



# **2017 Hard Red Wheat / Hard White Wheat Crop Quality Report**

# California Wheat

California's wheat growing regions are defined by climate, value of alternative crops, and distinct differences in variety selection.

Five of the six wheat classes grown in the United States are produced in California, with Hard Red wheat accounting for 74%, Durum 10%, Soft White 9%, and Hard White 7% of planted acres this year.

Overall, the 2017 crop had medium to high protein, and some areas that experienced high rainfall had low protein. Consistent with other years, 2017 crop had low moisture, high flour extraction, and strong baking performance — all of which make California wheat suitable for blending.

Most California hard wheat is planted from October to January and harvested in the months of June and July. With the strong demand for new crop wheat in the domestic marketplace, importers are encouraged to express their interest in purchasing California wheat in early spring. For Hard White wheat, buyers should consider communicating with grain handlers and contracting for acres before planting time.

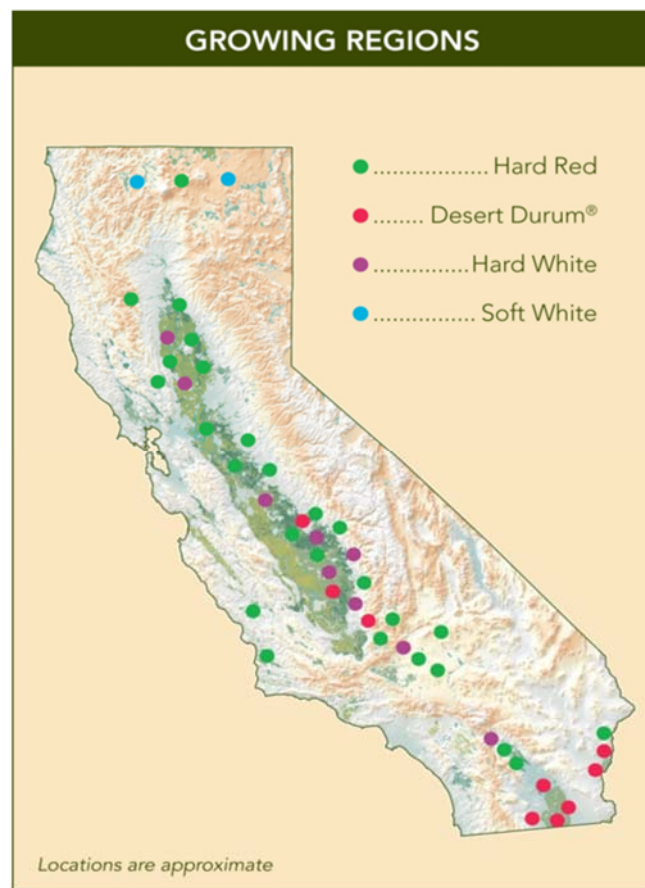
California hard wheat varieties are known for their low moisture and large and uniform kernel size. Because wheat is predominantly grown under irrigation, growers achieve high yields and consistent quality.

## 2017 Crop Conditions

The 2016-17 season was characterized by above average annual rainfall for most locations in California. In the northern Central Valley some locations had received two to three times average rainfall by March. This likely contributed to high average yields, but also resulted in waterlogging, heavier-than-normal weed growth, and greater disease pressure, in some cases. Locations in the southern Central Valley received more rainfall than in recent years, but proportionately less than in the northern Central Valley relative to long-term averages. Cumulative temperatures throughout the state during the growing season were cooler than in recent years, but mostly in line with the 10-year average.

## Data in this Report

Samples for this year's report were collected from grain handlers and producers around the state. This program collects samples throughout the harvest season, resulting in a crop quality report that is highly representative of the crop. Averages are reported as weighted averages for each growing region: Sacramento and San Joaquin Valleys.



## PRODUCTION HISTORY\*

YEAR	METRIC TONS	SHORT TONS
	(1,000 MT's)	(1,000 ST's)
2017	290	320
2016	361	398
2015	336	370
2014	392	432
2013	751	828
2012	706	778
2011	1054	1162

\*All common wheat (excluding Durum).

## HARD RED WHEAT GRADE HARVEST DATA

	2017	2016	2015	2014	2013
Test Weight: lb/bu	62.8	63.8	63.7	63.4	62.3
kg/hl	82.6	83.8	83.7	83.4	81.9
Moisture (%)	8.7	8.5	8.6	9.1	9.2
Damaged (%)	0.1	0.2	0.2	0	0
Foreign Material* (%)	0.1	0.5	0.2	0.4	0.2
Shrunken/Broken* (%)	0.8	0.8	0.5	0.7	0.7
Total Defects (%)	1.0	1.2	0.9	1.1	0.9
Dockage* (%)	1.0	1.2	0.9	0.7	1.0
Total Screenings (%)	1.9	2.5	1.6	1.8	1.9
Net Wheat (%)	88.5	89.2	89.9	89.3	89.1
CTW (%)	105.3	106.2	107.1	106.3	106.0
MWVI (%)	94.9	94.2	93.4	94.1	94.3

Harvest year = Calendar year. \*Total Screenings are those factors represented on the grade certificate that are cleaned out in the flour mill. Test weight conversion from lb/bu to kg/hl according to FGIS-PN-97-5,  $(1.292 \times \text{lb/bu}) + 1.419$ . Net Wheat =  $(100\% - (\text{FM} + \text{SHBN} + \text{Dockage})) \times (100\% - \text{Moisture}) / 100\%$ . Clean, Tempered Wheat (CTW%) =  $(100\% - (\text{FM} + \text{SHBN} + \text{Dockage})) \times (100\% - \text{Moisture}) / (100\% - 16\% (\text{temper moisture}))$ . Millable Wheat Value Index (MWVI) =  $100\% / \text{CTW}$ .

## Varietal Descriptions

### HARD RED WHEAT

**Cal Rojo (HRW)** is a widely adapted, high yielding variety for both the San Joaquin and Sacramento Valleys. It is mid-early maturing and receives good scores for grain, milling, and baking quality.

**Summit 515 (HRW)** is a variant of the variety Summit with two effective genes for stripe rust resistance added by marker assisted selection. Summit 515 has very high yield potential in both the San Joaquin and Sacramento Valleys.

**WB-9229 (HRW)** is adapted to both the San Joaquin and Sacramento Valleys. It has medium to high protein and test weight and has excellent milling and baking properties. It is moderately resistant to Septoria and is resistant to the current races of stripe rust.

**WB-Joaquin Oro (HRW)** is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties, similar to the variety Joaquin. In addition, WB-Joaquin Oro carries two genes for stripe rust resistance, one of which is effective against all current races.

**WB-9112 (HRW)** is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties. It is very similar to the variety Joaquin and has resistance to stripe rust.

### HARD WHITE WHEAT

**Blanca Grande 515 (HWW)** is a variant of the variety Blanca Grande, with two effective genes for stripe rust resistance added by marker assisted selection. Blanca Grande 515 has excellent end-use quality and high yielding ability in both the San Joaquin and Sacramento Valleys.

**Patwin 515 (HWW)** is a high yielding variety with high protein levels, and is adapted to both the Sacramento and San Joaquin Valleys. Patwin 515 is a variant of Patwin with the addition of stripe rust resistance genes *Yr5* and *Yr15*.

**WB-7566 (HWW)** has excellent yield potential and high test weight, and it has been identified as consistent high yielder. It has stripe rust resistance and good grain protein levels. It has excellent baking qualities.

### FORAGE WHEAT VARIETIES

#### WB-Patron and Triple IV

Hard Red wheat varieties primarily grown as forage wheat varieties.

**WB-Patron** is a hard red spring awnless forage wheat that has stripe and leaf rust resistance and is moderately susceptible to Septoria. It has medium protein content and poor gluten strength.

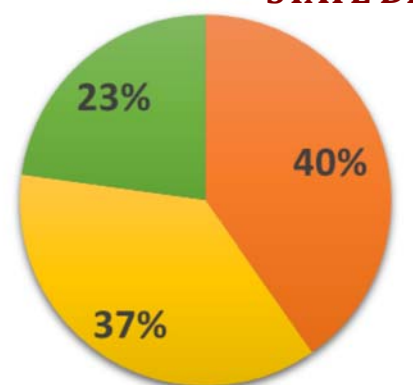
**Triple IV** has high protein content and overall acceptable gluten strength.

## KERNEL QUALITY DATA

State and Region	Protein	Ash	Moisture	Falling	Test Weight		SKCS	1000	Kernel			Micro
	(12% moisture)			Number		Hardness	Kernel	Size Distribution				
	%	%		SEC	lbs/bu	Kg/hL	Score	Weight	Large	Medium	Small	
								g	%	%	%	
HARD RED WINTER WHEAT												
Sacramento Valley	11.0	1.61	10.9	387	62.9	82.6	69.9	41.5	89	11	0	43
San Joaquin Valley	12.7	1.56	7.8	456	63.0	82.8	62.0	44.1	87	13	0	40
State Avg. 2017	12.3	1.57	8.7	434	62.9	82.7	64.3	43.1	87	13	0	41

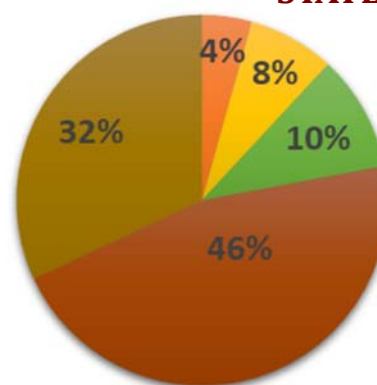
<b>HARD WHITE WHEAT</b>												
Sacramento Valley	10.9	1.53	10.1	395	62.4	82.1	81.6	38.3	79	20	1	35
San Joaquin Valley	12.9	1.40	9.9	401	60.2	79.2	73.9	34.0	64	35	1	40
State Avg. 2017	11.6	1.53	10.1	397	61.6	81.1	78.8	36.8	74	25	1	37

PROTEIN (12% MOISTURE)  
STATE DISTRIBUTION



■ >12.5 ■ 11.0-12.4 ■ <10.9

TEST WEIGHT (LBS/BU)  
STATE DISTRIBUTION



■ <58 ■ 58-59.9 ■ 60-61.9 ■ 62-63.9 ■ >64

## FLOUR QUALITY DATA

State and Region	Lab Mill	Protein	Ash		Wet				Falling
	Yield	(14% moisture)		Gluten	Gluten	SRC	Water/	5% Lactic Acid/	Number
	%	%	%	Index	%	GPI	50% Sucrose	5% Na <sub>2</sub> CO <sub>3</sub>	SEC
HARD RED WINTER WHEAT									
Sacramento Valley	66.2	9.7	0.49	83.8	27.0	0.66	69/108	132/90	384
San Joaquin Valley	69.2	11.3	0.42	75.4	33.7	0.68	69/109	132/85	469
State Avg. 2017	68.3	10.9	0.44	77.6	32.0	0.68	69/109	133/87	441

<b>HARD WHITE WHEAT</b>									
Sacramento Valley	65.1	9.5	0.48	90.5	24.2	0.67	70/111	139/95	422
San Joaquin Valley	65.9	11.5	0.45	81.8	31.2	0.71	72/112	143/89	443
State Avg. 2017	65.4	10.2	0.47	87.4	26.7	0.69	71/112	140/93	430



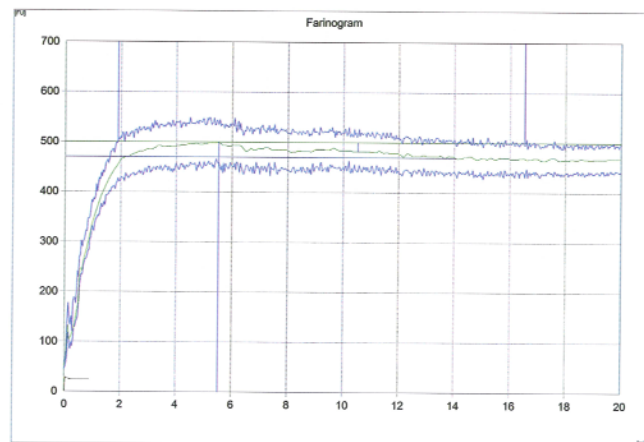
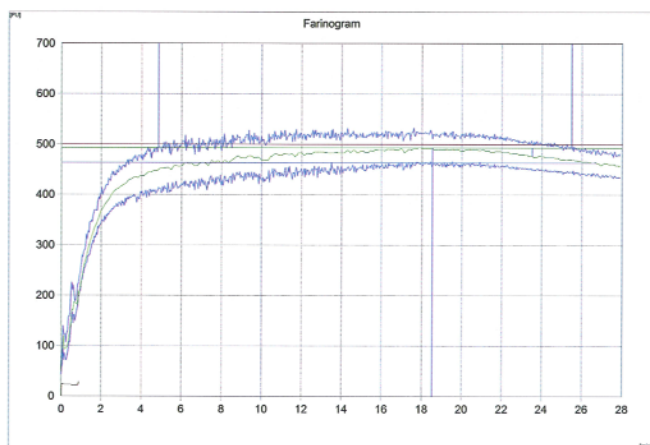
# PHYSICAL DOUGH QUALITY

State and Region	Farinograph				Alveograph			W Joules X 10 <sup>4</sup>
	Absorption %	Development		MTI B.U.	P MM	L MM	P/L Ratio	
		Time MIN	Stability MIN					
HARD RED WINTER WHEAT								
Sacramento Valley	63.5	4.8	9.5	36	110	68	1.77	259
San Joaquin Valley	64.0	8.6	13.4	19	100	74	1.40	245
State Avg. 2017	63.9	7.5	12.3	24	101	76	1.47	251
HARD WHITE WHEAT								
Sacramento Valley	64.6	5.0	15.7	14	117	62	2.04	261
San Joaquin Valley	65.3	11.3	14.1	16	108	117	0.92	427
State Avg. 2017	64.8	7.2	15.1	14	114	81	1.64	320

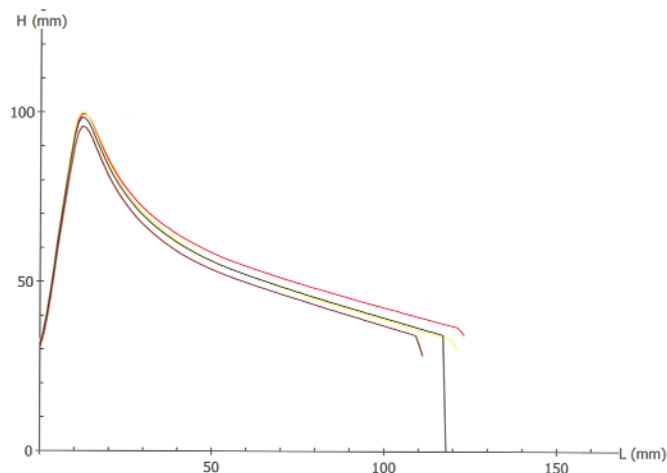
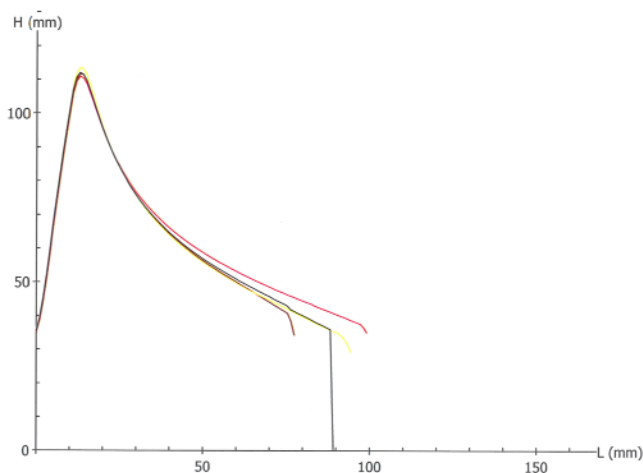
## HARD RED WINTER WHEAT

## HARD WHITE WHEAT

### 2017 AVERAGE FARINOGRAM



### 2017 AVERAGE ALVEOGRAM



# BAKING QUALITY DATA

State and Region	Baking Absorption %	Loaf Volume CC	Dough Handling (1-10)	Crumb Color (1-10)	Crumb Grain (1-10)	Crumb Texture (1-10)	Bread Symmetry (1-10)
<b>HARD RED WINTER WHEAT</b>							
Sacramento Valley	63.5	847	5.6	5.8	7.2	7.5	5.9
San Joaquin Valley	63.8	927	6.2	7.7	8.0	8.5	7.4
State Avg. 2017	63.5	907	6.1	7.2	7.8	8.2	7.0
<b>HARD WHITE WHEAT</b>							
Sacramento Valley	64.6	823	6.0	4.2	6.1	6.1	6.0
San Joaquin Valley	65.3	950	8.0	8.0	9.0	8.0	8.0
State Avg. 2017	64.8	868	6.7	5.6	7.1	6.8	6.7



## 2017 HARD RED VARIETY SPECIFIC INFORMATION

	Cal Rojo		Summit 515		WB-9229	
WHEAT	Sacramento Valley	San Joaquin Valley	Sacramento Valley	San Joaquin Valley	Sacramento Valley	San Joaquin Valley
Protein (12% MB)	8.6	12.3	11.1	12.6	11.3	12.7
Ash (12% MB)	1.62	1.54	1.51	1.53	1.62	1.57
Moisture (%)	9.8	9.0	9.4	8.5	10.3	8.5
Falling Number (sec)	393	400	333	347	437	445
Micro Sedimentation (CC)	30	44	45	48	47	53
<b>Test Weight</b>						
lb/bu	61.9	62.3	63.8	62.5	63.5	63.9
kg/hl	81.4	81.9	83.8	82.2	83.5	83.9
SKCS Hardness Score	54	60	70	66	77	75
1000 Kernel Weight (g)	41.1	43.1	43.2	41.5	38.7	41.0
<b>Kernel Size Distribution</b>						
Large/Medium/Small	89/11/0	81/18/1	92/8/0	79/20/1	84/16/0	87/13/0
<b>FLOUR</b>						
Lab Mill Yield (%)	67.5	70.2	66.7	67.1	66.1	67.2
Protein (14% MB)	7.6	11.0	9.8	11.2	10.2	11.6
Ash (14% MB)	0.51	0.45	0.42	0.42	0.46	0.45
Gluten Index	97.4	92.3	91.0	83.2	94.1	92.5
Wet Gluten (14% MB)	17.3	29.9	27.9	33.1	27.2	32.5
SRC: GPI	0.58	0.69	0.68	0.71	0.76	0.83
Water/ 50% Sucrose	63/102	66/105	70/109	71/115	71/113	70/111
5% Lactic Acid/5% Na <sub>2</sub> CO <sub>3</sub>	112/90	132/87	137/92	137/90	157/92	167/90
<b>ALVEOGRAPH</b>						
P (mm)	86	90	116	115	135	121
L (mm)	50	99	60	68	83	100
P/L ratio	1.72	0.95	2.18	1.74	1.83	1.24
W (10 <sup>-4</sup> Joules)	164	299	241	277	394	415
<b>MIXOGRAPH</b>						
Absorption (%)	58.0	61.4	64.2	63.5	65.5	68.0
Peak Time (min)	4.3	3.7	3.0	3.3	4.3	4.8
Peak Height (mu)	46	52	52	51	55	53
M.T. Score (1-8)	3	3	4	3	5	6
<b>FARINOGRAPH</b>						
Absorption (%)	57.8	61.0	64.7	64.6	65.2	67.2
Peak Time (min)	2.5	7.7	4.7	9.3	7.6	19.7
Stability (min)	5.8	13.4	10.8	15.5	17.6	23.8
M.T.I. (B.U.)	40.5	23.9	22.9	15.6	17.3	18.4
<b>BAKING RESULTS</b>						
Baking Absorption (%)	58.1	60.8	64.7	64.4	64.7	66.5
Bread Volume (cc)	733	923	890	962	923	1029
Crumb Grain & Texture	7	8	8	9	9	9

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5,  $\{(1.292 \times (\text{lb/bu}) + 1.419)\}$ .

## 2017 HARD RED VARIETY SPECIFIC INFORMATION

	Joaquin Oro	WB-9112	Triple IV	WB Patron	
WHEAT	San Joaquin Valley	San Joaquin Valley	Sacramento Valley	Sacramento Valley	San Joaquin Valley
Protein (12% MB)	13.6	12.7	14.0	11.5	12.6
Ash (12% MB)	1.60	1.53	1.59	1.67	1.57
Moisture (%)	6.4	6.5	9.0	13.2	7.3
Falling Number (sec)	563	546	376	401	496
Micro Sedimentation (CC)	43	46	53	43	32
<b>Test Weight</b>					
lb/bu	63.7	65.0	61.4	62.0	63.2
kg/hl	83.8	85.4	80.7	81.5	83.0
SKCS Hardness Score	64	71	63	71	60
1000 Kernel Weight (g)	44.8	41.5	38.0	42.0	45.8
<b>Kernel Size Distribution</b>					
Large/Medium/Small	93/7/0	89/10/1	75/25/0	90/10/0	90/10/0
<b>FLOUR</b>					
Lab Mill Yield (%)	72.0	71.1	67.7	65.2	68.8
Protein (14% MB)	12.3	11.5	12.7	9.9	11.2
Ash (14% MB)	0.40	0.37	0.47	0.55	0.42
Gluten Index	89.4	85.8	68.7	66.3	58.4
Wet Gluten (14% MB)	36.9	33.3	39.3	29.1	35.0
SRC: GPI	0.69	0.79	0.78	0.61	0.65
Water/ 50% Sucrose	71/112	73/110	66/110	70/105	69/107
5% Lactic Acid/5% NA <sub>2</sub> CO <sub>3</sub>	137/88	154/85	148/80	117/88	123/82
<b>ALVEOGRAPH</b>					
P (mm)	132	127	66	98	87
L (mm)	83	81	163	69	62
P/L ratio	1.59	1.57	0.40	1.42	1.41
W (10 <sup>-4</sup> Joules)	369	355	287	220	159
<b>MIXOGRAPH</b>					
Absorption (%)	71.0	68.5	65.0	64.0	63.3
Peak Time (min)	3.8	4.4	2.5	2.0	1.6
Peak Height (mu)	65	51	60	50	53
M.T. Score (1-8)	4	5	3	2	2
<b>FARINOGRAPH</b>					
Absorption (%)	68.1	67.8	62.9	63.4	63.9
Peak Time (min)	16.4	18.4	8.2	3.8	5.7
Stability (min)	19.6	16.7	12.9	4.2	10.5
M.T.I. (B.U.)	14.8	29.0	20.7	58.0	19.1
<b>BAKING RESULTS</b>					
Baking Absorption (%)	67.2	66.8	58.7	63.5	63.9
Bread Volume (cc)	986	990	975	798	892
Crumb Grain & Texture	9	9	9	6	8

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5, {(1.292 x (lb/bu) + 1.419)}.



## 2017 HARD WHITE VARIETY SPECIFIC INFORMATION

## Blanca Grande 515

## Patwin 515

## WB-7566

WHEAT	San Joaquin Valley	Sacramento Valley	Sacramento Valley
Protein (12% MB)	12.9	11.0	10.2
Ash (12% MB)	1.40	1.54	1.44
Moisture (%)	9.9	10.3	8.5
Falling Number (sec)	401	393	415
Micro Sedimentation (CC)	40	36	32
<b>Test Weight</b>			
lb/bu	60.2	62.3	63.3
kg/hl	79.2	82.0	83.2
SKCS Hardness Score	74	83	67
1000 Kernel Weight (g)	34.0	37.7	44.2
<b>Kernel Size Distribution</b>			
Large/Medium/Small	64/35/1	78/22/0	93/7/0
<b>FLOUR</b>			
Lab Mill Yield (%)	65.9	65.3	63.0
Protein (14% MB)	11.5	9.6	9.0
Ash (14% MB)	0.45	0.49	0.40
Gluten Index	81.8	89.5	99.4
Wet Gluten (14% MB)	31.2	24.3	23.4
SRC: GPI	0.71	0.67	0.73
Water/ 50% Sucrose	72/112	71/111	70/111
5% Lactic Acid/5% $\text{Na}_2\text{CO}_3$	143/89	138/95	148/94
<b>ALVEOGRAPH</b>			
P (mm)	108	115	139
L (mm)	117	65	39
P/L ratio	0.92	1.86	3.56
W ( $10^{-4}$ Joules)	427	265	228
<b>MIXOGRAPH</b>			
Absorption (%)	64.7	64.9	63.6
Peak Time (min)	3.4	3.6	6.0
Peak Height (mu)	47	53	43
M.T. Score (1-8)	4	3	4
<b>FARINOGRAPH</b>			
Absorption (%)	65.3	64.6	64.6
Peak Time (min)	11.3	5.3	2.0
Stability (min)	14.1	16.0	13.5
M.T.I. (B.U.)	15.5	12.5	23.0
<b>BAKING RESULTS</b>			
Baking Absorption (%)	65.3	64.6	64.6
Bread Volume (cc)	950	825	808
Crumb Grain & Texture	9	6	7

Wheat samples were collected by handlers. Wheat and Flour Protein: Leco Combustion Nitrogen Analyzer Model TruSpec, Lab mill yield: Brabender Quadromat Sr. Mill, modified in 1997; Bread Volume: AACCI Method 10-10B; Test weight conversion from lb/bu to kg/hl according to FGIS PN-97-5,  $\{(1.292 \times (\text{lb/bu}) + 1.419)\}$ .

## Technical and Laboratory Services



*CWC Executive Director Claudia Carter and Laboratory Manager Teng Vang*  
Photo credit: Matt Salvo, California Farm Bureau Federation

The California Wheat Commission laboratory has the equipment necessary for evaluation of common and durum wheat milling quality, flour chemical analysis, physical dough testing, semolina analysis, bake and noodle production tests, and pasta analysis.

The Commission's staff is available to work with customers in the area of quality assurance, product development, problem solving, quality control training, and research. The lab order test form is available on the California Wheat Commission website, please use when requesting services.

### Customer Assistance and Support

The Commission is available to answer technical questions about California's wheat quality, including recommendations for blending and appropriate end-use. The Commission conducts specialized training programs in milling, baking, semolina, pasta, and quality control. These specific programs may be customized to meet the customers' needs.

### Crop and Export Survey

California produces five of the six classes of U.S. wheat: Hard Red Winter (HRW), Desert Durum®, Hard White, Soft White and Hard Red Spring. While HRW, Hard White, and Durum are the predominately produced and exported classes, information and contacts for all the above classes of wheat are available by contacting the Commission office. Every effort is made to provide an accurate assessment of quality to buyers. With greater amounts of wheat being sold by variety, varietal specific information is emphasized in Commission surveys.

### Varietal Development

Private and public breeding programs play an important role in the development of new varieties available to California wheat producers. The Commission analyzes hundreds of samples each year to support these programs and encourages the release of new varieties that will meet the customers' needs. New varieties are evaluated by commercial mills through the California Wheat Collaborator program.

### Research

The Commission laboratory is available for flour, semolina, milling, end-product, and new-product research. Technical expertise is available in hearth breads, pasta, Asian food products, standard loaf bread, steamed bread, Asian noodles, cookies, tortillas and Middle Eastern flat breads.



*CWC Laboratory Manager Teng Vang*  
Photo credit: Matt Salvo, California Farm Bureau Federation



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**California**  
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COMMISSION