66.4	0.33
B3	3.8	0.70	66.6	0.39	B3	3.1	0.69	72.2	0.32	B3	3.6	0.64	70.0	0.35
M3	6.0	0.78	72.6	0.42	M3	4.2	0.97	76.5	0.36	M3	4.8	0.85	74.8	0.38
M4	3.0	1.71	75.7	0.47	M4	2.2	2.15	78.6	0.41	M4	2.3	1.87	77.1	0.43
M5	1.5	2.35	77.1	0.51	M5	0.9	2.55	79.5	0.43	M5	1.0	2.64	78.1	0.45
REDDOG	1.0	2.84	78.1	0.54	REDDOG	0.5	2.74	80.0	0.45	REDDOG	0.5	2.64	78.6	0.47
REDSH	1.1	3.65	79.2	0.58	REDSH	0.8	3.50	80.8	0.48	REDSH	0.7	3.51	79.3	0.50
BKSH	3.1	3.98	82.3	0.71	BKSH	3.1	4.09	83.9	0.61	BKSH	3.0	3.86	82.3	0.62
BRAN	17.7	4.57	100.0	1.39	BRAN	16.1	4.89	100.0	1.30	BRAN	17.7	4.38	100.0	1.28
Whole Wheat Ash		1.59			Whole Wheat Ash		1.41			Whole Wheat Ash		1.64		
Break Flour Yield		24.5			Break Flour Yield		26.7			Break Flour Yield		25.3		



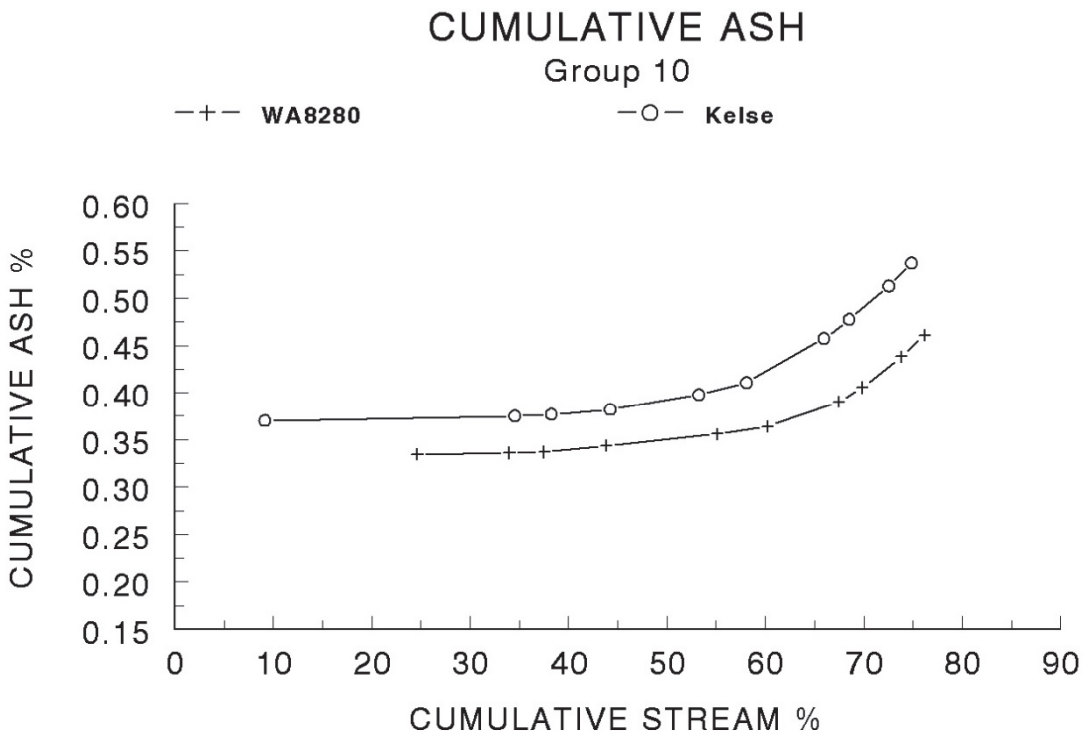
	ORI2150031C1					ORI2161250					ORCF102			
			Cumulative					Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
B1	12.8	0.35	12.8	0.35	M1	11.1	0.32	11.1	0.32	B1	11.9	0.37	11.9	0.37
M2	20.5	0.35	33.3	0.35	B1	12.8	0.33	23.9	0.32	M1	11.4	0.38	23.3	0.37
M1	12.1	0.35	45.4	0.35	B2	12.9	0.39	36.8	0.35	M2	21.3	0.41	44.6	0.39
B2	13.6	0.40	59.0	0.36	M1RD	3.7	0.39	40.5	0.35	B2	12.4	0.42	57.0	0.40
M1RD	3.8	0.41	62.8	0.37	GR	6.0	0.42	46.5	0.36	M1RD	3.8	0.44	60.7	0.40
GR	5.7	0.43	68.5	0.37	M2	20.3	0.42	66.8	0.38	GR	5.5	0.44	66.2	0.40
B3	3.2	0.71	71.7	0.39	B3	3.3	0.75	70.1	0.40	B3	2.9	0.81	69.1	0.42
M3	3.5	1.19	75.2	0.42	M3	4.3	0.96	74.4	0.43	M3	4.9	1.05	74.0	0.46
M4	1.8	2.25	77.0	0.47	M4	2.4	1.72	76.8	0.47	M4	2.7	1.69	76.7	0.51
M5	0.8	2.83	77.8	0.49	M5	1.0	2.51	77.8	0.49	M5	1.2	2.49	77.9	0.54
REDDOG	0.4	2.97	78.2	0.50	REDDOG	0.6	2.62	78.4	0.51	REDDOG	0.6	2.86	78.5	0.55
BKSH	2.9	3.75	81.1	0.62	REDSH	0.6	3.20	79.0	0.53	REDSH	0.8	3.46	79.3	0.58
REDSH	0.6	3.77	81.6	0.64	BKSH	2.6	3.38	81.6	0.62	BKSH	2.9	3.79	82.2	0.69
BRAN	18.4	4.63	100.0	1.37	BRAN	18.4	4.72	100.0	1.38	BRAN	17.8	4.68	100.0	1.40
Whole Wheat Ash		1.31			Whole Wheat Ash		1.45			Whole Wheat Ash		1.48		
Break Flour Yield		26.0			Break Flour Yield		27.5			Break Flour Yield		26.4		



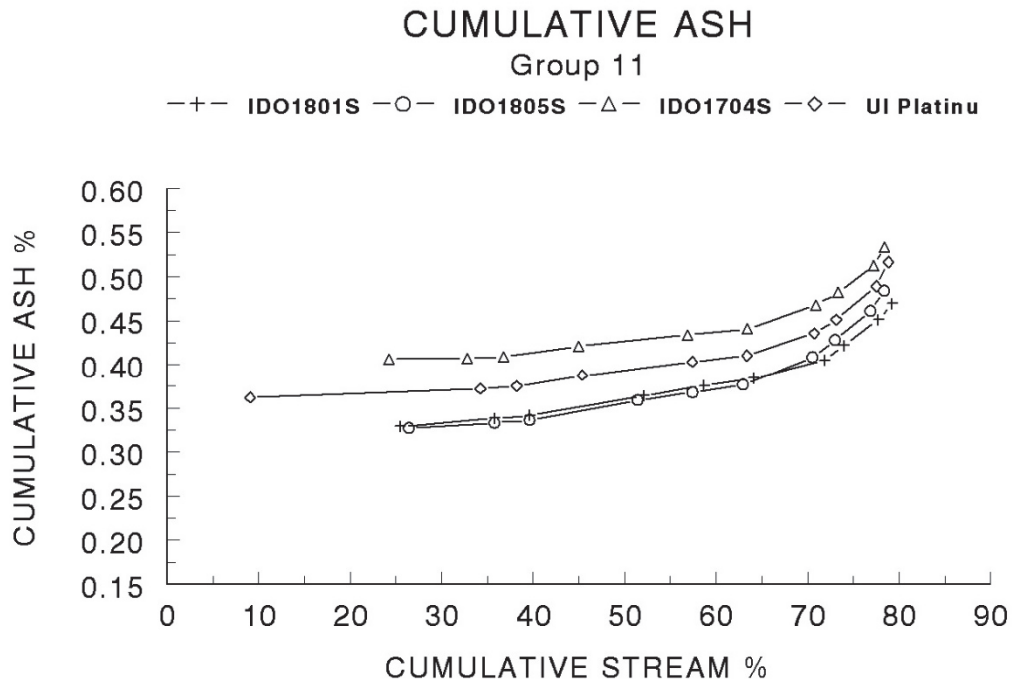
	WB9662			
			Cumulative	
Stream	Yield	Ash	Yield	Ash
M2	23.0	0.38	23.0	0.38
M1	9.1	0.40	32.2	0.39
M1RD	4.0	0.41	36.2	0.39
B1	7.2	0.49	43.4	0.41
B2	11.0	0.50	54.4	0.43
GR	5.3	0.53	59.7	0.44
M3	7.7	0.68	67.4	0.46
B3	2.8	1.01	70.3	0.49
M4	4.5	1.07	74.8	0.52
M5	2.7	1.66	77.5	0.56
REDDOG	1.1	2.76	78.6	0.59
REDSH	0.9	4.11	79.5	0.63
BKSH	2.9	4.61	82.4	0.77
BRAN	17.6	5.78	100.0	1.65
Whole Wheat Ash		1.10		
Break Flour Yield		26.8		



	10PN3039-02					SY-605CL			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M1RD	3.8	0.39	3.8	0.39	M1	9.1	0.34	9.1	0.34
M2	23.3	0.39	27.1	0.39	M2	22.9	0.36	32.0	0.35
M1	8.9	0.39	36.0	0.39	M1RD	3.5	0.38	35.5	0.36
B1	5.8	0.46	41.8	0.40	B1	7.7	0.38	43.1	0.36
B2	9.3	0.47	51.1	0.41	B2	12.3	0.41	55.4	0.37
GR	4.4	0.53	55.5	0.42	GR	5.0	0.46	60.4	0.38
M3	8.3	0.67	63.8	0.45	M3	6.5	0.77	66.9	0.42
M4	6.2	0.87	70.0	0.49	B3	2.8	0.95	69.8	0.44
B3	2.7	1.01	72.7	0.51	M4	3.3	1.48	73.0	0.49
M5	3.0	1.25	75.7	0.54	M5	2.2	1.72	75.2	0.52
REDDOG	1.5	2.33	77.2	0.57	REDDOG	0.9	2.93	76.1	0.55
REDSH	1.2	3.56	78.4	0.62	REDSH	1.0	3.96	77.2	0.60
BKSH	3.3	3.90	81.7	0.75	BKSH	3.5	4.39	80.6	0.76
BRAN	18.3	5.35	100.0	1.59	BRAN	19.4	5.51	100.0	1.68
Whole Wheat Ash		1.49			Whole Wheat Ash		1.13		
Break Flour Yield		29.9			Break Flour Yield		28.9		



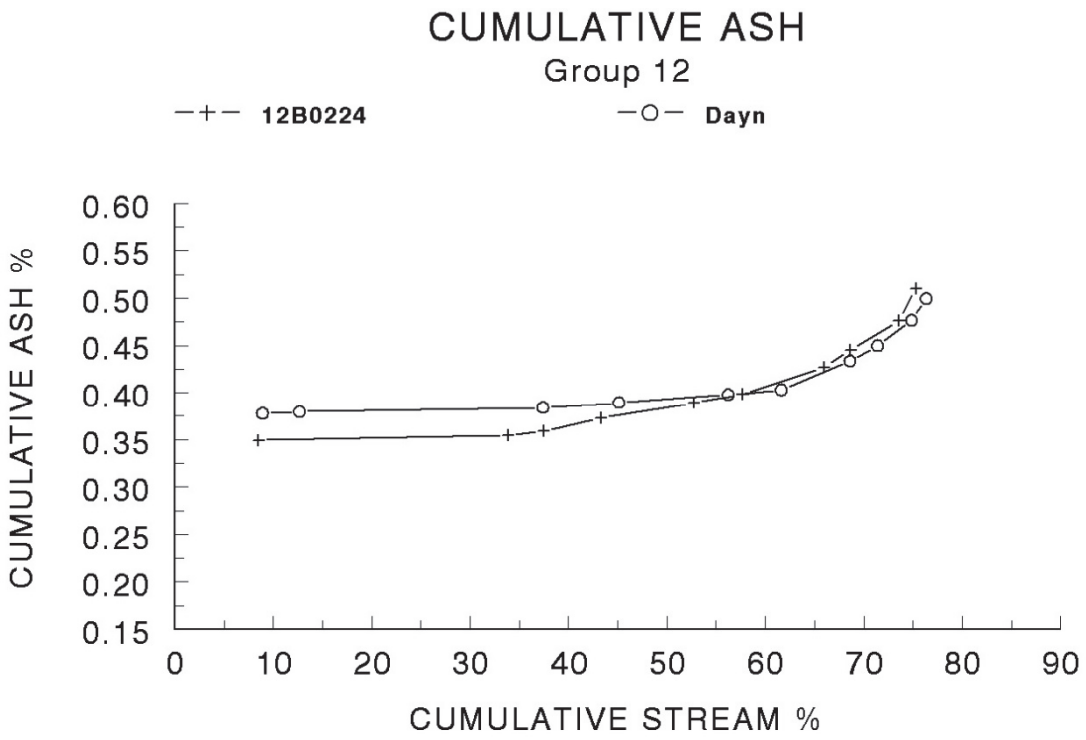
	WA8280					KELSE			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M2	24.6	0.33	24.6	0.33	M1	9.2	0.37	9.2	0.37
M1	9.3	0.34	34.0	0.34	M2	25.3	0.38	34.5	0.38
M1RD	3.5	0.35	37.5	0.34	M1RD	3.8	0.39	38.3	0.38
B1	6.3	0.38	43.8	0.34	B1	5.9	0.41	44.2	0.38
B2	11.3	0.40	55.1	0.36	B2	9.0	0.48	53.2	0.40
GR	5.1	0.45	60.2	0.36	GR	4.9	0.56	58.1	0.41
M3	7.2	0.61	67.5	0.39	M3	7.9	0.80	66.0	0.46
B3	2.4	0.84	69.9	0.41	B3	2.6	0.99	68.5	0.48
M4	3.9	1.02	73.8	0.44	M4	4.0	1.12	72.5	0.51
M5	2.4	1.16	76.2	0.46	M5	2.3	1.30	74.9	0.54
REDDOG	0.8	2.21	77.0	0.48	REDDOG	1.1	2.47	75.9	0.56
REDSH	0.9	3.51	77.9	0.52	REDSH	0.8	3.32	76.8	0.59
BKSH	3.4	3.58	81.3	0.64	BKSH	3.0	3.39	79.8	0.70
BRAN	18.7	4.46	100.0	1.36	BRAN	20.2	4.38	100.0	1.44
Whole Wheat Ash		1.20			Whole Wheat Ash		1.25		
Break Flour Yield		28.1			Break Flour Yield		25.9		



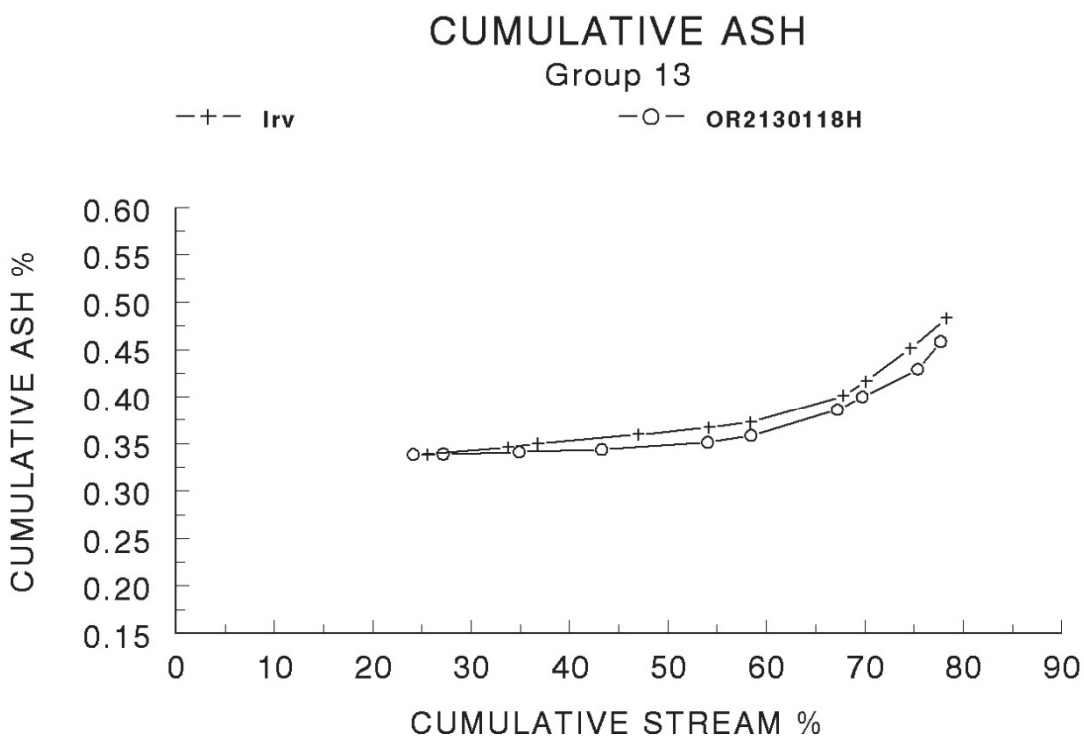
	IDO1801S					IDO1805S			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M2	25.5	0.33	25.5	0.33	M2	26.4	0.33	26.4	0.33
M1	10.3	0.36	35.8	0.34	M1	9.3	0.35	35.8	0.33
M1RD	3.8	0.37	39.7	0.34	M1RD	3.9	0.36	39.6	0.34
B2	12.5	0.44	52.1	0.36	B2	11.8	0.44	51.4	0.36
B1	6.6	0.47	58.7	0.38	B1	6.0	0.44	57.4	0.37
GR	5.4	0.48	64.1	0.38	GR	5.5	0.47	63.0	0.38
M3	7.7	0.57	71.9	0.40	M3	7.6	0.67	70.6	0.41
B3	2.1	1.00	74.0	0.42	B3	2.5	0.99	73.0	0.43
M4	3.8	1.03	77.7	0.45	M4	3.9	1.09	76.9	0.46
M5	1.5	1.42	79.3	0.47	M5	1.5	1.63	78.4	0.48
REDDO	0.5	2.68	79.7	0.48	REDDOG	0.5	2.82	78.8	0.50
REDSH	0.6	3.53	80.3	0.51	REDSH	0.7	3.57	79.5	0.52
BKSH	2.4	4.04	82.7	0.61	BKSH	2.6	4.18	82.1	0.64
BRAN	17.3	5.94	100.0	1.53	BRAN	17.9	5.51	100.0	1.51
Whole Wheat Ash		1.33			Whole Wheat Ash		1.37		
Break Flour Yield		26.1			Break Flour Yield		24.1		

	IDO1704S					PLATINUM			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M2	24.2	0.41	24.2	0.41	M1	9.1	0.36	9.1	0.36
M1	8.5	0.41	32.8	0.41	M2	25.2	0.38	34.2	0.37
M1RD	4.0	0.42	36.8	0.41	M1RD	4.0	0.40	38.2	0.38
B1	8.2	0.48	45.0	0.42	B1	7.2	0.45	45.4	0.39
B2	11.9	0.48	56.9	0.43	B2	12.0	0.46	57.4	0.40
GR	6.5	0.50	63.4	0.44	GR	6.0	0.48	63.4	0.41
M3	7.5	0.70	70.9	0.47	M3	7.4	0.65	70.7	0.44
B3	2.4	0.90	73.3	0.48	B3	2.4	0.91	73.1	0.45
M4	3.9	1.09	77.2	0.51	M4	4.4	1.12	77.5	0.49
M5	1.2	1.91	78.4	0.53	M5	1.3	2.12	78.8	0.52
REDDO	0.4	2.67	78.8	0.54	REDDOG	0.5	2.81	79.3	0.53
REDSH	0.6	3.48	79.4	0.57	REDSH	0.2	3.75	79.5	0.54
BKSH	2.6	4.00	82.0	0.68	BKSH	2.5	4.23	82.0	0.65
BRAN	18.0	5.87	100.0	1.61	BRAN	18.0	5.80	100.0	1.58
Whole Wheat Ash		1.7			Whole Wheat Ash		1.36		
Break Flour Yield		25.9			Break Flour Yield		28.5		

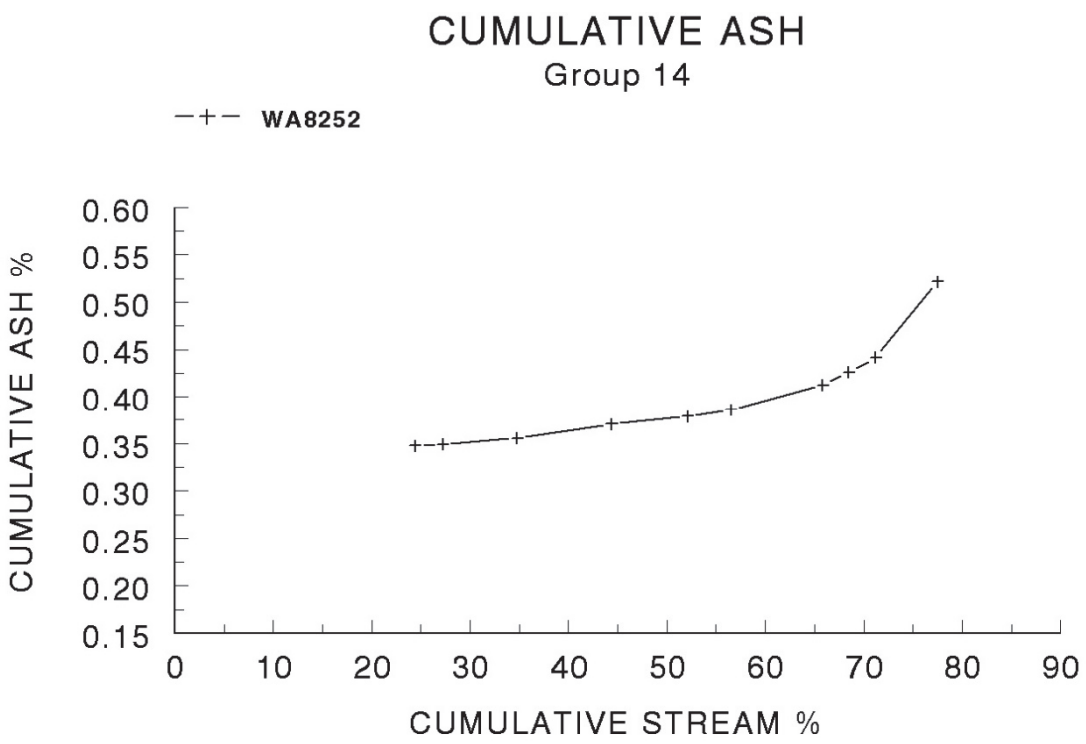
- 29 -



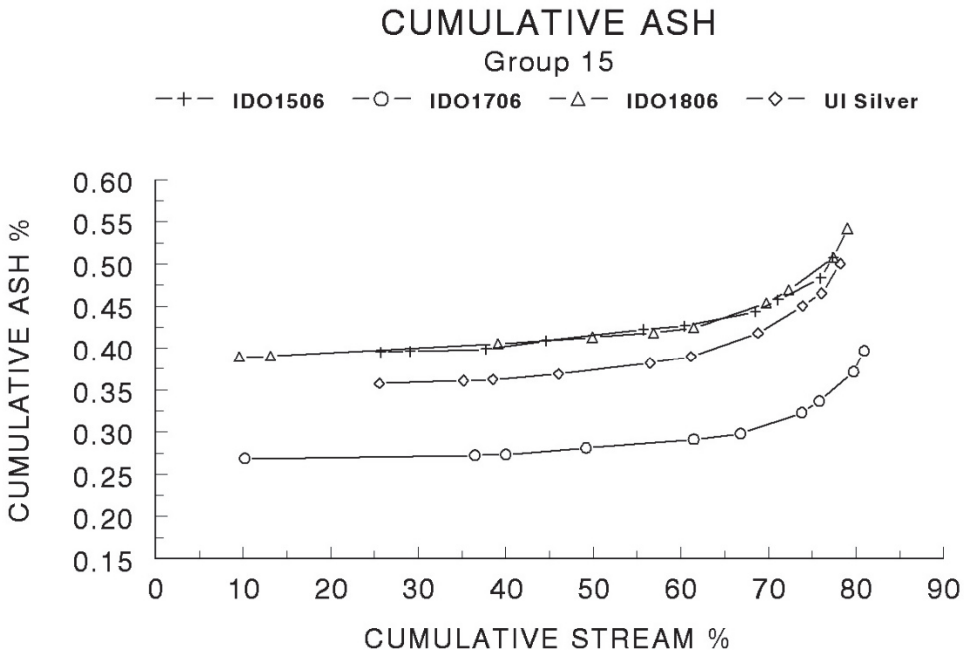
	12SB0224						DAYN			
			Cumulative						Cumulative	
Stream	Yield	Ash	Yield	Ash		Stream	Yield	Ash	Yield	Ash
M1	8.5	0.35	8.5	0.35		M1	8.9	0.38	8.9	0.38
M2	25.3	0.36	33.9	0.35		M1RD	3.8	0.38	12.7	0.38
M1RD	3.6	0.40	37.5	0.36		M2	24.7	0.39	37.4	0.38
B1	5.8	0.46	43.3	0.37		B1	7.7	0.41	45.1	0.39
B2	9.4	0.47	52.7	0.39		B2	11.1	0.43	56.2	0.40
GR	5.0	0.50	57.7	0.40		GR	5.4	0.45	61.6	0.40
M3	8.2	0.63	65.9	0.43		M3	7.0	0.70	68.6	0.43
B3	2.7	0.88	68.6	0.44		B3	2.8	0.85	71.4	0.45
M4	4.9	0.91	73.6	0.48		M4	3.5	1.03	74.9	0.48
M5	1.8	1.93	75.3	0.51		M5	1.5	1.67	76.3	0.50
REDDOG	0.3	2.63	75.6	0.52		REDDOG	0.2	2.67	76.5	0.50
REDSH	0.6	3.35	76.2	0.54		REDSH	0.4	3.14	77.0	0.52
BKSH	3.1	3.67	79.2	0.66		BKSH	2.6	3.38	79.5	0.61
BRAN	20.8	4.73	100.0	1.51		BRAN	20.5	4.87	100.0	1.48
Whole Wheat Ash		1.53				Whole Wheat Ash		1.73		
Break Flour Yield		24.6				Break Flour Yield		30.2		



	IRV					OR2130118H			
			Cumulative					Cumulative	
Stream	Yield	Ash	Yield	Ash	Stream	Yield	Ash	Yield	Ash
M2	25.6	0.34	25.6	0.34	M2	24.1	0.34	24.1	0.34
M1	8.1	0.37	33.8	0.35	M1RD	3.1	0.34	27.2	0.34
M1RD	3.0	0.39	36.8	0.35	M1	7.7	0.35	34.9	0.34
B2	10.2	0.39	47.0	0.36	B1	8.4	0.35	43.3	0.34
B1	7.2	0.41	54.2	0.37	B2	10.8	0.38	54.0	0.35
GR	4.2	0.45	58.4	0.37	GR	4.4	0.45	58.4	0.36
M3	9.4	0.58	67.8	0.40	M3	8.8	0.57	67.2	0.39
B3	2.3	0.87	70.1	0.42	B3	2.5	0.77	69.8	0.40
M4	4.5	0.99	74.6	0.45	M4	5.6	0.79	75.4	0.43
M5	3.7	1.13	78.3	0.48	M5	2.3	1.40	77.7	0.46
REDDOG	0.9	2.17	79.2	0.50	REDDOG	0.3	2.39	78.1	0.47
REDSH	0.5	3.63	79.7	0.52	REDSH	0.7	3.44	78.8	0.49
BKSH	3.0	4.07	82.7	0.65	BKSH	3.1	3.71	81.9	0.62
BRAN	17.3	5.63	100.0	1.51	BRAN	18.1	5.28	100.0	1.46
Whole Wheat Ash		1.19			Whole Wheat Ash		1.11		
Break Flour Yield		29.4			Break Flour Yield		24.9		



	WA8252			
			Cumulative	
Stream	Yield	Ash	Yield	Ash
M2	24.4	0.35	24.4	0.35
M1RD	2.8	0.36	27.2	0.35
M1	7.6	0.38	34.8	0.36
B2	9.6	0.43	44.4	0.37
B1	7.7	0.43	52.1	0.38
GR	4.4	0.47	56.5	0.39
M3	9.3	0.57	65.8	0.41
M5	2.6	0.77	68.5	0.43
B3	2.7	0.82	71.2	0.44
M4	6.3	1.43	77.5	0.52
REDDOG	0.4	2.35	77.9	0.53
REDSH	0.7	3.45	78.6	0.56
BKSH	3.0	3.51	81.6	0.66
BRAN	18.4	5.33	100.0	1.52
Whole Wheat Ash		1.34		
Break Flour Yield		31.8		



	IDO1506						IDO1706			
			Cumulative						Cumulative	
Stream	Yield	Ash	Yield	Ash		Stream	Yield	Ash	Yield	Ash
M2	25.7	0.40	25.7	0.40		M1	10.2	0.27	10.2	0.27
M1RD	3.4	0.40	29.1	0.40		M2	26.3	0.27	36.5	0.27
M1	8.7	0.41	37.8	0.40		M1RD	3.5	0.28	40.0	0.27
B1	6.9	0.46	44.6	0.41		B1	9.2	0.31	49.2	0.28
B2	11.1	0.47	55.7	0.42		B2	12.3	0.33	61.5	0.29
GR	4.7	0.48	60.5	0.43		GR	5.3	0.38	66.8	0.30
M3	8.0	0.57	68.5	0.44		M3	7.0	0.56	73.8	0.32
B3	2.6	0.83	71.1	0.46		B3	2.0	0.85	75.8	0.34
M4	4.9	0.86	76.0	0.48		M4	3.9	1.04	79.7	0.37
M5	1.4	1.82	77.4	0.51		M5	1.2	2.07	81.0	0.40
REDDOG	0.1	2.80	77.5	0.51		REDDOG	0.1	2.56	81.1	0.40
REDSH	0.4	3.59	77.9	0.53		REDSH	0.3	3.63	81.4	0.41
BKSH	2.3	3.99	80.1	0.62		BKSH	2.0	3.65	83.4	0.49
BRAN	19.9	5.86	100.0	1.66		BRAN	16.6	5.52	100.0	1.32
Whole Wheat Ash		1.20				Whole Wheat Ash		1.24		
Break Flour Yield		30.0				Break Flour Yield		28.4		

	IDO1806						SILVER			
			Cumulative						Cumulative	
Stream	Yield	Ash	Yield	Ash		Stream	Yield	Ash	Yield	Ash
M1	9.5	0.39	9.5	0.39		M2	25.6	0.36	25.6	0.36
M1RD	3.6	0.39	13.1	0.39		M1	9.6	0.37	35.2	0.36
M2	26.0	0.41	39.1	0.41		M1RD	3.3	0.38	38.5	0.36
B2	10.8	0.44	49.9	0.41		B1	7.5	0.40	46.0	0.37
B1	7.0	0.46	56.9	0.42		B2	10.5	0.44	56.5	0.38
GR	4.6	0.50	61.5	0.42		GR	4.7	0.49	61.2	0.39
M3	8.3	0.67	69.7	0.45		M3	7.7	0.64	68.8	0.42
B3	2.6	0.90	72.3	0.47		M4	5.1	0.89	73.9	0.45
M4	5.1	1.05	77.4	0.51		B3	2.2	0.96	76.1	0.47
M5	1.6	2.20	79.0	0.54		M5	2.1	1.76	78.2	0.50
REDDOG	0.1	2.99	79.2	0.55		REDDOG	0.2	2.54	78.4	0.51
REDSH	0.5	3.73	79.6	0.57		BRAN	18.5	2.66	96.9	0.92
BKSH	2.3	4.14	82.0	0.67		REDSH	0.6	3.53	97.5	0.93
BRAN	18.0	5.43	100.0	1.52		BKSH	2.5	3.82	100.0	1.01
Whole Wheat Ash		1.57				Whole Wheat Ash		1.06		
Break Flour Yield		28.1				Break Flour Yield		32.4		

- 33 -

USDA Federal Grain Inspection Service
Olympia, Washington

WQC 2018 OLYMPIA/PORTLAND RESULTS

11 INSPECTORS

1 – 17 SWH	AVERAGE
18 HRS HRS HRS HRS HRS HRS HRS HRS HRS HRS HRS	**HRS**
19 HRS HRS HRS HRS HRS HRS HRS HRS HRS HRS HRS	**HRS**
20 HRS HRS HRS HRS HRS HRW HRS HRS HRS HRS HRW	**HRS**
21 HRS HRW HRS HRS HRW HRW HRS HRS HRW HRS HRW	**HRS**
22 HRS HRW HRS HRS HRW HRS HRS HRW HRW HRS HRW	**HRS**
23 HRW HRW HRS HRS HRW HRW HRS HRW HRW HRW HRW	**HRW**
24 HRW HRW HRW HRW HRS HRW HRS HRW HRW HRW HRW	**HRW**
25 HDWH HDWH HDWH HDWH HDWH HDWH HDWH HDWH SWH HDWH HDWH	**HDWH**
26 HDWH HDWH HDWH HDWH HDWH HDWH HDWH HDWH SWH HDWH HDWH	**HDWH**
27 HDWH SWH SWH SWH SWH SWH HDWH SWH HDWH SWH	**SWH**
28 HDWH SWH SWH SWH HDWH SWH HDWH SWH HDWH SWH	**SWH**
29 HDWH HDWH SWH HDWH HDWH HDWH HDWH SWH HDWH HDWH HDWH	**HDWH**
30 HDWH HDWH SWH HDWH HDWH HDWH HDWH SWH HDWH SWH HDWH	**HDWH**
31 HDWH HDWH SWH HDWH HDWH HDWH HDWH SWH HDWH HDWH HDWH	**HDWH**
32 HDWH HDWH SWH HDWH HDWH HDWH HDWH SWH HDWH SWH HDWH	**HDWH**
33 SWH HDWH SWH SWH SWH SWH HDWH SWH HDWH HDWH SWH	**SWH**
34 HDWH HDWH HDWH HDWH HDWH HDWH HDWH SWH HDWH HDWH HDWH	**HDWH**
35 SWH HDWH SWH SWH SWH SWH HDWH SWH HDWH HDWH SWH	**SWH**

- 34 -

ADM Milling
Overland Park, Kansas

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Cookie	8	Good dough	4	Light checking	8	Nice spread factor	Lowest protein in Group 1
SY SALTESE	ck	SWS	1	2	Cookie	8	Good dough	4	Light checking	8	Nice spread factor	
11PN2532-195		SWS	2	3	Cookie	8	Good dough	4	Light checking	8	Nice spread factor	Protein similar to the check
11PN2532-507		SWS	2	4	Cookie	8	Good dough	4	Light checking	8	Nice spread factor	Protein similar to the check
WB1035CL2	ck	SWS	2	5	Cookie	8	Good dough	4	Light checking	5	Smaller spread than #3 & #4	
WA8290		SWW	3	6	Cookie	8	Good dough	4	Light checking	5	Average spread similar to the check	Lower protein than the check
MADSEN	ck	SWW	3	7	Cookie	8	Good dough	3	No checking	5	Average spread factor	
UIL09-15702A		SWW	4	8	Cookie	8	Good dough	4	Light checking	7	Good spread, better than the check	Protein similar to the check
UI WSU HUFFMAN	ck	SWW	4	9	Cookie	6	Sticky dough	3	No checking	5	Average spread factor	
06PN212-25		SWW	5	10	Cookie	8	Good dough	3	No checking	5	Average spread, same as the check	Protein similar to the check
SY OVATION	ck	SWW	5	11	Cookie	8	Good dough	4	Light checking	5	Average spread factor	
SONIC		SWW	6	12	Cookie	8	Good dough	3	No checking	5	All similar spreads in Group 6, no check	Highest protein in Group 6 and overall
SHARK		SWW	6	13	Cookie	8	Good dough	3	No checking	5	Average spread factor	Protein similar to #14
HULK	no ck	SWW	6	14	Cookie	8	Good dough	4	Light checking	5	Average spread factor	
ORI2150031CL+		SWW	7	15	Cookie	8	Good dough	4	Light checking	5	Average spread factor	Protein similar to the check
OR12161250CL+		SWW	7	16	Cookie	8	Good dough	7	Good checking	5	Slightly smaller spread than #15&#17	Lowest protein in Group 7
ORCF102	ck	SWW	7	17	Cookie	8	Good dough	4	Light checking	5	Average spread factor	

- 35 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	Bread	5	Sticky sponge Soft dough	5	Short mix time for pro level	5	Low loaf volume Dull crumb color	Open grain
10PN3039-02		HRS	9	19	Bread	8	Strong dough long mix time	8	Average loaf volume	8	Slightly creamy interior slightly open grain	Better than Ck overall
SY-605CL	ck	HRS	9	20	Bread	8	Shorter mix time for protein	7	Average loaf volume	8	Open grain Creamy color	
WA8280		HRS	10	21	Bread	7	Very strong tough dough	7	Good volume	7	Low protein for spring	Eqaul to check overall
KELSE	ck	HRS	10	22	Bread	7	Good dough out of mixer	7	Good volume	7	Both nice interior and slightly cr interior	Good set
IDO 1801S		HRS	11	23	Bread	5	Soft dough	5	Low loaf volume	5	Dull crumb color Open grain	Equal to Ck
IDO 1805S		HRS	11	24	Bread	7	Good out of mixer and make u	7	Good loaf volume	7	Open grain Creamy interior	Better than Ck
IDO 1704S		HWS	11	25	Bread	7	Good out of mixer and make u	7	Good loaf volume	7	Open grain Creamy interior	Better than Ck
UI PLANTINUM	ck	HWS	11	26	Bread	5	Soft dough	5	Low loaf volume	5	Open grain	Average group
12SB0224		HWS	12	27	Bread	5	Short mix time soft dough	6	Average loaf volume	6	Close grain Creamy crumb color	Poorer than ck due to short mix
DAYN	ck	HWS	12	28	Bread	7	Average mix time	7	Average loaf volume	7	Close grain Creamy crumb color	Overall good set
IRV		HWW	13	29	Bread	5	Good dough out of mixer	5	Good loaf volume	5	Creamy interior slightly open grain	Equal to Ck
OR2130118H	no ck	HWW	13	30	Bread	5	Good dough out of mixer	5	Good loaf volume	5	Creamy interior slightly open grain	Low protein
WA8252	no ck	HWW	14	31	Bread	5	Good mix for protein level	5	Average loaf volume	5	Creamy crumb color close grain	Low protein
IDO 1506		HWW	15	32	Bread	5	Soft doughs out of mixer	5	Open grain	5	Creamy crumb color	Equal to ck
IDO 1706		HWW	15	33	Bread	5	Soft doughs out of mixer	5	Open grain	5	Creamy crumb color	Equal to ck
IDO 1806		HWW	15	34	Bread	5	Soft doughs out of mixer	5	Open grain	5	Creamy crumb color	Equal to Ck
UI SILVER	ck	HWW	15	35	Bread	5	Soft doughs out of mixer	5	Open grain	5	Creamy crumb color	Worst group overall

- 36 -

				Analytical						Farinograph				SRC			
SampleID	Report	SampleDesc	LotNumber	Moisture	Ash	Protein	Ash, 14%	Protein, 14%	FN	Absorption	Peak	Stability	MTI	SRC-Water	SRC-Sucrose	SRC-Lactic	SRC-Sod Carb
08PN2001-07	Cookie	PNW	1	12.57	0.44	9.43	0.429	9.28	354	52.7	2.3	3.1	94	55.78	108.18	94.61	75.46
SY SALTESE	Cookie	PNW	2	12.39	0.4	9.66	0.396	9.48	419	51.8	2.5	7.6	29	54.14	108.68	120.23	73.22
11PN2532-195	Cookie	PNW	3	13.14	0.47	9.65	0.465	9.55	373	52.1	1.4	8.2	25	52.98	103.22	113.69	70.68
11PN2532-507	Cookie	PNW	4	13.15	0.48	9.83	0.471	9.73	345	52.9	1.7	9.3	15	53.82	100.51	112.29	68.81
WB1035CL2	Cookie	PNW	5	12.39	0.54	9.82	0.527	9.64	362	55.9	1.9	2.5	101	60.92	116.31	87.96	80.53
WA8290	Cookie	PNW	6	12.59	0.47	8.07	0.459	7.94	371	54.3	2.2	4.4	54	59.80	114.11	107.56	76.76
MADSEN	Cookie	PNW	7	12.71	0.43	10	0.42	9.85	441	54.2	0.9	2.7	92	56.24	108.12	88.41	76.62
UIL09-15702A	Cookie	PNW	8	12.3	0.45	9.06	0.441	8.88	412	51.8	1.5	1.6	148	55.03	101.11	70.04	73.61
UIWSU HUFFMAN	Cookie	PNW	9	12.58	0.44	9.29	0.433	9.14	413	54.9	1.4	4	67	56.57	103.76	93.61	73.68
06PN212-25	Cookie	PNW	10	12.19	0.51	8.84	0.499	8.66	474	53.7	1.2	1.3	114	59.25	114.02	72.07	80.18
SY OVATION	Cookie	PNW	11	12.53	0.5	8.76	0.488	8.61	394	53.3	1.3	1.4	94	55.66	103.78	70.92	73.69
SONIC	Cookie	PNW	12	12.21	0.49	11.46	0.483	11.23	451	56.4	3.1	2.9	93	60.09	113.69	107.05	75.21
SHARK	Cookie	PNW	13	12.44	0.42	10.7	0.416	10.51	383	53.4	3.5	4.4	64	55.39	107.67	113.96	68.63
HULK	Cookie	PNW	14	12.02	0.46	10.9	0.45	10.65	411	55	2	2.4	95	56.46	109.31	86.87	73.06
ORI2150031CL+	Cookie	PNW	15	12.3	0.49	8	0.478	7.84	396	53.2	1.4	2	88	57.53	107.94	85.30	79.52
OR12161250CL+	Cookie	PNW	16	12.51	0.49	6.94	0.485	6.82	341	53.1	1	1.1	128	58.44	100.96	78.40	75.15
ORCF102	Cookie	PNW	17	12.68	0.51	7.73	0.498	7.61	403	53.9	1.3	1.2	120	58.24	105.23	81.93	78.41

- 37 -

				Analytical						Bake						
SampleID	Report	SampleDesc	LotNumber	Moisture	Ash	Protein	Ash, 14%	Protein, 14%	FN	Absorption	Mix Time	Loaf Volume	Grain	Texture	Crumb Color	Dough Condition
WB9662	Bake	PNW	18	13.51	0.53	13.98	0.53	13.9	561	59	6	2575	Open	Soft	Dull	Soft
10PN3039-02	Bake	PNW	19	13.53	0.51	13.57	0.507	13.5	534	59	20	2750	ightly Op	Soft	Slightly Crmy	Tough
SY-605CL	Bake	PNW	20	13.63	0.49	14.64	0.483	14.58	526	60	10	2750	Open	Soft	Creamy	Good
WA8280	Bake	PNW	21	13.49	0.46	11.2	0.457	11.13	461	56	19	2800	Fine	Soft	Slightly Crmy	Good
KELSE	Bake	PNW	22	13.32	0.54	11.94	0.54	11.85	523	57	10	2825	Fine	Soft	Slightly Crmy	Good
IDO1801S	Bake	PNW	23	13.59	0.52	12.27	0.521	12.21	484	57	4	2575	Open	Soft	Dull	Soft
IDO1805S	Bake	PNW	24	13.22	0.51	12.87	0.505	12.75	514	58	11	2850	Open	Soft	Creamy	Good
IDO1704S	Bake	PNW	25	13.35	0.53	12.35	0.522	12.26	428	57	11	2700	ightly Op	Soft	Creamy	Good
UIPLANTINUM	Bake	PNW	26	13.35	0.54	11.95	0.536	11.86	401	57	4	2500	ightly Op	Soft	Slightly Crmy	Soft
12SB0224	Bake	PNW	27	13.1	0.53	11.81	0.522	11.69	537	57	4	2675	Fine	Soft	Creamy	Soft
DAYN	Bake	PNW	28	13.06	0.5	12.31	0.495	12.18	491	57	9	2675	ightly Op	Soft	Creamy	Good
IRV	Bake	PNW	29	13.59	0.45	10.61	0.445	10.56	399	56	6	2750	ightly Op	Soft	Creamy	Good
OR2130118H	Bake	PNW	30	13.41	0.45	10.71	0.45	10.64	416	56	7	2675	ightly Op	Soft	Creamy	Good
WA8252	Bake	PNW	31	13.23	0.49	10.87	0.489	10.77	470	56	7	2575	Fine	Soft	Creamy	Good
IDO1506	Bake	PNW	32	13.05	0.49	11.03	0.481	10.91	407	56	7	2575	Open	Soft	Creamy	Good
IDO1706	Bake	PNW	33	13.04	0.43	11.12	0.428	11	408	56	7	2475	Open	Soft	Creamy	Soft
IDO1806	Bake	PNW	34	13.76	0.52	11.97	0.522	11.94	491	57	7	2575	Open	Soft	Creamy	Soft
UISILVER	Bake	PNW	35	13.47	0.49	11.08	0.49	11.01	399	56	6	2600	Open	Soft	Creamy	Soft

- 38 -

Ardent Mills
Denver, CO

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performa	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling, better than ck	9	Liked: very high spread factor, comparable to ck	9	Liked: slightly better yield than check and comparable protein, bake results show it's good for cookie application	
SY SALTESE	ck	SWS	1	2	Cookie	7	Disliked: slightly sticky, broke down a bit at the end of mixing	9		8		
11PN2532-195		SWS	2	3	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling	9	Liked: very high spread factor, higher than ck	9	Liked: better yield, higher protein, better for cookie application than ck	
11PN2532-507		SWS	2	4	Cookie	6	Disliked: dry. Took about a minute and a half to combine.	9	Liked: very high spread factor, higher than ck	7	Liked: higher protein, bake results show it's good for cookie application than ck Disliked: average yield, comparable to ck	
WB1035CL2	ck	SWS	2	5	Cookie	6	Disliked: dry (less than above). About a minute and 15 seconds to combine	6	Disliked: slightly low spread factor	6		
WA8290		SWW	3	6	Cookie	7	Sl dry	7	Higher spread factor than ck	8	Liked: high yield/comparable to ck, bake results show it's good for cookie application.	Lower protein than ck isn't a bad thing for cookie application; it's still within good range
MADSEN	ck	SWW	3	7	Cookie	7	Sl dry	6	Disliked: slightly low spread factor	7		
UIL09-15702A		SWW	4	8	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling	9	Liked: Very high spread factor/higher than ck	9	Liked: high yield, comparable to ck, bake results show it's good for cookie application Disliked: slightly higher ash than ck	Lower protein than ck isn't a bad thing for cookie application; it's still within good range
UI WSU HUFFMAN	ck	SWW	4	9	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling	7		8		
06PN212-25		SWW	5	10	Cookie	7	Sl dry	8	High spread factor compared to CK sample	8	Liked: higher protein than ck but not too high, bake results show it's good for cookie application Disliked: lower yield than ck	Yield is still good
SY OVATION	ck	SWW	5	11	Cookie	7	Sl dry	7		8		
SONIC		SWW	6	12	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling	8		8	Liked: good yield, bake results show it's good for cookie application	

- 39 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performa	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
SHARK		SWW	6	13	Cookie	7	Sl dry	8		8	Liked: good yield, low ash, bake results show it's good for cookie application	
HULK	no ck	SWW	6	14	Cookie	7	Sl dry	8		8	Liked: good yield, low ash, bake results show it's good for cookie application	
ORI2150031CL+		SWW	7	15	Cookie	7	Sl dry	8	Spread factor close to CK	8	Liked: good and comparable yield to ck, bake results show it's good for cookie application	Low protein potentially suitable for cake application
OR12161250CL+		SWW	7	16	Cookie	9	Liked: neither wet nor dry, no sticking or crumbling	8	Spread factor very close to CK	8	Liked: good and comparable yield to ck, bake results show it's good for cookie application	Low protein potentially suitable for cake application
ORCF102	ck	SWW	7	17	Cookie	7	Sl dry	8		8		Low protein potentially suitable for cake application
WB9662	no ck	HRS	8	18	Bread Pound Loaf	4	Disliked: weak dough with slightly low mixing tolerance	3	Disliked: low volume, open grain, no break and shred, flat top	3	Disliked: performed unfavorably despite relatively high absorption and protein	
10PN3039-02		HRS	9	19	Bread Pound Loaf	7	Liked: good elasticity and strength	8	Good volume, good grain and break and shred, very close result to ck	8	Liked: slightly better results than ck, good for bread baking, can be used for blending purposes Dislike: lower protein than ck	
SY-605CL	ck	HRS	9	20	Bread Pound Loaf	7	Liked: good elasticity and strength	7	Liked: good volume, good grain, break and shred	7		
WA8280		HRS	10	21	Bread Pound Loaf	6	Liked: better elasticity and strength than ck Disliked: slightly low mixing tolerane	8	Liked: good volume, good break shred Disliked: slightly open grain	8	Liked: good for bread baking	
KELSE	ck	HRS	10	22	Bread Pound Loaf	4	Disliked: weak, wet, slightly low mixing tolerance	7	Liked: excellent volume, good grain and break and shred	6	Despite the dough handling stage the baking results are very good	
IDO 1801S		HRS	11	23	Bread Pound Loaf	3	Disliked: weak and slightly wet with low mixing tolerance	4	Disliked: below average volume, open grain, flat top, no break and shred, worse than ck	4	Disliked: peformed unfavorably compared to the ck	Yield is comparable to ck, protein is higher than ck
IDO 1805S		HRS	11	24	Bread Pound Loaf	7	Liked: good elasticity and strength	8	Liked: very good volume, good break and shred, better than ck Disliked: slightly open grain	8	Liked: higher protein than ck, good yield but not as high as ck	

- 40 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performa	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
IDO 1704S		HWS	11	25	Bread Pound Loaf	7	Liked: good elasticity and strength	8	Liked: good volume Disliked: open grain	7	Liked: overall performance similar to ck, good yield but not as high as ck	
UI PLANTINUM	ck	HWS	11	26	Bread Pound Loaf	7	Liked: good elasticity and strength	8	Liked: good volume Disliked: open grain	7		
12SB0224		HWS	12	27	Bread Pound Loaf	7	Liked: good elasticity and strength	8	Liked: very good volumes, overall better than ck Disliked: slightly open grain	7	Disliked: protein lower than ck, lower yield than ck	Can be used in blends, yield is still acceptable
DAYN	ck	HWS	12	28	Bread Pound Loaf	6	Disliked: slightly low mixing tolerance	7	Liked: very good volumes Disliked: open grain	7		
IRV	ck	HWW	13	29	Bread Pound Loaf	5	Disliked: slightly weak, wet	7	Liked: good volume, good grain and break and shred	6	Liked: good yield	Potentially suitable for noodle application
OR2130118H		HWW	13	30	Bread Pound Loaf	4	Disliked: weak, wet, slightly low mixing tolerance, not as good as ck	6	Disliked: average volume, open grain, not as good as ck	5	Liked: higher absorption	Protein comparable to ck, potentially suitable for noodle application
WA8252	no ck	HWW	14	31	Bread Pound Loaf	4	Disliked: weak, slightly wet dough, low mixing tolerance	5	Disliked: low volume, open grain, little break and shred	5	Liked: Good yield	Potentially suitable for noodle application
IDO 1506		HWW	15	32	Bread Pound Loaf	6	Disliked: slightly wet dough	6	Disliked: low volume, open grain, little break and shred, not as good as ck	5	Disliked: lower protein, higher ash for lower yield compared to ck	Potentially suitable for noodle application
IDO 1706		HWW	15	33	Bread Pound Loaf	7	Liked: good elasticity and strength	7	Liked: good volume, good grain, good break and shred, slightly better than ck	8	Like: high yield, lower ash than ck Dislike: lower protein than ck	Can be used for blending, performed well in bread baking, potentially suitable for noodle application
IDO 1806		HWW	15	34	Bread Pound Loaf	6	Disliked: slightly low mixing tolerance	7	Liked: good volume Disliked: open grain, little break and shred	7	Liked: overall slightly better than ck Disliked: higher ash for same yield compared to ck	Higher protein than ck
UI SILVER	ck	HWW	15	35	Bread Pound Loaf	6	Disliked: slightly low mixing tolerance	7	Liked: good grain, good break and shred Disliked: average volume	6		

- 41 -

Sample#	SRC			
	Water	Sucrose	Lactic Acid	Sodium Bicarbonate
1	53.99	100.61	96.23	70.18
2	52.43	96.14	121.85	70.67
3	52.68	91.86	98.04	67.08
4	53.97	96.88	110.76	65.77
5	59.26	104.93	90.87	76.19
6	57.78	101.24	107.04	76.13
7	58.49	99.30	91.32	74.02
8	52.98	91.64	74.48	70.62
9	55.99	97.32	99.74	70.81
10	56.81	103.62	80.80	78.25
11	54.97	94.86	73.63	73.14
12	58.00	105.33	115.33	74.66
13	56.40	96.56	123.53	69.11
14	59.16	98.93	99.13	72.91
15	56.93	99.61	94.76	76.83
16	57.87	98.12	83.86	73.84
17	58.84	101.11	82.13	77.49

- 42 -

Grain Craft
Blackfoot, ID

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent			
						Question #1		Question #2		Question #3		Question #4	
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments	
08PN2001-07		SWS	1	1						5	Low WT, good LA, SC, SUC.		
SY SALTESE	ck	SWS	1	2						6	Very low WT, but excellent LA, SC, SUC.		
11PN2532-195		SWS	2	3						6	Very low WT, but very good LA, SC, SUC.		
11PN2532-507		SWS	2	4						5	Very low WT, but very good LA, SC, SUC.	Slightly low flour yield.	
WB1035CL2	ck	SWS	2	5						4	High WT, SC, SUC, borderline L	Slightly low flour yield	
WA8290		SWW	3	6						6	Good WT, very good LA. Borderline SC, SUC.		
MADSEN	ck	SWW	3	7						3	Poor LA. SC and SUC above ou	1.4% higher protein content, yet poor LA.	
UIL09-15702A		SWW	4	8						2	Low WT, poor LA.		
UI WSU HUFFMAN	ck	SWW	4	9						6	Good WT, good LA.		
06PN212-25		SWW	5	10						4	Low LA, high SC.		
SY OVATION	ck	SWW	5	11						3	Poor LA.		
SONIC		SWW	6	12						5	Very good LA. Borderline high SC, SUC.		
SHARK		SWW	6	13						6	Low WT, but excellent LA and SC.		
HULK	no ck	SWW	6	14						5	Good LA.		
ORI2150031CL+		SWW	7	15						5	Good WT and LA. Borderline high SC and SUC.	Very low protein content.	
OR12161250CL+		SWW	7	16						3	Low LA.	Very low protein content.	
ORCF102	ck	SWW	7	17						3	Low LA.	Very low protein content.	
WB9662	no ck	HRS	8	18	Sponge & Dough, 1 lb Loaf	2	Low mix time, Low gluten strength and excellent absorption	1	Very low loaf volume, dark crumb color and open grain	1	Low gluten strength, very low loaf volume	Good TW, TKW & Fabs. Low Fstability	
10PN3039-02		HRS	9	19	Sponge & Dough, 1 lb Loaf	9	Very long mix time, Excellent gluten strength and absorption	9	Good loaf volume, crumb color and tight grain	9	Excellent gluten strength, good loaf volume	Good TW, TKW, Fabs & Fstability	
SY-605CL	ck	HRS	9	20	Sponge & Dough, 1 lb Loaf	6	Average mix time, Good gluten strength and excellent absroption	4	Low loaf volume, average color and grain	4	Good gluten strength, low loaf volume	Good TW, Ash, & Fabs	
WA8280		HRS	10	21	Sponge & Dough, 1 lb Loaf	8	Long mix time, Very good gluten strength and fair absorption	8	Good loaf volume, crumb color and tight grain	8	Very good gluten strength, good loaf volume	Good Ash, Yield & Fstability	
KELSE	ck	HRS	10	22	Sponge & Dough, 1 lb Loaf	4	Below average mix time, Low gluten strength and good absorption	7	Good loaf volume, crumb color and slightly tight grain	6	Below average gluten strength, good loaf volume	Good Ash	

- 43 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent			
						Question #1		Question #2		Question #3		Question #4	
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments	
IDO 1801S		HRS	11	23	Sponge & Dough, 1 lb Loaf	2	Low mix time, Low gluten strength and average absorption	2	Low loaf volume, good crumb color and open grain	2	Low gluten strength, low loaf volume	Good Ash & Yield	
IDO 1805S		HRS	11	24	Sponge & Dough, 1 lb Loaf	8	Very long mix time, Excellent gluten strength and good absorption	6	Average loaf volume, good crumb color and average grain	6	Excellent gluten strength, average loaf volume	Good Ash & Yield	
IDO 1704S		HWS	11	25	Sponge & Dough, 1 lb Loaf	4	Slightly low mix time, Low gluten strength and average absorption	2	Low loaf volume, average crumb color and grain	3	Low gluten strength, low loaf volume	Good TW, TKW, Ash & Yield	
UI PLANTINUM	ck	HWS	11	26	Sponge & Dough, 1 lb Loaf	5	Average mix time, Average gluten strength and absorption.	4	Slightly low loaf volume, average crumb color and grain	4	Average gluten strength, slightly low loaf volume	Good TW, TKW & Yield	
12SB0224		HWS	12	27	Sponge & Dough, 1 lb Loaf	7	Good mix time, Good gluten strength and average absorption	7	Good loaf volume, average crumb color and grain	7	Good gluten strength, good loaf volulme	Good Fstablity	
DAYN	ck	HWS	12	28	Sponge & Dough, 1 lb Loaf	3	Below average mix time, Low gluten strength and average absorption	3	Slightly low loaf volume, good crumb color and open grain	3	Low gluten strength, slightly low loaf volume	Good Yield	
IRV	ck	HWW	13	29	Sponge & Dough, 1 lb Loaf	2	Low mix time, Low gluten strength and average absorption	3	Slightly low loaf volume, good crumb color and open grain	3	Low gluten strength, slightly low loaf volume	Good TW, TKW, Ash & Yield	
OR2130118H		HWW	13	30	Sponge & Dough, 1 lb Loaf	2	Low mix time, Low gluten strength and good absorption	3	Slightly low loaf volume, good crumb color and open grain	3	Low gluten strength, slightly low loaf volume	Good TW, TKW, Ash & Yield	
WA8252	no ck	HWW	14	31	Sponge & Dough, 1 lb Loaf	2	Very low mix time, Low gluten strength and excellent absorption	2	Low loaf volume, good crumb color and open grain	2	Low gluten strength, low loaf volume	Good TW, TKW, Ash & Yield	
IDO 1506		HWW	15	32	Sponge & Dough, 1 lb Loaf	3	Below average mix time, Low gluten strength and good absorption	2	Low loaf volume, good crumb color and open grain	3	Low gluten strength, low loaf volume	Good Yield & Fabs	
IDO 1706		HWW	15	33	Sponge & Dough, 1 lb Loaf	2	Very low mix time, Low gluten strength and average absorption	3	Slightly low loaf volume, good crumb color and open grain	2	Low gluten strength, slightly low loaf volume	Good TKW, Ash & Yield	
IDO 1806		HWW	15	34	Sponge & Dough, 1 lb Loaf	2	Very low mix time, Low gluten strength and good absorption	3	Low loaf volume, good crumb color and average grain	2	Low gluten strength, low loaf volume	Good TW, TKW & Yield	
UI SILVER	ck	HWW	15	35	Sponge & Dough, 1 lb Loaf	3	Low mix time, Low gluten strength and good absorption	6	Average loaf volume, good crumb color and average grain	4	Low gluten strength, average loaf volume	Good Ash, Yield & Fabs	

- 44 -

GRAIN CRAFT

Pacific North West Wheat Quality Council Sample Results - 2018

								Bake Results: One Pound Sponge and Dough - Lean Formula									
Sample Description	Check	Group	FNV	Farino Abs	Farino Peak	Farino MTI	Farino Stab	Bake Abs	Mix Time	Dough Score	Dough Comments	Loaf Volume cc	Crumb Color (1-9)	Crumb Grain (1-9)	Crumb Texture (1-9)	External (1-9)	Bake Evaluation Comments
WB9662	no ck	8	250	67.1	4.2	42	3.7	64.0	7.0	6	Slack	2456	2	4	4	1	Low gluten strength, very low loaf volume
10PN3039-02		9	279	65.0	7.5	12	18.6	64.0	25.0	4	Bucky	2927	4	7	7	6	Excellent gluten strength, good loaf volume
SY-605CL	ck	9	260	65.4	7.0	27	13.0	64.0	17.0	8	Developed	2750	3	5	5	3	Good gluten strength, low loaf volume
WA8280		10	265	61.4	5.1	7	18.4	61.0	22.0	8	Developed	2868	4	7	7	5	Very good gluten strength, good loaf volume
KELSE	ck	10	269	62.0	5.2	23	12.6	62.0	12.0	8	Developed	2927	4	6	5	6	Below average gluten strength, good loaf volume
IDO 1801S		11	243	60.8	5.5	51	6.1	60.0	8.0	8	Developed	2691	4	4	4	1	Low gluten strength, low loaf volume
IDO 1805S		11	244	62.1	8.8	23	14.2	62.0	25.0	8	Developed	2839	4	5	6	4	Excellent gluten strength, average loaf volume
IDO 1704S		11	236	60.8	7.2	31	9.9	60.0	14.0	8	Developed	2691	3	5	5	1	Low gluten strength, low loaf volume
UI PLANTINUM	ck	11	240	61.6	7.3	35	10.4	61.0	16.0	8	Developed	2780	3	5	5	3	Average gluten strength, slightly low loaf volume
12SB0224		12	282	60.1	6.5	33	11.7	60.0	20.0	8	Developed	2868	3	5	6	5	Good gluten strength, good loaf volulme
DAYN	ck	12	264	60.6	6.3	52	6.3	60.0	12.0	8	Developed	2750	4	4	4	3	Low gluten strength, slightly low loaf volume
IRV		13	257	60.7	4.7	49	7.6	60.0	8.0	8	Developed	2780	4	4	5	3	Low gluten strength, slightly low loaf volume
OR2130118H	no ck	13	268	61.9	4.8	47	7.4	62.0	7.0	8	Developed	2780	4	4	5	3	Low gluten strength, slightly low loaf volume
WA8252	no ck	14	246	65.2	3.3	8	4.0	64.0	6.0	8	Developed	2662	4	4	4	1	Low gluten strength, low loaf volume
IDO 1506		15	244	62.5	4.0	64	5.4	62.0	10.0	8	Developed	2691	4	5	4	1	Low gluten strength, low loaf volume
IDO 1706		15	239	61.3	3.5	68	4.7	61.0	7.0	7	Sl. Slack	2750	4	4	4	3	Low gluten strength, slightly low loaf volume
IDO 1806		15	270	63.4	5.2	62	6.2	63.0	6.0	8	Developed	2721	4	5	4	2	Low gluten strength, low loaf volume
UI SILVER	ck	15	235	62.7	5.5	53	7.6	62.0	8.0	8	Developed	2839	4	5	5	4	Low gluten strength, average loaf volume
	Farinograph and Bake results were done after the flour was treated with malted barley flour.																

- 45 -

Grain Craft Soft Wheat Samples

			Solvent Retention Capacity (SRC)				
Sample	Class	Group	Water	Lactic Acid	Sodium Carbonate	Sucrose	GPI
			52-58	>85	<70	<95	>0.55
08PN2001-07	SWS	1	52.7	98.6	68.4	90.4	0.62
SY SALTESE*	SWS	1	49.7	118.1	66.8	88.9	0.76
11PN2532-195	SWS	2	49.1	109.2	62.9	82.9	0.75
11PN2532-507	SWS	2	50.0	105.0	61.5	84.6	0.72
WB1035CL2*	SWS	2	57.6	87.7	75.7	98.8	0.50
WA8290	SWW	3	54.5	100.6	71.9	93.9	0.61
MADSEN*	SWW	3	54.8	78.2	72.7	94.9	0.47
UIL09-15702A	SWW	4	51.0	74.2	67.9	83.6	0.49
UI WSU HUFFMAN*	SWW	4	54.9	96.7	68.5	90.0	0.61
06PN212-25	SWW	5	54.6	82.8	74.3	92.1	0.50
SY OVATION*	SWW	5	53.1	72.8	70.2	88.0	0.46
SONIC	SWW	6	54.9	109.4	70.3	96.2	0.66
SHARK	SWW	6	52.2	119.5	65.9	91.6	0.76
HULK	SWW	6	53.2	97.8	70.2	91.4	0.61
ORI2150031CL+	SWW	7	53.1	92.0	72.8	91.9	0.56
OR12161250CL+	SWW	7	54.6	80.5	71.0	89.0	0.50
ORCF102*	SWW	7	55.0	79.1	72.8	90.9	0.48

* - Check

- 46 -

Daesun Flour Mills
Chungcheonanam-Do, KOREA

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	sponge cake	4	high specific gravity	5	fine color	5	little chewy and moist	
SY SALTESE	ck	SWS	1	2	sponge cake	5	nothing significant to report	7	good symmetry and color	6	little hard and dry	
11PN2532-195		SWS	2	3	sponge cake	7	nothing significant to report	8	execllent symmetry, color, crumb	8	soft and moist, good texture	
11PN2532-507		SWS	2	4	sponge cake	6	nothing significant to report	7.5	good symmetry and crumb	7.5	soft and moist, good texture	
WB1035CL2	ck	SWS	2	5	sponge cake	4	high specific gravity	5	high volume	5	little hard and dry	
WA8290		SWW	3	6	sponge cake	5	nothing significant to report	6	fine color	6	soft and moist	
MADSEN	ck	SWW	3	7	sponge cake	5	nothing significant to report	5	little dark	5	like sponge texture and little hard	
UIL09-15702A		SWW	4	8	sponge cake	6	nothing significant to report	7	high volume and color	7	soft and melt texture, little greasy	
UI WSU HUFFMAN	ck	SWW	4	9	sponge cake	6		7	yellow color of crumb	7	soft and little greasy	
06PN212-25		SWW	5	10	sponge cake	5		6	fine color	6	hard and greasy	
SY OVATION	ck	SWW	5	11	sponge cake	4		5	fine color	5	soft and moist	
SONIC		SWW	6	12	sponge cake	5		4	big cell and tough crumb	4	hard and tough texture	
SHARK		SWW	6	13	sponge cake	5		4	big cell and tough crumb	5	soft and greasy	
HULK	no ck	SWW	7	14	sponge cake	5		5	high volume	5	soft and tough texture	
ORI2150031CL+		SWW	7	15	sponge cake	5		5	high volume and tough crumb	6	soft and greasy	
OR12161250CL+		SWW	7	16	sponge cake	5		7	fine color and crumb	7	soft and greasy	
ORCF102	ck	SWW	8	17	sponge cake	5		6	good symmetry, big cell of crumb	6	soft and melt texture, little greasy	

- 47 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	pan bread	5	high extensibility and fast water absorption. low elasticcity	4	low volume, tough crumb	4	hard texture	
10PN3039-02		HRS	9	19	pan bread	5	high extensibility and fast water absorption	7	good color and crumb, symmetry	6	chewy texture	
SY-605CL	ck	HRS	9	20	pan bread	7	good balance elasticity and extensibility. high fermentation	7	high volume, good crumb	7	soft and chewy texture	
WA8280		HRS	9	21	pan bread	5	low fermentation, hard dough	6	higher oven spring than first fermentation	6	soft and moist. Slow Staling	
KELSE	ck	HRS	9	22	pan bread	7	execllent extensibility	7	good color and cell of crumb suitable volum	7.5	soft texture and slow staling	
IDO 1801S		HRS	10	23	pan bread	5	high extensibility but weak elasticity	5	symmetric loaf volum but big cell of crumb	6	soft but weak chewy	
IDO 1805S		HRS	10	24	pan bread	5	high extensibility but weak elasticity	4	big cell of crumb	5	soft but weak chewy	
IDO 1704S		HWS	11	25	steamed bread	6	little yellow color and soft dough	7	symmetric loaf volum but big cell of crumb	6.5	soft and moist little chewy	
UI PLANTINUM	ck	HWS	12	26	steamed bread	6	soft dough	7	good shape and color, crumb	6	too soft	
12SB0224		HWS	12	27	steamed bread	4	hard and little sticky	5	dense cell of crumb	5	too mush soft and weak chewy	
DAYN	ck	HWS	12	28	steamed bread	7	good soft and extensibilty of dou	7	good shape and color, crumb	7	soft and moist, chewy texture	
IRV		HWW	13	29	steamed bread	6	little hard and dry	7	good shape and color, crumb	6.5	soft texture	
OR2130118H	no ck	HWW	13	30	steamed bread	7	soft and extensibity	7	good shape and color, crumb	7	soft and chewy texture	
WA8252	no ck	HWW	13	31	steamed bread	5	so hard and elasticity	4	tough crumb	5	hard texture	
IDO 1506		HWW	13	32	steamed bread	4	too soft	4	tough crumb	4	too soft	
IDO 1706		HWW	14	33	steamed bread	4	too soft and extensibility	3.5	yellow and dark color. tough crumb	3.5	too much soft	
IDO 1806		HWW	14	34	steamed bread	5	soft and extensibility	6	good shape but little tough crumb	6	soft chewy	
UI SILVER	ck	HWW	15	35	steamed bread	4	hard	5	yellow color and tough crumb	4	too soft	

- 48 -

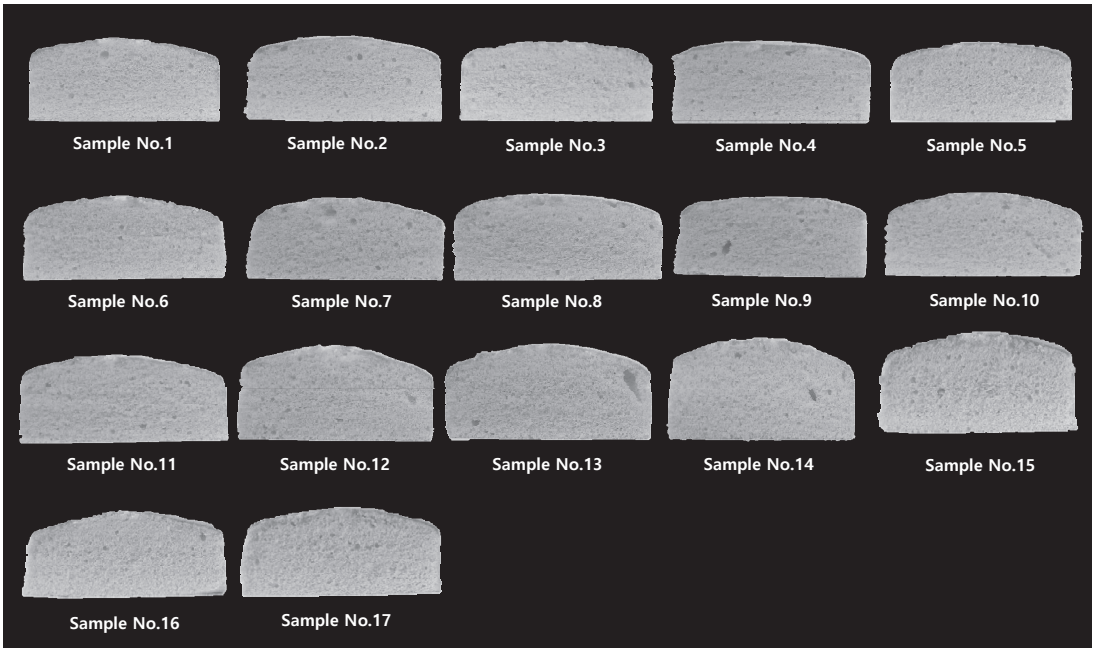
index				Flour								
Sample	Variety	Group	Class	입도(㎛)	Falling Number	Moisture	Protein	Ash	*L	*a	*b	Absorption(%)
1	08PN2001-07	1	SWS	69.74	**373**	13.1	**8.89**	**0.411**	86.38	-0.67	7.74	**54.2**
2	SY SALTESE	1	SWS	64.84	**422**	13.1	**9.24**	**0.415**	86.62	-0.69	7.59	**52.0**
3	11PN2532-195	2	SWS	69.66	**365**	13.8	**9.36**	**0.462**	86.72	-0.82	8.08	**51.9**
4	11PN2532-507	2	SWS	69.67	**336**	14.1	**9.37**	**0.476**	86.67	-1.07	8.91	**52.0**
5	WB1035CL2	2	SWS	70.64	**365**	12.7	**9.17**	**0.483**	86.25	-0.69	7.83	**59.3**
6	WA8290	3	SWW	74.29	**385**	13.5	**7.72**	**0.394**	86.45	-1.05	9.04	**54.3**
7	MADSEN	3	SWW	76.59	**391**	13.3	**9.50**	**0.415**	86.18	-0.89	8.94	**56.7**
8	UIL09-15702A	4	SWW	66.94	**423**	12.9	**8.67**	**0.436**	86.92	-0.92	8.16	**52.7**
9	UI WSU HUFFMAN	4	SWW	79.15	**407**	13.0	**8.83**	**0.386**	86.28	-0.75	8.39	**56.5**
10	06PN212-25	5	SWW	70.60	**501**	12.9	**8.49**	**0.453**	86.30	-0.75	7.79	**56.2**
11	SY OVATION	5	SWW	76.66	**408**	12.8	**8.37**	**0.516**	86.63	-0.52	7.21	**55.1**
12	SONIC	6	SWW	72.79	**543**	13.0	**11.10**	**0.493**	86.40	-0.46	7.47	**57.7**
13	SHARK	6	SWW	69.70	**441**	13.3	**10.39**	**0.413**	86.39	-0.86	8.66	**53.8**
14	HULK	6	SWW	76.83	**430**	12.8	**10.46**	**0.432**	86.17	-0.83	8.56	**57.6**
15	ORI2150031CL+	7	SWW	74.72	**413**	13.0	**7.67**	**0.509**	86.67	-0.92	8.69	**54.4**
16	OR12161250CL+	7	SWW	75.72	**387**	13.1	**6.61**	**0.497**	87.00	-1.04	8.48	**53.7**
17	ORCF102	7	SWW	83.92	**405**	13.1	**7.29**	**0.488**	86.63	-0.87	8.32	**54.5**
18	WB9662	8	HRS	97.90	**547**	13.9	**13.37**	**0.513**	85.06	-0.36	8.50	**64.9**
19	10PN3039-02	9	HRS	95.31	**486**	14.2	**13.07**	**0.528**	84.63	-0.18	8.24	**63.4**
20	SY-605CL	9	HRS	97.19	**446**	14.4	**14.14**	**0.490**	84.61	-0.55	9.50	**62.3**
21	WA8280	10	HRS	98.43	**463**	13.9	**10.83**	**0.438**	85.14	-0.53	8.69	**59.4**
22	KELSE	10	HRS	94.45	**475**	13.8	**11.23**	**0.516**	85.51	-0.61	9.01	**61.5**
23	IDO 1801S	11	HRS	95.60	**493**	14.2	**11.95**	**0.474**	85.60	-0.28	7.90	**59.6**
24	IDO 1805S	11	HRS	93.63	**468**	14.1	**12.45**	**0.476**	85.07	-0.24	8.27	**62.4**
25	IDO 1704S	11	HWS	86.13	**429**	14.0	**11.60**	**0.481**	86.16	-0.45	7.95	**59.3**
26	UI PLANTINUM	11	HWS	94.90	**415**	13.9	**11.42**	**0.499**	85.93	-0.24	7.62	**61.5**
27	12SB0224	12	HWS	97.62	**489**	13.7	**11.20**	**0.505**	85.42	-0.86	10.01	**60.1**
28	DAYN	12	HWS	98.29	**502**	13.5	**12.00**	**0.483**	85.72	-0.15	7.60	**60.8**
29	IRV	13	HWW	100.08	**437**	14.2	**10.21**	**0.441**	85.01	-0.41	8.69	**60.4**
30	OR2130118H	13	HWW	95.11	**395**	14.1	**10.24**	**0.428**	85.56	-0.34	7.82	**61.8**
31	WA8252	14	HWW	99.62	**478**	14.0	**10.25**	**0.466**	85.28	-0.57	8.75	**64.9**
32	IDO 1506	15	HWW	98.01	**424**	14.0	**10.49**	**0.472**	85.44	-0.77	9.79	**61.9**
33	IDO 1706	15	HWW	95.34	**421**	14.0	**10.59**	**0.399**	84.82	-0.91	10.88	**60.5**
34	IDO 1806	15	HWW	95.75	**501**	14.3	**11.35**	**0.471**	85.60	-0.59	9.06	**61.6**
35	UI SILVER	15	HWW	102.20	**434**	14.5	**10.56**	**0.458**	84.61	-1.17	11.96	**61.8**

- 49 -

index			Farino-Graph			Visco-Graph	
Sample	Variety	Group	Peak(min)	Stability(min)	Weakness	maximum temperature (℃)	maximum viscosity(BU)
1	08PN2001-07	1	2.2	**2.5**	**123**	88.8	1033
2	SY SALTESE	1	1.8	**7.3**	**71**	91.7	700
3	11PN2532-195	2	1.5	**7.8**	**59**	90.8	667
4	11PN2532-507	2	1.7	**9.3**	**57**	90.8	693
5	WB1035CL2	2	1.9	**1.7**	**130**	89.7	990
6	WA8290	3	1.4	**2.7**	**91**	91.9	513
7	MADSEN	3	1.7	**1.9**	**28**	96.8	491
8	UIL09-15702A	4	1.2	**1.3**	**155**	96.9	565
9	UI WSU HUFFMAN	4	1.8	**2.7**	**98**	96.8	598
10	06PN212-25	5	1.5	**1.5**	**131**	97.0	563
11	SY OVATION	5	1.5	**1.9**	**103**	91.7	531
12	SONIC	6	2.8	**2.7**	**114**	90.7	365
13	SHARK	6	3.3	**4.2**	**94**	91.6	537
14	HULK	6	1.8	**1.8**	**124**	96.7	459
15	ORI2150031CL+	7	1.4	**2.0**	**118**	91.8	462
16	OR12161250CL+	7	1.2	**1.0**	**168**	90.8	466
17	ORCF102	7	1.2	**1.3**	**148**	90.3	348
18	WB9662	8	4.5	**4.6**	**66**	90.6	795
19	10PN3039-02	9	8.7	**28.8**	**28**	91.3	667
20	SY-605CL	9	7.5	**13.4**	**35**	92.5	744
21	WA8280	10	6.8	**36.2**	**23**	93.3	663
22	KELSE	10	7.7	**17.5**	**30**	91.9	741
23	IDO 1801S	11	7.0	**8.9**	**60**	92.0	789
24	IDO 1805S	11	13.8	**18.8**	**32**	92.2	852
25	IDO 1704S	11	7.0	**12.7**	**48**	91.0	514
26	UI PLANTINUM	11	9.0	**11.2**	**51**	89.4	356
27	12SB0224	12	13.2	**22.4**	**26**	90.7	760
28	DAYN	12	7.0	**11.6**	**40**	90.3	989
29	IRV	13	2.5	**12.2**	**32**	89.8	637
30	OR2130118H	13	2.7	**10.9**	**38**	90.6	763
31	WA8252	14	3.7	**5.0**	**82**	89.9	524
32	IDO 1506	15	4.2	**7.0**	**74**	89.5	388
33	IDO 1706	15	3.4	**5.8**	**66**	91.4	496
34	IDO 1806	15	6.3	**9.0**	**53**	93.2	641
35	UI SILVER	15	7.0	**13.0**	**39**	89.9	511

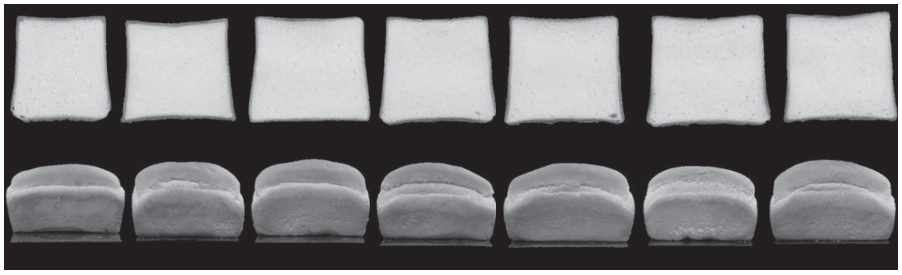
- 50 -

1. PICTURE OF SPONGE CAKE



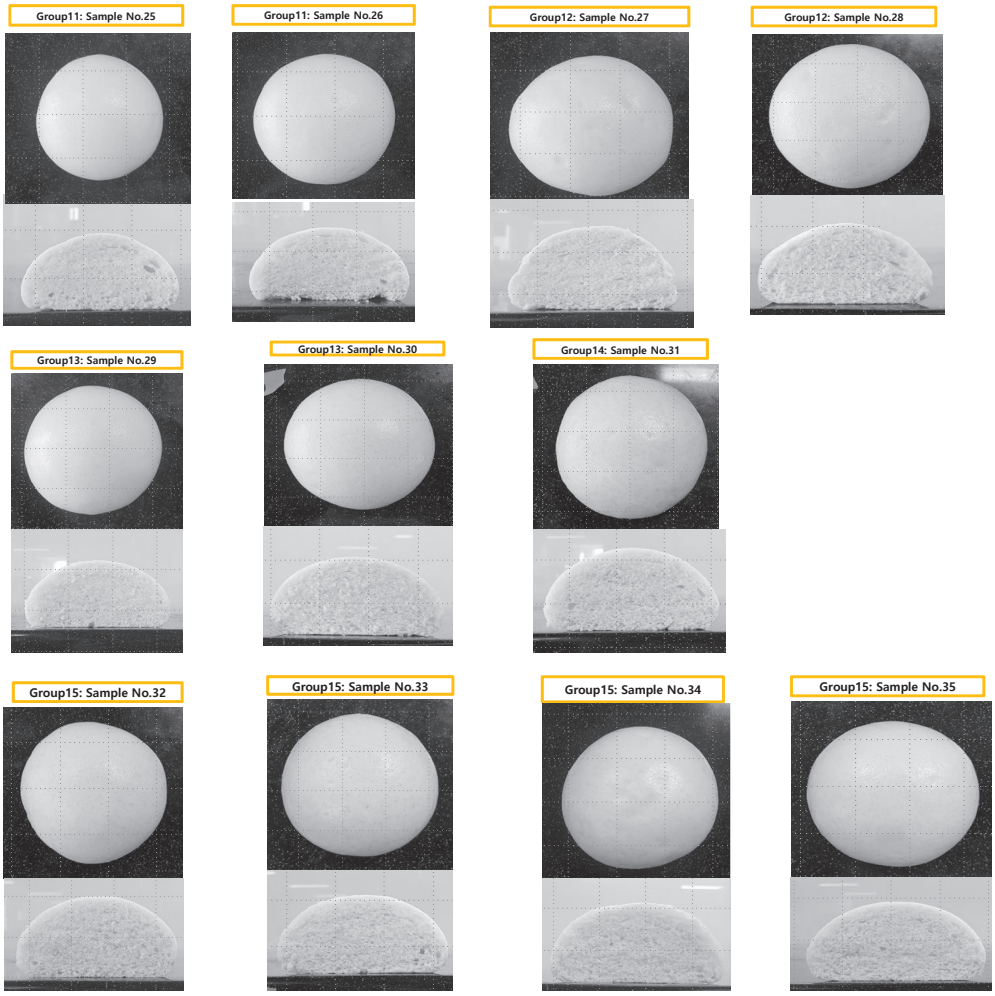
2. PICTURE OF PAN BREAD

#18	#19	#20	#21	#22	#23	#24
Sample no.1	Sample no.2	Sample no.3	Sample no.4	Sample no.5	Sample no.6	Sample no.7



- 51 -

3. PICTURE OF STEAMED BREAD



- 52 -

Japan Flour Millers Association
Tokyo, JAPAN

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	sponge cake	4		3	bad texture	4		
SY SALTESE	ck	SWS	1	2	sponge cake	5		5		5		
11PN2532-195		SWS	2	3	sponge cake	6		5		5		
11PN2532-507		SWS	2	4	sponge cake	5		3	bad texture	4		
WB1035CL2	ck	SWS	2	5	sponge cake	3	heavy	3	bad texture	3		low volume
WA8290		SWW	3	6	sponge cake	6		5		5		
MADSEN	ck	SWW	3	7	sponge cake	5		5		5		low volume
UIL09-15702A		SWW	4	8	sponge cake	6		5		5		
UI WSU HUFFMAN	ck	SWW	4	9	sponge cake	5		5		5		
06PN212-25		SWW	5	10	sponge cake	6		7	good texture	7		good volume
SY OVATION	ck	SWW	5	11	sponge cake	6		6	good texture	6		
SONIC		SWW	6	12	sponge cake	6		3		4		protein toohigh,low volume
SHARK		SWW	6	13	sponge cake	6		4		4		
HULK	no ck	SWW	7	14	sponge cake	6		4		5		protein high
ORI2150031CL+		SWW	7	15	sponge cake	4		4		4		
OR12161250CL+		SWW	7	16	sponge cake	4		4		4		
ORCF102	ck	SWW	8	17	sponge cake	4		3	bad texture	3		
WB9662	no ck	HRS	8	18	BREAD	3	sticky	3	bad texture	4		low volume
10PN3039-02		HRS	9	19	BREAD	7		4		5		
SY-605CL	ck	HRS	9	20	BREAD	7		6		6		high volume
WA8280		HRS	9	21	BREAD	6		6		6		protein toolow
KELSE	ck	HRS	9	22	BREAD	7		6		6		protein toolow,high volume
IDO 1801S		HRS	10	23	BREAD	2	weak dough	3	bad texture	2		low volume
IDO 1805S		HRS	10	24	BREAD	3	less extensibility	3	bad texture	3		low volume
IDO 1704S		HWS	11	25	BREAD	4		3	bad texture	3		low volume
UI PLANTINUM	ck	HWS	12	26	BREAD	3	less extensibilty	3	bad texture	3		low volume
12SB0224		HWS	12	27	BREAD	6		7		6		high volume
DAYN	ck	HWS	12	28	BREAD	4		3	bad texture	3		
IRV		HWW	13	29	BREAD	5		6		5		
OR2130118H	no ck	HWW	13	30	BREAD	5		5		5		protein toolow
WA8252	no ck	HWW	13	31	BREAD	5		6		6		
IDO 1506		HWW	13	32	BREAD	7	good exteciblity	4		5		low volume
IDO 1706		HWW	14	33	BREAD	5		5		5		
IDO 1806		HWW	14	34	BREAD	5		5		5		
UI SILVER	ck	HWW	15	35	BREAD	4		5		5		

- 53 -

Mondeléz International
Toledo, Ohio

PNW 2018 flour samples

Meets Target **Corrector** **Not Suitable**

Sample Id	SRC, %					Comments
	Water	Sucrose	Na Carbonate	Lactic acid	GPI	
08PN2001-07	55.94	111.98	85.55	95.26	0.48	High on Pentosans and Damaged starch, low GPI. Could present high water absorption
SY SALTESE	55.12	114.76	80.50	117.46	0.60	High on Pentosans and Damaged starch, could present high water absorption
11PN2532-195	54.03	107.00	75.04	110.78	0.61	Profile in general good. Sucrose could be lower. Use for crackers
11PM2532-507	52.52	105.56	74.21	108.26	0.60	Profile closest to target. Sucrose could be lower. Use for crackers
WB1035CL2	58.48	112.93	93.51	85.51	0.41	High Damaged Starch, High Pentosans, low GPI. Potentially high water absorption. Not recommended for biscuit manufacturing
WA8290	58.05	115.82	89.41	104.61	0.51	High Damaged Starch, High Pentosans, low GPI. Potentially high water absorption. Not recommended for biscuit manufacturing
MADSEN	56.10	110.94	88.68	87.55	0.44	High Damaged Starch, High Pentosans, low GPI. Potentially high water absorption. Not recommended for biscuit manufacturing
UIL09-15702A	56.62	101.61	83.25	77.78	0.42	Above limit on Pentosans, damage starch with low GPI, could be used in blend
UI WSU HUFFMAN	56.86	105.71	84.51	95.34	0.50	Above limit on Pentosans, damage starch with low GPI, could be used in blend
06PN212-25	62.23	111.15	90.77	74.68	0.37	High Damaged Starch, High Pentosans, low GPI. Potentially high water absorption. Not recommended for biscuit manufacturing
SY OVATION	56.79	104.60	85.73	74.12	0.39	Above limit on Pentosans, damage starch with low GPI, could be used in blend
SONIC	57.37	116.17	89.56	102.54	0.50	High Damaged Starch, High Pentosans, low GPI. Potentially high water absorption. Not recommended for biscuit manufacturing
Target	**<55**	**<93**	**<71**	**>98**	**>0.60**	

- 54 -

PNW 2018 flour samples

Meets Target **Corrector** **Not Suitable**

Sample Id	SRC, %					Comments
	Water	Sucrose	Na Carbonate	Lactic acid	GPI	
SHARK	57.32	108.58	82.40	106.12	0.56	High on Pentosans and Damaged starch. Could present high water absorption
HULK	59.22	115.63	90.50	85.41	0.41	High Damaged Starch, High Pentosans, low GPI. potential problems with high water absorption. not recommended for biscuit manufacturing
ORI2150031CL+	60.51	110.11	90.67	88.24	0.44	High Damaged Starch, High Pentosans, low GPI. Potential problems with high water absorption. not recommended for biscuit manufacturing
OR12161250CL+	61.10	100.97	85.68	86.84	0.47	High Damaged Starch, High Pentosans, low GPI. Potential problems with high water absorption. not recommended for biscuit manufacturing
ORCF102	60.52	106.73	92.10	82.14	0.41	High Damaged Starch, High Pentosans, low GPI. Potential problems with high water absorption. not recommended for biscuit manufacturing
TARGET	**<55**	**<93**	**<71**	**>98**	**>0.60**	

- 55 -

Limagrain Cereal Seeds
Fort Collins, CO

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
Limagrain Cereal Seeds						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	cookie 10-52.02	9		6	nice top grain	8	liked sodium carbonate	
SY SALTESE	ck	SWS	1	2	cookie 10-52.02	9		6		6	liked sodium carbonate	
11PN2532-195		SWS	2	3	cookie 10-52.02	9		6		8	liked sodium carbonate	
11PN2532-507		SWS	2	4	cookie 10-52.02	9		6	nice top grain	6	liked sodium carbonate	
WB1035CL2	ck	SWS	2	5	cookie 10-52.02	4		4		4		
WA8290		SWW	3	6	cookie 10-52.02	5		5		7		high flr yld, low pro
MADSEN	ck	SWW	3	7	cookie 10-52.02	5		5		6		high flr yld
UIL09-15702A		SWW	4	8	cookie 10-52.02	5		7		9		high flr yld, low pro
UI WSU HUFFMAN	ck	SWW	4	9	cookie 10-52.02	5		6		6		
06PN212-25		SWW	5	10	cookie 10-52.02	4		5		5		
SY OVATION	ck	SWW	5	11	cookie 10-52.02	5		6	nice top grain	8		high flr yld, low pro
SONIC		SWW	6	12	cookie 10-52.02	5		4		4	disliked pro	
SHARK		SWW	6	13	cookie 10-52.02	9		6		8	liked sodium carbonate, disliked pro	high flr yld
HULK	no ck	SWW	6	14	cookie 10-52.02	5		5		5	disliked pro	
ORI2150031CL+		SWW	7	15	cookie 10-52.02	4		6		5		
OR12161250CL+		SWW	7	16	cookie 10-52.02	4		5	nice top grain	5		
ORCF102	ck	SWW	7	17	cookie 10-52.02	4		5		5		

- 56 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
Limagrain Cereal Seeds						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	bread 10-10B	3		2		3	bad at pan, short mix time	
10PN3039-02		HRS	9	19	bread 10-10B	8		8		8	good at pan	
SY-605CL	ck	HRS	9	20	bread 10-10B	4		8		5	good at pan, mix time & flr yld low	
WA8280		HRS	10	21	bread 10-10B	6		4		4	lower pro/ABS	
KELSE	ck	HRS	10	22	bread 10-10B	5		7		5	flr yld low	
IDO 1801S		HRS	11	23	bread 10-10B	3		5		2	mix time and tolerance low	
IDO 1805S		HRS	11	24	bread 10-10B	8		9		8	good at pan, nice overall	
IDO 1704S		HWS	11	25	bread 10-10B	5		8		7	nice at 2nd punch	
UI PLANTINUM	ck	HWS	11	26	bread 10-10B	7		7		6		
12SB0224		HWS	12	27	bread 10-10B	8		6		6	lower flr yld	
DAYN	ck	HWS	12	28	bread 10-10B	4		5		5		
IRV		HWW	13	29	bread 10-10B	7		2		4	disliked pro	
OR2130118H	no ck	HWW	13	30	bread 10-10B	8		2		4		
WA8252	no ck	HWW	14	31	bread 10-10B	5		1		4	poor loaf volume	
IDO 1506		HWW	15	32	bread 10-10B	7		3		4		
IDO 1706		HWW	15	33	bread 10-10B	6		3		3	shorter mix time	
IDO 1806		HWW	15	34	bread 10-10B	6		4		6		
UI SILVER	ck	HWW	15	35	bread 10-10B	8		3		6	yellow	

- 57 -

Limagrain Cereal Seeds

						Mixograph				Cookie cm			SRC
Check	Class	Group	Sample#	Protein	ash	Energy	Mix TIME	PRO Val	Predicted Cookie DIA.	DIA	D/T	thick (T)	Na2CO3
	SWS	1	1	9.1	0.43	87	2.6	45	8.9	9.1	13.3	0.68	72
ck	SWS	1	2	9.4	0.41	130	4.2	47	8.6	9.2	14.1	0.66	70
	SWS	2	3	9.3	0.41	151	4.3	45	8.7	8.9	12.5	0.71	67
	SWS	2	4	9.3	0.42	139	5.7	43	8.7	9.2	13.0	0.70	66
ck	SWS	2	5	9.4	0.46	81	1.9	46	8.6	8.4	10.1	0.83	78
	SWW	3	6	7.8	0.4	134	4.4	41	10.4	8.6	11.0	0.79	75
ck	SWW	3	7	9.7	0.41	95	2.0	47	8.3	8.8	11.4	0.77	74
	SWW	4	8	8.7	0.37	68	1.5	44	9.3	9.0	14.4	0.63	73
ck	SWW	4	9	8.9	0.41	134	2.7	47	9.1	8.7	11.7	0.74	73
	SWW	5	10	8.6	0.4	82	1.7	41	9.5	8.9	11.4	0.78	80
ck	SWW	5	11	8.4	0.45	87	2.1	42	9.6	8.8	11.6	0.76	75
	SWW	6	12	11.2	0.46	99	2.3	49	7.2	8.6	10.6	0.81	74
	SWW	6	13	10.3	0.43	108	3.4	46	7.9	8.6	11.6	0.74	69
no ck	SWW	6	14	10.5	0.4	91	1.8	48	7.7	8.7	11.2	0.78	75
	SWW	7	15	7.6	0.41	131	3.5	41	10.7	8.7	12.0	0.73	79
	SWW	7	16	6.5	0.41	138	0.6	40	12.4	8.6	11.1	0.78	76
ck	SWW	7	17	7.4	0.42	132	3.3	40	10.9	8.6	10.9	0.79	78
						Mixograph				Bread			
Check	Class	Group	Sample#	Protein	ash	Energy	Mix TIME	PRO Val	Predicted Loaf Vol.	Loaf Vol cc	ABS %	Crumb Grain	Crumb Color
no ck	HRS	8	18	13.9	0.48	102	1.6	62	1040	670	68	2	3
	HRS	9	19	13.2	0.49	221	5.5	58	999	890	66	4	5
ck	HRS	9	20	14.3	0.49	131	2.8	56	1068	900	68	4	4
	HRS	10	21	11.0	0.45	169	5.2	50	857	825	63	4	5
ck	HRS	10	22	11.6	0.51	157	4.6	52	893	875	64	4	5
	HRS	11	23	11.8	0.45	109	2.8	55	909	850	64	5	5
	HRS	11	24	12.4	0.47	212	4.1	61	949	965	65	5	5
	HWS	11	25	12.0	0.45	159	3.4	58	919	925	64	5	5
ck	HWS	11	26	11.7	0.45	187	3.5	61	901	875	64	4	5
	HWS	12	27	11.4	0.45	206	4.2	57	883	865	63	4	4
ck	HWS	12	28	12.2	0.45	131	3.3	54	934	850	65	4	5
	HWW	13	29	10.4	0.43	169	3.6	51	813	690	59	3	5
no ck	HWW	13	30	10.6	0.4	198	2.9	53	832	695	59	3	5
no ck	HWW	14	31	10.6	0.42	155	2.6	56	830	620	59	3	4
	HWW	15	32	10.8	0.41	170	2.7	58	840	715	60	3	4
	HWW	15	33	10.8	0.41	168	2.2	55	842	750	60	3	4
	HWW	15	34	11.6	0.46	165	3.0	59	896	805	61	4	4
ck	HWW	15	35	10.9	0.44	211	4.1	58	848	755	60	4	2

- 58 -

AgriPro Wheat
Berthoud, Colorado

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Cookie 10-52	7	Good Dough	8	Very good cookie, Nice spread	8	Low WhtFN, VG miller	performed better than chk
SY SALTESE	CK	SWS	1	2	Cookie 10-52	7	Good Dough	8	Very good cookie, Nice spread	8	VG mill with low Ash, Strong	good mill/bake
11PN2532-195		SWS	2	3	Cookie 10-52	7	Good Dough	9	Excellent cookie	8	VG SRC,strong	performed better than chk
11PN2532-507		SWS	2	4	Cookie 10-52	7	Good Dough	9	Excellent cookie	8	?mill,stronger	performed better than chk
WB1035CL2	CK	SWS	2	5	Cookie 10-52	7	Good Dough	7	Slightly above average cookie	6	?mill,HiH2O/SUC	Poor quality check
WA8290		SWW	3	6	Cookie 10-52	7	Good Dough	8	Very good cookie	8	Exc mill with low prot,Hi H@O/SUC	performed better than chk-despite SRC
MADSEN	CK	SWW	3	7	Cookie 10-52	7	Good Dough	7	Avg TG, Smaller Spread	6		
UIL09-15702A		SWW	4	8	Cookie 10-52	6	Slighty sticky dough	7	Slightly above average cookie	8	Best SRC's of 2018	overall = or better than chk
UI WSU HUFFMAN	CK	SWW	4	9	Cookie 10-52	7	Good Dough	8	Very good cookie,better than CK	8	Low prot, Good mill & ash	good milling and baking
06PN212-25		SWW	5	10	Cookie 10-52	7	Good Dough	8	Very good cookie equal to Ck	8	Low prot	equal to chk
SY OVATION	CK	SWW	5	11	Cookie 10-52	7	Good Dough	8	Very good cookie	8	Low prot, high mill yld but poor ash	
SONIC		SWW	6	12	Cookie 10-52	6	Slighty dry dough	5	Avg TG, Smaller Spread	4	Higher prot, poor mill&ash,vstrong, Hi H2o/SUC	Overall poor milling/baking line
SHARK		SWW	6	13	Cookie 10-52	7	Good Dough	7	Best Cookie of grp	7	VG mill with low Ash,strong	
HULK	NO CHK	SWW	7	14	Cookie 10-52	7	Good Dough	6	Average cookie	6		acc-? Quality
ORI2150031CL+		SWW	7	15	Cookie 10-52	7	Good Dough	7	Good cookie equal to Ck	7	Vlow prot	equal or better than chk
OR12161250CL+		SWW	7	16	Cookie 10-52	7	Good Dough	8	Very good cookie, best of grp	8	Vlow prot	equal or better than chk
ORCF102	CK	SWW	7	17	Cookie 10-52	7	Good Dough	7	Slightly above average cookie	7	Vlow prot	
WB9662	NO CHK	HRS	8	18	Bread	1	No Gluten, Chunks in dough	2	VERY Poor loaf!	1	VG prot, high Ash, Low ABS and short mixing	Unacceptable despite protein
10PN3039-02		HRS	9	19	Bread	5	Avg dough	5	Nice grain, white slightly low vol	6	VG prot, high Ash	Good gluten strength, better than chk
SY-605CL	CK	HRS	9	20	Bread	3	Weaker dough W/Chunks	4	Poorer grain, Vol & color	4	Exc prot	Short mix, low Abs for prot
WA8280		HRS	10	21	Bread	4	Slighty dry dough	4	Very nice Grain,white	4	Low prot, good ash/mill	Comparable to chk
KELSE	CK	HRS	10	22	Bread	4	Slighty dry dough	4	Nice grain & loaf vol	4	Low prot, poor ash/mill	
IDO 1801S		HRS	11	23	Bread	2	Weak dough W/Chunks	2	Avg loaf	3	Weak, short mixing, poor Abs	No gluten strength but baked ok
IDO 1805S		HRS	11	24	Bread	6	Nice dough	6	Nice grain & loaf vol	6		= or sl better than chk
IDO 1704S		HWS	11	25	Bread	6	Nice dough	6	Nice grain & loaf vol	6	Soft kernels	= or sl better than chk
UI PLANTINUM	CK	HWS	11	26	Bread	5	Avg dough	5	Avg loaf	5	Lower FN	
12SB0224		HWS	12	27	Bread	4	Slighty weaker dough	4	Very nice Grain	4		sl better than chk
DAYN	CK	HWS	12	28	Bread	4	Slighty weaker dough	4	Avg loaf	3	Soft kernels, low Abs	
IRV	CK	HWW	13	29	Bread	3	Weaker dough	3	Avg loaf,white	4	Vlow prot, good mill with low ash, mellow	
OR2130118H		HWW	13	30	Bread	3	Weaker dough	3	Nice grain, white	4	Vlow prot, good mill with low ash,mellow	
WA8252	NO CHK	HWW	14	31	Bread	2	Weak dough W/Chunks	4	Poorer grain & Vol	3	Vlow prot, good mill with low ash, weak	Unacceptable quality
IDO 1506		HWW	15	32	Bread	3	Weaker dough W/Chunks	4	Poorer grain & color	4	Low prot, short mix	
IDO 1706		HWW	15	33	Bread	4	Slighty weaker dough W/Chunks & YF	4	Poorer grain & color	3	Vlow prot, good mill with low ash	Short weak
IDO 1806		HWW	15	34	Bread	4	Slighty weaker dough	4	Avg loaf	4	Low prot, mellow, short mix	Highest prot of grp
UI SILVER	CK	HWW	15	35	Bread	3	Weaker dough W/Chunks & YF	3	Avg loaf,poor color	4	Low prot, good mill with low ash	good abs for prot, best of grp

- 59 -

Soft Wheat Quality Evaluations

LabNo	Variety	Class	Grp	No	FlrMst	NirFlrAsh	FlrHrd	NIR SKCSFlr	FlrProt	Cdiam	TG	SRCH2O	SRCSC	SRCLA	SRCSUC	Comment
					%	%			14%	mm	9=Exc	%	%	%	%	
X0015	Group 1	SWS	1	1	13.2	0.453	56	22	8.8	19.6	8	55	69	90	93	
X0016	Group 1 CHK	SWS	1	2	12.9	0.449	38	15	9.0	19.4	8	53	71	115	92	
X0017	Group 2	SWS	2	3	13.6	0.413	47	18	9.1	19.8	9	52	65	101	87	
X0018	Group 2	SWS	2	4	13.7	0.424	45	22	9.3	19.8	9	54	66	105	90	
X0019	Group 2 CHK	SWS	2	5	12.7	0.476	60	22	9.0	18.4	7	59	75	82	104	
X0020	Group 3	SWW	3	6	13.1	0.424	47	21	7.6	19.0	8	60	73	99	100	
X0021	Group 3 CHK	SWW	3	7	13.1	0.426	63	21	9.4	18.2	7	58	73	86	97	
X0022	Group 4	SWW	4	8	12.9	0.432	42	23	8.5	19.4	7	54	67	66	87	
X0023	Group 4 CHK	SWW	4	9	12.8	0.408	68	28	8.5	19.4	8	58	72	90	91	
X0024	Group 5	SWW	5	10	12.5	0.434	36	18	8.1	19.2	8	56	76	75	96	
X0025	Group 5 CHK	SWW	5	11	12.8	0.452	51	16	8.0	19.2	8	55	71	67	91	
X0026	Group 6	SWW	6	12	12.6	0.496	51	26	10.8	18.2	5	59	73	104	100	
X0027	Group 6	SWW	6	13	12.9	0.442	48	23	10.1	18.8	7	55	68	113	95	
X0028	Group 6	SWW	7	14	12.3	0.439	52	28	10.1	18.6	6	56	70	91	96	
X0029	Group 7	SWW	7	15	12.6	0.428	47	17	7.3	19.0	7	55	73	85	98	
X0030	Group 7	SWW	7	16	12.9	0.433	26	15	6.4	19.4	8	56	72	74	91	
X0031	Group 7 CHK	SWW	8	17	12.9	0.451	54	25	7.1	18.8	7	57	74	74	94	

Hard Wheat Quality Evaluations

LabNo	Variety	Class	EXP	ENT	FlrMst	NirFlrAsh	FlrHrd	NIR SKCSFlr	FlrProt	PkTime	PkHt	Tol	MixoAbs	MR	Babs	Bake mixtime	Loaf	Grain	Tex	Color	Predloaf	Predloaf diff	Comment
					%	%			%	min			%	1=Excel	%	min	cc	1=Excel	1=Excel	1=Excel			
X0032	Group 8	HRS	8	18	13.9	0.482	132	57	13.5	1.50	5.85	358	62.0	9	62.0	1.4	605	6	6	3	1018	-413	
X0033	Group 9	HRS	9	19	13.9	0.480	135	57	13.0	4.40	5.05	1352	66.8	3	66.5	3.4	945	4	3	2	985	-40	
X0034	Group 9 CHK	HRS	9	20	14.2	0.458	134	61	14.2	2.50	5.30	772	65.0	7.5	65.5	2.3	985	5	3	4	1063	-78	
X0035	Group 10	HRS	9	21	13.8	0.455	129	60	10.6	4.25	4.50	1084	61.5	5	63.0	3.8	905	3.5	3	2	829	76	
X0036	Group 10 CHK	HRS	9	22	13.5	0.535	103	44	11.3	3.50	4.65	924	61.2	6	62.0	3.2	975	4	3	3	875	101	SS
X0037	Group 11	HRS	10	23	14.1	0.468	114	54	11.6	2.65	5.00	412	62.0	9	61.5	2.3	930	4.5	4	3	894	36	
X0038	Group 11	HRS	10	24	13.9	0.468	122	57	12.2	4.00	5.10	1007	64.0	5	63.5	3.3	1020	4	3	2	933	87	
X0039	Group 11	HWS	11	25	13.7	0.471	85	41	11.7	3.25	4.95	922	62.5	6.5	63.0	2.8	1000	4	3	3	901	100	S
X0040	Group 11 CHK	HWS	12	26	13.6	0.482	98	52	11.5	3.25	5.20	803	63.0	7	63.0	2.7	905	4.5	4	3	888	18	S
X0041	Group 12	HWS	12	27	13.5	0.467	118	60	11.2	4.50	4.75	756	62.2	7	63.0	3.3	940	3.5	3	4	868	72	
X0042	Group 12 CHK	HWS	12	28	13.6	0.486	112	50	11.7	2.80	5.05	946	61.5	6	62.0	2.6	905	4.5	3	2	901	5	
X0043	Group 13 CHK	HWW	13	29	13.7	0.420	129	59	10.1	3.00	4.40	870	60.4	7	60.5	2.8	800	4.5	4	3	797	4	
X0044	Group 13	HWW	13	30	13.8	0.409	113	55	10.3	3.25	4.70	865	60.6	7	61.5	2.7	820	4	4	2	810	11	
X0045	Group 14	HWW	13	31	13.6	0.432	122	57	10.3	2.50	5.05	620	60.4	8	61.0	2.2	725	5	5	3	810	-85	
X0046	Group 15	HWW	13	32	13.3	0.447	118	54	10.5	2.50	5.30	733	61.3	7.5	62.0	2.4	825	5	4	4	823	3	
X0047	Group 15	HWW	14	33	13.4	0.404	133	63	10.5	2.75	5.00	445	61.0	8	61.5	2.3	845	5	4	5	823	23	
X0048	Group 15	HWW	14	34	13.9	0.488	113	62	11.6	3.00	5.05	772	63.0	7	63.5	2.5	885	4.5	4	3	894	-9	
X0049	Group 15 CHK	HWW	15	35	13.7	0.441	136	63	10.7	3.50	4.90	908	62.3	6	63.0	3.0	890	4.5	3	5	836	55	

- 60 -

Krusteaz-Continental Mills
Tukwilla, WA

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Pancake	7	Good Bostwick.	6	Good height. Firmer bite and gummy	6	Prefer check	
SY SALTESE	ck	SWS	1	2	Pancake	7	Good Bostwick.	7	Good height. Firm and gummy	7		
11PN2532-195		SWS	2	3	Pancake	4	Poor Bostwick	5	Low height. Soft texture, slightly gummy	5	Not as good as the check. Prefer check	
11PN2532-507		SWS	2	4	Pancake	6	Fair Bostwick	7	Good height. Soft texture	7	Closer to check. Prefer check	
WB1035CL2	ck	SWS	2	5	Pancake	7	Good Bostwick	8	Very good height. Soft and light texture.	8		
WA8290		SWW	3	6	Pancake	7	Good Bostwick	7	Good height. Soft texture and slightly gummy.	7	Good performance, but prefer check	
MADSEN	ck	SWW	3	7	Pancake	7	Great Bostwick	8	Great height. Soft texture, but dense slighlty more gummy	8		
UIL09-15702A		SWW	4	8	Pancake	6	Fair Bostwick	6	Good height, soft bite, but gummy, slightly chewy	6	Prefer check	
UI WSU HUFFMAN	ck	SWW	4	9	Pancake	7	Good Bostwick	8	Great height. Soft bite, slight chewy, but less than sample 8	8		
06PN212-25		SWW	5	10	Pancake	4	Poor Bostwick	6	Good height. Firm pancake, slightly gummy	6	Prefer check	
SY OVATION	ck	SWW	5	11	Pancake	7	Good Bostwick	7	Good height. Softer pancake	7		
SONIC		SWW	6	12	Pancake	7	Good Bostwick	9	Excellent height. Fluffy.	9	Overall best.	
SHARK		SWW	6	13	Pancake	7	Good Bostwick	7	Good height, slightly gummy	7		
HULK	no ck	SWW	6	14	Pancake	8	Good Bostwick	8	Excellent height. Fluffy, but gummy	8		
ORI2150031CL+		SWW	7	15	Pancake	7	Fair Bostwick	6	Good height. Soft, but gummy	5	Similar to check	
OR12161250CL+		SWW	7	16	Pancake	2	Poor Bostwick	2	Poor height. Tough, chewy.	2	Worse than check	
ORCF102	ck	SWW	7	17	Pancake	7	Fair Bostwick	6	Good height. Chewy, gummy	5		

- 61 -

Sample #	Sample ID	Group	Check	Score	Bostwick (cm)	3-stack height (in)
					8.00-14.00	1.30 - 1.85
1	18-01	1		6	12.75	1.42
2	18-02	1	Check	7	12.25	1.59
3	18-03	2		5	14.75	1.39
4	18-04	2		7	13.25	1.53
5	18-05	2	Check	8	9.75	1.80
6	18-06	3		7	11.75	1.55
7	18-07	3	Check	8	10.00	1.76
8	18-08	4		6	14.00	1.47
9	18-09	4		8	12.00	1.62
10	18-10	5		6	14.75	1.47
11	18-11	5	Check	7	12.75	1.57
12	18-12	6		9	9.75	1.92
13	18-13	6		7	13.00	1.53
14	18-14	6		8	11.25	1.80
15	18-15	7		5	13.00	1.48
16	18-16	7		2	16.25	1.27
17	18-17	7	Check	5	13.50	1.43

- 62 -

Montana State University Wheat Quality Laboratory
Bozeman, Montana

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	Pup Loaf	4.5	droopy, tacky, wet, rough dome	4	slightly dark, large open cells	4.3	didn't really care for this sample	
10PN3039-02		HRS	9	19	Pup Loaf	5.8	tacky but has good strength	7	decent CGS, side tear	6.4	nicer than check	
SY-605CL	ck	HRS	9	20	Pup Loaf	5.9	nice, strong	5	nice, has side tear	5.5		
WA8280		HRS	10	21	Pup Loaf	5.7	sticks to the bottom of the bowl, streng	6	nice cell structure	5.9	nicer than check	
KELSE	ck	HRS	10	22	Pup Loaf	5.6	slightly dead, tacky, slightly bucky	5	good, has side tear	5.3		
IDO 1801S		HRS	11	23	Pup Loaf	5.1	drooping, wet, tacky, flat	4	nice break & shred, poor cell structure	4.6		
IDO 1805S		HRS	11	24	Pup Loaf	6.0	slightly wet, improved as it developed	5	nice	5.5	nice almost as good as the check	
IDO 1704S		HWS	11	25	Pup Loaf	5.9	slightly wet but has body	5	side tear, weak cell structure pattern	5.5		
UI PLANTINUM	ck	HWS	11	26	Pup Loaf	6.2	slightly wet, improved as it developed	6	nice side tear, nice crumb	6.1	nice	
12SB0224		HWS	12	27	Pup Loaf	6.2	slightly yellow, good body strength	6	nice	6.1	slightly better than check	
DAYN	ck	HWS	12	28	Pup Loaf	6.2	slightly wet, improved as it developed	5	loose cell structure pattern	5.6		
IRV	ck	HWW	13	29	Pup Loaf	6.2	started out stiff then developed strengt	6	slightly dark, nice cell structure	6.1	prefer check sample	
OR2130118H		HWW	13	30	Pup Loaf	5.7	started out stiff then developed strengt	4	no center cell structure	4.9		
WA8252	no ck	HWW	14	31	Pup Loaf	5.2	sticky, dry then wet, no life	4	no center cell structure	4.6		
IDO 1506		HWW	15	32	Pup Loaf	5.7	strong, slightly wet	4	nice cells, poor volume	4.9		
IDO 1706		HWW	15	33	Pup Loaf	5.5	slightly wet but has body	4	loose cell structure pattern	4.8		
IDO 1806		HWW	15	34	Pup Loaf	6.0	slightly tacky, nice at punches	4	loose cell structure pattern	5.0		
UI SILVER	ck	HWW	15	35	Pup Loaf	5.7	tacky but has good strength	5	side tear, needs a better center for it's	5.4		

- 63 -

2018 PNW Wheat Quality Council								**MIXOGRAPH**			**BAKE**			
MSU 2018														
Sample #	**Variety**	**Check**	**Group**		**Class**	**FPROT**	**MTYPE**	**MTOL**	**MTIME**	**MABS**	**BMTIME**	**BABS**	**LVOL**	**CGS**
18	WB9662	no ck	8	Pup Loaf	HRS	13.8	MH	1	1.8	67.1	1.7	74.8	1010	4
19	10PN3039-02		9	Pup Loaf	HRS	13.2	MH	4	5.0	71.1	9.6	81.8	1080	7
20	SY-605CL	ck	9	Pup Loaf	HRS	14.4	M	2	2.9	69.3	5.3	79.0	1015	6
21	WA8280		10	Pup Loaf	HRS	9.9	M	4	4.4	62.0	7.7	71.7	1025	6
22	KELSE	ck	10	Pup Loaf	HRS	11.5	M	3	3.8	65.8	6.8	75.5	1025	5
23	IDO 1801S		11	Pup Loaf	HRS	12.2	M	1	2.9	65.8	5.4	76.0	1075	4
24	IDO 1805S		11	Pup Loaf	HRS	12.8	M	3	4.4	68.6	10.6	78.8	1170	5
25	IDO 1704S		11	Pup Loaf	HWS	11.9	M	1	3.5	69.4	9.4	79.6	1085	5
26	UI PLANTINUM	ck	11	Pup Loaf	HWS	11.6	M	2	3.4	65.0	6.4	74.7	1060	6
27	12SB0224		12	Pup Loaf	HWS	11.1	M	3	4.7	64.7	7.0	74.4	1020	3
28	DAYN	ck	12	Pup Loaf	HWS	11.0	M	2	3.3	64.8	5.3	74.5	1045	5
29	IRV	ck	13	Pup Loaf	HWW	10.4	M	3	3.6	62.9	4.5	72.6	950	6
30	OR2130118H		13	Pup Loaf	HWW	10.6	M	4	3.5	64.1	4.5	73.8	955	4
31	WA8252	no ck	14	Pup Loaf	HWW	10.5	M	2	3.0	62.9	2.8	72.6	935	4
32	IDO 1506		15	Pup Loaf	HWW	11.0	M	2	2.9	69.8	4.8	79.5	955	4
33	IDO 1706		15	Pup Loaf	HWW	10.9	M	1	2.8	66.7	4.4	76.4	905	4
34	IDO 1806		15	Pup Loaf	HWW	10.5	M	2	3.0	65.2	4.0	74.9	1075	4
35	UI SILVER	ck	15	Pup Loaf	HWW	10.9	M	3	3.8	66.5	5.0	76.7	1000	5

- 64 -

California Wheat Quality Laboratory
Woodland, California

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comme
WB9662	no ck	HRS	8	18	AACCI Puploaf	4	poor mixing tolerance, developed quickly/ soft out of mixer/ not very elastic, soft/ not spongy	7	good volume, rough break & shred, mostly small rounded cells, open crumb, soft interior	5	fast development, but good volume and good crumb	
10PN3039-02		HRS	9	19	AACCI Puploaf	8	good mixing tolerance, long development, strong dough, good extensibility during punching/ strong/ spongy	9	excellent volume, good break & shred, mostly uniform crumb, small rounded cells, slightly open, quite soft	9	strong dough, good extensibility, excellent volume with a good crumb	better than control
SY-605CL	ck	HRS	9	20	AACCI Puploaf	8	faster development compared to 19, slightly softer but still strong, strong & spongy dough	7	excellent volume, a bit rough break & shred, tight crumb, rounded cells, slightly soft & springy crumb	8	strong dough, good extensibility, excellent volume, but tighter crumb & not as soft	
WA8280		HRS	10	21	AACCI Puploaf	7	good mixing tolerance, long development, strong dough, good extensibility, strong/ slightly spongy	7	good volume, ok break & shred, tight crumb, rounded cells, thick cell walls, a bit firm/ coarse crumb	7	strong dough, good extensibility, good volume, but a tighter crumb	
KELSE	ck	HRS	10	22	AACCI Puploaf	8	strong dough/ good extensibility, firm/ slightly spongy	7	excellent volume, ok break & shred, rounded cells, slightly thick cell walls, soft & springy crumb	8	stronger dough compared to 21, though faster development, excellent volume, ok crumb	liked control better
IDO 1801S		HRS	11	23	AACCI Puploaf	6	soft out of mixer,gained strength during punching, slightly soft/ slightly spongy	8	excellent volume, good break & shred, open crumb, rounded cells, slightly soft crumb	7	soft but gained strength throughout punching, though not as strong compared to the other samples, excellent volume and good crumb	weaker than control/ least liked
IDO 1805S		HRS	11	24	AACCI Puploaf	9	longer development, good extensibility, strong/ spongy	8	excellent volume, good break & shred, slightly open crumb, mostly small rounded cells, slightly soft, springy crumb	9	good mixing tolerance, strong dough, good extensibility, excellent volume and very nice crumb	better than control
IDO 1704S		HWS	11	25	AACCI Puploaf	8	strong dough, comparable to 24, firm/ spongy, smooth	8	excellent volume, a bit rough break & shred, slightly tight crumb, very small rounded cells, soft & springy crumb	8	strong dough, good extensibility, excellent volume, but a tighter crumb	comparable to control
UI PLANTINUM	ck	HWS	11	26	AACCI Puploaf	8	strong dough, good extensibility, firm/ spongy	8	excellent volume, good break & shred, more open crumb, mostly small rounded cells, quite soft & springy	8	strong dough, good extensibility, excellent volume, good crumb	

- 65 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comme
12SB0224		HWS	12	27	AACCI Puploaf	8	long development, strong, good extensibility, firm/ slightly spongy	6	good volume, very rough break & shred, small rounded cells, slightly thick cells walls, slightly soft, creamy crumb	7	good mixing tolerance, strong dough, good extensibility, good volume, poor bread symmetry, slightly tight crumb	dough handling was preferred over control but end product was poorer
DAYN	ck	HWS	12	28	AACCI Puploaf	7	slightly soft/ slightly soft but spongy dough	9	excellent volume, good break & shred, nice crumb, some rounded & elongated cells, a bit too soft	7	softer dough compared to 27, but excellent volume and good crumb	
IRV		HWW	13	29	AACCI Puploaf	5	soft dough/ can't retain gas well, somewhat sticky, slightly soft/ not spongy	8	good volume, slightly rough break & shred, open crumb, rounded cells, quite soft & springy crumb	6	soft dough, but good volume, ok crumb	preferred over sample 30
OR2130118H	no ck	HWW	13	30	AACCI Puploaf	6	slightly soft/ gained strength, slightly firm/ slightly spongy	5	good volume, rough break & shred, small & large cells, thick cell walls, slightly coarse	5	a bit stronger dough than 29, but still somewhat soft, good volume, poor crumb-too open	
WA8252	no ck	HWW	14	31	AACCI Puploaf	4	very soft/ can't trap gas/ slightly soft, not very spongy	5	good volume, rough break & shred, open crumb, mix of small & large rounded cells,soft crumb	4	soft dough, too open crumb with large rounded cells,but good volume	disliked
IDO 1506		HWW	15	32	AACCI Puploaf	6	soft/ slightly soft/ spongy	6	good volume, rough break & shred, tight crumb, thick cell walls, firm/ slightly coarse crumb	6	slightly soft dough, thick cell walls, but good volume	
IDO 1706		HWW	15	33	AACCI Puploaf	5	soft/ can't retain gas/ slightly soft/ slightly spongy	5	ok volume, rough break & shred, tight crumb, thick cell walls, slightly coarse, creamy crumb	4	slightly soft dough, thick cell walls, creamy crumb but ok volume	
IDO 1806		HWW	15	34	AACCI Puploaf	6	slightly soft/ slightly firm/ spongy	7	excellent volume, good break & shred, rounded cells, slightly thick cell walls, soft crumb	6	a bit stronger dough compared to the previous samples, excellent volume, ok crumb	
UI SILVER	ck	HWW	15	35	AACCI Puploaf	7	slightly strong/ ok extensibility/ firm/spongy	7	good volume, rough break & shred, rounded cells,slightly tight crumb, soft & springy, very creamy	7	stronger dough compared to the rest, good volume, ok crumb, but very creamy crumb	creamy flour, control was preferred over other samples

						SRC					ALVEOGRAPH			
PNW ID#	FLOUR PROTEIN (14% M.B.)	MOIS %	ASH % (14% mb)	WET GLUTEN (14% mb)	GLUTEN INDEX	WATER	LACTIC ACID	SUCROSE	SC	GPI	P	L	P/L	W
WB9662	13.48	13.69	0.54	45.29	68.64	64.01	112.55	110.19	78.55	0.60	66	96	172	0.69
10PN3039-02	12.96	13.74	0.52	33.20	98.35	65.59	136.75	104.77	79.67	0.74	119	92	421	1.29
SY-605CL	14.07	13.86	0.49	41.98	76.71	64.49	134.33	102.00	73.85	0.76	101	73	287	1.38
WA8280	10.61	13.86	0.46	26.06	98.66	65.82	140.43	109.30	82.39	0.73	103	76	306	1.36
KELSE	10.46	13.54	0.51	27.95	98.04	63.73	126.65	102.56	75.61	0.71	95	92	319	1.03
IDO 1801S	11.72	14.10	0.51	31.74	93.70	62.38	107.86	105.55	72.45	0.61	66	94	207	0.70
IDO 1805S	12.16	13.80	0.49	32.42	96.77	63.04	129.26	109.95	74.64	0.70	88	77	276	1.14
IDO 1704S	11.70	13.61	0.50	31.41	95.74	62.40	131.65	112.70	78.80	0.69	70	138	295	0.51
UI PLANTINUM	11.34	13.53	0.52	30.43	95.43	64.40	118.97	114.86	82.04	0.60	73	144	304	0.51
12SB0224	11.05	13.36	0.48	27.94	98.58	63.09	117.61	104.76	77.88	0.64	97	113	365	0.86
DAYN	11.63	13.50	0.50	30.92	91.33	61.02	111.39	96.39	71.41	0.66	72	154	298	0.47
IRV	9.92	13.50	0.42	26.94	89.51	66.27	110.46	104.66	80.44	0.60	103	75	249	1.37
OR2130118H	10.06	13.88	0.49	26.21	89.69	66.94	118.96	109.45	80.05	0.63	107	78	264	1.37
WA8252	10.16	13.42	0.53	29.40	62.50	70.65	107.77	109.55	86.63	0.55	99	70	214	1.41
IDO 1506	10.32	13.14	0.40	30.20	90.02	67.06	113.75	98.47	83.42	0.63	94	76	226	1.24
IDO 1706	10.31	13.48	0.41	30.17	82.07	66.41	114.23	101.71	75.49	0.64	71	91	182	0.78
IDO 1806	11.36	13.89	0.50	31.21	87.98	63.62	115.03	108.51	79.37	0.61	85	121	277	0.70
UI SILVER	10.46	13.73	0.47	27.71	94.23	68.19	122.90	111.37	82.98	0.63	112	65	250	1.72

	FARINOGRAPH				BAKING ANALYSIS							
PNW ID#	ABS%	Dev Time (MIN)	Stability (MIN)	M.T.I. (FU)	BAKING ABS%	MIX TIME	VOL C.C	DOUGH HANDLING (1-10)	CRUMB COLOR (1-10)	CRUMB GRAIN (1-10)	CRUMB TEXTURE (1-10)	BREAD SYMMETRY (1-10)
WB9662	66.5	5.5	5.9	41	66.5	1.67	940	6	8	7	8	8
10PN3039-02	64.9	10	21.4	19	66.5	2.03	990	9	8	9	9	9
SY-605CL	64.8	8.9	13.7	14	64.5	2.68	1000	9	8	7	8	9
WA8280	61.2	6.4	18	15	63.5	4.58	935	7	8	8	7	7
KELSE	62.4	9.5	20.1	11	62.5	3.60	1025	8	8	7	7	9
IDO 1801S	61.5	6.5	9.4	27	61.5	2.57	1000	6	8	8	8	7
IDO 1805S	62.3	9.2	14.6	20	62.5	3.67	1035	9	8	8	8	8
IDO 1704S	60.9	8.3	14.5	15	60.5	3.27	1040	8	8	8	8	8
UI PLANTINUM	61.4	8.2	14.2	25	62.5	2.88	1015	8	9	7	9	8
12SB0224	60.6	7.5	15.7	18	60.5	3.87	950	6	8	7	8	6
DAYN	60.8	7.5	10.9	20	60.5	2.78	990	5	9	9	8	7
IRV	61.2	5.7	8.9	34	64.5	3.18	935	5	8	7	9	7
OR2130118H	61.9	5.4	10.2	26	63.5	2.90	945	6	8	6	7	7
WA8252	65.3	3.4	4.3	45	68.5	2.22	940	5	8	5	8	7
IDO 1506	62.9	4.8	6.3	42	65.5	2.77	975	6	8	6	7	7
IDO 1706	61.2	5.7	8.1	35	64.5	2.62	915	7	6	5	7	7
IDO 1806	62.5	5.8	9.4	26	64.5	2.62	995	7	8	7	8	8
UI SILVER	63.4	6.4	12.5	19	65.5	3.08	955	8	6	6	8	8

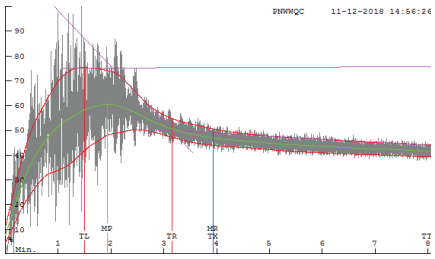
- 67 -

Colorado State University Wheat Quality Laboratory
Fort Collins, Colorado

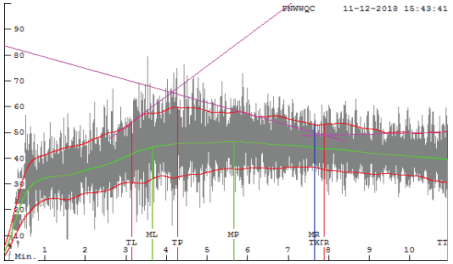
						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	bread	1	lifeless dough, slack at pan	1	poor crumb and low loaf volume	1	not acceptable	poor for it's level of protein
10PN3039-02		HRS	9	19	bread	7		5	white, average crumb	5		poor for it's level of protein
SY-605CL	ck	HRS	9	20	bread	5		6	good color & crumb, cap. Ok volume	6		poor for it's level of protein
WA8280		HRS	10	21	bread	7		5	good color, crumb. Low volume	5		
KELSE	ck	HRS	10	22	bread	6		4	ok volume, average crumb & color	5		
IDO 1801S		HRS	11	23	bread	3	weak dough	3	ok volume, poor crumb and color	3		
IDO 1805S		HRS	11	24	bread	7	good at make up	6	good volume, nice loaf external	6		
IDO 1704S		HWS	11	25	bread	7	good at make up	7	good volume, nice loaf external	7		
UI PLANTINUM	ck	HWS	11	26	bread	6		5		5		
12SB0224		HWS	12	27	bread	5		7	good volume, excellent crumb	7		
DAYN	ck	HWS	12	28	bread	6		4	white	5		
IRV		HWW	13	29	bread	3	lifeless, tough dough	3	cap	3		
OR2130118H	no ck	HWW	13	30	bread	4	lifeless dough	4		4		
WA8252	no ck	HWW	14	31	bread	2	dead dough	4		3		
IDO 1506		HWW	15	32	bread	2		2	very low volume	2	very poor	
IDO 1706		HWW	15	33	bread	3	yellow dough	3		3		
IDO 1806		HWW	15	34	bread	5		4		4		
UI SILVER	ck	HWW	15	35	bread	6	very yellow dough	4		4		yellow dough

Variety	Lab#	Class	Check	Group	Sample#	flr pro	flr moist	mix tol	pred %abs	act %abs	bake %abs	mix time	loaf vol	grn	color	elasticity
Group 8	193312	HRS	no ck	8	18-18	13.9	13.8	0	66.2	64.7	63.7	1.75	715	0	3	1
Group 9	193313	HRS		9	18-19	13.4	14.0	4	65.4	65.0	66.0	4.00	810	3	5	3
Group 9	193314	HRS	ck	9	18-20	14.5	14.3	1	67.1	67.3	66.3	2.50	845	4	4	2
Group 10	193315	HRS		10	18-21	11.1	13.9	4	61.4	60.9	61.9	4.00	800	4	5	3
Group 10	193316	HRS	ck	10	18-22	11.7	13.8	4	62.4	62.8	62.8	3.75	880	3	4	2
Group 11	193317	HRS		11	18-23	12.0	14.2	0	62.9	63.2	61.2	2.75	875	1	3	1
Group 11	193318	HRS		11	18-24	12.6	14.2	3	64.1	64.2	64.2	3.75	940	2	4	3
Group 11	193319	HWS		11	18-25	12.0	14.0	1	62.9	63.0	61.0	3.25	950	3	3	3
Group 11	193320	HWS	ck	11	18-26	11.8	13.9	2	62.6	62.9	61.9	3.00	810	3	3	2
Group 12	193321	HWS		12	18-27	11.7	13.6	4	62.4	63.6	63.6	4.00	940	6	4	2
Group 12	193322	HWS	ck	12	18-28	12.3	13.5	1	63.5	63.4	61.4	2.75	805	2	5	3
Group 13	193323	HWW		13	18-29	10.6	13.8	3	60.6	60.7	61.7	3.25	755	3	5	1
Group 13	193324	HWW	no ck	13	18-30	10.6	14.0	3	60.6	61.0	62.0	3.25	770	2	4	2
Group 14	193325	HWW	no ck	14	18-31	10.6	13.7	2	60.6	60.6	60.6	2.75	725	3	3	1
Group 15	193326	HWW		15	18-32	10.8	13.5	2	61.0	60.5	60.5	3.00	690	2	2	2
Group 15	193327	HWW		15	18-33	11.0	13.7	1	61.3	60.6	59.6	2.75	740	3	2	1
Group 15	193328	HWW		15	18-34	11.7	14.3	1	62.4	62.3	60.3	3.00	805	2	3	2
Group 15	193329	HWW	ck	15	18-35	11.0	14.1	4	61.2	61.1	62.1	3.25	800	3	1	2

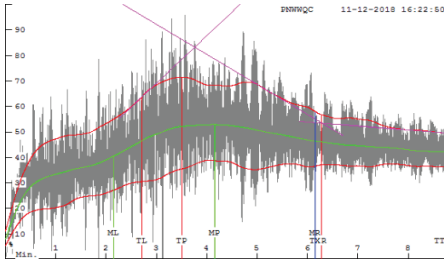
- 69 -



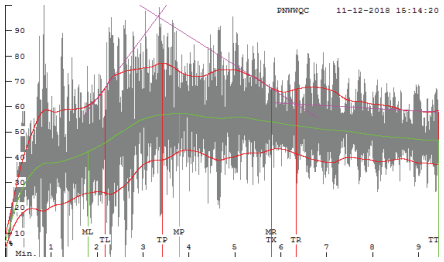
18-18



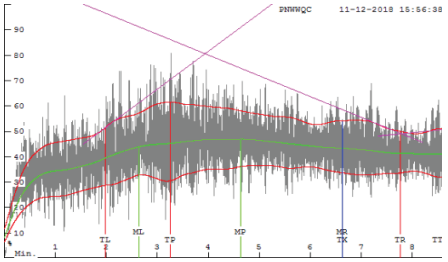
18-21



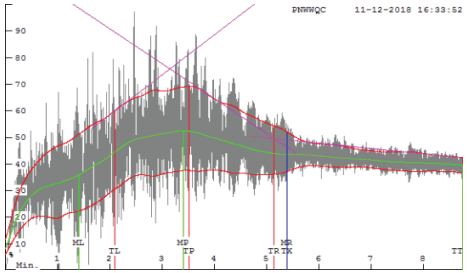
18-24



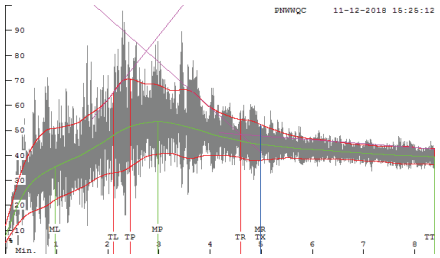
18-19



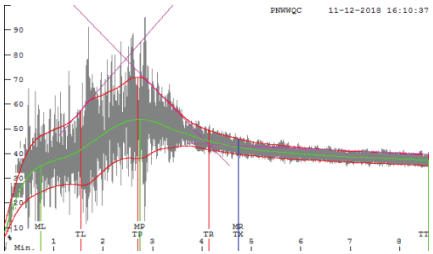
18-22



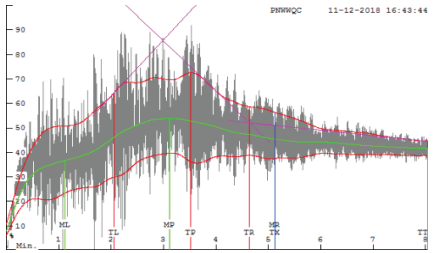
18-25



18-20

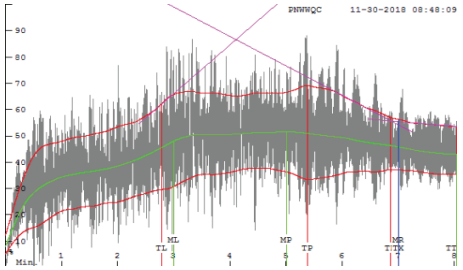


18-23

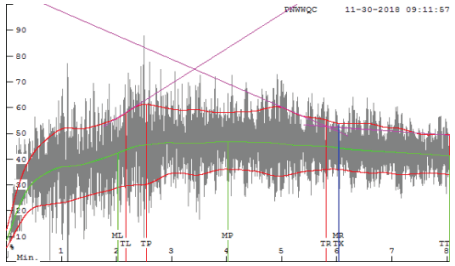


18-26

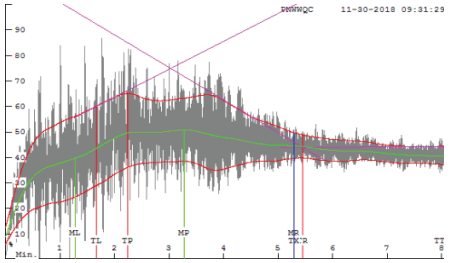
- 70 -



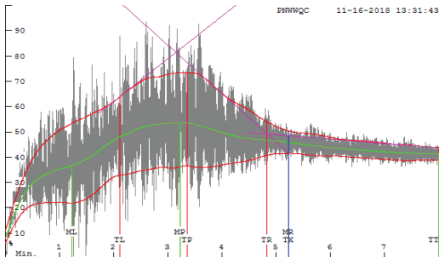
18-27



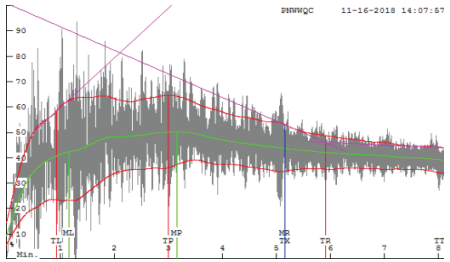
18-30



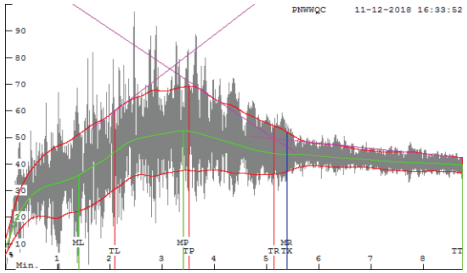
18-33



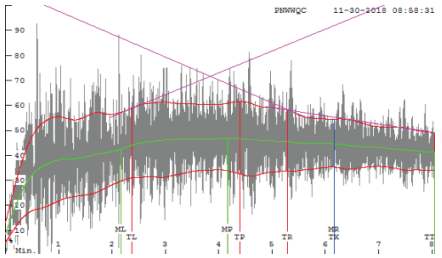
18-28



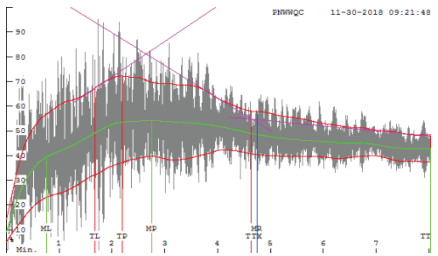
18-31



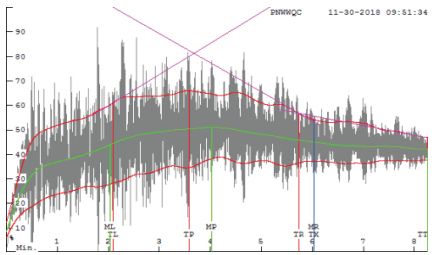
18-34



18-29



18-32



18-35

- 71 -

CGAHR, USDA-ARS Hard Winter Wheat Quality Laboratory
Manhattan, Kansas

Report from USDA-ARS-HWWQL in Manhattan, KS

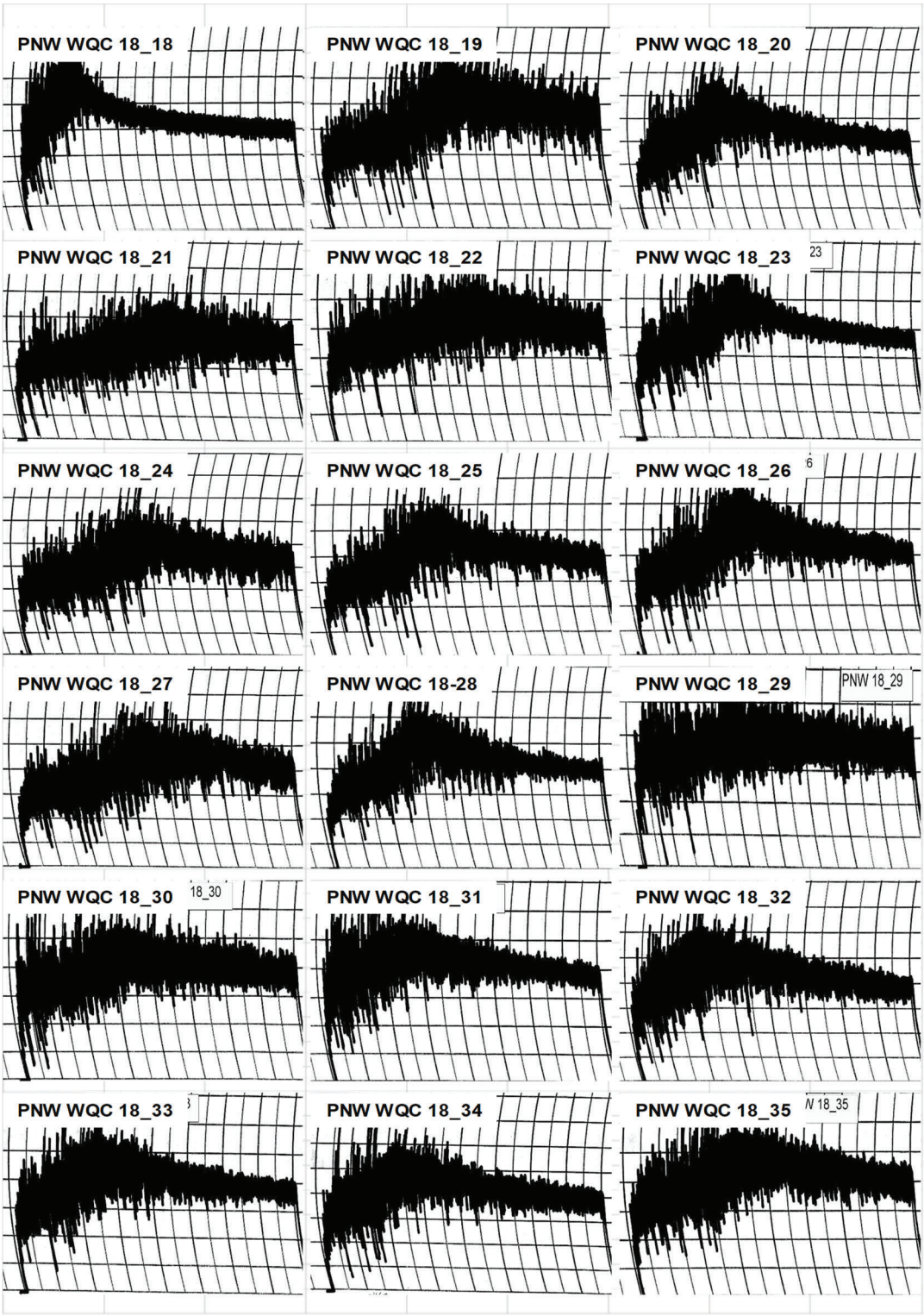
1. Mixograph Data

MIXOGRAPH DATA of 2018 PNW WQC SAMPLES

HWWQL ID	PNW ID	FLR-MC	FLR-PC (14%MC)	FLR-ABS(asis)	FLR_ABS(14%mc)	MIX-TM	MIX-TOL
18-0002451	**PNW 18_18**	14.0	13.7	66.7	66.7	1.5	0
18-0002452	**PNW 18_19**	14.0	13.1	68.2	68.2	3.8	4
18-0002453	**PNW 18_20**	14.4	14.2	67.1	67.6	2.5	1
18-0002454	**PNW 18_21**	14.1	10.9	62.5	62.6	4.5	4
18-0002455	**PNW 18_22**	13.7	11.5	63.4	63.0	4.5	3
18-0002456	**PNW 18_23**	14.2	11.8	64.0	64.2	3.0	0
18-0002457	**PNW 18_24**	14.2	12.3	63.7	63.9	3.6	3
18-0002458	**PNW 18_25**	14.1	11.9	63.8	63.9	3.4	1
18-0002459	**PNW 18_26**	14.0	11.6	64.8	64.8	3.3	1
18-0002460	**PNW 18_27**	13.7	11.4	64.3	64.0	3.8	3
18-0002461	**PNW 18_28**	13.7	12.1	64.4	64.1	2.9	1
18-0002462	**PNW 18_29**	13.9	10.2	61.0	60.9	2.9	2
18-0002463	**PNW 18_30**	14.1	10.4	61.6	61.7	3.1	3
18-0002464	**PNW 18_31**	13.7	10.5	62.7	62.4	2.5	1
18-0002465	**PNW 18_32**	13.5	10.7	64.8	64.3	2.1	1
18-0002466	**PNW 18_33**	13.7	10.7	63.1	62.8	2.5	1
18-0002467	**PNW 18_34**	14.2	11.5	63.3	63.6	2.3	1
18-0002468	**PNW 18_35**	13.9	10.8	63.0	62.9	3.0	2

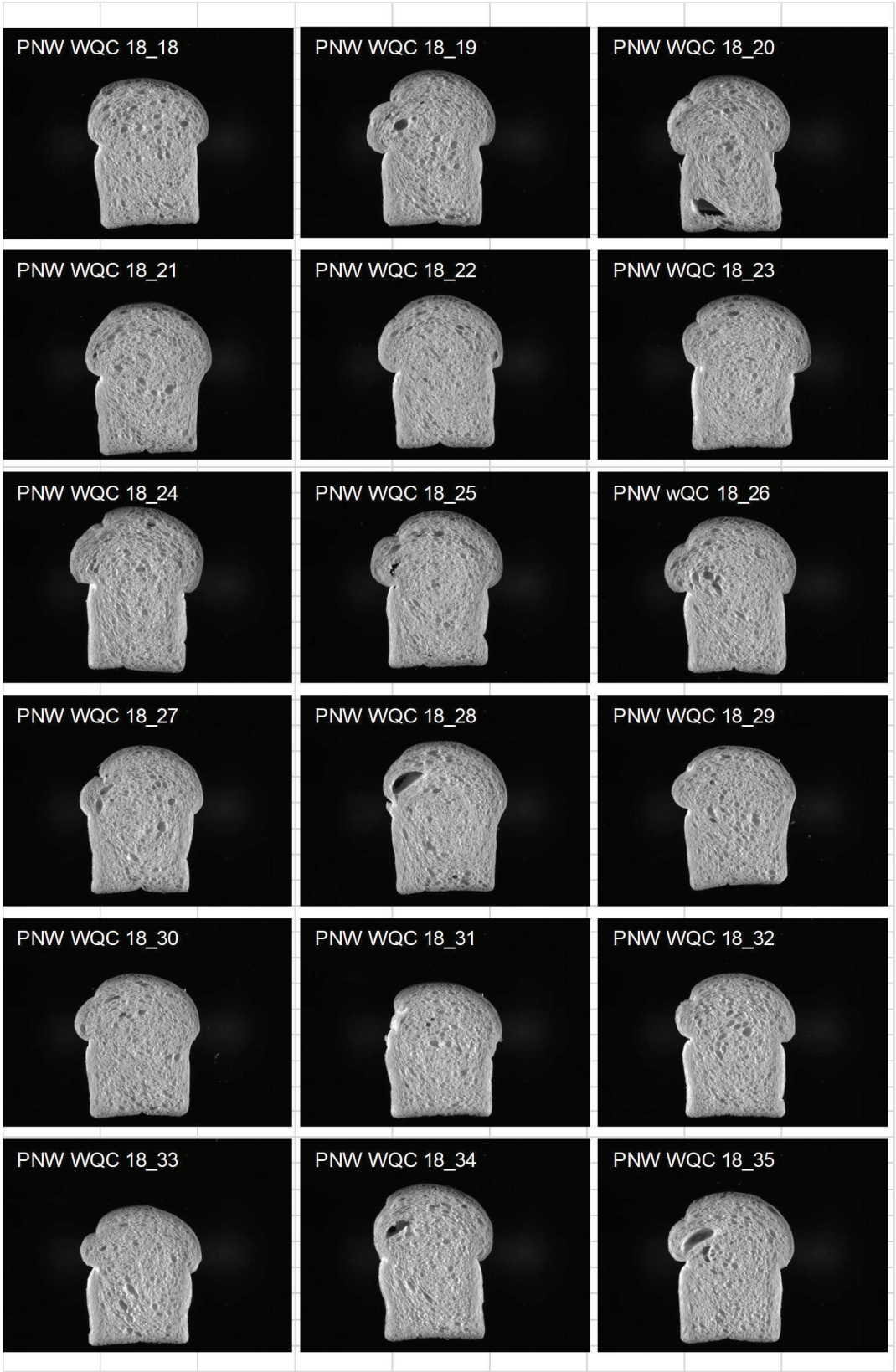
- 72 -

2. Mixograms



- 73 -

3. C-Cell Images



- 74 -

Wheat Marketing Center
Portland, Oregon

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18	Pup Loaf Bread			4	Low abs, volume			
10PN3039-02		HRS	9	19	Pup Loaf Bread			7	Good abs, mix time, volume, grain			
SY-605CL	ck	HRS	9	20	Pup Loaf Bread			7	Good abs, mix time, volume, grain			
WA8280		HRS	10	21	Pup Loaf Bread			5	Low abs, OK mix time, volume, grain			
KELSE	ck	HRS	10	22	Pup Loaf Bread			5	Low abs, OK mix time, volume, grain			
IDO 1801S		HRS	11	23	Pup Loaf Bread			3	Low abs, volume, Poor grain			
IDO 1805S		HRS	11	24	Pup Loaf Bread			9	Good abs, mix time, volume, grain			
IDO 1704S		HWS	11	25	Pup Loaf Bread			8	Good abs, mix time, volume, grain			
UI PLANTINUM	ck	HWS	11	26	Pup Loaf Bread			7	Good abs, mix time, volume, grain			
12SB0224		HWS	12	27	Pup Loaf Bread			4	Low abs, volume			
DAYN	ck	HWS	12	28	Pup Loaf Bread			6	Good abs, grain			
IRV	ck	HWW	13	29	Pup Loaf Bread			4	Low abs, volume			
OR2130118H		HWW	13	30	Pup Loaf Bread			3	Low abs, volume, Poor grain			
WA8252	no ck	HWW	14	31	Pup Loaf Bread			2	Low abs, Very low volume, Poor grain			
IDO 1506		HWW	15	32	Pup Loaf Bread			3	Low abs, volume, Poor grain			
IDO 1706		HWW	15	33	Pup Loaf Bread			2	Low abs, Very low volume, Poor grain			
IDO 1806		HWW	15	34	Pup Loaf Bread			4	Low abs, volume			
UI SILVER	ck	HWW	15	35	Pup Loaf Bread			4	Low abs, volume			

- 75 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Sponge Cake			4	Low volume, Poor exterior and interior			
SY SALTESE	ck	SWS	1	2	Sponge Cake			2	Poor cake			
11PN2532-195		SWS	2	3	Sponge Cake			2	Poor cake			
11PN2532-507		SWS	2	4	Sponge Cake			2	Poor cake			
WB1035CL2	ck	SWS	2	5	Sponge Cake			4	Low volume, Poor exterior and interior			
WA8290		SWW	3	6	Sponge Cake			6	Low volume, Soft texture, Poor exterior			
MADSEN	ck	SWW	3	7	Sponge Cake			3	Low volume, Hard texture, Poor ext&int			
UIL09-15702A		SWW	4	8	Sponge Cake			4	Low volume, Hard texture, Good ext&int			
UI WSU HUFFMAN	ck	SWW	4	9	Sponge Cake			9	Good volume, Soft texture			
06PN212-25		SWW	5	10	Sponge Cake			8	Good volume, total score			
SY OVATION	ck	SWW	5	11	Sponge Cake			7	Ok volume, Slightly hard texture			
SONIC		SWW	6	12	Sponge Cake			4	Low volume, Hard texture			
SHARK		SWW	6	13	Sponge Cake			1	Worst cake			
HULK	no ck	SWW	6	14	Sponge Cake			6	Low volume, Poor exterior			
ORI2150031CL+		SWW	7	15	Sponge Cake			8	Ok volume, soft texture			
OR12161250CL+		SWW	7	16	Sponge Cake			9	Good volume, Soft texture			
ORCF102	ck	SWW	7	17	Sponge Cake			8	Good volume, total score			

- 76 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
IDO 1801S		HRS	11	23	Raw Noodle							
IDO 1805S		HRS	11	24	Raw Noodle							
IDO 1704S		HWS	11	25	Raw Noodle			3	Very hard texture, Poor color stability			
UI PLANTINUM	ck	HWS	11	26	Raw Noodle			6	Hard texture, Good color stability			
12SB0224		HWS	12	27	Raw Noodle			4	Very hard texture, Poor color stability			
DAYN	ck	HWS	12	28	Raw Noodle			5	Hard texture, Good color stability			
IRV	ck	HWW	13	29	Raw Noodle			5	Hard texture, Good initial color			
OR2130118H		HWW	13	30	Raw Noodle			4	Softer texture, Poor color stability			
WA8252	no ck	HWW	14	31	Raw Noodle			8	Good texture, Good color stability			
IDO 1506		HWW	15	32	Raw Noodle			9	Good texture, Good color stability			
IDO 1706		HWW	15	33	Raw Noodle			7	Good texture, Good color stability			
IDO 1806		HWW	15	34	Raw Noodle			6	Good texture, Poor initial color, Good color stability			
UI SILVER	ck	HWW	15	35	Raw Noodle			7	Good texture, Good color stability			

- 77 -

Variety	Group	Sponge Cake Volume	External Score	Internal Score	Texture Score	Total Score	Ranking
08PN2001-07	Group 1	1079	10	16	18	44	9
SY SALTESE	**Group 1**	**1122**	**11**	**18**	**9**	38	**14**
11PN2532-195	Group 2	1084	10	16	6	32	16
11PN2532-507	Group 2	1136	12	17	6	35	15
WB1035CL2	**Group 2**	**1070**	**10**	**16**	**18**	44	**10**
WA8290	Group 3	1134	12	17	21	50	7
MADSEN	**Group 3**	**1103**	**12**	**17**	**12**	41	**13**
UIL09-15702A	Group 4	1180	14	21	12	47	11
UI WSU Huffm	**Group 4**	**1230**	**15**	**21**	**21**	57	**1**
06PN212-25	Group 5	1216	15	21	18	54	3
SY OVATION	**Group 5**	**1181**	**15**	**21**	**15**	51	**6**
SONIC	Group 6	1070	12	16	3	31	17
SHARK	Group 6	1142	12	18	12	42	12
HULK	Group 6	1158	12	17	15	44	8
ORI2150031C	Group 7	1181	12	20	21	53	5
ORI2161250	Group 7	1229	15	21	21	57	2
ORCF102	**Group 7**	**1190**	**15**	**21**	**18**	54	**4**

		Raw Noodle Color L* 0 Hour	a* 0 Hour	b* 0 Hour	L* 24 Hour	a* 24 Hour	b* 24 Hour	Delta L	Firmness	Ranking	Pup Loaf Absorption	Mix Time	Volume	Crumb Grain	Ranking
WB9662	Group 8	—	—	—	—	—	—	—	—	—	61.1	1.6	722	6	13
10PN3039-02	Group 9	—	—	—	—	—	—	—	—	—	65.1	3.9	842	6	5
SY-605CL	**Group 9**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**63.8**	**2.5**	**832**	**7**	**4**
WA8280	Group 10	—	—	—	—	—	—	—	—	—	61.2	3.9	800	6	8
KELSE	**Group 10**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**60.9**	**3**	**827**	**6**	**7**
IDO 1801S	Group 11	—	—	—	—	—	—	—	—	—	60.9	2.3	706	5	17
IDO 1805S	Group 11	—	—	—	—	—	—	—	—	—	62.6	3.6	900	8	1
IDO 1704S	Group 11	82.0	0.6	19.3	69.6	1.5	22.6	12.4	1429	11	61.6	3.2	874	7.5	2
UI PLATINUM	**Group 11**	**83.4**	**0.8**	**16.8**	**74.2**	**1.8**	**22.5**	**9.2**	**1303**	**6**	**61.7**	**3.1**	**848**	**7**	**3**
12SB0224	Group 12	83.8	-0.4	20.1	72.5	0.1	22.6	11.3	1523	10	60.9	3.9	780	6	9
DAYN	**Group 12**	**81.6**	**1.0**	**18.5**	**73.3**	**2.0**	**22.5**	**8.3**	**1348**	**8**	**61.2**	**2.6**	**814**	**7**	**6**
IRV	**Group 13**	**86.8**	**0.4**	**16.2**	**73.9**	**1.0**	**20**	**12.9**	**1310**	**7**	**60.2**	**3.5**	**746**	**6**	**11**
OR2130118H	Group 13	83.5	0.5	16.2	72.8	1.0	18.9	10.7	1194	9	61.6	2.9	718	5	15
WA8252	Group 14	84.9	-0.1	16.4	77.2	0.3	20.4	7.7	1291	2	61.2	2.8	669	5	18
IDO 1506	Group 15	85.3	-0.3	18.3	77.6	0.2	25	7.7	1375	1	60.8	2.8	722	5	14
IDO 1706	Group 15	83.8	-0.3	20.5	76.3	0.5	27.8	7.5	1221	3	60.9	3.0	686	5	16
IDO 1806	Group 15	82.0	0.2	20.0	73.7	1.2	25	8.3	1288	5	61.8	2.5	756	6	10
UI Silver	**Group 15**	**83.2**	**-0.6**	**22.7**	**75.6**	**0.4**	**29.2**	**7.6**	**1262**	**4**	**61.9**	**3.0**	**720**	**6**	**12**

- 78 -

USDA-ARS Eastern Soft Wheat Quality Laboratory
Wooster, Ohio

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Sugar-Snap Cookies			7		7		
SY SALTESE	ck	SWS	1	2	Sugar-Snap Cookies			8	Large cookie diameter	8		High lactic acid SRC
11PN2532-195		SWS	2	3	Sugar-Snap Cookies			8	Large cookie diameter	8		Nice SRC profile
11PN2532-507		SWS	2	4	Sugar-Snap Cookies			7		7		Nice SRC profile
WB1035CL2	ck	SWS	2	5	Sugar-Snap Cookies			4	Small cookie diameter	3	High flour ash	High water, sod.carb & sucrose
WA8290		SWW	3	6	Sugar-Snap Cookies			6		6		High water SRC
MADSEN	ck	SWW	3	7	Sugar-Snap Cookies			4		4		High water SRC
UIL09-15702A		SWW	4	8	Sugar-Snap Cookies			8	Large cookie diameter	8		Low water, sucrose & lactic acid
UI WSU HUFFMAN	ck	SWW	4	9	Sugar-Snap Cookies			6		6		
06PN212-25		SWW	5	10	Sugar-Snap Cookies			6		6		High water, sod.carb & sucrose
SY OVATION	ck	SWW	5	11	Sugar-Snap Cookies			5		4	High flour ash	Low lactic acid SRC
SONIC		SWW	6	12	Sugar-Snap Cookies			3	Small cookie diameter	2	High protein	High water & sucrose SRC
SHARK		SWW	6	13	Sugar-Snap Cookies			5	Poor top grain	5	High protein	Low sod.carb; high lactic acid
HULK	no ck	SWW	6	14	Sugar-Snap Cookies			5		4	High protein	
ORI2150031CL+		SWW	7	15	Sugar-Snap Cookies			5		5		High socium carb. SRC
OR12161250CL+		SWW	7	16	Sugar-Snap Cookies			5		5	Low protein	High water SRC
ORCF102	ck	SWW	7	17	Sugar-Snap Cookies			4		3	High flour ash; low protein	High water SRC

- 79 -

Evaluation by the Soft Wheat Quality Laboratory-USDA ARS, Wooster OH

Sample No.	Variety	Class	Primary Flour Analysis			Solvent Retention Capacity			
			Flour moisture %	NIR Flour protein 14%mb	Flour Ash 14%mb	Water %	Sodium carbonate %	Sucrose %	Lactic acid %
1	08PN2001-07	SWS	13.2	8.7	0.42	56.9	76.4	96.0	95.4
2	SY SALTESE	SWS	13.0	9.1	0.39	56.2	76.5	94.5	116.9
3	11PN2532-195	SWS	13.7	9.1	0.45	54.3	70.5	90.6	106.2
4	11PN2532-507	SWS	13.9	9.2	0.46	54.8	69.4	89.1	101.8
5	WB1035CL2	SWS	12.8	9.2	0.49	62.9	80.3	103.2	85.4
6	WA8290	SWW	13.3	7.5	0.42	60.0	78.7	97.0	101.1
7	MADSEN	SWW	13.2	9.3	0.44	61.0	78.1	97.0	87.2
8	UIL09-15702A	SWW	13.1	8.3	0.43	54.7	75.4	88.5	72.4
9	UI WSU HUFFMAN	SWW	13.0	8.4	0.39	59.2	75.8	94.4	92.7
10	06PN212-25	SWW	12.7	8.1	0.48	60.6	82.2	101.6	79.1
11	SY OVATION	SWW	12.9	8.0	0.51	59.0	78.1	93.6	73.5
12	SONIC	SWW	12.8	10.9	0.47	60.6	77.7	101.1	105.6
13	SHARK	SWW	13.0	10.0	0.39	56.3	72.6	97.0	115.4
14	HULK	SWW	12.6	10.3	0.42	59.5	76.8	98.8	92.5
15	ORI2150031CL+	SWW	12.8	7.1	0.46	59.0	82.3	96.9	90.5
16	OR12161250CL+	SWW	13.0	6.0	0.46	60.6	78.6	93.4	81.9
17	ORCF102	SWW	13.1	6.8	0.50	60.2	79.6	95.9	82.2

- 80 -

Sample No.	Variety	Class	Rapid Visco-Analyzer								Sugar-snap Cookies	
			Peak 1 cP	Trough 1 cP	Breakdown cP	Final Visc cP	Setback cP	Peak Time (min)	Pasting Temp. °C	Peak/ Final Ratio	Diameter cm	Top Grain
1	08PN2001-07	SWS	3131	1728	1403	2829	1101	6.07	69.0	1.11	9.2	7
2	SY SALTESE	SWS	2821	1915	906	3440	1525	6.00	81.5	0.82	9.2	7
3	11PN2532-195	SWS	2786	1815	971	3237	1423	6.17	84.7	0.86	9.2	7
4	11PN2532-507	SWS	2898	1856	1042	3193	1337	6.17	85.5	0.91	9.1	7
5	WB1035CL2	SWS	3062	1720	1342	2849	1129	6.17	70.2	1.07	8.6	5
6	WA8290	SWW	2397	1662	735	3153	1492	6.10	85.2	0.76	8.9	7
7	MADSEN	SWW	2129	1580	549	3043	1463	6.13	85.6	0.70	8.7	6
8	UIL09-15702A	SWW	2210	1828	382	3433	1605	6.17	84.8	0.64	9.2	5
9	UI WSU HUFFMAN	SWW	2120	1662	458	3115	1453	6.17	85.6	0.68	8.9	5
10	06PN212-25	SWW	1957	1817	140	3419	1602	6.43	86.7	0.57	8.9	6
11	SY OVATION	SWW	2253	1659	594	3077	1418	6.17	86.8	0.73	8.8	6
12	SONIC	SWW	1908	1364	544	2699	1336	5.93	85.1	0.71	8.5	5
13	SHARK	SWW	2369	1620	749	3038	1418	6.00	84.9	0.78	8.9	3
14	HULK	SWW	2111	1607	505	3090	1484	6.03	83.9	0.68	8.8	5
15	ORI2150031CL+	SWW	2132	1610	522	2997	1387	6.20	87.7	0.71	8.8	6
16	OR12161250CL+	SWW	2379	1568	811	3016	1448	6.00	85.6	0.79	8.9	7
17	ORCF102	SWW	1896	1313	583	2574	1261	5.97	86.4	0.74	8.7	5

- 81 -

Hard Spring and Durum Wheat Quality Laboratory
Fargo, North Dakota

					1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
					Question #1		Question #2		Question #3		Question #4
Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
no ck	HRS	8	**18**	Bread	2	Shorter mix time; saggy, limp dough.	3	Low loaf volume; coarse and crumbly crumb; creamy crumb color.	3	Below average.	
	HRS	9	**19**	Bread	7	Strong elastic dough that handled well.	7	Good loaf volume; bright crumb color; soft and smooth crumb texture; elongated crumb cells.	7	Better than the check.	
ck	HRS	9	**20**	Bread	6	Dough was very moist, almost wet, during mixing. Very good gas production and retention.	6	Good loaf volume; soft and smooth crumb texture; slightly creamy crumb color.	6	Good.	
	HRS	10	**21**	Bread	5	Acceptable dough but had weak elasticity.	4	Slightly coarse crumb texture with irregular cell structure.	4	Below average.	
ck	HRS	10	**22**	Bread	6	Strong elastic dough but had a slightly lifeless feel.	6	Good texture.	6	Good.	Performed better than expected considering low flour protein.
	HRS	11	**23**	Bread	3	Smooth, limp and saggy dough but had okay gas production.	2	Very crumbly crumb texture; large, round cells; creamy crumb color.	3	Weak dough; below average end-product.	
	HRS	11	**24**	Bread	6	Handled well overall; weak elasticity.	7	Very good loaf volume; soft and smooth crumb texture; elongated crumb cells.	7	Good end-product.	
	HWS	11	**25**	Bread	5	Fine dough, good gas production but okay gas retention. Dough held form but was slightly weak.	7	Silky crumb texture; very nice crumb grain structure; creamy crumb color.	7	Good end-product.	Performed better than expected considering lower flour protein.
ck	HWS	11	**26**	Bread	5	Smooth and soft dough with weak elasticity; good gas production; little gas retention when handled.	6	Good loaf volume; very nice crumb texture; creamy crumb color.	6	Good end-product	Performed better than expected considering low flour protein.
	HWS	12	**27**	Bread	4	Weak dough from start to finish with low gas production.	4	Low loaf volume; open crumb cell structure; slightly coarse crumb texture; slightly yellow crumb.	4	Below average.	
ck	HWS	12	**28**	Bread	5	Acceptable dough strength; slightly extensible with little spring but still felt nice.	7	Good end-product except for low loaf volume.	6	Average dough but good end-product.	
	HWW	13	**29**	Bread	6	Medium-strong elastic dough that handled well.	6	Good crumb texture and structure; slightly yellow crumb.	7	Nice overall except for crumb color.	Exceeded expectations considering low flour protein.
no ck	HWW	13	**30**	Bread	7	Strong elastic dough from bowl to pan.	6	Good crumb texture and cell structure; creamy crumb color.	7	Good.	Exceeded expectations considering low flour protein.
no ck	HWW	14	**31**	Bread	5	Dough had high moisture out of the mixer without being sticky or wet; weak elasticity.	3	Low loaf volume; light yellow crumb; slightly coarse crumb texture; open crumb cells.	4	Below average end-product.	
	HWW	15	**32**	Bread	4	Smooth and soft dough with slight spring at panning.	2	Light yellow crumb; round crumb cells; coarse crumb texture that crumbles slightly.	3	Below average.	
	HWW	15	**33**	Bread	4	Weak elasticity.	3	Poor loaf volume; light yellow crumb; round crumb cells; slightly coarse crumb texture.	3	Below average.	
	HWW	15	**34**	Bread	4	Medium-strong elastic dough that handled well from bowl but weakened during the proofing process.	2	Dull, light yellow crumb; large round cells; coarse crumb texture.	3	Below average.	
ck	HWW	15	**35**	Bread	6	Very yellow-colored dough; medium elasticity.	6	Good loaf volume; light yellow crumb; good crumb texture and structure.	6	Good end-product except for crumb color.	

- 82 -

Variety	Check	Class	Group	Sample #	Product	Calc. Bake Abs. (14% m.b.)	Mix Time (min.)	Loaf Volume (cc)	Loaf Weight (g)	Dough Characteristics	Crumb Color	Crumb Grain	Crumb Texture
Group 8	no ck	HRS	8	**18**	Bread	63.9	1.75	690	135.4	2	3	3	3
Group 9		HRS	9	**19**	Bread	63.5	3.00	860	133.2	7	4	4	5
Group 9	ck	HRS	9	**20**	Bread	63.8	2.50	825	132.8	6	3	4	5
Group 10		HRS	10	**21**	Bread	59.2	4.00	720	129.0	5	4	3	4
Group 10	ck	HRS	10	**22**	Bread	59.7	3.00	775	129.3	6	4	4	5
Group 11		HRS	11	**23**	Bread	60.4	2.50	715	129.9	3	2	2	2
Group 11		HRS	11	**24**	Bread	60.7	3.75	860	128.6	6	4	4	5
Group 11		HWS	11	**25**	Bread	58.9	3.25	790	128.5	5	3	4	6
Group 11	ck	HWS	11	**26**	Bread	60.4	3.25	800	128.6	5	3	4	6
Group 12		HWS	12	**27**	Bread	58.9	4.25	675	131.2	4	2	3	4
Group 12	ck	HWS	12	**28**	Bread	58.9	3.25	725	127.8	5	4	4	5
Group 13		HWW	13	**29**	Bread	62.7	3.25	720	132.8	6	2	4	5
Group 13	no ck	HWW	13	**30**	Bread	62.9	3.00	725	133.3	7	3	4	5
Group 14	no ck	HWW	14	**31**	Bread	65.7	2.50	695	139.9	5	2	3	4
Group 15		HWW	15	**32**	Bread	63.3	2.75	725	136.3	4	2	3	3
Group 15		HWW	15	**33**	Bread	62.3	2.75	685	134.5	5	2	3	4
Group 15		HWW	15	**34**	Bread	63.9	2.50	750	137.2	4	2	3	3
Group 15	ck	HWW	15	**35**	Bread	65.0	3.00	805	135.8	6	2	4	5

Dough characteristics (at mixing & panning): 1 weak, short, or sticky; 3 = strong, elastic; 6 = bucky, tough

Crumb color: 0 unacceptable discoloration, 1 yellow/gray/dull, 2 light yellow/gray/dull, 3 creamy, 4 white/slightly creamy, 5 bright white

Crumb grain: 1 = thick wells; 6 = fine

Crumb texture: 1 = dead; 6 = silky

- 83 -

University of Idaho Wheat Quality Lab
Aberdeen, Idaho

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1						4		
SY SALTESE	ck	SWS	1	2						4		low water src, higher lactic src
11PN2532-195		SWS	2	3						5		
11PN2532-507		SWS	2	4						6	good noodle color	
WB1035CL2	ck	SWS	2	5						3		high water src
WA8290		SWW	3	6						4		high water src
MADSEN	ck	SWW	3	7						4		
UIL09-15702A		SWW	4	8						6		
UI WSU HUFFMAN	ck	SWW	4	9						4		
06PN212-25		SWW	5	10						5		
SY OVATION	ck	SWW	5	11						5		
SONIC		SWW	6	12						4		all in group high water src
SHARK		SWW	6	13						4		higher lactic acid src
HULK	no ck	SWW	6	14						4		
ORI2150031CL+		SWW	7	15						6		
OR12161250CL+		SWW	7	16						5	good noodle color	
ORCF102	ck	SWW	7	17						4		

- 84 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
WB9662	no ck	HRS	8	18						4	short mixer/course crumb	
10PN3039-02		HRS	9	19						5		
SY-605CL	ck	HRS	9	20			better dough than 19			6		
WA8280		HRS	10	21						5	very similar to each other	
KELSE	ck	HRS	10	22						5		
IDO 1801S		HRS	11	23						5	all in group are very similar	
IDO 1805S		HRS	11	24						5		
IDO 1704S		HWS	11	25						5		
UI PLANTINUM	ck	HWS	11	26						5		
12SB0224		HWS	12	27					lower loaf vol. than 28	4	both in set very similar	low water absorption
DAYN	ck	HWS	12	28						5		
IRV		HWW	13	29						4		both in group have low protein
OR2130118H	no ck	HWW	13	30						4		may be better at higher protein
WA8252	no ck	HWW	14	31			poor dough strength/short mixer			2		low protein
IDO 1506		HWW	15	32						4		not much difference in the set
IDO 1706		HWW	15	33						4		all had very low protein
IDO 1806		HWW	15	34						5	nice looking loaf	may perform better at higher
UI SILVER	ck	HWW	15	35						4		protein

- 85 -

Group	Entry	Class	Flour Protein	Alkaline Noodle Dough L0	a0	b0	L24	a24	b24	Ldiff	Bake Mix Time	Dough Strength	Loaf Volume
8	18	HRS	13	82.5	-0.8	22.5	64.5	-0.5	19.1	-18.0	1.6	5	1025
9	19	HRS	12.7	82.6	-0.4	20.7	66.2	0.9	20.8	-16.5	3.7	5	1100
9	20	HRS	13.9	81.9	-0.6	24.1	66.3	0.5	21.1	-15.6	2.7	6	1000
10	21	HRS	10.1	83.7	-1.1	21.6	68.2	-0.1	20.9	-15.6	3.8	3	1025
10	22	HRS	10.8	86.7	-1.5	19.4	72.1	-0.8	23.3	-14.6	3	4	1050
11	23	HRS	11.5	86.1	-0.6	16.9	62.3	-0.7	16.5	-23.8	2.4	4	1025
11	24	HRS	12	83.1	-0.4	21.2	61.6	-0.6	17.4	-21.5	3.5	4	1050
11	25	HWS	11.2	85.1	-0.8	20.2	61.5	-0.9	18.3	-23.6	2.9	4	1025
11	26	HWS	11	86.7	-0.4	15.7	67.6	-0.5	19.6	-19.1	3	4	1000
12	27	HWS	11	86.7	-1.0	18.4	67.0	-0.4	22.3	-19.7	2.8	4	950
12	28	HWS	11.4	85.1	-0.8	19.0	71.2	-0.1	21.5	-13.9	2.5	4	1000
13	29	HWW	9.5	87.2	-1.6	18.8	72.1	-0.5	21.6	-15.1	3	4	900
13	30	HWW	9.6	86.2	-1.4	18.5	71.5	-0.3	22.3	-14.7	3	4	850
14	31	HWW	9.9	86.5	-1.4	18.4	70.8	-0.7	20.5	-15.6	2	3	750
15	32	HWW	10	87.4	-1.4	19.8	71.6	-1.2	23.0	-15.8	2.4	4	875
15	33	HWW	9.9	86.6	-1.8	22.4	73.9	-1.0	27.5	-12.7	2.6	3	875
15	34	HWW	10.9	85.1	-1.4	22.2	68.5	-0.7	21.8	-16.6	2	3	975
15	35	HWW	10.3	86.6	-1.8	22.0	73.4	-1.0	28.5	-13.1	2.8	3	925
												1=weak 8=very strong	(100g pup loaf)

Group	Entry	Class	Flour Protein	SRC Water	Sucrose	Na2CO3	LacticAcid
8	18	HRS	13	67.4	110.2	86.7	119.9
9	19	HRS	12.7	67.2	107.6	84.9	129.9
9	20	HRS	13.9	64.3	101.8	79.4	135.1
10	21	HRS	10.1	65.7	108.9	86.3	133.3
10	22	HRS	10.8	64.4	111.5	85.3	124.1
11	23	HRS	11.5	61.0	103.3	78.9	111.2
11	24	HRS	12	62.0	105.9	82.8	125.7
11	25	HWS	11.2	58.9	107.7	80.8	123.3
11	26	HWS	11	63.0	110.0	86.0	118.5
12	27	HWS	11	66.2	104.1	84.1	118.9
12	28	HWS	11.4	60.7	98.5	76.2	114.6
13	29	HWW	9.5	64.8	102.7	87.1	112.0
13	30	HWW	9.6	66.0	108.0	87.6	117.7
14	31	HWW	9.9	70.2	107.6	92.6	114.2
15	32	HWW	10	65.7	102.4	88.2	114.4
15	33	HWW	9.9	65.2	99.0	82.4	115.0
15	34	HWW	10.9	65.2	105.3	86.0	116.7
15	35	HWW	10.3	68.4	104.8	90.1	121.6

- 86 -

University of Idaho Soft Wheat Data																
			Flour		Alkaline Noodle Dough						Sugar Snap Cookie			SRC		
Group	Entry	Class	Protein	L0	a0	b0	L24	a24	b24	Ldiff	Diameter	Top Grain	Water	Sucrose	Na2CO3	LacticAcid
1	1	SWS	8.2	87.9	-2.0	18.7	76.7	-1.6	26.5	-11.2	8.9	3	51.6	94.5	69.8	89.2
1	2	SWS	8.6	88.4	-2.3	20.1	75.0	-1.6	23.5	-13.4	8.9	4	50.0	92.6	72.1	107.7
2	3	SWS	8.9	87.8	-2.1	20.4	75.8	-1.7	22.8	-12.0	9.2	4	49.6	88.2	65.3	99.3
2	4	SWS	9	87.3	-2.4	21.9	77.6	-1.8	25.0	-9.8	8.9	5	50.8	89.2	63.6	97.4
2	5	SWS	8.5	85.1	-1.9	22.7	71.9	-0.7	24.0	-13.2	8.5	5	57.1	101.0	76.8	83.8
3	6	SWW	7	87.1	-2.7	24.6	75.0	-1.6	26.5	-12.1	8.6	5	56.1	97.3	75.5	94.3
3	7	SWW	9	84.8	-2.1	25.8	71.0	-0.7	26.8	-13.9	8.5	4	55.0	96.9	73.6	86.3
4	8	SWW	8	85.1	-2.4	25.7	70.2	-0.7	23.9	-14.9	9.2	5	50.7	86.9	70.5	67.0
4	9	SWW	8.1	86.4	-2.0	22.4	72.8	-0.9	24.0	-13.6	8.7	5	54.2	91.4	70.9	89.3
5	10	SWW	7.6	85.0	-1.9	23.7	68.1	-0.6	23.9	-16.9	8.8	5	53.7	95.3	75.5	76.1
5	11	SWW	7.4	85.8	-2.2	22.6	72.2	-0.4	24.7	-13.6	8.9	5	52.9	90.1	71.0	69.6
6	12	SWW	10.6	82.9	-1.3	23.4	66.9	-0.1	22.4	-15.9	8.5	3	54.7	99.2	68.5	103.1
6	13	SWW	9.6	83.1	-1.7	25.5	70.2	-0.2	25.4	-12.9	8.7	5	52.4	92.6	68.8	109.1
6	14	SWW	9.7	83.5	-1.9	25.8	68.8	-0.1	25.6	-14.7	8.7	4	54.1	95.2	72.1	90.2
7	15	SWW	6.8	85.7	-2.4	25.0	73.4	-0.8	26.3	-12.2	8.7	5	53.8	94.0	75.4	83.9
7	16	SWW	5.8	87.4	-2.6	22.6	77.8	-1.7	26.6	-9.6	8.6	5	54.1	90.4	72.1	75.2
7	17	SWW	6.5	86.5	-2.2	22.6	74.4	-0.9	26.6	-12.1	8.5	5	55.1	98.1	74.4	77.9
											(cm)	1=no islands				
												10=many islands				

- 87 -

USDA-ARS Western Wheat Quality Laboratory
Pullman, Washington

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent				
						Question #1		Question #2		Question #3		Question #4		
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments		
08PN2001-07		SWS	1	1	Sponge Cake	na		5						
SY SALTESE	ck	SWS	1	2	Sponge Cake	na		6	good crumb grain					
11PN2532-195		SWS	2	3	Sponge Cake	na		6						
11PN2532-507		SWS	2	4	Sponge Cake	na		6						
WB1035CL2	ck	SWS	2	5	Sponge Cake	na		2	poor volume & crumb grain					
WA8290		SWW	3	6	Sponge Cake	na		5						
MADSEN	ck	SWW	3	7	Sponge Cake	na		5	rough crumb grain					
UIL09-15702A		SWW	4	8	Sponge Cake	na		9	good crumb grain		good volume			
UI WSU HUFFMAN	ck	SWW	4	9	Sponge Cake	na		5	rough crumb grain					
06PN212-25		SWW	5	10	Sponge Cake	na		7						
SY OVATION	ck	SWW	5	11	Sponge Cake	na		5	rough crumb grain					
SONIC		SWW	6	12	Sponge Cake	na		5	rough crumb grain					
SHARK		SWW	6	13	Sponge Cake	na		7						
HULK	no ck	SWW	6	14	Sponge Cake	na		6	rough crumb grain					
ORI2150031CL+		SWW	7	15	Sponge Cake	na		8			good volume			
OR12161250CL+		SWW	7	16	Sponge Cake	na		6	rough crumb grain					
ORCF102	ck	SWW	7	17	Sponge Cake	na		6						

- 88 -

						1 poor 9 excellent		1 poor 9 excellent		1 poor 9 excellent		
						Question #1		Question #2		Question #3		Question #4
Variety	Check	Class	Group	Sample#	Product	Dough/Batter Rating	Liked/Disliked Comments	End-Product Performance	Liked/Disliked Comments	Overall Acceptability	Liked/Disliked Comments	Mitigating Physical/Chemical Properties & Comments
08PN2001-07		SWS	1	1	Sugar Snap Cookie	na		5		5	High Sucrose SRC	partial waxy type
SY SALTESE	ck	SWS	1	2	Sugar Snap Cookie	na		5		5	High Sucrose SRC	strong gluten type
11PN2532-195		SWS	2	3	Sugar Snap Cookie	na		7		8	low Carb & Water SRC	strong gluten type/ partial waxy type
11PN2532-507		SWS	2	4	Sugar Snap Cookie	na		6		7	low Carb & Water SRC	strong gluten type/ partial waxy type
WB1035CL2	ck	SWS	2	5	Sugar Snap Cookie	na		4		3	High Sucrose, Water& Carb SRC	
WA8290		SWW	3	6	Sugar Snap Cookie	na		5		5	High Sucrose SRC	
MADSEN	ck	SWW	3	7	Sugar Snap Cookie	na		4		5	High Sucrose SRC	
UIL09-15702A		SWW	4	8	Sugar Snap Cookie	na		6		7	low Water SRC	
UI WSU HUFFMAN	ck	SWW	4	9	Sugar Snap Cookie	na		5		5		
06PN212-25		SWW	5	10	Sugar Snap Cookie	na		5		5	High Sucrose SRC	
SY OVATION	ck	SWW	5	11	Sugar Snap Cookie	na		5		5		
SONIC		SWW	6	12	Sugar Snap Cookie	na		4		4	High Sucrose & Water SRC	
SHARK		SWW	6	13	Sugar Snap Cookie	na		5		5		
HULK	no ck	SWW	6	14	Sugar Snap Cookie	na		4		4		
ORI2150031CL+		SWW	7	15	Sugar Snap Cookie	na		5		5		
OR12161250CL+		SWW	7	16	Sugar Snap Cookie	na		5		5		
ORCF102	ck	SWW	7	17	Sugar Snap Cookie	na		4		3	High Sucrose, Water& Carb SRC	
WB9662	no ck	HRS	8	18	Pup Loaf Bread	1	very weak mixing	2	good abs.	2	very poor grain & vol performance	reasonable dough handling feel
10PN3039-02		HRS	9	19	Pup Loaf Bread	4	lower level of accept. Strength	5		5		
SY-605CL	ck	HRS	9	20	Pup Loaf Bread	3	weak mix type	5		4	low volume for protein	good dough feel
WA8280		HRS	10	21	Pup Loaf Bread	5	promising strength for protein level	5	good abs.	6	good volume for protein	Good absorption
KELSE	ck	HRS	10	22	Pup Loaf Bread	4	minimal dough strength	5		5	good volume for protein	
IDO 1801S		HRS	11	23	Pup Loaf Bread	3	weak mix type	5		4	weak mixing and crumb grain type	
IDO 1805S		HRS	11	24	Pup Loaf Bread	7	good dough strength	5		6	vey good dough properties	good dough feel
IDO 1704S		HWS	11	25	Pup Loaf Bread	5		5		6	good volume for protein	
UI PLANTINUM	ck	HWS	11	26	Pup Loaf Bread	5		5		6	good volume for protein	good dough feel
12SB0224		HWS	12	27	Pup Loaf Bread	6	good mix time	5		6	showing effect of lower protein	good dough feel
DAYN	ck	HWS	12	28	Pup Loaf Bread	5		5		6	good volume for protein	good dough feel
IRV	ck	HWW	13	29	Pup Loaf Bread	7	good dough strength esp. for prot.	4	weaker crumb grain	5	very good performance for protein	showing effect of lower protein
OR2130118H		HWW	13	30	Pup Loaf Bread	5	promising strength for protein level	4	weaker crumb grain	5	good performance for protein	
WA8252	no ck	HWW	14	31	Pup Loaf Bread	3	weaker dough type	5	good abs./ poor grain	4	weak mixing type	showing effect of lower protein
IDO 1506		HWW	15	32	Pup Loaf Bread	3		4	weak grain type	4		showing effect of lower protein
IDO 1706		HWW	15	33	Pup Loaf Bread	4		3	poor grain	3		showing effect of lower protein
IDO 1806		HWW	15	34	Pup Loaf Bread	4	weak mix type	4	weak mixing & grain	4	made volume expectation for prot	showing effect of lower protein
UI SILVER	ck	HWW	15	35	Pup Loaf Bread	5		5	good abs.	5	good performance for protein	showing effect of lower protein

Sample	Variety	Group	Location	Class	Test Wt	Falling Number	Single Kernel Hardness	SD	Single Kernel Weight	SD	Single Kernel Size	SD
1	08PN2001-07	Group 1	Walla Walla	SWS	63.3	314	17.86	9.95	47.3	9.6	3	0.34
2	SY SALTESE	Group 1	Walla Walla	SWS	64.8	371	12.81	9.5	47.3	10.5	3.03	0.38
3	11PN2532-195	Group 2	Colfax	SWS	64.1	355	11.33	10	47	10.2	3.02	0.4
4	11PN2532-507	Group 2	Colfax	SWS	63.5	367	17.89	13.2	45.2	10.5	2.94	0.38
5	WB1035CL2	Group 2	Colfax	SWS	62.5	351	37.63	14.4	36.2	9.41	2.66	0.35
6	WA8290	Group 3	Pullman	SWW	62.7	359	23.08	12	41.7	8.74	2.7	0.31
7	MADSEN	Group 3	Pullman	SWW	63.4	365	35.59	12.6	39.6	8.26	2.75	0.3
8	UIL09-15702A	Group 4	Moscow	SWW	63.9	387	11.52	8.93	42.7	9.16	2.75	0.35
9	UI WSU Huffman	Group 4	Moscow	SWW	63.2	391	32.63	13.8	41.5	8.5	2.78	0.32
10	06PN212-25	Group 5	Moses Lake/Colfax	SWW	61.8	423	18.6	11.9	45.8	11.6	2.87	0.37
11	SY OVATION	Group 5	Moses Lake/Colfax	SWW	63.8	352	16.19	10.7	55.4	10.9	3.07	0.38
12	SONIC	Group 6		SWW	61.4	347	25.86	15.6	38.5	10.6	2.75	0.34
13	SHARK	Group 6		SWW	62.3	359	11.46	10.1	47.6	8.91	3.12	0.35
14	HULK	Group 6		SWW	63.4	368	22.38	14.9	41.5	10	2.83	0.35
15	ORI2150031C1	Group 7	Corvallis	SWW	63.1	363	19.99	13.4	43.2	11	2.85	0.36
16	ORI2161250	Group 7	Corvallis	SWW	62.8	355	17.67	12.3	45.5	11.3	2.97	0.39
17	ORCF102	Group 7	Corvallis	SWW	63.5	349	26.26	15.1	49.4	11.8	2.98	0.39
18	WB9662	Group 8	Stanfield	HRS	64.7	411	58.65	13.6	43.2	9.95	2.98	0.35
19	10PN3039-02	Group 9	Moses Lake/Colfax	HRS	65.1	407	67.26	15.3	40	10.6	2.8	0.4
20	SY-605CL	Group 9	Moses Lake/Colfax	HRS	64.6	380	69.13	16.4	32	9.46	2.6	0.33
21	WA8280	Group 10	Pullman/Palouse/Plaz	HRS	63.9	376	63.71	15.9	35	9.01	2.67	0.31
22	KELSE	Group 10	Pullman/Palouse/Plaz	HRS	62	385	51.16	15.2	41.7	10	2.82	0.36
23	IDO 1801S	Group 11	Aberdeen	HRS	62.9	386	51.04	12.3	39.2	8.04	2.84	0.35
24	IDO 1805S	Group 11	Aberdeen	HRS	63	399	61.16	12.6	37.1	7.29	2.73	0.3
25	IDO 1704S	Group 11	Aberdeen	HWS	64.1	404	40.87	13.5	48.6	9.44	2.93	0.35
26	UI PLATINUM	Group 11	Aberdeen	HWS	64.2	333	51.41	12.9	43.7	9.48	2.89	0.33
27	12SB0224	Group 12		HWS	62.3	447	57.06	16.7	35.9	9.82	2.72	0.37
28	DAYN	Group 12		HWS	63.6	432	41.69	16.3	39	9.91	2.72	0.37
29	IRV	Group 13	Hermiston/LaGrande	HWW	64.4	382	64.16	15.3	42.8	9.97	2.84	0.35
30	OR2130118H	Group 13	Hermiston/LaGrande	HWW	66.1	342	60.4	16.6	42.4	11.6	2.92	0.41
31	WA8252	Group 14	Pullman	HWW	66	387	59.92	15.4	51.5	12.1	3.14	0.37
32	IDO 1506	Group 15	Aberdeen	HWW	62.6	368	67.82	22.4	35.3	8.47	2.73	0.35
33	IDO 1706	Group 15	Aberdeen	HWW	63.1	359	53.9	16.4	42.7	10	2.8	0.41
34	IDO 1806	Group 15	Aberdeen	HWW	64.8	413	62.63	14.2	41.5	9.34	2.82	0.33
35	UI Silver	Group 15	Aberdeen	HWW	63.6	351	62.9	17.7	38.8	8.15	2.84	0.32

- 90 -

					Flour Milling (14% mb corrected)					
Sample	Variety	Group	L-DOPA Color	Wheat Protein	Break Yield	Patent Yield	Total Yield	Whole Wheat Ash	Flour Ash	Flour Protein
1	08PN2001-07	Group 1	0.624	9.5	29.9	62.0	77.9	1.09	0.42	8.2
2	SY SALTESE	Group 1	1.47	9.4	29.8	59.7	76.7	1.01	0.38	8.6
3	11PN2532-195	Group 2	0.531	10.3	27.7	58.7	77.3	1.76	0.46	8.9
4	11PN2532-507	Group 2	0.512	10.5	24.4	56.2	75.3	1.81	0.46	9
5	WB1035CL2	Group 2	1.056	10.2	23.8	57.8	75.6	1.85	0.48	8.5
6	WA8290	Group 3	1.125	8.4	28.5	61.6	79.6	1.32	0.43	7
7	MADSEN	Group 3	1.206	9.8	25.6	61.7	79.4	1.25	0.46	9
8	UIL09-15702A	Group 4	1.01	8.8	30.4	60.6	78.9	1.67	0.44	8
9	UI WSU Huffm	Group 4	1.131	9.4	26.6	61.7	78.2	1.44	0.4	8.1
10	06PN212-25	Group 5	1.933	9.1	28.0	57.6	76.5	1.53	0.48	7.6
11	SY OVATION	Group 5	1.084	8.3	28.8	61.6	79.6	1.72	0.52	7.4
12	SONIC	Group 6	0.93	11.7	24.5	55.8	77.1	1.62	0.49	10.6
13	SHARK	Group 6	1.198	10.5	27.8	61.6	79.5	1.31	0.4	9.6
14	HULK	Group 6	0.921	11	26.7	59.4	78.1	1.5	0.44	9.7
15	ORI2150031C	Group 7	1.714	7.9	29.5	62.8	77.8	1.5	0.47	6.8
16	ORI2161250	Group 7	0.584	6.5	29.0	60.8	77.8	1.48	0.47	5.8
17	ORCF102	Group 7	0.912	7.8	27.2	60.7	77.9	1.5	0.49	6.5
18	WB9662	Group 8	1.153	14.1	21.1	54.4	77.5	1.59	0.52	13
19	10PN3039-02	Group 9	1.558	13.6	17.8	51.1	75.7	1.47	0.51	12.7
20	SY-605CL	Group 9	1.64	14.7	22.8	55.4	75.2	1.66	0.45	13.9
21	WA8280	Group 10	0.821	11.6	20.0	55.1	76.2	1.29	0.4	10.1
22	KELSE	Group 10	0.462	11.7	17.5	53.2	74.9	1.34	0.5	10.9
23	IDO 1801S	Group 11	0.965	12.3	21.2	58.7	79.3	1.48	0.45	11.5
24	IDO 1805S	Group 11	1.032	12.9	20.3	57.4	78.4	1.61	0.45	12
25	IDO 1704S	Group 11	0.963	11.9	22.5	56.9	78.4	1.5	0.44	11.2
26	UI PLATINUM	Group 11	0.52	11.7	21.6	57.4	78.8	1.58	0.46	11
27	12SB0224	Group 12	1.164	11.7	18.0	52.7	75.3	1.5	0.49	11
28	DAYN	Group 12	0.48	12.3	21.6	56.2	76.3	1.53	0.46	11.4
29	IRV	Group 13	0.97	11.2	19.7	54.2	78.3	1.49	0.41	9.5
30	OR2130118H	Group 13	1.287	10.8	21.7	54.0	77.7	1.49	0.38	9.6
31	WA8252	Group 14	0.958	11	20.1	52.1	77.5	1.46	0.45	9.9
32	IDO 1506	Group 15	1.102	11.2	20.6	55.7	77.4	1.8	0.46	10
33	IDO 1706	Group 15	0.429	11.2	23.5	61.5	81.0	1.64	0.37	9.9
34	IDO 1806	Group 15	0.556	12.3	20.3	56.9	79.0	1.75	0.46	10.9
35	UI Silver	Group 15	0.395	11.3	20.2	56.5	78.2	1.73	0.4	10.3

- 91 -

			Solvent Retention Capacity				Flour	Flour Swelling		Flour Falling
Sample	Variety	Group	%CARB	%LACTIC	%WATER	%SUCROSE	SDS	Volume	RVA	Number
1	08PN2001-07	Group 1	70	95.4	55	97.1	10.3	26.2	242	350
2	SY SALTESE	Group 1	70.3	117.4	53.9	98.2	14.2	22.5	216	393
3	11PN2532-195	Group 2	65.5	108.2	51.9	90.9	12.5	22.7	215	353
4	11PN2532-507	Group 2	64.2	102.3	52.5	92.6	13.1	24	224	360
5	WB1035CL2	Group 2	76.1	89.7	59.5	102.1	8.9	24.2	239	337
6	WA8290	Group 3	74.3	100.1	57.4	98.4	8.6	22.7	182	339
7	MADSEN	Group 3	74.4	92.7	58	98.3	9	21	158	337
8	UIL09-15702A	Group 4	69.9	74.8	52.8	93.1	6.4	21.9	173	361
9	UI WSU Huffm	Group 4	71.6	96.5	58.1	93.8	7.6	23.4	168	359
10	06PN212-25	Group 5	76.9	84.1	56	98.7	6	23.6	152	416
11	SY OVATION	Group 5	72.9	67.9	54.7	92.1	6.7	22.5	181	374
12	SONIC	Group 6	74.7	111.6	60	100.9	13.5	20.5	138	381
13	SHARK	Group 6	69.5	118.6	54.4	94.5	14.8	23.3	184	371
14	HULK	Group 6	73.6	96.2	57.4	95	9.3	23.3	162	373
15	ORI2150031C	Group 7	75.5	90.6	57	95.3	8.7	21.7	161	359
16	ORI2161250	Group 7	73.1	78.9	56.7	95.1	5	23.6	175	361
17	ORCF102	Group 7	75.2	79.9	59.1	96.3	6.3	21	161	344
18	WB9662	Group 8	86	124	67.8	108.6	12.9	21.1	231	406
19	10PN3039-02	Group 9	85.4	136.9	68.1	103.9	19.3	20.7	211	411
20	SY-605CL	Group 9	80.3	140.1	65.2	100.8	15.1	20.8	199	364
21	WA8280	Group 10	86.8	145.2	68.2	107.7	20.8	21.3	190	371
22	KELSE	Group 10	84.3	137.2	65.3	107.8	21.2	22	196	388
23	IDO 1801S	Group 11	81.5	118.5	60.2	103.1	16.1	23	225	380
24	IDO 1805S	Group 11	81.5	139.8	63.7	102.3	18.7	23.7	212	389
25	IDO 1704S	Group 11	81.5	139.3	61.7	106	19.7	23.1	186	401
26	UI PLATINUM	Group 11	86.4	129.8	63.2	108.6	17.9	23	158	339
27	12SB0224	Group 12	83.7	124.3	66.5	104.3	16.3	20.7	230	431
28	DAYN	Group 12	78.5	123.1	63.8	100.2	15.5	24.2	262	419
29	IRV	Group 13	87.8	118.1	68.2	101.2	12.8	21.7	200	373
30	OR2130118H	Group 13	87.7	126.1	68.8	107.1	14.4	22.2	227	340
31	WA8252	Group 14	94.2	114.8	73.6	108.8	12.4	20.8	171	383
32	IDO 1506	Group 15	89.2	122.8	68.5	101.6	13.1	23.1	163	364
33	IDO 1706	Group 15	83.1	122.6	66.2	100.9	12.5	22.8	148	358
34	IDO 1806	Group 15	86	124.2	64.7	104.7	14.5	21.7	179	389
35	UI Silver	Group 15	89	127	69.9	104	15.5	21	178	371

- 92 -

Sample	Variety	Group	Absorption	Type	Time	Mixograph Height	Work	Width +2min	Absorption	Farinograph Peak	Stability	MTI
1	08PN2001-07	Group 1	56.8	3M	2.5	45.4	100	4.8	53.8	2.2	3	108
2	SY SALTESE	Group 1	58.5	4M	3.7	48.7	146.7	8	52.6	5	6.1	67
3	11PN2532-195	Group 2	58.4	6M	4.8	44.2	186.3	7.5	52.6	4.5	6.8	58
4	11PN2532-507	Group 2	58.2	6M	5.4	43.1	203.7	7.4	53.6	5	7.4	54
5	WB1035CL2	Group 2	58.3	2M	1.8	50.4	79.9	6	56.9	2.2	2.1	98
6	WA8290	Group 3	58.3	6M	4.4	40.8	160.3	6.8	54.1	1.2	1.1	97
7	MADSEN	Group 3	59	2M	2.1	50.2	92.7	5.3	56.4	2	2.9	97
8	UIL09-15702A	Group 4	57.6	1M	1.5	43.6	55.9	2.5	52.4	1.4	1.2	145
9	UI WSU Huffm	Group 4	58.5	3M	2.8	46.4	115.2	5.2	55.5	2.5	3.7	80
10	06PN212-25	Group 5	58.3	2M	1.8	44	69.8	2.9	55	1.2	1.6	127
11	SY OVATION	Group 5	58.5	3M	2.3	43.7	90.7	3.9	54.5	1.2	2.4	103
12	SONIC	Group 6	58.8	2M	2.3	54.2	105.6	4.2	56.4	2.8	2.6	33
13	SHARK	Group 6	58.6	4M	3.3	47.1	134.6	7	53.5	3.2	4.8	68
14	HULK	Group 6	58.8	2M	2	49.5	85	5	56.5	2	1.8	123
15	ORI2150031C1	Group 7	57.5	4M	3.5	41.3	130.1	5.5	53.8	1	2.1	105
16	ORI2161250	Group 7	56.6	3M	4.5	37.9	159.8	6.6	53.7	1	1	143
17	ORCF102	Group 7	57.2	4M	3.3	41.8	122.3	5.7	54.9	1.2	1.1	137
18	WB9662	Group 8	60.9	2H	1.8	69.5	96	5.4	66	5.2	5.5	28
19	10PN3039-02	Group 9	65	4H	3	62.8	155.4	17	65.6	10.5	16	9
20	SY-605CL	Group 9	63.7	2H	2.5	63.7	134.8	10	65.6	8	12	10
21	WA8280	Group 10	61.2	6M	3.9	53.5	178.8	14.5	61.5	7.2	15.6	14
22	KELSE	Group 10	61	4M	3	56.4	148.4	16.9	62.3	6.5	10.4	23
23	IDO 1801S	Group 11	61	3H	2.6	62.8	131.8	5.8	62.3	6.7	6.2	26
24	IDO 1805S	Group 11	62.4	4H	4.1	62.1	209	13.9	62.8	9.7	12.4	2
25	IDO 1704S	Group 11	61.8	4H	3.2	58.9	153.2	13.9	61.1	8	9.7	8
26	UI PLATINUM	Group 11	61.8	4H	3.3	62	166.6	11.1	62.6	6.8	8.8	13
27	12SB0224	Group 12	60.8	6M	4.7	56.8	228.4	10.6	61	7	13	13
28	DAYN	Group 12	61	3H	3.1	58.8	150	8.2	61.2	6.5	9.7	7
29	IRV	Group 13	60.3	6M	4.5	50.9	202.4	9.2	61.5	6	8	36
30	OR2130118H	Group 13	61.4	6M	3.7	53	171.2	9.1	62.4	5	7.8	31
31	WA8252	Group 14	61.4	3M	2.8	56.5	135.9	9.8	64.9	3.9	4.3	54
32	IDO 1506	Group 15	61	2H	3	59.2	151.5	9.9	62.9	4.7	5.4	45
33	IDO 1706	Group 15	60.9	3M	3.1	56.3	145.6	9.2	61.6	4.5	6.2	42
34	IDO 1806	Group 15	61.7	3H	2.9	59.5	144.8	9.9	62.9	5	6.3	37
35	UI Silver	Group 15	62	4M	3.6	57.8	174.5	11.2	63.8	5.8	8.2	30

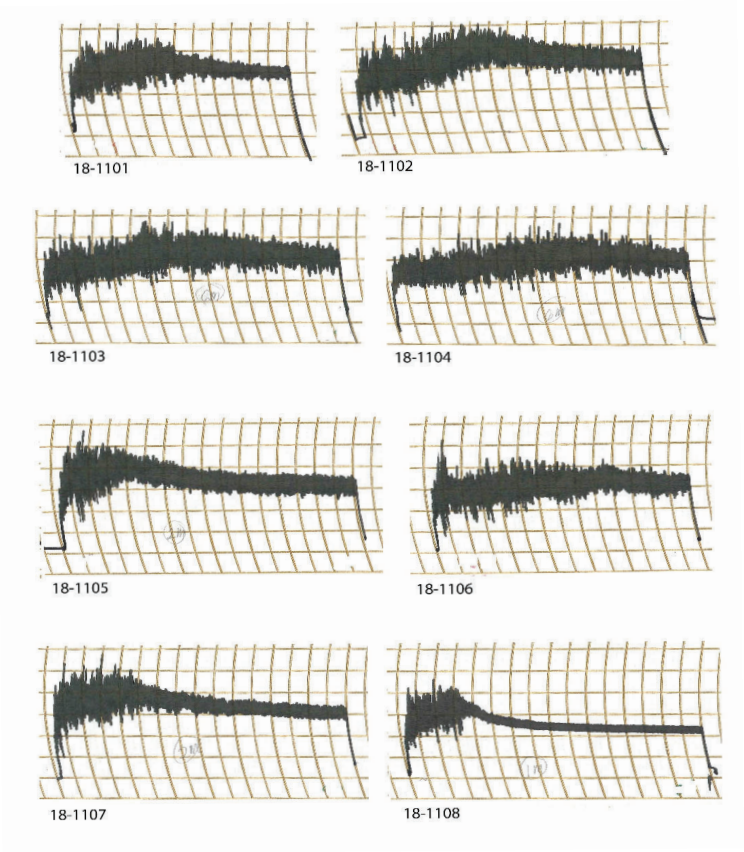
- 93 -

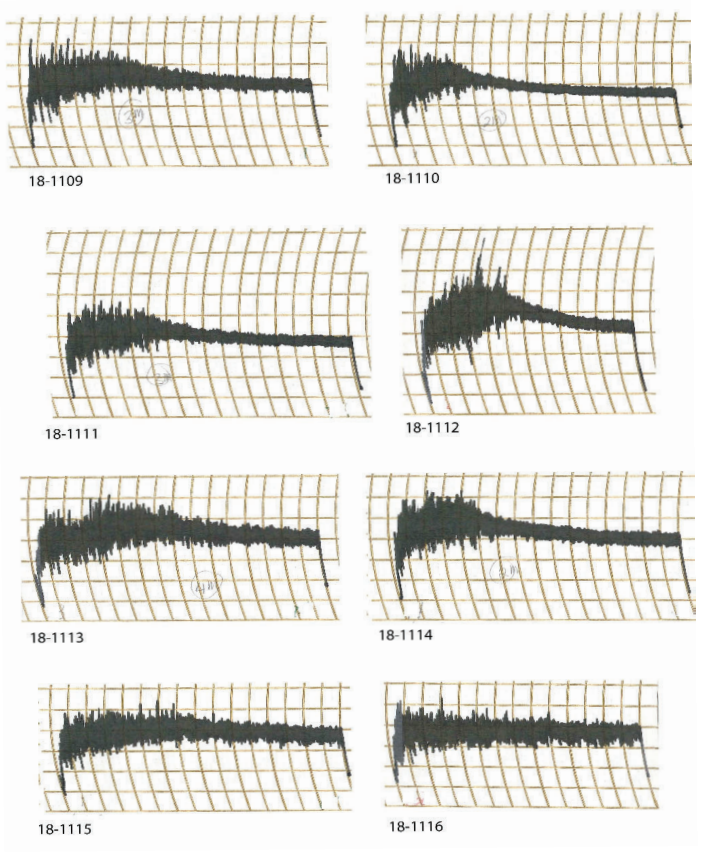
				Alveograph				Sugar Snap	Sugar Snap	Sponge	Cake	
Sample	Variety	Group	P	L	W	G	P/L	Diameter	Top Grain	Volume	Grain	Sample
1	08PN2001-07	Group 1	30	148	79	27	0.2	9.06		1198	20	1
2	SY SALTESE	Group 1	28	181	133	29.9	0.15	8.99		1215	22	2
3	11PN2532-195	Group 2	34	153	140	27.5	0.22	9.34		1225	20	3
4	11PN2532-507	Group 2	42	125	163	24.8	0.34	9.27		1235	20	4
5	WB1035CL2	Group 2	42	80	80	19.9	0.52	8.75		1168	19	5
6	WA8290	Group 3	77	52	140	16	1.48	8.93		1222	18	6
7	MADSEN	Group 3	48	92	102	21.3	0.52	8.74		1232	19	7
8	UIL09-15702A	Group 4	18	98	31	22	0.18	9.27		1332	22	8
9	UI WSU Huffm	Group 4	49	69	90	18.4	0.71	8.98		1222	19	9
10	06PN212-25	Group 5	36	68	55	18.3	0.53	9.02		1265	20	10
11	SY OVATION	Group 5	39	58	61	16.9	0.67	8.94		1242	19	11
12	SONIC	Group 6	38	150	110	27.2	0.25	8.63		1208	19	12
13	SHARK	Group 6	35	150	131	27.2	0.23	8.85		1255	20	13
14	HULK	Group 6	37	124	86	24.7	0.3	8.65		1260	19	14
15	ORI2150031C1	Group 7	36	78	70	19.6	0.46	8.88		1292	20	15
16	ORI2161250	Group 7	48	44	68	14.7	1.09	8.94		1268	19	16
17	ORCF102	Group 7	35	56	53	16.6	0.63	8.75		1210	20	17
18	WB9662	Group 8	51	118	142	24.1	0.43					18
19	10PN3039-02	Group 9	94	74	294	19.1	1.27					19
20	SY-605CL	Group 9	84	77	240	19.5	1.09					20
21	WA8280	Group 10	130	33	203	12.8	3.94					21
22	KELSE	Group 10	126	41	238	14.2	3.07					22
23	IDO 1801S	Group 11	68	150	271	27.2	0.45					23
24	IDO 1805S	Group 11	106	86	327	19.9	1.23					24
25	IDO 1704S	Group 11	77	150	341	27.2	0.51					25
26	UI PLATINUM	Group 11	98	74	265	19.1	1.32					26
27	12SB0224	Group 12	120	74	338	19.1	1.62					27
28	DAYN	Group 12	58	156	252	27.7	0.37					28
29	IRV	Group 13	109	49	205	15.5	2.22					29
30	OR2130118H	Group 13	135	49	256	15.5	2.76					30
31	WA8252	Group 14	125	45	209	14.9	2.78					31
32	IDO 1506	Group 15	99	85	260	20.5	1.16					32
33	IDO 1706	Group 15	77	69	171	18.4	1.12					33
34	IDO 1806	Group 15	113	48	214	15.4	2.35					34
35	UI Silver	Group 15	107	48	199	15.4	2.23					35

- 94 -

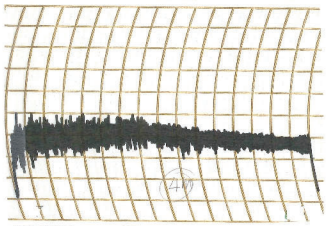
		100g Pup Loaf Bread				Potential			Alkaline Noodle Color				
Variety	Group	Absorption	Mix Time	Volume	Crumb Grain	Volume	L* 0 Hour	a* 0 Hour	b* 0 Hour	L* 24 Hour	a* 24 Hour	b* 24 Hour	Delta L
08PN2001-07	Group 1						87.2	-2.7	20.7	79.7	-1.4	29.3	7.5
SY SALTESE	Group 1						87.1	-2.3	19.3	75.4	-0.5	23.8	11.7
11PN2532-195	Group 2						87	-2.2	19.5	77.2	-1.2	25.2	9.8
11PN2532-507	Group 2						87.5	-2.3	19.6	79.8	-1.6	27.3	7.7
WB1035CL2	Group 2						83.6	-2	25.7	73.4	0.2	27.6	10.2
WA8290	Group 3						88	-2.7	20.7	78.2	-1.4	24.4	9.8
MADSEN	Group 3						86	-2	21.7	73	-0.1	27	13
UIL09-15702A	Group 4						88.2	-2	17.4	77.4	-0.8	21.4	10.8
UI WSU Huffm	Group 4						86.8	-2	19.7	76	-0.6	23.7	10.8
06PN212-25	Group 5						87.4	-2	18.1	75.5	-0.6	20.7	11.9
SY OVATION	Group 5						86.6	-2.1	19.6	74.8	0.1	24.5	11.8
SONIC	Group 6						85.7	-1.3	16.9	72	0.3	21.2	13.7
SHARK	Group 6						84.9	-1.5	19.9	72.2	0.6	27.5	12.7
HULK	Group 6						84.2	-1.7	22.5	71.1	0.5	27.3	13.1
ORI2150031C	Group 7						85.3	-2.5	25.1	73.8	0	29.3	11.5
ORI2161250	Group 7						86.8	-2.4	20.2	79.6	-1.2	26.2	7.2
ORCF102	Group 7						85.4	-2.3	23.1	75	-0.3	28.8	10.4
WB9662	Group 8	69.1	2.1	818	6	-167	84.2	-0.9	18.4	68.6	0	21.4	15.6
10PN3039-02	Group 9	67.2	4.5	950	4	-16	85.5	-0.7	15.2	73.7	0.7	19.2	11.8
SY-605CL	Group 9	67.9	3	970	4	-74	85	-0.8	16.9	71.4	0.5	21.8	13.6
WA8280	Group 10	66.4	4.6	908	4	112	85.6	-1.2	16.9	72.5	0.3	21.2	13.1
KELSE	Group 10	63.2	3.6	940	4	92	85.9	-1.5	18.7	74.8	0	27.3	11.1
IDO 1801S	Group 11	63.7	3.1	903	5	16	84.7	-0.9	18.3	64.7	0.3	19.5	20
IDO 1805S	Group 11	65.1	4.4	975	4	55	85.7	-0.8	16.2	68.4	-0.1	18.3	17.3
IDO 1704S	Group 11	65	3.9	955	4	87	86.1	-1.2	16.4	68.7	-0.1	17.8	17.4
UI PLATINUM	Group 11	64	3.3	935	4	80	87.9	-1.2	14.7	77.6	-0.4	20	10.3
12SB0224	Group 12	64.5	4.5	925	4	70	86.7	-1.8	18.9	75.1	-0.2	20.7	11.6
DAYN	Group 12	63.2	3.3	988	4	107	86.8	-1.4	17	77.9	-0.2	24.1	8.9
IRV	Group 13	62.5	4.3	800	5	43	85.5	-1.4	18.4	72.9	0.4	22.5	12.6
OR2130118H	Group 13	64.6	3.6	833	5	69	85.7	-1.4	17.4	72	0.7	23.8	13.7
WA8252	Group 14	65.6	2.8	823	6	40	85.7	-1.6	18.2	74	-0.1	21.3	11.7
IDO 1506	Group 15	63.2	2.5	813	5	23	88	-1.7	17.9	77	-0.9	22.3	11
IDO 1706	Group 15	64.1	2.8	805	6	22	86.9	-1.6	18.6	77.3	-0.3	28.3	9.6
IDO 1806	Group 15	64.4	2.7	850	5	2	85.9	-1.6	19.5	74.6	-0.1	24.7	11.3
UI Silver	Group 15	66.7	3.3	878	4	69	86.6	-1.8	20.6	77.5	-0.5	29.3	9.1

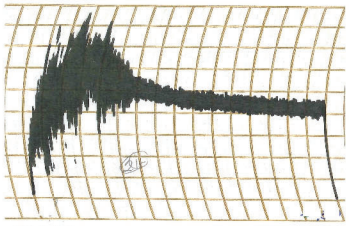
- 95 -

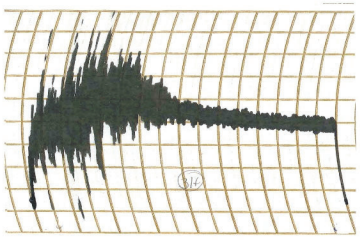

18-1101
18-1102
18-1103
18-1104
18-1105
18-1106
18-1107
18-1108

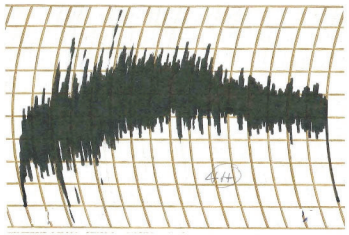

18-1109
18-1110
18-1111
18-1112
18-1113
18-1114
18-1115
18-1116

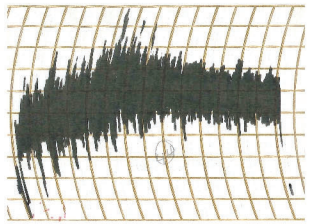
- 96 -

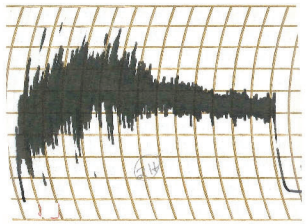

18-1117

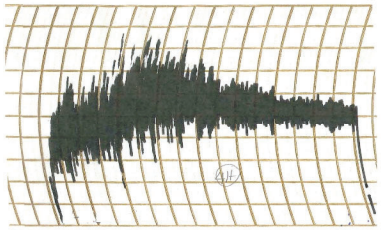

18-1118

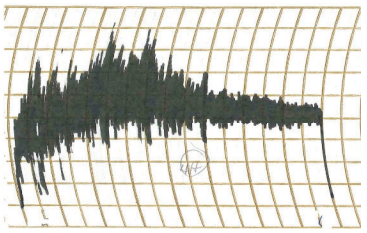

18-1123

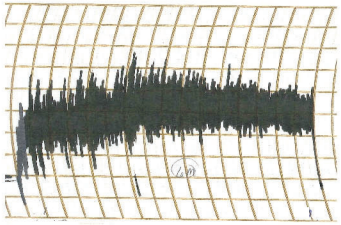

18-1124

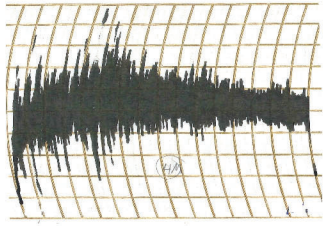

18-1119

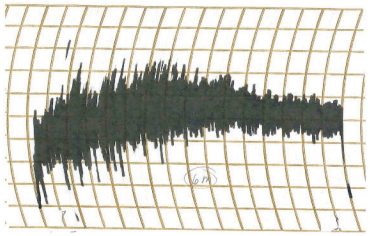

18-1120

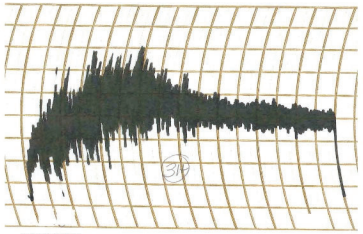

18-1125


18-1126

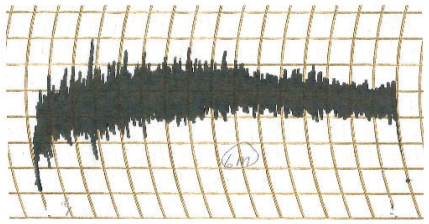

18-1121

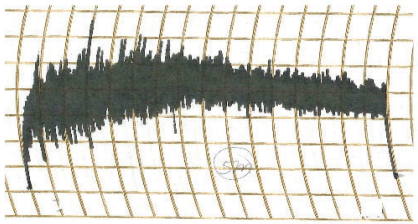

18-1122

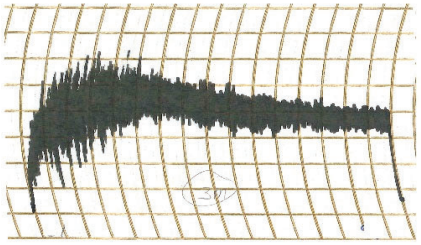

18-1127

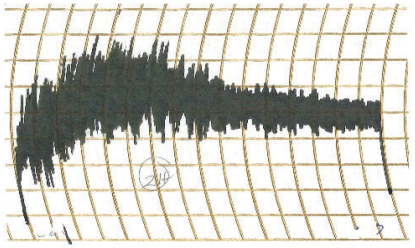

18-1128

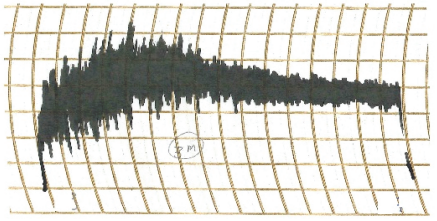
- 97 -

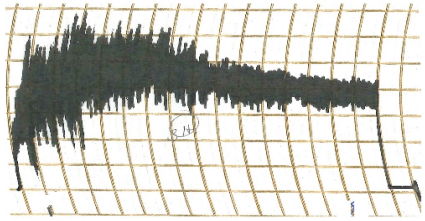

18-1129

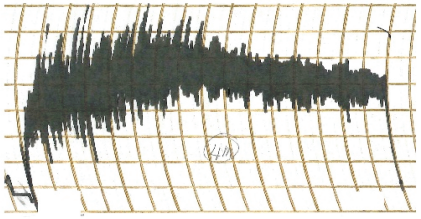

18-1130


18-1131


18-1132


18-1133


18-1134


18-1135

End-Use Form Summary Tables

	Sample																																		
Question #1 Dough	08PN2001-07	SY SALTESE	11PN2532-195	11PN2532-507	WB1035CL2	WA8290	MADSEN	UIL09-15702A	UI WSU HUFFMAN	06PN212-25	SY OVATION	SONIC	SHARK	HULK	ORI215003 1CL+	OR12161250CL+	ORCF102	WB9662	10PN3039-02	SY-605CL	WA8280	KELSE	IDO 1801S	IDO 1805S	IDO 1704S	UI PLANTINUM	12SB0224	DAYN	IRV	OR2130118H	WA8252	IDO 1506	IDO 1706	IDO 1806	UI SILVER
Collaborator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
ADM (Bread & Cookie)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	7.0	7.0	5.0	7.0	7.0	5.0	5.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ardent Mills (Bread & Cookie)	9.0	7.0	9.0	6.0	6.0	7.0	7.0	9.0	9.0	7.0	7.0	9.0	7.0	7.0	7.0	9.0	7.0	4.0	7.0	7.0	6.0	4.0	3.0	7.0	7.0	7.0	7.0	6.0	5.0	4.0	4.0	6.0	7.0	6.0	6.0
California WQL (Bread)																		4.0	8.0	8.0	7.0	8.0	6.0	9.0	8.0	8.0	8.0	7.0	5.0	6.0	4.0	6.0	5.0	6.0	7.0
Colorado State (Bread)																		1.0	7.0	5.0	7.0	6.0	3.0	7.0	7.0	6.0	5.0	6.0	3.0	4.0	2.0	2.0	3.0	5.0	6.0
Daesun Flour Mills Korea	4.0	5.0	7.0	6.0	4.0	5.0	5.0	6.0	6.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	5.0	7.0	5.0	5.0	6.0	6.0	4.0	7.0	6.0	7.0	5.0	4.0	4.0	5.0	4.0
Graincraft (Bread)																		2.0	9.0	6.0	8.0	4.0	2.0	8.0	4.0	5.0	7.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0	3.0
HRS & Durum WQL (Bread)																		2.0	7.0	6.0	5.0	6.0	3.0	6.0	5.0	5.0	4.0	5.0	6.0	7.0	5.0	4.0	4.0	4.0	6.0
Japan Flour Millers Association (Sponge Cake & Bread)	4.0	5.0	6.0	5.0	3.0	6.0	5.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	3.0	7.0	7.0	6.0	7.0	2.0	3.0	4.0	3.0	6.0	4.0	5.0	5.0	5.0	7.0	5.0	5.0	4.0
Krusteaz - Continental Mills (Pancake)	7.0	7.0	4.0	6.0	7.0	7.0	7.0	6.0	7.0	4.0	7.0	7.0	7.0	8.0	7.0	2.0	7.0																		
Limagrain (Bread & Cookie)	9.0	9.0	9.0	9.0	4.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	9.0	5.0	4.0	4.0	4.0	3.0	8.0	4.0	6.0	5.0	3.0	8.0	5.0	7.0	8.0	4.0	7.0	8.0	5.0	7.0	6.0	6.0	8.0
Montana State (Bread)																		4.5	5.8	5.9	5.7	5.6	5.1	6.0	5.9	6.2	6.2	6.2	6.2	5.7	5.2	5.7	5.5	6.0	5.7
SWQL (Cookie)																																			
Syngenta (Bread & Cookie)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	7.0	1.0	5.0	3.0	4.0	4.0	2.0	6.0	6.0	5.0	4.0	4.0	3.0	3.0	2.0	3.0	4.0	4.0	3.0
U of Idaho (Bread & Cookie)																																			
WWQL (Bread & Cookie)																		1.0	4.0	3.0	5.0	4.0	3.0	7.0	5.0	5.0	6.0	5.0	7.0	5.0	3.0	3.0	4.0	4.0	5.0
Wheat Marketing Center (Noodle)																																			
Wheat Marketing Center (Bread & Sponge Cake)																																			
Mean	**6.9**	**6.9**	**7.1**	**6.7**	**5.6**	**6.4**	**6.3**	**6.6**	**6.4**	**5.9**	**6.3**	**6.6**	**7.0**	**6.6**	**6.0**	**5.6**	**6.0**	**3.0**	**6.7**	**5.8**	**6.0**	**5.6**	**3.5**	**6.6**	**5.8**	**5.7**	**5.9**	**5.4**	**5.0**	**5.1**	**3.9**	**4.6**	**4.5**	**4.8**	**5.2**

Soft Wheat Samples Hard Wheat Samples

- 99 -

	Sample																																		
Question #2 Product	08PN2001-07	SY SALTESE	11PN2532-195	11PN2532-507	WB1035CL2	WA8290	MADSEN	UIL09-15702A	UI WSU HUFFMAN	08PN212-25	SY OVATION	SONIC	SHARK	HULK	ORI2150031CL+	OR12161250CL+	ORCF102	WB9662	10PN3039-02	SY-605CL	WA8280	KELSE	IDO 1801S	IDO 1805S	IDO 1704S	UI PLANTINUM	12SB0224	DAYN	IRV	OR2130118H	WA8252	IDO 1506	IDO 1706	IDO 1806	UI SILVER
Collaborator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
ADM (Bread & Cookie)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	4.0	7.0	4.0	5.0	8.0	7.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ardent Mills (Bread & Cookie)	9.0	9.0	9.0	9.0	6.0	7.0	6.0	9.0	7.0	8.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0	3.0	8.0	7.0	8.0	7.0	4.0	8.0	8.0	8.0	8.0	7.0	7.0	6.0	5.0	6.0	7.0	7.0	7.0
California WQL (Bread)																		7.0	9.0	7.0	7.0	7.0	8.0	8.0	8.0	8.0	6.0	9.0	8.0	5.0	5.0	6.0	5.0	7.0	7.0
Colorado State (Bread)																		1.0	5.0	6.0	5.0	4.0	3.0	6.0	7.0	5.0	7.0	4.0	3.0	4.0	4.0	2.0	3.0	4.0	4.0
Daesun Flour Mills Korea	5.0	7.0	8.0	7.5	5.0	6.0	5.0	7.0	7.0	6.0	5.0	4.0	4.0	5.0	5.0	7.0	6.0	4.0	7.0	7.0	6.0	7.0	5.0	4.0	7.0	7.0	5.0	7.0	7.0	7.0	4.0	4.0	3.5	6.0	5.0
Graincraft (Bread)																		1.0	9.0	4.0	8.0	7.0	2.0	6.0	2.0	4.0	7.0	3.0	3.0	3.0	2.0	2.0	3.0	3.0	6.0
HRS & Durum WQL (Bread)																		3.0	7.0	6.0	4.0	6.0	2.0	7.0	7.0	6.0	4.0	7.0	6.0	6.0	3.0	2.0	3.0	2.0	6.0
Japan Flour Millers Association (Sponge Cake & Bread)	3.0	5.0	5.0	3.0	3.0	5.0	5.0	5.0	5.0	7.0	6.0	3.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0	7.0	3.0	6.0	5.0	6.0	4.0	5.0	5.0	5.0
Krusteaz - Continental Mills (Pancake)	6.0	7.0	5.0	7.0	8.0	7.0	8.0	6.0	8.0	6.0	7.0	9.0	7.0	8.0	6.0	2.0	6.0																		
Limagrain (Bread & Cookie)	6.0	6.0	6.0	6.0	4.0	5.0	5.0	7.0	6.0	5.0	6.0	4.0	6.0	5.0	6.0	5.0	5.0	2.0	8.0	8.0	4.0	7.0	5.0	9.0	8.0	7.0	6.0	5.0	2.0	2.0	1.0	3.0	3.0	4.0	3.0
Montana State (Bread)																		4.0	7.0	5.0	6.0	5.0	4.0	5.0	5.0	6.0	6.0	5.0	6.0	4.0	4.0	4.0	4.0	4.0	5.0
SWQL (Cookie)	7.0	8.0	8.0	7.0	4.0	6.0	4.0	8.0	6.0	6.0	5.0	3.0	5.0	5.0	5.0	5.0	4.0																		
Syngenta (Bread & Cookie)	8.0	8.0	9.0	9.0	7.0	8.0	7.0	7.0	8.0	8.0	8.0	5.0	7.0	6.0	7.0	8.0	7.0	2.0	5.0	4.0	4.0	4.0	2.0	6.0	6.0	5.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0	3.0
U of Idaho (Bread & Cookie)																																			
WWQL (Bread & Cookie)	5.0	5.0	7.0	6.0	4.0	5.0	4.0	6.0	5.0	5.0	5.0	4.0	5.0	4.0	5.0	5.0	4.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	5.0	4.0	3.0	4.0	5.0
WWQL (Cake)	5.0	6.0	6.0	6.0	2.0	5.0	5.0	9.0	5.0	7.0	5.0	5.0	7.0	6.0	8.0	6.0	6.0																		
Wheat Marketing Center (Noodle)																									3.0	6.0	4.0	5.0	5.0	4.0	8.0	9.0	7.0	6.0	7.0
Wheat Marketing Center (Bread & Sponge Cake)	4.0	2.0	2.0	2.0	4.0	6.0	3.0	4.0	9.0	8.0	7.0	4.0	1.0	6.0	8.0	9.0	8.0	4.0	7.0	7.0	5.0	5.0	3.0	9.0	8.0	7.0	4.0	6.0	4.0	3.0	2.0	3.0	2.0	4.0	4.0
Mean	**5.6**	**6.1**	**6.3**	**6.0**	**4.6**	**5.8**	**5.0**	**6.5**	**6.3**	**6.3**	**5.9**	**4.7**	**5.2**	**5.5**	**6.0**	**6.0**	**5.5**	**3.2**	**6.8**	**6.1**	**5.8**	**5.9**	**3.9**	**6.4**	**6.0**	**5.9**	**5.6**	**5.5**	**4.9**	**4.4**	**4.1**	**4.1**	**4.1**	**4.6**	**5.1**

Soft Wheat Samples

Hard Wheat Samples

- 100 -

	Sample																																		
Question #3 Overall	08PN2001-07	SY SALTESE	11PN2532-195	11PN2532-507	WB1035CL2	WA8290	MADSEN	UIL09-15702A	UI WSU HUFFMAN	08PN212-25	SY OVATION	SONIC	SHARK	HULK	ORI2150031CL+	OR12161250CL+	ORCF102	WB9662	10PN3039-02	SY-605CL	WA8280	KELSE	IDO 1801S	IDO 1805S	IDO 1704S	UI PLANTINUM	12SB0224	DAYN	IRV	OR2130118H	WA8252	IDO 1506	IDO 1706	IDO 1806	UI SILVER
Collaborator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
ADM (Bread & Cookie)	8.0	8.0	8.0	8.0	5.0	5.0	5.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	8.0	8.0	7.0	7.0	5.0	7.0	7.0	5.0	6.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ardent Mills (Bread & Cookie)	9.0	8.0	9.0	7.0	6.0	8.0	7.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	3.0	8.0	7.0	8.0	6.0	4.0	8.0	7.0	7.0	7.0	7.0	6.0	5.0	5.0	5.0	8.0	7.0	6.0
California WQL (Bread)																		5.0	9.0	8.0	7.0	8.0	7.0	9.0	8.0	8.0	7.0	7.0	6.0	5.0	4.0	6.0	4.0	6.0	7.0
Colorado State (Bread)																		1.0	5.0	6.0	5.0	5.0	3.0	6.0	7.0	5.0	7.0	5.0	3.0	4.0	3.0	2.0	3.0	4.0	4.0
Daesun Flour Mills Korea	5.0	6.0	8.0	7.5	5.0	6.0	5.0	7.0	7.0	6.0	5.0	4.0	5.0	5.0	6.0	7.0	6.0	4.0	6.0	7.0	6.0	7.5	6.0	5.0	6.5	6.0	5.0	7.0	6.5	7.0	5.0	4.0	3.5	6.0	4.0
Graincraft (Bread)	5.0	6.0	6.0	5.0	4.0	6.0	3.0	2.0	6.0	4.0	3.0	5.0	6.0	5.0	5.0	3.0	3.0	1.0	9.0	4.0	8.0	6.0	2.0	6.0	3.0	4.0	7.0	3.0	3.0	3.0	2.0	3.0	2.0	2.0	4.0
HRS & Durum WQL (Bread)																		3.0	7.0	6.0	4.0	6.0	3.0	7.0	7.0	6.0	4.0	6.0	7.0	7.0	4.0	3.0	3.0	3.0	6.0
Japan Flour Millers Association (Sponge Cake & Bread)	4.0	5.0	5.0	4.0	3.0	5.0	5.0	5.0	5.0	7.0	6.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	5.0	6.0	6.0	6.0	2.0	3.0	3.0	3.0	6.0	3.0	5.0	5.0	6.0	5.0	5.0	5.0	5.0
Krusteaz - Continental Mills (Pancake)	6.0	7.0	5.0	7.0	8.0	7.0	8.0	6.0	8.0	6.0	7.0	9.0	7.0	8.0	5.0	2.0	5.0																		
Limagrain (Bread & Cookie)	8.0	6.0	8.0	6.0	4.0	7.0	6.0	9.0	6.0	5.0	8.0	4.0	8.0	5.0	5.0	5.0	5.0	3.0	8.0	5.0	4.0	5.0	2.0	8.0	7.0	6.0	6.0	5.0	4.0	4.0	4.0	4.0	3.0	6.0	6.0
Montana State (Bread)																		4.3	6.4	5.5	5.9	5.3	4.6	5.5	5.5	6.1	6.1	5.6	6.1	4.9	4.6	4.9	4.8	5.0	5.4
SWQL (Cookie)	7.0	8.0	8.0	7.0	3.0	6.0	4.0	8.0	6.0	6.0	4.0	2.0	5.0	4.0	5.0	5.0	3.0																		
Syngenta (Bread & Cookie)	8.0	8.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0	8.0	8.0	4.0	7.0	6.0	7.0	8.0	7.0	1.0	6.0	4.0	4.0	4.0	3.0	6.0	6.0	5.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
U of Idaho (Bread & Cookie)	4.0	4.0	5.0	6.0	3.0	4.0	4.0	6.0	4.0	5.0	5.0	4.0	4.0	4.0	6.0	5.0	4.0	4.0	5.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	4.0	4.0	2.0	4.0	4.0	5.0	4.0
WWQL (Bread & Cookie)	5.0	5.0	8.0	7.0	3.0	5.0	5.0	7.0	5.0	5.0	5.0	4.0	5.0	4.0	5.0	5.0	3.0	2.0	5.0	4.0	6.0	5.0	4.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	4.0	5.0
Wheat Marketing Center (Noodle)																																			
Wheat Marketing Center (Bread, & Sponge Cake)																																			
Mean	**6.3**	**6.5**	**7.1**	**6.6**	**4.5**	**6.1**	**5.3**	**6.7**	**6.2**	**5.9**	**5.8**	**4.8**	**5.8**	**5.4**	**5.5**	**5.2**	**4.7**	**3.1**	**6.7**	**5.9**	**5.8**	**5.8**	**3.9**	**6.3**	**6.0**	**5.5**	**5.8**	**5.4**	**5.0**	**4.8**	**4.0**	**4.1**	**3.9**	**4.8**	**5.0**

Soft Wheat Samples

Hard Wheat Samples

- 101 -

Quality Targets
Production Statistics
Cultivar List Cross Reference Guide
PNW WQC Officers
PNW WQC Charter
Charter Amendment

Hard White Wheat Quality Targets

Dual Purpose -- Chinese Noodles and Western Pan Bread

Updated on March 2, 2001 at Hard White Wheat Quality Targets Workshop
Wheat Marketing Center, Portland, Oregon

	Chinese Hard-Bite Noodles (1)	**Pan Bread**
Wheat Quality Parameter		
Test Weight (lb/bu)	60 Minimum	60 Minimum
Kernel Hardness (SKCS 4100)	65 Minimum	65 Minimum
Kernel Diameter (mm) (SKCS 4100)	2.5 Minimum	2.5 Minimum
Falling Number (seconds)	300 Minimum	300 Minimum
Protein (%, 12% mb)	11-15.0	11.5-14.0
Ash (%, 14% mb)	1.4 Maximum	1.6 Maximum
PPO Level by L-DOPA (WWQL Method)	0-0.2	N/A
Flour Quality Parameter		
Protein (%, 14% mb)	10-13.5	10.2-11.5
Ash (14% mb)	0.38-0.45	N/A
Patent Flour Yield at 0.4% Ash (%)	60 (by Buhler)	N/A
Straight-Grade Flour Yield at 0.45% Ash (%)	70 (by Buhler)	N/A
L* (Minolta Colorimeter CR 310)	91 Minimum	N/A
Wet Gluten (%, 14% mb)	30 Minimum (2)	28
Farinograph Absorption (%, 14% mb)	60 Minimum (2)	60
Farinograph Stability (minutes)	12 Minimum (2)	12
Amylograph Peak Viscosity (Bu) (3)	500-850	500 minimum
Mixograph Peak Time (minutes)	N/A	3-7 @ 5.5 mm peak ht.
Mixograph Absorption (%)	N/A	60
Chinese Raw Noodle Quality Parameter (Refer to WMC Protocol) (4)		
Chinese Raw Noodle Dough Sheet L*24 h	72 Minimum	N/A
Chinese Raw Noodle Dough Sheet L*0-L*24	10 Maximum	N/A
Chinese Raw Noodle Dough Sheet b* 24 h	25 Maximum	N/A
Cooked Noodle Hardness (g)	1250 Minimum (2)	N/A
Pan Bread Quality Parameter		
Pup Loaf Volume (cc)	N/A	900 @11% flour protein

Notes:

(1) Chinese raw, Chinese wet, Chinese instant fried, Philippine instant fried, Malaysia hokkien and Thai bamee noodles.

(2) Straight-grade flour of 12% protein wheat.

(3) Method: 65 g untreated flour + 450 ml deionized water.

(4) Noodle formula: straight-grade flour, 100%; water, 28%; and sodium chloride, 1.2%.
Noodle sizes: 2.5 mm (width) x 1.2 mm (thickness).
Noodle textural measurement: cook 100 g noodles in 1000 ml deionized water for 5 min, rinse in 27^0C water and drain. Measure noodle texture on five noodle strands by compressing to 70% of noodle thickness with a 5-mm flat probe attached to TA.XT2 Texture Analyzer.

These end-use quality targets emphasize the broadest possible utilization of hard white wheats.

- 102 -

Other Product Categories

(Based on hard white wheat protein levels and blends with other U.S. wheat classes)

Updated on March 2, 2001 at Hard White Wheat Quality Targets Workshop
Wheat Marketing Center, Portland, Oregon

	Korean Instant Noodles	Chinese Northern-Type Steamed Bread	Hamburger/Hotdog Buns
Wheat Quality Parameter			
Test Weight (lb/bu)	60 Minimum	60 Minimum	60 Minimum
Kernel Hardness (SKCS 4100)	65 Minimum	65 Minimum	65 Minimum
Kernel Diameter (mm) (SKCS 4100)	2.5 Minimum	2.5 Minimum	2.5 Minimum
Falling Number (seconds)	300 Minimum	350-400	300 Minimum
Protein (%, 12% mb)	10-11.0	10-11.5	13-15.0
Ash (%, 14% mb)	1.4 Maximum	1.4 Maximum	1.6 Maximum
PPO Level by L-DOPA (WWQL Method)	0-0.2	0-0.2	N/A
Flour Quality Parameter			
Protein (%, 14% mb)	8.5-9.5	8.5-10.0	12.2-13.0
Ash (14% mb)	0.38-0.40	0.38-0.45	N/A
Patent Flour Yield at 0.4% Ash (%)	60 (by Buhler)	60 (by Buhler)	N/A
Straight-Grade Flour Yield at 0.45% Ash (%)	70 (by Buhler)	70 (by Buhler)	N/A
L* (Minolta Colorimeter CR 310)	91 Minimum	91 Minimum	N/A
Wet Gluten (%, 14% mb)	N/A	28-30	34.5
Farinograph Absorption (%, 14% mb)	58-60	60-62	64
Farinograph Stability (minutes)	7.5-8.5	4-6.0	15-18.0
Amylograph Peak Viscosity (Bu) (1)	800 Minimum	500 Minimum	500 Minimum
Amylograph Breakdown (Bu)	200 Minimum	N/A	N/A
Mixograph Peak Time (minutes)	N/A	N/A	4-7 @ 5.8 mm peak ht.
Mixograph Absorption (%)	N/A	N/A	64
Pan Bread Quality Parameter			
Pup Loaf Volume (cc)	N/A	N/A	980 @ 13% flour protein

Notes:
(1) Method: 65 g untreated flour + 450 ml deionized water.

- 103 -

QUALITY TARGETS FOR HARD RED SPRING WHEAT
Quality Targets Steering Committee
Adopted PNW WQC January 25th 2013, Scottsdale, Arizona

	HRS Targets
Grain Quality Parameter	
Test Weight (lb/bu)	≥60.0
Kernel Hardness (SKCS 4100)	60-80
Kernel Diameter (mm) (SKCS 4100)	2.8
Kernel Weight (mg) (SKCS 4100)	38
Falling Number (seconds) (in absence of sprout)	>300
Protein (%, 12% mb)	14.5
Ash (%, 12% mb) [1]	1.52

Flour Quality Parameter	
Protein (%, 14% mb) [2]	13.1
Flour Yield (%) [3]	67.4
Flour Ash (%) [1]	0.41
Mill Score [1]	81.3
Gluten Index (%, 14% mb)	
SDS Sedimentation (cc/g, 14% mb) [4]	27.4
Farinograph Absorption (%, 14% mb) [5]	63.4
Farinograph Peak (min, 14% mb) [5]	16.3
Farinograph Stability (minutes) [5]	20.7
Mixograph Absorption (%)	64.1
Mixograph Peak (min by Mixsmart)	4.9
Mixograph Tolerance (subjective by chart)	1.6

Baking Quality Parameter	
Bake Absorption (%)	67.2
Bake Mix Time (min)	4.7
Bread Loaf Volume (cc)	1021.6
Bread Crumb Grain (subjective, 1-good 9-poor)	3.2

[1] Adjusted for lower PNW whole wheat ash observed
[2] "Protein Differential" --the difference between wheat and flour is greater on the Western Wheat
[3] Western Wheat Quality Lab Quadrumat Milling System.
[4] Micro Method, 0.5g
[5] 50-gram mixing bowl. NOTE: Limited WWQL Data--Midwest numbers used

- 104 -

QUALITY TARGETS FOR HARD RED WINTER WHEAT

Quality Targets Steering Committee

Accepted PNW WQC January 25th 2007,Salt Lake City

Grain Quality Parameter	
Test Weight (lb/bu)	≥60
Kernel Hardness (SKCS 4100)	60-80
Kernel Diameter (mm) (SKCS 4100)	≥2.4
Kernel Weight (mg) (SKCS 4100)	≥30
Falling Number (seconds) (in absence of sprout)	≥ 300
Protein (%, 12% mb)	≥12.0
Ash (%, 12% mb) [1]	≤1.30

Flour Quality Parameter	
Protein (%, 14% mb) [2]	≥11.0
Flour Yield (%) [3]	≥68.0
Flour Ash (%) [1]	≤0.37
Mill Score [1]	≥85
Gluten Index (%, 14% mb)	≥95
SDS Sedimentation (cc/g, 14% mb) [4]	≥17.5
Farinograph Absorption (%, 14% mb) [5]	≥62.0
Farinograph Peak (min, 14% mb) [5]	4.0-8.0
Farinograph Stability (minutes) [5]	10.0-16.0
Mixograph Absorption (%)	≥60.2
Mixograph Peak (min by Mixsmart)	3.7-5.7
Mixograph Tolerance (subjective by chart)	≥1.1

Baking Quality Parameter	
Bake Absorption (%)	≥63.5
Bake Mix Time (min)	3.0-5.0
Bread Loaf Volume (cc)	≥870
Bread Crumb Grain (subjective, 1-good 9-poor)	≤5

[1] Adjusted for lower PNW whole wheat ash observed
[2] "Protein Differential" --the difference between wheat and flour is greater on the Western Wheat
[3] Western Wheat Quality Lab Quadrumat Milling System.
[4] Micro Method, 0.5g
[5] 50-gram mixing bowl. NOTE: Limited WWQL Data--Midwest numbers used

- 105 -

QUALITY TARGETS FOR SOFT WHITE WHEAT

Quality Targets Steering Committee

Adopted January 25, 2005, Portland, OR

		WWQL Data N=1249		PNW WQC Data N=78		SRW WQC N=83	
		Quad Milled G&E Data		Miag Milled Released Varieties*		Miag Milled	
		Means	STD	Means	STD	Means	STD
Grain Quality Parameter		Varieties representing 80% of PNW Crop					
Test Weight (lb/bu)	>60	61.4	1.6	62.0	1.5		
Kernel Hardness (SKCS 4100)	≤ 45 ?<35?	31.2	10.5	28.2	10.3		
Kernel Diameter (mm) (SKCS 4100)	>2.5	2.67	0.27	2.73	0.1823		
Kernel Weight (mg) (SKCS 4100)	>35	37.93	5.7	39.07	5.4551		
Falling Number (seconds) (in absence of sprout)	≥ 300						
Protein (%, 12% mb)	10.5	10.6	1.7	11.0	1.4		
Ash (%, 12% mb)	≤1.30	1.37	0.16	1.34	0.1249		
Flour Quality Parameter							
Protein (%, 14% mb) [1]	<8.71	9.0	1.6	9.3	1.3	8.6	1.2
Ash (%, 14% mb) at 67% extraction [2]	<0.38	0.39	0.05	0.45	0.05	0.40	0.40
Flour Yield (%) [2]	>68.15	68.2	2.6	77.2	1.0		
Break flour yield (%) [2]	>46.75	48.6	3.3	26.9	2.9		
Milling Score [2]	>83.47	83.0	3.9				
Wet Gluten (%, 14% mb)	<27						
Farinograph Absorption (%, 14% mb) @ 8.7% protein [3]	<55						
Farinograph Stability (minutes) [3]	<7.0						
Mixograph Absorption (%) @ 8.7% protein	<53.97	55.1	2.5	54.8	2.0	54.5	1.5
Color / Polyphenol Oxidase (L-DOPA A_{475})	<0.5	0.840	0.290	0.870	0.370		
Solvent Retention Capacity: Water (%)	<58	55.6	2.8	55.6	2.8	53.0	2.8
Solvent Retention Capacity: Carbonate (%)	<75	72.0	4.2	72.6	3.5	72.6	5.2
Solvent Retention Capacity: Sucrose (%)	<95	95.4	7.1	97.2	6.5	93.2	11.4
Solvent Retention Capacity: Lactic acid (%)	60-170	107.8	23.4	96.0	16.8	104.3	14.4
SDS Sedimentation Volume (mL/g) @ 8.7% protein	7.0-14.0	11.2	4.1	11.0	3.4	9.1	2.5
Sugar-Snap Cookie Diameter (cm) @ 8.7% protein	9.3	9.34	0.27	9.25	0.26	9.20	0.35
Sponge Cake Volume (cc)	1280	1274	69	1249	67	1314	62

[1] "Protein Differential" --the difference between wheat and flour is greater on the Western Wheat

[2] Western Wheat Quality Lab Quadrumat Milling System.

[3] 50-gram mixing bowl.

* Varieties with over 10K acres

- 106 -

QUALITY TARGETS FOR CLUB WHEAT
Quality Targets Steering Committee
Adopted January 25, 2005, Portland, OR

Grain Quality Parameter	
Test Weight (lb/bu)	>58
Kernel Hardness (SKCS 4100)	≤ 45?35
Kernel Diameter (mm) (SKCS 4100)	>2.36
Kernel Weight (mg) (SKCS 4100)	>35
Falling Number (seconds) (in absence of sprout)	≥ 300
Protein (%, 12% mb)	<10
Ash (%, 14% mb)	≤1.30

Flour Quality Parameter	
Protein (%, 14% mb) [1]	<8.3
Ash (%, 14% mb) at 67% extraction [2]	<0.39
Flour Yield (%) [2]	>69.2
Break flour yield (%) [2]	>50.64
Milling Score [2]	>84.62
Wet Gluten (%, 14% mb)	<26
Farinograph Absorption (%, 14% mb) [3]	<52.0
Farinograph Stability (minutes) @ 8.3% protein [3]	<2.0
Mixograph Absorption (%) @ 8.3% protein	<50
Color / Polyphenol Oxidase (L-DOPA A_{475})	<0.5
Solvent Retention Capacity: Water (%)	<56.0
Solvent Retention Capacity: Carbonate (%)	<72.0
Solvent Retention Capacity: Sucrose (%)	<93
Solvent Retention Capacity: Lactic acid (%)	<72.0
SDS Sedimentation Volume (mL/g) @ 8.3% protein	< 5.0

Sugar-Snap Cookie Diameter (cm) @ 8.3% protein	9.4

Sponge Cake Volume (cc)	1300

[1] "Protein Differential" --the difference between wheat and flour is greater on the Western Wheat Quality Lab Quadrumat Milling System than typical of commercial mills.
[2] Western Wheat Quality Lab Quadrumat Milling System.
[3] 50-gram mixing bowl.

- 107 -

WHEAT PRODUCTION IN THE PNW

Compiled by Stacey Sykes and Dr. Craig F. Morris
USDA-ARS Western Wheat Quality Lab, Pullman, WA. January, 2019

Winter Wheat (all classes)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
millions of bushels										
OR	42.0	54.3	63.5	51.8	48.4	40.7	34.5	35.5	43.4	46.6
ID	56.7	58.2	63.1	59.2	61.9	58.4	57.4	66.7	53.6	61.2
WA	96.8	118.0	129.8	118.6	114.5	85.3	89.0	130.3	120.5	125.4
Total	195.5	230.5	256.4	229.6	224.8	184.4	180.9	232.5	217.5	233.2

Spring Wheat (all classes)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
millions of bushels										
OR	6.9	9.5	11.0	5.8	5.5	3.7	4.7	4.4	4.6	5.0
ID	40.8	48.6	52.1	38.0	39.3	34.6	29.8	34.4	35.3	42.3
WA	26.3	29.9	38.1	27.8	29.7	23.2	22.5	27.0	22.1	27.8
Total	74.0	88.0	101.2	71.6	74.5	61.5	57.0	65.8	62.0	75.1

Total Wheat (all classes)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
millions of bushels										
OR	49.0	63.7	74.5	57.6	53.9	44.4	39.2	39.9	48.1	51.6
ID	99.1	108.1	116.0	98.0	101.8	93.7	87.9	101.9	90.7	104.4
WA	123.1	147.9	167.9	146.3	144.2	108.5	111.5	157.3	142.5	153.2
Totals										
PNW	271.2	319.7	357.8	301.9	299.9	246.6	238.6	299.1	281.3	309.2
US	2217.0	2207.0	1999.3	2269.1	2127.5	2035.4	2051.7	2309.7	1740.6	1884.5

Sources: USDA National Agricultural Statistics Service, and the Idaho, Oregon and Washington State Statistics Services.

- 108 -

Leading Soft White Common and Club Varieties in the PNW - Idaho

	2010	2011	2012*	2013	2014*	2015*	2016	2017	2018
acreage in >000 ($ denotes spring variety, 8 denotes club variety, # denotes that individual varieties are planted together as mixtures)									
SY Ovation	-	-	-	60	-	-	145	140	224
WB 1529	-	-	-	-	-	-	-	82	118
SY Assure	-	-	-	-	-	-	-	-	71
UI Magic CLP	-	-	-	-	-	-	-	-	47
Brundage	136	141	-	93	-	-	69	-	47
Coda 8	17	11	-	20	-	-	-	-	35
UI Stone $	-	-	-	-	-	-	25	-	28
Seahawk $	-	-	-	-	-	-	-	-	23
Eltan	-	-	-	34	-	-	59	58	-
Puma	-	-	-	-	-	-	-	35	-
WB 528	51	38	-	62	-	-	32	-	-
ORCF 102	36	62	-	49	-	-	26	-	-
Stephens	-	53	-	37	-	-	15	-	-
Alturas $	92	92	-	50	-	-	10	-	-
WB 456	12	40	-	60	-	-	5	-	-
UI Pettit $	6	37	-	52	-	-	-	-	-
Madsen	34	33	-	38	-	-	-	-	-
Diva $	-	-	-	31	-	-	-	-	-
Louise $	28	29	-	23	-	-	-	-	-
WB 470	24	34	-	-	-	-	-	-	-
Brundage 96	19	33	-	-	-	-	-	-	-
Lambert	16	25	-	-	-	-	-	-	-
AP700 CL	15	17	-	-	-	-	-	-	-
Penawawa $	26	14	-	-	-	-	-	-	-
Common Winter	535	621	-	611	-	-	710	720	507
Common Spring	193	205	-	208	-	-	395	420	460
Club	32	21	-	26	-	-	10	-	35

* No variety survey was conducted in 2012, 2014, or 2015.

- 109 -

Leading Soft White Common and Club Varieties in the PNW - Oregon

	2010	2011	2012*	2013	2014	2015	2016*	2017	2018
acreage in >000 ($ denotes spring variety, 8 denotes club variety, # denotes that individual varieties are planted together as mixtures)									
UI Magic CL+	-	-	-	-	-	-	-	59	224
SY Ovation	-	-	-	6	72	84	-	109	56
ORCF 101	187	199	-	382	336	309	-	152	47
ORCF 102	67	118	-	102	169	122	-	83	34
Assure	-	-	-	-	-	-	-	1	30
UI Castle CL+	-	-	-	-	-	-	-	26	30
LCS Drive	-	-	-	-	-	-	-	15	26
Rosalyn	-	-	-	-	-	2	-	9	25
Bobtail	-	-	-	-	-	26	-	26	16
Norwest Tandem	-	-	-	-	-	-	-	1	11
Diva $	-	-	-	38	42	31	-	7	8
Mary	-	-	-	9	51	55	-	35	8
LCS Artdeco	-	-	-	-	-	14	-	6	7
WB 528	-	-	-	22	57	34	-	19	6
Trifecta II	-	-	-	-	-	6	-	4	6
WB 1529	-	-	-	-	-	-	-	14	5
LCS Biancor	-	-	-	-	-	-	-	5	5
WB 6121 $	-	-	-	-	-	-	-	3	2
Louise $	15	26	-	15	25	13	-	3	2
Norwest Duet	-	-	-	-	-	-	-	1	2
Kaseberg	-	-	-	-	11	12	-	1	1
Tubbs	100	4	-	5	2	6	-	1	1
Alturas $	-	-	-	-	-	-	-	2	1
Puma	-	-	-	-	-	-	-	1	1
WB 1376 CL+	-	-	-	-	-	-	-	1	1
Twin $	-	-	-	-	-	-	-	3	1
Babe $	-	3	-	9	8	3	-	8	-
Curiosity CL+	-	-	-	-	-	-	-	8	-
WB 1035CL+ $	-	-	-	11	16	16	-	4	-
WB 6341 $	-	-	-	-	-	1	-	4	-
Brundage 96	3	5	-	2	3	-	-	1	-
Yamhill	4	4	-	5	3	7	-	1	-
Common Winter	790	782	-	721	810	729	-	578	545
Common Spring	73	97	-	96	102	64	-	37	18
Club	14	14	-	-	-	-	-	20	-

* No variety survey was conducted in 2012 or 2016.

- 110 -

Leading Soft White Common and Club Varieties in the PNW - Washington

	2010	2011	2012*	2013	2014	2015	2016	2017	2018
acreage in >000 ($ denotes spring variety, 8 denotes club variety, # denotes that individual varieties are planted together as mixtures; the leading mixtures are noted)									
Otto	-	-	-	-	125	222	221	222	207
Curiosity CL+	-	-	-	-	-	21	145	155	158
SY Ovation	-	-	-	103	131	187	248	189	138
UI Magic	-	-	-	-	-	-	-	51	115
Puma	-	-	-	-	-	-	24	63	76
Bruehl 8	169	165	-	110	114	147	188	56	69
ORCF-102	166	237	-	235	265	218	209	127	66
ARS Crescent 8	-	-	-	-	18	41	61	98	65
Louise $	161	192	-	94	39	84	54	56	53
LCS Artdeco	-	-	-	6	7	31	44	58	47
Mela CL+	-	-	-	-	-	6	31	34	41
LCS Drive	-	-	-	-	-	-	-	9	39
Northwest Duet	-	-	-	-	-	-	-	-	38
WB 1529	-	-	-	-	-	32	71	65	37
Eltan	238	202	-	140	107	53	61	17	31
Northwest Tandem	-	-	-	-	-	-	-	-	29
Jasper	-	-	-	-	-	-	-	30	28
Seahawk	-	-	-	-	-	-	-	3	28
WB 6121 $	-	-	-	-	12	50	67	37	28
WB 528	84	85	-	125	108	98	46	43	27
WB 1604	-	-	-	-	-	9	19	18	24
JD $8	-	6	-	5	15	11	22	21	21
Whit $	3	7	-	25	36	40	35	17	19
SY Assure	-	-	-	-	-	-	-	-	18
Xerpha	140	115	-	148	161	126	119	58	16
Madsen	63	46	-	37	46	27	17	-	16
Diva $	-	-	-	73	117	71	37	18	14
SY 107	-	-	-	-	27	30	16	12	12
UI Castle	-	-	-	-	-	-	-	-	12
UICF-Brundage	-	-	-	-	-	-	-	-	9
Ryan	-	-	-	-	-	-	-	-	9
WB-1070CL	-	-	-	36	26	19	9	13	8
WB-1035 CL+ $	-	-	-	19	37	15	23	18	5
Melba $8	-	-	-	-	-	-	-	-	5
SY Saltese	-	-	-	-	-	-	-	-	2
Pritchett 8	-	-	-	-	-	-	-	-	2
Babe $	-	4	-	27	20	13	16	8	2
WB 523	7	9	-	46	33	23	21	22	-
Bobtail	-	-	-	-	-	21	8	17	-

- 111 -

WB 1376CLP	-	-	-	-	-	-	11	16	-
Masami	13	18	-	13	21	10	11	14	-
Legion	2	5	-	31	19	16	-	12	-
Skiles	-	2	-	18	15	10	-	9	-
WB 6341 $	-	-	-	-	9	25	21	4	-
Tekoa	-	-	-	-	-	-	-	1	-
Brundage 96	39	48	-	46	18	25	14	-	-
Bruneau	-	-	-	12	9	7	8	-	-
Coda 8	7	6	-	18	5	6	3	-	-
ORCF-103	20	46	-	82	71	48	-	-	-
Stephens	21	25	-	20	15	14	-	-	-
AP700CL	48	54	-	49	38	13	-	-	-
WB 456	5	8	-	21	20	11	-	-	-
Nick $	58	62	-	28	17	-	-	-	-
Cara 8	8	18	-	33	13	-	-	-	-
Tubbs 06	16	9	-	10	9	-	-	-	-
SWW Mixtures #	329	250	-	-	-	-	-	-	-
Trifecta II Mix	-	35	-	57	43	37	33	29	21
Eltan-Tubbs	29	31	-	-	-	-	-	-	-
Rod-Madsen	27	18	-	-	-	-	-	-	-
Rod-Tubbs	30	10	-	-	-	-	-	-	-
Other Varieties/Mixes	-	107	-	22	24	27	67	50	67
TOTALS									
Common Winter	1303	1328	-	1292	1365	1349	1454	1334	1281
Common Spring	256	300	-	270	302	304	252	161	160
Club	240	240	-	179	172	207	274	176	156

* No variety survey was conducted in 2012.

- 112 -

Leading Hard Red Winter & Spring Wheat Varieties in the PNW

	2010	2011	2012*	2013	2014*	2015*	2016	2017	2018
acreage in >000									
Idaho									
LCS Jet	-	-	-	-	-	-	-	-	71
Keldin	-	-	-	-	-	-	26	47	-
Garland	16	9	-	21	-	-	-	-	-
Utah 100	28	22	-	-	-	-	-	-	-
Promontory	36	22	-	-	-	-	-	-	-
Boundary	13	16	-	-	-	-	-	-	-
Eddy	25	15	-	-	-	-	-	-	-
Moreland	12	13	-	-	-	-	-	-	-
Bonneville	12	10	-	-	-	-	-	-	-
Total HRW	214	173	-	156	-	-	-	-	130
WB 9668	-	-	-	-	-	-	-	58	32
WB 9668 / Glee	-	-	-	-	-	-	-	-	32
WB 9518	-	-	-	-	-	-	-	23	28
Jefferson	66	70	-	91	-	-	84	-	23
WB 9411	-	-	-	-	-	-	-	23	-
Bullseye	-	-	-	-	-	-	10	-	-
WB 936	124	123	-	-	-	-	-	-	-
Cabernet	9	18	-	-	-	-	-	-	-
Tara 2002	14	10	-	-	-	-	-	-	-
Total HRS	258	275	-	169	-	-	-	-	115

* No variety survey was conducted in 2012, 2014, or 2015.

- 113 -

Leading Hard Red Winter & Spring Wheat Varieties in the PNW
Continued

	2010	2011	2012*	2013	2014	2015	2016*	2017	2018
acreage in >000									
Oregon									
LCS Jet	-	-	-	-	-	-	-	17	19
Brawl CL+	-	-	-	-	-	1	-	5	16
Keldin	-	-	-	1	1	3	-	5	8
SY Clearstone CL	-	-	-	-	-	4	-	5	2
LCS Colonia	-	-	-	-	1	-	-	1	1
WB Arrowhead	-	-	-	-	-	-	-	1	1
Northwest 553	17	18	-	14	10	13	-	3	-
WB 4623	-	-	-	-	-	-	-	1	-
Other Varieties	11	12	-	-	9	-	-	-	-
Total HRW	37	34	-	17	20	28	-	41	46
Buck Pronto	-	4	-	1	6	7	-	2	6
Solano	6	7	-	3	8	3	-	7	4
Kelse	-	-	-	-	-	1	-	12	4
WB 9518	-	-	-	-	-	-	-	2	3
WB 9668	-	-	-	-	-	-	-	1	2
Glee	-	-	-	-	-	7	-	1	1
SY 605 CL+	-	-	-	-	-	-	-	-	1
WB Rockland	-	-	-	1	1	-	-	-	1
Alum	-	-	-	-	-	-	-	1	1
LCS Iron	-	-	-	-	-	-	-	-	1
Expresso	-	6	-	2	-	2	-	-	-
Jefferson	18	11	-	3	2	7	-	-	-
Yecora Rojo	3	7	-	1	1	-	-	-	-
Other Varieties	11	15	-	1	3	-	-	3	1
Total HRS	62	61	-	12	21	33	-	29	23

* No variety survey was conducted in 2012 or 2016.

- 114 -

Leading Hard Red Winter & Spring Wheat Varieties in the PNW
Continued

	2010	2011	2012*	2013	2014	2015	2016	2017	2018
acreage in >000 (# denotes that individual varieties are planted together as mixtures)									
Washington									
LCS Jet	-	-	-	-	-	-	26	98	110
Keldin	-	-	-	-	5	36	99	101	82
SY Clearstone 2CL	-	-	-	-	-	11	31	50	38
Esperia	-	-	-	7	26	-	-	26	11
Farnum	11	58	-	38	50	29	18	30	5
WB Arrowhead	-	-	-	8	14	11	14	5	-
LCS Azimut	-	-	-	19	12	25	19	-	-
Whetstone	1	11	-	37	29	29	13	-	-
LCS Colonia	-	-	-	-	-	-	13	-	-
Norwest 553	-	16	-	68	74	44	7	-	-
Bauermeister	30	11	-	5	-	-	-	-	-
Eddy	34	17	-	3	-	-	-	-	-
Other Varieties	-	-	-	-	-	-	-	8	12
Total HRW	222	213	-	215	228	218	243	318	259
WB Expresso	10	16	-	56	34	45	39	41	50
Glee	-	-	-	4	41	51	42	54	40
WB 9668	-	-	-	-	-	-	-	-	29
SY Selway	-	-	-	-	-	-	-	4	22
Solano	15	14	-	33	25	26	16	21	20
WB 9518	-	-	-	-	9	18	35	37	19
SY Basalt	-	-	-	-	-	-	-	4	17
Kelse	1	18	-	46	44	14	32	46	16
SY 605CL	-	-	-	10	15	12	11	7	15
Alum	-	-	-	-	-	-	-	3	14
Chet	-	-	-	-	-	-	-	8	14
Buck Pronto	12	17	-	22	21	24	18	16	13
WB 9662	-	-	-	-	-	-	-	-	10
SY Steelhead	-	-	-	-	-	8	7	5	6
Cabernet	5	17	-	10	10	-	-	11	5
Express	6	17	-	-	-	-	-	4	-
Hollis	26	33	-	5	-	4	-	-	-
Jefferson	29	35	-	21	27	-	-	-	-
Total HRS	277	307	-	224	251	222	214	263	294

* No variety survey was conducted in 2012.

- 115 -

Hard White Wheat Varieties in the PNW

	2010	2011	2012*	2013	2014*	2015*	2016	2017*	2018
acreage in >000 ($ denotes spring variety)									
Idaho									
Dayn $	-	-	-	-	-	-	-	-	51
UI Platinum $	-	-	-	-	-	-	-	-	23
WB Paloma $	-	-	-	-	-	-	15	-	-
Snow Crest $	23	16	-	27	-	-	-	-	-
Klasic $	60	89	-	24	-	-	-	-	-
WB Idamax $	5	14	-	-	-	-	-	-	-
Pristine $	11	-	-	-	-	-	-	-	-
Total Hard White	108	135	-	91	-	-	15	-	74

* No variety survey was conducted in 2012, 2014, 2015, or 2017.

Washington									
WB Hartline $	-	-	-	6	-	3	1	.50	4
LCS Star $	-	-	-	-	-	-	-	-	.50
Dayn $	-	-	-	-	-	5	1	.50	-
Total Hard White	12	23	-	20	35	8	2	1	4.5

* No variety survey was conducted in 2012.

Durum Wheat in the PNW

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Idaho	-	-	-	26	11	10	10	-	1
Oregon	-	-	-	-	-	-	-	-	-
Washington	-	-	-	-	-	-	-	-	-

Above	CO980894	HRW	PI 631449	PVP 200200206
Accipiter	DH00-18-196	HRW	PI 663207	PVP 201100370
AgriPro Paladin	W96-355	HRW	PI 643094	PVP 200600240
Albany	06MSP18	HRS	PI658002	PVP 200900283
Albion	GT00123M	SWW	PI 608582	PVP 9900146
Alkabo	D96604	DURUM	PI 642020	PVP 200600105
Alpowa	WA7677	SWS	PI 566596	
Alsen	ND716	HRS	PI 615543	PVP 200100066
Alturas	IDO526	SWS	PI 620631	PVP 200200265
Alum	WA8166	HRS	PI 676289	PVP 201600077
Alzada	YU894-75	DURUM	PI 634820	PVP 200400162
Amidon	ND606	HRS	PI 527682	
Anton	NW98S097	HWW	PI 651044	PVP 200800301
Anza	D6923	HRS	CItr 15284	
AP Badger	RemPop80-3	SWW	PI 658543	PVP 201000078
AP Legacy	ORF2BC9800267-0	SWW	PI 658008	PVP 200900300
AP 502 CL	CO980889	HRW	PI 632374	PVP 200300044
AP 503 CL2	CLO 3040-5-2	HRW	PI 654423	PVP 200800322
AP 700 CL	OSUPOP 28-13	SWW	PI 654424	PVP 200800323
Arapahoe	NE82656	HRW	PI 518591	PVP 8900295
Arlin	KSSB369-7	HWW	PI 564246	PVP 9300123
ARS-Amber	ARS96277L	SWW	PI 665047	
ARS-Castella	ARS20060123-31C	Club-W		
ARS-Chrystal	ARS970075-3C	Club-W	PI 665049	
ARS-Crescent	ARS970163-4C	Club-W	PI 665048	
ARS-Pritchett	4J0713366C	Club-W	PI 678944	PVP 201700197
ARS-Selbu	ARS970161-3L	SWW	PI 667744	X970161-3L
Babe	WA8039	SWS	PI 656791	PVP 201100010
Bannock	IDO028	HRS	CItr 15318	
Basin	WA7520	SWW	PI 601238	PVP 8500177
Bauermeister	WA7939	HRW	PI 634717	PVP 200600245
Beamer	BZ6W93-481	SWW		
Bearpaw	MTS0721	HRW	PI 665228	PVP 201200407
Betty	KS84063-2W	HWW	PI 612578	PVP 200000155
Bighorn	78W296	HRW	PI 601204	PVP 8500109
BigSky	MT9432	HRW	PI 619166	PVP 200300290
Bill Brown	CO01385-A1	HRW	PI 653260	PVP 200800327
Bitterroot	ID92-22407A	SWW	PI 655042	PVP 200800411
Blanca Fuerte	02W500274	HWS	PI 655032	PVP 200800398
Blanca Grande	96WV53620	HWS	PI 631481	PVP 200200240
Blanca Royale	02W50076-W	HWS	PI 655033	PVP 200800399
Bliss	IDO172	SWS	PI 486350	
Blizzard	IDO297	HRW	PI 512302	
Bobtail	OR08047P94	SWW	PI 673133	PVP 201400488
Bonneville	IDO421	HRW	PI 557015	PVP 9400231
Bonus	RSI31206	HRS	PI 619428	PVP 9900402
Borah	IDO0043	HRS	CItr 17267	

- 117 -

BR7030		HWS		
Brawl CL Plus	CO06052	HRW	PI 664255	PVP 201200434
Bruehl	WA7833	Club-W	PI 606764	PVP 200100258
Brundage	ID86-14502B	SWW	PI 599193	PVP 9800376
Brundage 96	ID-B-96	SWW	PI 631486	PVP 200200245
Brundage CF		SWW		
Bruneau	ID93-64901A	SWW	PI 664304	PVP 201200014
Buchanan	WA7523	HRW	PI 532994	
Buck Pronto	T1052	HRS	PI 619397	PVP 200100067
Bullseye	B02-0081	HRS	PI 658036	PVP 200900414
Butte	ND519	HRS	CItr 17681	
Butte 86	ND597	HRS		
Bynum	MTCL0318	HRW	PI 643429	PVP 200600285
Byrd	CO06424	HRW	PI 664257	PVP 201200432
Cabernet	95WV10616	HRS	PI 646196	PVP 200700161
Cal Rojo	00WB80404	HRS	PI 651032	PVP 200700443
Calorwa	WUC657	Club-S	PI 566594	
Cara	ARS97-135-9	Club-W	PI 643435	
Carter	BZ9W022060	HRW	PI 654518	PVP 200800383
Cashup		SWW	PI 601237	PVP 8500178
Cataldo	IDO642	SWS	PI 642361	
CDC Falcon	S94-4	HRW	PI 619610	PVP 200100279
Centennial	IDO312	SWS	PI 537303	PVP 9000218
Challis	BZ692-108	SWS	PI 630935	PVP 200200105
Chet	WA8165	HRS	PI 676288	PVP 201600076
Choteau	MT9929	HRS	PI 633974	PVP 200400035
Chukar	WA7855	Club-W	PI 628641	PVP 200300326
Clear White	UC 1361	HWS	PI 635044	PVP 200400244
ClearFirst		SWW	PI 636458	PVP 200400053
Coda	WA7752	Club-W	PI 594372	
Columbia-1	W9123321	HRW		
Conan	BZ922-588	HRS	PI 607549	PVP 9900232
Concept	89S*88D	SWW	PI 644021	PVP 200600278
Crown	D3117	DURUM	PI 614671	PVP 200000312
Curiosity CL+	WA8143	SWW	PI 675007	PVP 201500290
Curlew	UT932555	HRW	PI 663157	
Dayn	WA8123	HWS	PI 666941	PVP 201300130
Dash 12	DA998-12	HRS	PI 644068	PVP 200700018
Daws	WA6099	SWW	CItr 17419	
Decade	MT0552	HRW	PI 660291	PVP 201100096
Declo	215-B	HRW	PI 619419	PVP 200100249
Deloris	UT2030-32	HRW	PI 631447	
Denali	CO050303-2	HRW	PI 664256	PVP 201200433
Desert King	UC1375	DURUM	PI 638726	PVP 200500187
DG Star		DURUM		
Dirkwin	IDO106	SWS	CItr17745	
Diva	WA8090	SWS	PI 660663	PVP 201100268

- 119 -

Divide	D9715-11	DURUM	PI 642021	PVP 200600106
Dumas	M95-385	HRW	PI 619199	PVP 200100218
Dune	ID9120503A	SWW		
Duraking	D 5456	DURUM	PI 561928	PVP 9200227
DW	IDO513	HRW	PI 620629	PVP 200200151
Earl	WA8184	HWW	PI 680639	
Eddy	BZ9W96-788-e	HRW	PI 643423	PVP 200600277
Eden	WA7902	Club-S	PI 630983	PVP 200300264
Edwall	WA6831	SWS	PI 477919	
Edwin	WA7834	Club-W	PI 606765	
Elkhorn	ND8933	HRW	PI 596352	PVP 9700319
Eltan	WA7431	SWW	PI 536994	
Erhardt	MT8719	HRW	PI 564761	
Ernest Lemaire	T-1064	HRS	PI 352291	
Esperia		HRW		
Estica		HRW	PI 585231	PVP 9500069
Expedition	SD97457	HRW	PI 629060	PVP 200400245
Explorer	MTHW9710	HWS	PI 619086	PVP 200300182
Express	DA984034	HRS	PI 573003	PVP 9000012
Expresso	DA984-034SRR	HRS	PI 651616	PVP 200800002
F1182-M1-10		Club		
Fairview	IDO338	HRW	PI 557017	
Farnum	WA7975	HRW	PI 638535	PVP 200900327
Federation	CItr 4734	SWS	PI 41080	
Fergus	TR983-239	HRS	PI 587198	PVP 9500093
Fieldwin	IDO087	SWS	CItr 17425	
Finch	WA7853	SWW	PI 628640	PVP 200300327
Fineway	FX001B	HRW	PI 653509	PVP 200700441
Finley	WA7773	HRW	PI 586757	
Foote	OR880172	SWW	PI 599663	
Fortissimo	00WV50064	DURUM	PI 651031	PVP 200700442
Fortuna	(ND)60-54	HRS	CItr13596	
Garland	UT1706-1	HRW	PI 583291	PVP 9400178
Gary	IDO550	HWW	PI 620632	PVP 200200152
Gene	OR8300801	SWW	PI 560129	
Genou	MTS0031	HRW	PI 640424	PVP 200500334
George	GMGQ1	SWW	PI 639737	PVP 200500288
Glee	WA8074	HRS	PI 666940	PVP 201300129
Glenn	ND747	HRS	PI 639273	PVP 200500280
Goetze	ORH010920	SWW	PI 655029	PVP 200800393
Golden Spike	UT1944-158	HWW	PI 614813	PVP 200100033
Greenville	UT9743-42	HRW	PI 665932	PVP 201200470
Grenora	D97780	DURUM	PI 642022	PVP 200600107
Hank	BZ992-322	HRS	PI 613585	PVP 200000191
Hatcher	CO980607	HRW	PI 638512	PVP 200500340
Hatton	WA6364	HRW	CItr17772	
Havasu	PH896-21	DURUM	PI 644065	PVP 200700015

- 120 -

Hayden	IDO465	HRW	PI 608040	
Helios	D00-627	DURUM	PI 670000	PVP 201400051
Heyne	KS85W663-42	HWW	PI 612577	PVP 200000154
Hi-Line	MT8402	HRS	PI 549275	
Hill 81	OWW68007-2M6	SWW	CItr17954	
Hiller	WA7729	Club-W	PI 587026	
Hollis	WA7859	HRS	PI 632857	
Hubbard	ID86-10420A	SWW	PI 632273	PVP 200300007
Hyalite	MTCL0306	HWW	PI 643978	PVP 200600291
Idaho 266	IDO266	SWS	PI 561074	
Idaho 352	IDO352	HRW	PI 557012	
Idaho 364	IDO364	HRW	PI 578276	
Idaho 377s	IDO377s	HWS	PI 591045	PVP 9500250
Idaho 443	IDO443	HRW	PI 578277	
Idaho 444	IDO444	HRW	PI 578278	
Idaho 472	IDO472	SWS	PI 592987	
IDO442	IDO442	HRW	PI 557016	
IDO488	IDO488	SWS	PI 592986	
IDO545	IDO545	HRS	PI 632710	
IDO556	IDO556	Club-S	PI 620633	A91329S-22
IDO562	IDO562	HRW	PI 632711	
IDO563	IDO563	SWS	PI 620634	A95631-S-Js-4-2
IDO569	IDO569	SWS	PI 620635	
IDO571	IDO571	HRW	PI 620636	A781011W-1-4
IDO576	IDO576	SWS	PI 620637	A9495W-G-1
IDO580	IDO580	HWS	PI 620638	A96203S-D-11
IDO586	IDO586	HWS	PI 632713	
IDO587	IDO587	SWW	PI 634567	PVP 200400096
IDO602	IDO602	HRS	PI 620628	A93324S-76kbr
IDO629	IDO629	SWS-waxy	PI 642365	AOO149S-4
IDO630	IDO630	SWS-waxy	PI 642364	A99139-wxy-A-1
IDO644	IDO644	SWS	PI 660549	A97067S-C-3
IDO686	IDO686	SWS	PI 660561	A01605S-B-1-4
IDO687	IDO687	SWS	PI 660562	A99038S-H-1
IDO702	IDO702	HRS	PI 660563	A99372S-F-10
Ike	KS89H48	HRW	PI 574488	PVP 9400149
Iona	IDO492	HRS	PI 618734	
Ivory	OR850513	HWW	PI 599664	
Jagalene	W98-362	HRW	PI 631376	PVP 200200160
Jagger	KS84063-9-39-3	HRW	PI 593688	PVP 9500324
Jake		HRS		
Jasper	WA8169	SWW	PI 678442	PVP 201600299
JD	WA8047	Club-S	PI 656790	PVP 201100009
Jefferson	IDO462	HRS	PI 603040	
Jerome	IDO566	HRS	PI 632712	PVP 200400097
Jerry	ND9257	HRW	PI 632433	
Joaquin	YU999-178	HRS	PI 644066	PVP 200700016

- 121 -

Jubilee	IDO525	SWS	PI 614839	PVP 200100167
Judee	MTS0713	HRW	PI 665227	PVP 201200161
Judith	MT8039	HRW	PI 584526	
Juniper	IDO575	HRW	PI 639951	
Kaseberg	OR2071628	SWW	PI 669570	PVP 201300487
Keldin	ACS55017	HRW	PI 669490	PVP 201300462
Kelse	WA7954	HRS	PI 653842	PVP 200900351
Kern		HRS	PI 612142	PVP 200000047
Klasic	NKF08022	HWS	PI 486139	PVP 8200095
Kronos	D03-21	DURUM	PI 576168	PVP 9400033
Kulm	ND671	HRS	PI 590576	PVP 9500233
KW9043	KW9043	SWW	PI 639106	
Ladd	OR2070870	SWW	PI 669569	PVP 201300486
Lakin	KS96HW115	HWW	PI 617032	PVP 200200049
Lambert	ID85-153	SWW	PI 583372	
Lassik	UC1495	HRS	PI 653535	PVP 200800176
LCS Artdeco	NSA06-2153A	SWW	PI 667102	PVP 201300198
LCS Atomo	06SB0086	HWS	PI 673944	PVP 201500011
LCS Aymeric	NSA09-5098	HRW	PI 684646	PVP 201700313
LCS Azimut	NSA97-2365	HRW		
LCS Biancor		SWW		
LCS Colonia	NIC05-4711-B	HRW	PI 673087	PVP 201400489
LCS Drive	LWW12-7015	SWW	PI 680589	PVP 201700097
LCS Evina	NIC04-3377-A	HRW	PI 679968	PVP 201600412
LCS Iron	11SB0096	HRS	PI 683538	PVP 201700222
LCS Jet	NSA10-7208	HRW	PI 678936	PVP 201600094
LCS Luna	10SB0087-B	HRS	PI 683539	PVP 201700223
LCS Powerplay	09FSP18	HRS	PI 665019	PVP 201200204
LCS Silk		SWS		
LCS Star	08SB0658-B	HWS	PI 673945	PVP 201500012
Ledger	BZ9W96-788-d	HRW	PI 642315	PVP 200600063
Legion	99X1009-23	SWW	PI 658035	PVP 200900413
Leona		Waxy-S		
Levante		DURUM		
Lewjain	WA6363	SWW	CItr 17909	
LHS	IDO835	HWW	PI 660547	
Lolo	IDO533	HWS	PI 614840	
Louise	WA7921	SWS	PI 634865	PVP 200500311
Lucin-CL	UT10322	HWW	PI 663156	PVP 201100464
M-Press		SWW		
Macon	WA7899	HWS	PI 617072	PVP 200200130
MacVicar	ORF75336	SWW	PI 552427	
Madsen	WA7163	SWW	PI 511673	
Maestrale		DURUM		
Maier	D89135	DURUM	PI 607531	PVP 9900265
Malbec	RSI50603	HRS	PI 661105	PVP 201100038
Malcolm	ORCW8113	SWW	PI 497672	

- 122 -

Manning	UT89099	HRW	CItr 17846	
Mary	OR2040726	SWW	PI 666373	PVP 201200472
Masami	WA7916	SWW	PI 634715	PVP 200600244
Matt	D95-434	DURUM	PI 614136	PVP 200000301
McNeal	MT8849	HRS	PI 574642	
MDM	WA7936	HWW	PI 634716	PVP 200600246
Mel	CDH01	Club-W	PI 636459	PVP 200400052
Mela CL+	WA8155	SWW	PI 675008	PVP 201500291
Melba	WA8193	Club-S	PI 682073	PVP 201700203
Meridian	IDO360	HRW	PI 557013	PVP 9300027
Millennium	NE94479	HRW	PI 613099	PVP 200100236
Miwok		DURUM	PI 670040	PVP 201400031
MJ-4	MJ-4	SWW		
MJ-9	MJ-9	SWW		
ML455 ('455')	ML107455	HWS	PI 607570	PVP 9900251
Mohler	BU6W93-477	SWW	PI 635996	PVP 200400304
Moreland	IDO517	HRW	PI 620630	PVP 200200266
Morgan	S89-142	HRW	PI 599336	PVP 9700399
Moro	AUS 11865	Club-W	CItr 13740	
MT1159CL	MTCL01159	HRW	PI 641221	PVP 200500347
MTHW9420	MTHW9420	HWS	PI 612605	PVP 200000138
Neeley	IDO158	HRW	CItr 17860	
New Dirkwin	UC1667	SWS	PI 664268	PVP 201100455
Newana	MT7156	HRS	CItr 17430	
Nick	BZ698-31	SWS	PI 638697	PVP 200500144
Normano		DURUM		
Norris	MTCL0316	HRW	PI 643430	PVP 200600286
Norstar	WT80	HRW	CItr 17735	
Norwest 553	ORN00B553	HRW	PI 655030	PVP 200800394
Norwest Duet	ORLD113092	SWW	PI 681650	PVP 201700199
Norwest Tandem		SWW		
NuDakota	BC97ROM-50W	HWW	PI 643089	PVP 200600235
NuFrontier	W94-480W	HWW	PI 619089	PVP 200100199
NuHills	W98-363	HWW	PI 633916	PVP 200300337
NuHorizon	M95-610W	HWW	PI 619198	PVP 200100217
NuPlains	N94L205	HWW	PI 605741	PVP 200100266
NuSky	MTW9441	HWW	PI 619167	
NuWest	MT7811	HWW	PI 586806	PVP 9600342
ONeal	BZ999-592	HRS	PI 659480	PVP 201000272
ORCF-101	OR2010051	SWW	PI 633765	PVP 200300286
ORCF-101R	ORI2060306	SWW		
ORCF-102	OR2010007	SWW	PI 641787	PVP 200500337
ORCF-103	ORI2042037	SWW	PI 658153	PVP 200900464
ORSS-1757	OR9801757	SWW	PI 641786	PVP 200500336
Orita	YU895-89	DURUM	PI 628368	PVP 200200030
Otis	WA7931	HWS	PI 634866	PVP 200500312
Otto	WA8092	SWW	PI 667557	PVP 201300360

- 123 -

Outlook	MT9874	HRS	PI 632252	PVP 200400008
Owens	IDO185	SWS	CItr 17904	
Paha	WA4966	Club-W	CItr14485	
Palomino	W96-359W	HWW	PI 648023	PVP 200700247
Patwin	UC 1419	HWS	PI 643981	PVP 200600297
Paul	MT9426	HRW	PI 640425	PVP 200500335
Penawawa	WA6920	SWS	PI 495916	
Peregrine	DH99-37-100	HRW	PI 663208	PVP 201100371
Plata	96WV54013-W	HWS	PI 631482	PVP 200200241
Platinum	D9430	DURUM	PI 614670	PVP 200000311
Pomerelle	IDO448	SWS	PI 592983	
Pondera	MT479	HRS	CItr 17828	
Promontory	UT1567-51	HRW	PI 555458	PVP 9100244
Pronto	T0001052	HRS	CItr 14078	
Prowers 99	CO980001-MB	HRW	PI 612420	PVP 200000315
Pryor	BZ9W96-919	HRW	PI 634564	PVP 200400072
Puma	WA8134	SWW	PI 670038	PVP 201400085
Quantum 542	XNH1359	HRW		
Quantum 7817	XWH1017	SWW		
QCB36	OR9900553	SWW	PI 658244	
Rampart	MTS92042	HRW	PI 593889	
Reeder	ND 695	HRS	PI 613586	PVP 200000211
Rely	WA7527	Club-W	PI 542401	
Residence	CEBECO01	HRW	PI 628987	PVP 2002000067
Resilience CL+	WA8187	SWW	PI 686413	PVP 201800104
Rick	UT541774	HRS	PI 614834	
Rimrock	ACS52025	HRW	PI 664271	PVP 201100463
Ripper	CO00016	HRW	PI 644222	PVP 200700302
Rjames	GMGQ2	SWW	PI 639736	PVP 200500287
Rocket		HRW		
Rocky	NAPB 1316-76	HRW	CItr17879	PVP 7800013
Rod	WA7662	SWW	PI 558510	
Rohde	OR855	Club-W	PI 562529	
Rosalyn	OR2071071	SWW	PI 673132	PVP 201400487
RSI 220	RSI 220	SWS	PI 584322	PVP 9400282
Rudy	CI4873	SWW	CItr 4873	
Rulo	WA7622	Club-W	PI 578137	
Ryan	WA8214	SWS	PI 682074	PVP 201700204
Salute	99X1008-02	SWW	PI 654425	PVP 200800324
Saxon	N93-3026	HRS	PI 608714	PVP 9800360
Scarlet	WA7802	HRS	PI 601814	PVP 200000190
Scarlet '09	WA8034	HRS		
Scholar	MT9433	HRS	PI 607557	PVP 200000144
Seahawk	WA8162	SWS	PI 676290	PVP 201600078
Semper	CEBECO02	HRW	PI 628988	PVP 200200068
Sequoia	WA8180	HRW	PI 678966	PVP 201600315
Simon	ID9134302A	SWW	PI 636132	PVP 200500001

- 124 -

Skiles	ORH010085	SWW	PI 658154	PVP 200900465
Skookum	ML042-409-1,5	SWS		
Snow Crest	BZ998-247W	HWS	PI 642376	PVP 200600162
Snowmass	CO03W054-2	HWW	PI 658597	PVP 201000432
Spillman	WA7075	HRS	PI 506350	
Sprinter	WA8118	HRW	PI 671896	PVP 201400223
Stephens	OR332	SWW	CItr 17596	
Striker	CA9W07-818	HRW	PI 660653	PVP 201100049
Summit	96WV52305	HRS	PI 631480	PVP 200200239
Sunstar 50-30		SWS		
Sunstar II	SDM2	HRS	PI 559378	PVP 9200035
Sunstar Promise	SDM406	SWS	PI 585232	PVP 9500069
Survivor	IDO332	HRW	PI 509503	
SY 107	03PN107#3	SWW	PI 664948	PVP 201200115
SY 483	MH07-7483	SRW	PI 664947	PVP 201200114
SY 605CL		HRS		
SY 901	MC07*7001W	SWW	PI 664944	PVP 201200111
SY Assure	04PN096	SWW	PI 678621	PVP 201600255
SY Banks	09PN005#25	SWW	PI 682076	PVP 201700209
SY Basalt	SY240R	HRS	PI 672584	PVP 201400335
SY Capstone	03W10348	HWS	PI 665404	PVP 201200245
SY Clearstone 2CL	MTCL1077	HRW	PI 668090	PVP 201300357
SY Coho	04W40292R	HRS	PI 676286	PVP 201600039
SY Command	SY04PN066-7	SWW	PI 682078	PVP 201700211
SY Dayton	09PN062#18	SWW	PI 682079	PVP 201700212
SY Harrison	B05*0154	SRW	PI 664946	PVP 201200113
SY Ovation	03PN-108#21	SWW	PI 662047	PVP 201100387
SY Raptor	09PN046#16	SWW	PI 682081	PVP 201700214
SY Saltese	06PN3024-2	SWS	PI 678969	PVP 201600399
SY Selway	04PN3001-2	HRS	PI 676285	PVP 201600038
SY Steelhead	97S0621-05	HRS	PI 667769	PVP 201300338
SY Teton	08W10136	HWS	PI 676287	PVP 201600040
SY Touchstone	04PN028B-3	HRW	PI 678623	PVP 201600258
Sylvan	UT002464	HRS	PI 578867	
Symphony	TV10982-1	HRW	PI 583754	PVP 9400220
Tammy	W696-000	HRS	PI 601288	PVP 8600038
Tara 2002	WA7824	HRS	PI 617073	PVP 200200129
Tekoa	WA8189	SWS	PI 681653	PVP 201700124
Temple	OR92CL0054	Club-W	PI 599665	
Tempo	96WV52303A	HRS		
Tiber	MT8003	HRW	PI 517194	
Tiburon	D1-2	DURUM	PI 669999	PVP 201400050
Treasure	IDO248	SWS	PI 468962	
Trego	KS95HW62-6	HWW	PI 612576	PVP 200100117
Tubbs	OR939526	SWW	PI 629114	PVP 200300287
Tubbs 06	OR939526-05	SWW	PI 651023	PVP 200700423
UI Alta Blanca	IDO628	HWS	PI 642378	

- 125 -

UI Castle	09-DH10	SWW	PI 675641	PVP 201600014
UI Darwin	IDO604	HWW	PI 639953	
UI Lochsa	IDO597	HWS	PI 639952	
UI Magic CL+	09-DH11	SWW	PI 678629	PVP 201600300
UI Palouse CL+	3_5_10	SWW	PI 678630	PVP 201600316
UI Pettit	IDO632	SWS	PI 642363	
UI Platinum	IDO694	HWS	PI 672533	PVP 201400419
UI Silver	IDO658	HWW	PI 658467	PVP 201400011
UI Sparrow	IDO1108DH	SWW	PI 680612	PVP 201700189
UI SRG	IDO656	HRW	PI 660546	
UI Stone	IDO599	SWS	PI 660550	PVP 201300342
UI Whitmore	IDO671	SWS	PI 660548	
UI Winchester	IDO578	HRS	PI 642362	
UICF-Brundage	ID02-859	SWW	PI 660543	PVP 201100031
UICF-Grace	IDO651	HWW	PI 658468	PVP 201000086
UICF-Lambert	ID99-435	SWW	PI 660544	PVP 201100008
UI-WSU Huffman	IDN-03-29902A	SWW	PI 678853	PVP 201500295
Utah-100	UT1650-150	HRW	PI 594920	
Utopia	DOI933	DURUM	PI 608756	PVP 9900209
Vandal	IDO341	HRS	PI 546056	PVP 9100144
Vanguard	MTSF2238	HRW	PI 593891	
Vanna	BZ684023	SWS	PI 587199	PVP 9500094
Vida	MT0245	HRS	PI 642366	PVP 200600225
Vista	NE87615	HRW	PI 562653	PVP 9300284
Volante	00WV50014	DURUM	PI 655037	PVP 200800403
Volt	ACS52610	HRS	PI 655039	PVP 200800407
WA7811	WA7811	HWW	PI 636367	VH094487
WA7832	WA7832	SWW	PI 636368	VH092245
WA7870	WA7870	SWW	PI 636370	VH094755
WA7970	WA7970	SWW	PI 645606	J00C0014
WA7971	WA7971	SWW	PI 645607	J00C0029
WA7995	WA7995	HRS	PI 638536	
WA7998	WA7998	HRS	PI 638537	
WA8059	WA8059	SWS	PI 661152	
Wahoo	NE94654	HRW	PI 619098	PVP 200100237
Waikea	BZ98-447W	HWS	PI 648029	PVP 200700256
Wakanz	WA7183	SWS	PI 506352	
Wanser	AUS10692	HRW	CItr 13844	
Wawawai	WA7712	SWS	PI 574538	
Waxy-Pen	WA7996	Waxy	PI 63779	PVP 200600005
WB 1020M	BZ6WM02-1020	SWW	PI 655031	PVP 200800397
WB 1035CL+	BZM06-1001	SWS	PI 665495	PVP 201200399
WB 1066CL	BZ6WM04-1066	SWW	PI 664099	PVP 201100477
WB 1070CL	BZWM04-1070	SWW	PI 664092	PVP 201100470
WB 1081CL+	BZ6WM06-1081	SWW	PI 669998	PVP 201300488
WB 112	XY04-112	SRW	PI 664097	PVP 201100475
WB 139	WB-139	SRW	PI 664096	PVP 201100474

- 126 -

WB 196	ZX04-196	SRW	PI 664095	PVP 201100473
WB 249	LA02-249	SRW	PI 664094	PVP 201100472
WB 456	BU6W99-456	SWW	PI 658148	PVP 200900445
WB 470	WPB90470	SWW	PI 599335	PVP 9700398
WB 523	BU6W00-523	SWW	PI 658149	PVP 200900446
WB 528	BZ6W98-528	SWW	PI 643142	PVP 200600273
WB 906R		HRS	PI 483455	PVP 8000078
WB 926	RC 80-8	HRS		
WB 936	PH986-61	HRS	PI 587200	PVP 9500095
WB 1376CLP	BZ6WM09-1030	SWW	PI 674194	PVP 201500187
WB 1529	BZ6W07-427	SWW	PI 671989	PVP 201400230
WB 1604	BZ6W07-458	SWW	PI 671990	PVP 201400231
WB 1783		SWW	PI 686431	PVP 201800095
WB 6341	BZ608-014	SWS	PI 671992	PVP 201400233
WB 6430	BZ608-125	SWS	PI 671993	PVP 201400234
WB 7589	BZ9S09-0735W	HWS	PI 674344	PVP 201500196
WB 9200		HRS	PI 678860	PVP 201600384
WB 9879CLP	IMICHT-79	HRS	PI 666046	PVP 201200491
WB Arrowhead	ML9W05-2501	HRW	PI 664101	PVP 201100479
WB Cedar	HV9W96-1383R	HRW	PI 661996	PVP 201100378
WB Fuzion	BZ901-717	HRS	PI 661160	PVP 201100306
WB Grainfield	HV9W06-509	HRW	PI 665062	PVP 201200153
WB Gunnison	BZ902-413R	HRS	PI 665064	PVP 201200155
WB Hartline	BZ903-445WP	HWS	PI 665065	PVP 201200156
WB Idamax	BZ904-336WP	HWS	PI 661159	PVP 201100305
WB Joaquin Oro	SJ909-369	HRS	PI 664098	PVP 201100476
WB Junction	BZ6W02-616	SWW	PI 664100	PVP 201100478
WB Matlock	CA9W07-817	HRW	PI 661215	PVP 201100362
WB Mayville	CA907-827	HRS	PI 661061	PVP 201100266
WB Mead	YU802-4	DURUM	PI 664091	PVP 201100469
WB Paloma	BZ904-331WP	HWS	PI 659489	PVP 201000293
WB Patron	YU908-017	HRS	PI 664090	PVP 201100468
WB Perla	SJ909-371	HWS	PI 664089	PVP 201100467
WB Prestea	BZ903-461W	HWS	PI 665061	PVP 201200152
WB Pristine	BZ991-408	HWS	PI 613581	PVP 200000180
WB Quake	BZ9W05-2043	HRW	PI 664093	PVP 201100471
WB Redhawk	HV9W06-727	HRS	PI 665063	PVP 201200154
WB Rockland	SJ908-247	HRS	PI 659487	PVP 201000291
WB Tucson	ML9W05-2506	HRW	PI 664088	PVP 201100466
Weatherford	OR898120	SWW	PI 602861	PVP 9900341
Westmore	257S11	DURUM	PI 665066	PVP 201200293
Weston	ID74-55-20	HRW	CItr 17727	
Whetstone	W98-344	HRW	PI 658009	PVP 200900301
Whit	WA8008	SWS	PI 653841	PVP 200900350
Whitebird	IDO392	SWS	PI 592982	
Winsome	OR4870453	HWS	PI 613177	PVP 200100111
Xerpha	WA7973	SWW	PI 645605	PVP 200900289

- 127 -

Yamhill	COR61-1227-66-7	SWW	CItr 14563	
Yecora Rojo	Bluebird	HRS	CItr 17414	
Yellowstone	MT00159	HRW	PI 643428	PVP 200600284
Zak	WA7850	SWS	PI 607839	PVP 200100257
Zeke	WPB87331	HRS	PI 607548	PVP 9900231

- 128 -

Pacific Northwest Wheat Quality Council, Officers, 2018

Technical Board
Hayley Butler, Chair
Andrew Ross, Vice Chair
Heather Davis, Secretary
Arron Carter, Treasurer
Craig F. Morris, *Ex Officio*

Program Committee (representing)
Doug Engle, Chair
Technical Board members
Craig Morris, Director of Western Wheat Quality Lab
Arron Carter, Wheat Breeder
Reuben McLean, Collaborator
Andew Ross, PNW Section AACCI
Jay Noller, Administrative Coordinator, WERA-1009
Dana Herron, Tri-State Wheat Commissions Representative
Steve Wirsching, U.S. Wheat Associates, West Coast

Pacific Northwest Section AACC International, Officers 2018
Andrew Ross, Chair
Claudia Carter, Past Chair
Teepakorn Kongraksawech, Vice-Chair
Craig F. Morris, Treasurer
Zory Quinde-Axtell, Secretary

- 129 -

Pacific Northwest Wheat Quality Council
Charter & Mission

Adopted January 19, 2012

Mission, Policy, and Operating Procedure

The mission of the Pacific Northwest Wheat Quality Council (PNW WQC) is to provide a forum for leadership and communication in promoting continuous quality improvement among the various elements of the community of Pacific Northwest wheat interests. The PNW WQC will provide an organization structure to evaluate the quality of experimental lines and cultivars that may be grown in the traditional growing regions of the Western United States. The PNW WQC also will establish other activities as requested by the membership. The PNW WQC is an autonomous unit of AACC International, and operates under the direction and supervision of the Technical Board with the advice and counsel of the Tri-State wheat commissions of Washington, Oregon and Idaho, and U.S. Wheat Associates.

Objectives

- Encourage wide participation by all members of the wheat industry active in the Western U.S.
- Determine, through professional consulting expertise, the end-use quality parameters and ranges that adequately describe the performance characteristics that members seek in new and existing cultivars.
- Promote the enhancement of wheat quality in new cultivars.
- Emphasize the importance of communication across all sectors and provide resources for education on the continuous quality improvement and utilization of hard and soft wheat.
- Encourage the organizations vital to wheat quality enhancement to continue to make positive contributions through research and communications.
- Offer advice and support for Federal, State and private wheat quality laboratories in the region.

Membership

- The membership of the PNW WQC will consist of those registrants attending the annual collaborative baking technical conference ('Annual Meeting').

PNW WQC Technical Board

- The Technical Board shall be the administrative unit responsible for managing the functions of the PNW WQC.
- The Technical Board shall consist of four members elected from the membership.
- Officers of the Technical Board shall consist of a Chair, Vice-Chair and Secretary, each to serve a one-year term; and a Treasurer who may serve for up to three consecutive years.

- 130 -

- The Director of the Western Wheat Quality Laboratory shall serve as an *Ex Officio* member of the Technical Board with no term limit.
- Terms for elected officers start the day after the annual meeting of the PNW WQC.
- The Vice-Chair generally replaces the Chair at the conclusion of the Chair's term and the Secretary generally replaces the Vice-Chair at the conclusion of the Vice-Chair's term.
- Normally only the Secretary shall be elected annually at the Annual Meeting of the PNW WQC by nomination and majority vote; and the Treasurer as appropriate.
- Any eligible member may be reelected after being out of office for one year.
- Vacancies that occur during the term of office of the members of the Technical Board shall be filled by nomination and consensus vote of the remaining members of the Technical Board. The appointee will serve the remaining term of the vacancy.
- Exceptions to the above may be granted if voted on by the Technical Board or by majority vote of the PNW WQC at the annual meeting.

Duties of the Technical Board

- The Chair shall be responsible to establish a meeting place and preside at all meetings of the Technical Board and selected elements of the PNW WQC Annual Meeting.
- The Vice-Chair shall preside at meetings in the absence of the Chair and assume such duties as may be assigned by the Chair of the Technical Board.
- The Secretary shall be responsible for taking minutes of the Technical Board meetings.
- The Treasurer will maintain a record of income and expenditures, and shall receive and disburse funds following the actions directed by the Technical Board in furtherance of the aims of the PNW WQC.
- The Treasurer shall make available to the membership a full accounting of finances at the Annual Meeting, such accounting shall become a part of the minutes.

Compensation

- Technical Board members shall serve without compensation.

Indemnity

- The Technical Board members shall be indemnified against personal liability and be included under the AACCI Board insurance. The cost of said insurance to be a legitimate expense of the PNW WQC.

- 131 -

Fiscal Accounting, Income and Disbursement

- PNW WQC funds will be maintained at AACCI Headquarters and available for review upon written request.
- Income will be deposited with AACCI, and disbursements made by AACCI upon written request from the PNW WQC Treasurer.
- The Technical Board will authorize the paying of expenses related to the Annual Meeting and other functions relevant to the aims and operations of the PNW WQC.

Finances and Budget

- The operating expenses of the PNW WQC may come from various sources at the discretion and approval of the Technical Board. These sources are typically Annual Meeting registrations and contributions from the Tri-State Wheat Commissions and industry donors.
- The budget shall be presented to the membership for review and approval at the Annual Meeting.
- The successful operation of the PNW WQC is founded on the principle of substantial 'in-kind' contributions of members; no accounting of in-kind contributions shall be made.

Amendments

- Amendments to the policy and operation procedure of the PNW WQC can be made by majority vote of the PNW WQC members.
- The proposed changes must be submitted in writing and must be in the hands of the membership two weeks prior to voting on the change.

PNW WQC Program Committee

Committee Purpose

A committee entitled "PNW WQC Program Committee" shall be established and consist of the four Technical Board members and additional PNW WQC members as deemed appropriate. Members shall include, but not be limited to:

- The Director of the USDA Western Wheat Quality Laboratory
- One wheat breeder from the Western U.S.
- One collaborator from the wheat milling or baking industries
- A Program Chair, appointed by the Technical Committee, who is generally responsible for coordinating wheat sample acquisition/submittal, pilot flour milling, flour distribution to cooperators, data collection, and report compilation
- The current Chair of the Pacific Northwest Section of AACC International
- The Administrative Coordinator of WERA-1009
- A representative of the Tri-State Wheat Commissions
- The West Coast Director of U.S. Wheat Associates

Responsibilities

- Establish procedures and requirements for sample origination, production, handling, evaluation and reporting of the Collaborative Testing Program
- Approval of samples submitted by Western U.S. wheat breeders
- The milling and reporting of the experimental and check samples
- Distribution of samples to cooperators (companies willing to conduct testing and baking evaluations on the samples prepared)
- Approval of cooperators to participate in the Collaborative Testing Program
- Preparation of an annual quality report
- Establish the program of the Annual Meeting

Samples

- Each breeder shall have the privilege of proposing the submission of experimental test lines and check cultivar(s) each year for evaluation. The maximum number of samples, and their allocation will be determined by the Program Committee.
- All deadlines, minimum sample size and other practical constraints will be set at the discretion of the Program Committee.

Annual Meeting

- The Annual Meeting of the PNW WQC shall be established with the input of the membership at the conclusion of the previous Annual Meeting. The Program Committee will establish the Annual Meeting time and place utilizing the recommendations to the extent possible.
- The purpose of the Annual Meeting shall be to openly present and discuss the results of the Collaborative Testing Program, discuss quality issues important to the wheat industry of the Western U.S., elect board members and carry on other business as required by the PNW WQC.
- Participating cooperators shall return evaluation data and other relevant information by the date set by the Program Committee to be included in the Annual Meeting program.
- The Program Committee is encouraged to coordinate the Annual Meeting with complementary activities of the Pacific Northwest Section of AACC International and WERA-1009.
- The Technical Board may establish other meetings determined to be necessary.

- 133 -

Pacific Northwest Wheat Quality Council
Charter & Mission
Amendment No. 1

Adopted, January 25, 2013 Scottsdale, Arizona

As per the PNW WQC Charter:

"Amendments

- Amendments to the policy and operation procedure of the PNW WQC can be made by majority vote of the PNW WQC members.
- The proposed changes must be submitted in writing and must be in the hands of the membership two weeks prior to voting on the change."

Proposed Amendment No. 1.

Termination and Liquidation

- Upon majority vote of the General Membership, the PNW WQC may be terminated, no sooner than 90 days after such vote.
- Upon such action the Executive Committee shall pay all outstanding obligations, liquidate all assets, and close all bank accounts.
- Disbursements shall first fulfill all existing written agreements
- The residue of assets shall be disbursed in the following manner:
  1) Donation in whole or in part to the Student Travel Fund of AACC International
  2) Disbursement to one or more not-for-profit entities for the expressed purpose of advancing wheat grain quality in the Pacific Northwest; such disbursement(s) shall be approved by a majority vote of returned ballots from the General Membership.

- 134 -