California Crop Quality Report

2023 Hard Red Wheat / Hard White Wheat

California WHEAT COMMISSION

California Wheat

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

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.

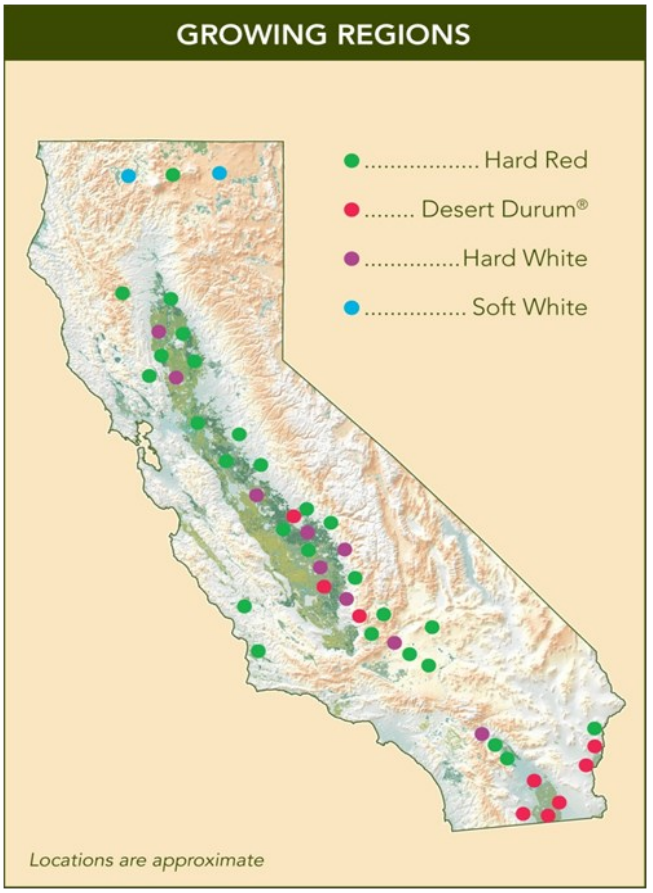
2023 Crop Conditions

Precipitation totals for the 2022-23 season were much greater than average in the main wheat-growing regions of California (approximately 160% to 200%, depending on the location). For the period between October 1 and March 1, rainfall in the Sacramento and San Joaquin Valleys was 155% and 215% of normal, respectively, and rainfall during this period accounted for 73% and 75% (respectively) of the yearly total. Wet early-season conditions narrowed the planting window for crops in the Sacramento Valley and the northern San Joaquin Valley, and some crops were planted later than normal. In addition, geese predation was reported in areas around the Sacramento Valley and Delta region, and flooding negatively affected fields in the Delta region and the Tulare Lakebed. Cooler than average temperatures also factored into the growing season, with some crops weeks behind their normal growth stages for equivalent dates in an average season. The generally cool springtime conditions and abundant rainfall totals led to higher-than-average yields alongside better-than-average grain quality in many locations around the state. In UC trial locations, stripe rust and powdery mildew were observed on varieties with known susceptibility, but overall disease incidence was moderate.

Data for 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 for each growing region: Sacramento and San Joaquin Valleys.

Crop Quality values cannot be used to compare varieties since they are harvested from different fields. Weather, soil, and cultural practices can influence the quality of all varieties between years and of particular lots of any one variety.



PRODUCTION HISTORY*

YEAR	METRIC TONS (1,000 MT's)	SHORT TONS (1,000 ST's)
2023	185	204
2022	155	171
2021	131	144
2020	208	230
2019	239	263
2018	231	255
2017	270	299

*All common wheat (excluding Durum).

HARD RED WHEAT GRADE HARVEST DATA					
	2023	2022	2021	2020	2019
Test Weight: lb/bu	65.0	63.0	63.1	62.9	62.5
kg/hl	85.4	82.8	83.0	82.7	82.2
Moisture (%)	9.4	9.6	9.6	9.2	8.6
Damaged (%)	0.0	0.0	0.0	0.0	0.1
Foreign Material* (%)	0.0	0.1	0.1	0.1	0.1
Shrunken/Broken* (%)	0.3	0.5	0.6	0.5	0.7
Total Defects (%)	0.4	0.6	0.7	0.6	0.8
Dockage* (%)	1.0	1.0	0.9	0.9	1.1
Total Screenings (%)	1.3	1.5	1.6	1.5	1.9
Net Wheat (%)	89.3	89.0	88.9	89.5	89.7
CTW (%)	106.4	105.9	105.9	106.5	106.8
MWVI (%)	94.0	94.4	94.4	93.9	93.6

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 x lb/bu) + 1.419. Net Wheat = (100%-(FM+SHBN+Dockage)) x (100%-Moisture)/100%. Clean, Tempered Wheat (CTW%) = (100%- (FM +SHBN+Dockage)) x (100%-Moisture)/(100%-16% (temper moisture)). Millable Wheat Value Index (MWVI) = 100%/CTW.

Varietal Descriptions

HARD RED WHEAT

Cal Rojo (HRS) 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 (HRS) 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 (HRS) 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 (HRS) 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-9727 (HRS) is a hard red spring wheat variety with excellent yield potential and very good protein content. This medium-late maturing variety is adapted for California's Sacramento Valley and has excellent milling and baking quality.

AP-Octane (HRS) is a hard red spring wheat variety bred and developed by Syngenta Participation AG. AP Octane was selected for height, maturity, appearance, kernel color, kernel soundness, disease reaction, and end use quality. It is primarily adapted to Sacramento and San Joaquin Valleys. AP Octane has shown above average tolerance to current races of stripe rust.

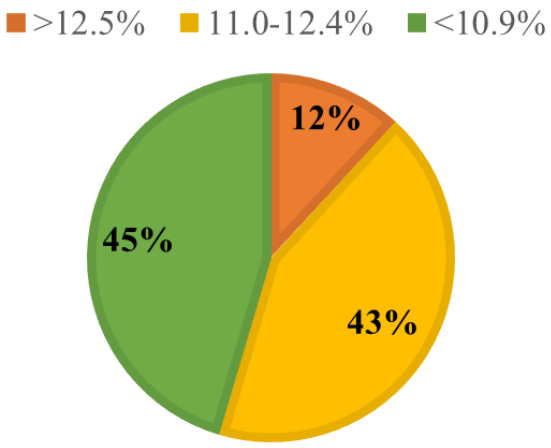
WB-Joaquin (HRS) is adapted to the San Joaquin Valley and has high protein and test weight with excellent milling and baking properties.

KERNEL QUALITY DATA

State and Region	Protein (12% moisture) %	Ash %	Moisture %	Falling Number SEC	Test Weight lbs/bu	Test Weight Kg/hL	SKCS Hardness Score	1000 Kernel Weight g	Kernel Size Distribution Large %	Kernel Size Distribution Medium %	Kernel Size Distribution Small %	Micro Sed CC
HARD RED WINTER WHEAT												
Sacramento Valley	12.1	1.52	9.7	337	66.2	87.0	69.8	40.8	88	12	0	59
San Joaquin Valley	13.0	1.62	9.5	385	64.8	85.1	63.4	43.1	90	10	0	53
State Avg. 2023	12.6	1.57	9.6	361	65.5	86.1	66.6	42.0	89	11	0	56
HARD WHITE WHEAT												
Sacramento Valley	11.9	1.58	10.0	314	65.4	85.9	74.7	42.8	86	14	0	57
State Avg. 2023	11.9	1.58	10.0	314	65.4	85.9	74.7	42.8	86	14	0	57

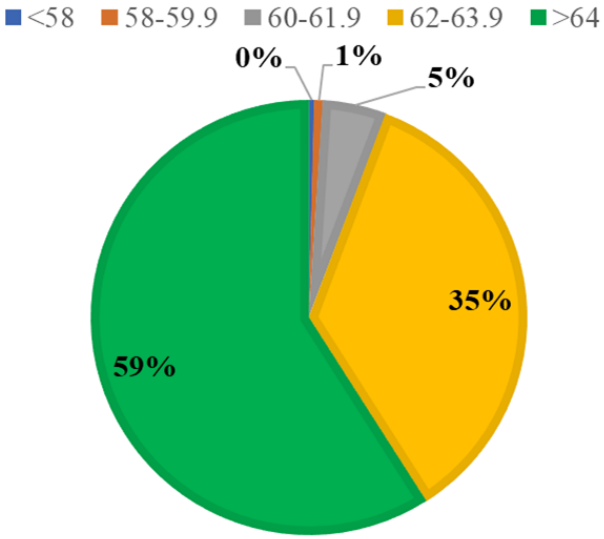
PROTEIN (12% MOISTURE)

STATE DISTRIBUTION



TEST WEIGHT (lbs/bu)

STATE DISTRIBUTION



FLOUR QUALITY DATA

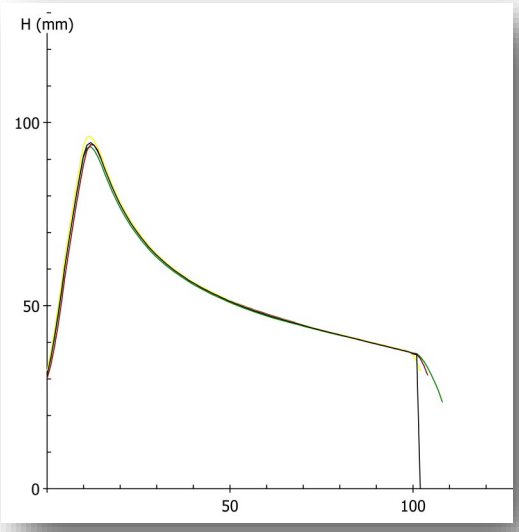
State and Region	Lab Mill Yield %	Protein (14% moisture) %	Ash %	Gluten Index	Wet Gluten %	SRC GPI	Water/ 50% Sucrose	5% Lactic Acid/ 5% NA_2CO_3	Falling Number SEC
HARD RED WINTER WHEAT									
Sacramento Valley	65.8	10.7	0.45	98.1	24.5	0.72	65/103	132/82	342
San Joaquin Valley	67.1	11.6	0.46	88.4	30.0	0.70	65/100	124/78	391
State Avg. 2023	66.5	11.2	0.46	93.3	27.3	0.71	65/102	128/80	367
HARD WHITE WHEAT									
Sacramento Valley	64.2	10.6	0.49	96.0	26.0	0.65	64/106	125/86	358
State Avg. 2023	64.2	10.6	0.49	96.0	26.0	0.65	64/106	125/86	358

PHYSICAL DOUGH QUALITY

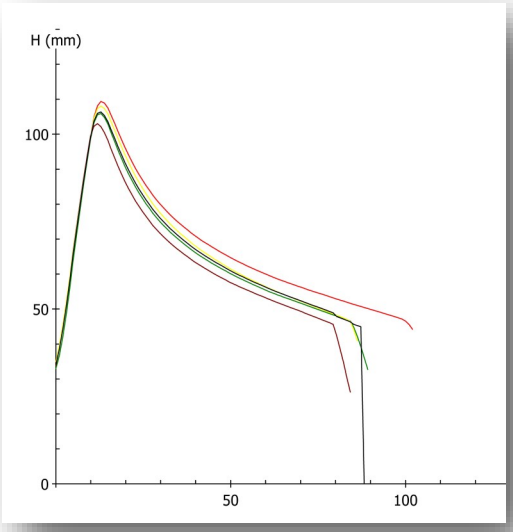
State and Region	Farinograph Absorption %	Farinograph Development Time MIN	Farinograph Stability MIN	Farinograph MTI B.U.	Alveograph P MM	Alveograph L MM	Alveograph P/L Ratio	Alveograph W Joules X 10^{-4}
HARD RED WINTER WHEAT								
Sacramento Valley	60.0	6.4	15.2	19	94	114	0.82	348
San Joaquin Valley	61.5	7.2	13.6	26	77	150	0.51	326
State Avg. 2023	60.8	6.8	14.4	22	85	132	0.64	337
HARD WHITE WHEAT								
Sacramento Valley	60.6	6.1	15.0	18	105	91	1.15	329
State Avg. 2023	60.6	6.1	15.0	18	105	91	1.15	329

2023 AVERAGE ALVEOGRAM

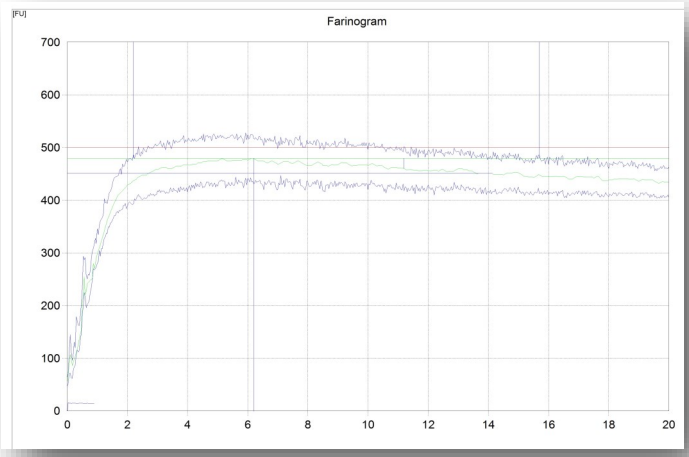
HARD RED WHEAT

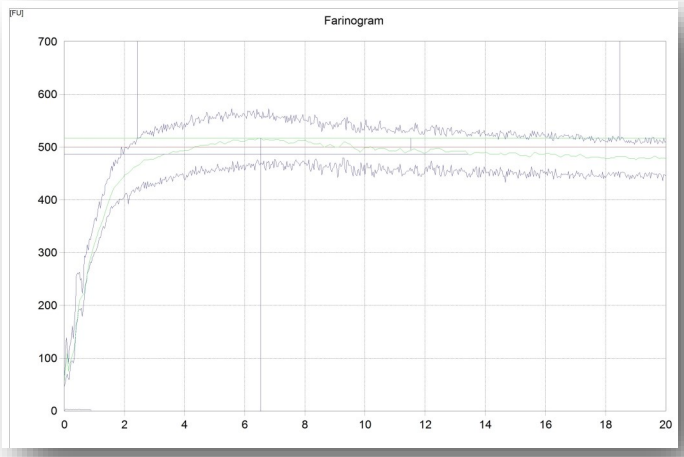


HARD WHITE WHEAT



2023 AVERAGE FARINOGRAM





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)
HARD RED WINTER WHEAT							
Sacramento Valley	60.9	930	7.4	8.8	7.6	7.9	7.5
San Joaquin Valley	61.7	888	6.5	8.3	6.1	6.7	6.8
State Avg. 2023	61.3	909	6.9	8.5	6.9	7.3	7.2
HARD WHITE WHEAT							
Sacramento Valley	61.0	903	8.0	9.0	8.0	8.5	7.5
State Avg. 2023	61.0	903	8.0	9.0	8.0	8.5	7.5

2023 HARD RED VARIETY SPECIFIC INFORMATION

	AP-Octane	Joaquin	Summit 515	
WHEAT	Sacramento Valley	San Joaquin Valley	Sacramento Valley	San Joaquin Valley
Protein (12% MB)	11.6	13.5	12.1	12.4
Ash (12% MB)	1.50	1.73	1.52	1.47
Moisture (%)	9.6	8.9	9.5	10.2
Falling Number (sec)	364	463	271	295
Micro Sedimentation (cc)	56	47	58	60
Test Weight				
lb/bu	65.9	63.6	66.8	65.9
kg/hl	86.6	83.6	87.7	86.5
SKCS Hardness Score	64	53	66	69
1000 Kernel Weight (g)	43.3	43.3	41.5	43.3
Kernel Size Distribution				
Large/Medium/Small	88/12/0	93/7/0	93/7/0	91/9/0
FLOUR				
Lab Mill Yield (%)	67.3	69.2	65.3	66.1
Protein (14% MB)	10.3	12.2	10.6	10.9
Ash (14% MB)	0.44	0.44	0.42	0.43
Gluten Index	100	88	95	91
Wet Gluten (14% MB)	21	33	25	27
SRC: GPI	0.72	0.71	0.68	0.71
Water/ 50% Sucrose (%)	62/101	65/98	64/100	64/102
5%LacticAcid/5%NA_2CO_3 (%)	130/78	124/77	125/85	126/75
ALVEOGRAPH				
P (mm)	102	71	82	64
L (mm)	97	179	114	138
P/L ratio	1.05	0.40	0.72	0.46
W (10^{-4} Joules)	331	364	285	241
MIXOGRAPH				
Absorption (%)	57.4	62.7	60.3	58.9
Peak Time (min)	5.5	3.2	4.0	3.2
Work (%Torque*min)	214	138	151	130
Peak Height (mu)	45	59	45	49
M.T. Score (1-8)	5	3	3	3
FARINOGRAPH				
Absorption (%)	57.4	62.7	60.3	58.9
Peak Time (min)	6.6	9.0	5.2	4.8
Stability (min)	18.4	17.3	10.8	9.1
M.T.I.	13	21	27	28
BAKING RESULTS				
Baking Absorption (%)	59.5	62.6	61.3	59.5
Bread Volume (cc)	908	920	980	788
Crumb Grain & Texture (1-10)	8	7	9	5

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)}.

2023 HARD RED VARIETY SPECIFIC INFORMATION

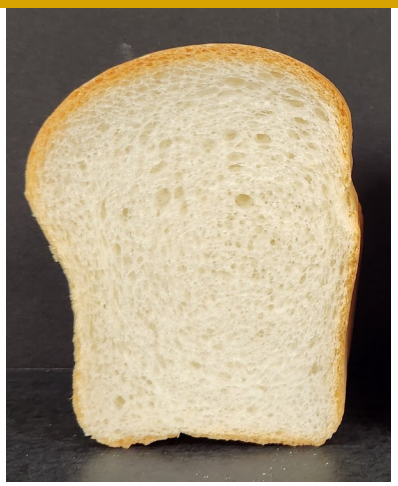
	WB 9229		WB 9727	Joaquin Oro
WHEAT	Sacramento Valley	San Joaquin Valley	Sacramento Valley	San Joaquin Valley
Protein (12% MB)	12.6	12.6	11.6	14.3
Ash (12% MB)	1.56	1.59	1.44	1.57
Moisture (%)	10.0	10.2	9.9	9.3
Falling Number (sec)	368	383	325	440
Micro Sedimentation (cc)	61	65	61	52
Test Weight				
lb/bu	66.0	64.4	66.5	66.7
kg/hl	86.7	84.6	87.4	87.6
SKCS Hardness Score	73	76	78	59
1000 Kernel Weight (g)	39.0	38.0	40.2	46.5
Kernel Size Distribution				
Large/Medium/Small	86/14/0	76/24/0	87/13/0	93/7/0
FLOUR				
Lab Mill Yield (%)	65.3	63.3	65.2	69.2
Protein (14% MB)	11.1	11.1	10.4	13.0
Ash (14% MB)	0.48	0.52	0.48	0.39
Gluten Index	99	98	98	78
Wet Gluten (14% MB)	26	25	27	35
SRC: GPI	0.75	0.70	0.69	0.74
Water/ 50% Sucrose (%)	67/105	68/108	66/104	64/100
5%LacticAcid/5%NA_2CO_3 (%)	139/80	137/86	133/87	128/74
ALVEOGRAPH				
P (mm)	94	101	104	83
L (mm)	131	113	101	144
P/L ratio	0.72	0.89	1.03	0.58
W (10^{-4} Joules)	397	375	362	308
MIXOGRAPH				
Absorption (%)	60.7	61.0	61.0	62.0
Peak Time (min)	4.2	3.9	4.1	2.6
Work (%Torque*min)	176	161	160	114
Peak Height (mu)	52	50	46	57
M.T. Score (1-8)	5	5	5	3
FARINOGRAPH				
Absorption (%)	60.8	61.2	61.0	62.4
Peak Time (min)	7.3	7.6	5.7	6.7
Stability (min)	16.3	15.5	13.9	11.4
M.T.I.	16	26	21	29
BAKING RESULTS				
Baking Absorption (%)	61.5	61.0	61.0	62.0
Bread Volume (cc)	930	913	875	900
Crumb Grain & Texture (1-10)	7	8	7	6

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)}.

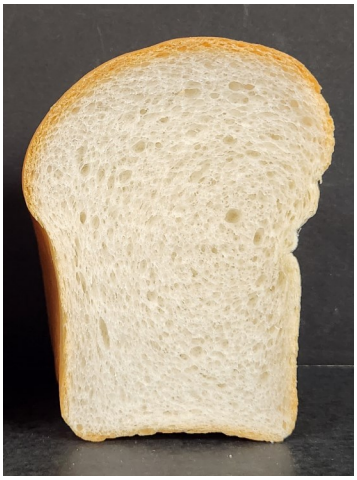
2023 HARD WHITE VARIETY SPECIFIC INFORMATION

	UC Patwin 515	UC Central White
WHEAT	**Sacramento Valley**	**Sacramento Valley**
Protein (12% MB)	11.3	12.5
Ash (14% MB)	1.64	1.60
Moisture (%)	10.2	10.2
Falling Number (sec)	328	323
Micro Sedimentation (cc)	54	59
Test Weight		
lb/bu	63.9	64.6
kg/hl	84.0	84.9
SKCS Hardness Score	79	70
1000 Kernel Weight (g)	36.6	42.7
Kernel Size Distribution		
Large/Medium/Small	84/16/0	91/9/0
FLOUR		
Lab Mill Yield (%)	63.5	64.9
Protein (14% MB)	9.8	11.4
Ash (14% MB)	0.51	0.47
Gluten Index	95	97
Wet Gluten (14% MB)	24	27
SRC: GPI	0.61	0.70
Water/ 50% Sucrose (%)	61/107	66/104
5% Lactic Acid/5% NA_2CO_3 (%)	118/88	132/84
ALVEOGRAPH		
P (mm)	93	117
L (mm)	95	87
P/L ratio	0.98	1.34
W (10^{-4} Joules)	278	380
MIXOGRAPH		
Absorption (%)	59.7	61.4
Peak Time (min)	3.5	6.4
Work (% Torque*min)	131	243
Peak Height (mu)	45	43
M.T. Score (1-8)	3	5
FARINOGRAPH		
Absorption (%)	59.7	61.4
Peak Time (min)	3.4	8.7
Stability (min)	9.0	21.0
M.T.I.	23.0	12.0
BAKING RESULTS		
Baking Absorption (%)	59.5	62.5
Bread Volume (cc)	880	925
Crumb Grain & Texture (1-10)	8	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 x (lb/bu) + 1.419)}.



UC Patwin 515



UC Central White

UC 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*.

UC Central White (HWW) is a productive hard-white spring wheat variety with higher yield and improved breadmaking quality relative to Patwin-515HP. UC-Central White showed stable yields in trials with reduced water and in irrigated trials. UC Central White is well adapted to the Central Valley and performed significantly better than other HWS varieties in the intermountain region.

Technical and Laboratory Services

CWC Lab Assistant and Baker, Alejandra Andrade.

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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