Arizona / California Combined Crop Analysis

2016 Desert Durum®
Crop Quality Report

ARIZONA
Grain Research & Promotion Council

California WHEAT COMMISSION

Desert Durum®

Desert Durum® is a registered certification mark owned by the Arizona Grain Research and Promotion Council and the California Wheat Commission, which authorize the use of the mark only to designate durum grain produced under irrigation in the desert valleys and lowlands of Arizona and California.

Desert Durum® can be produced and delivered "identity preserved" to domestic and export markets, which allows customers to purchase grain of varieties possessing quality traits specific to their needs. Annual production requirements can be pre-contracted with grain merchandisers ahead of the fall-winter planting season for harvest in late May-early July. Varietal identity is maintained by experienced growers planting certified seed and merchandisers who store and ship according to customers' preferred delivery schedules.

Desert Durum® production acreage in 2016 was less than in 2015, due largely to lower prices available at planting time. However, average yields were higher, and quality was uniformly very good. New crop grain still exhibits consistently large kernels and low moisture – traits that contribute to efficient transportation costs and high extraction rates. The 2016 Desert Durum crop will deliver the valuable milling, semolina, and pasta quality traits that customers have learned to expect and appreciate.

Desert Durum® samples were either collected by an FGIS-licensed inspection agency or submitted by handlers to a licensed agency. In 2016, the average grade is No. 1 Hard Amber Durum (HAD). Test weight average is 62.9 lbs/bu (82.6 kg/hl), slightly higher than 2015. The average vitreous kernel content (HVAC) is 97%, a high average typical of Desert Durum®. Average damaged kernels are 0.2% and total defects are 0.8%. Desert Durum® is characterized by its kernel low moisture content, and this year's average is 6.8%. Protein content average is 13.9% (12% mb), higher than both 2015 and the 5-year average.

Desert Durum® quality performance is analyzed at the California Wheat Commission Laboratory. Milling performance is based on an integrated system, including a pre-break utilizing a Chopin Mill comprised of three rolls. The coarse particles are run through a Witt Mill. The semolina sifter has screens of 136 microns, 240 microns, 465 microns, 660 microns. Lastly, the semolina passes through a purifier.

Semolina color improved in 2016. The semolina b* value is 28.6, higher than both 2015 and the 5-year average of 25.6 and 26.4, respectively. Wet gluten of 33.6% and gluten index of 76% are similar to the 5-year average values. Semolina mixograph score is 8 and alveograph W value is 230 (10-4 joules), both of which indicate high strength. Pasta color score is 8.3, comparable to the 5-year average. Pasta cooked firmness slightly decreased this year.

Summary

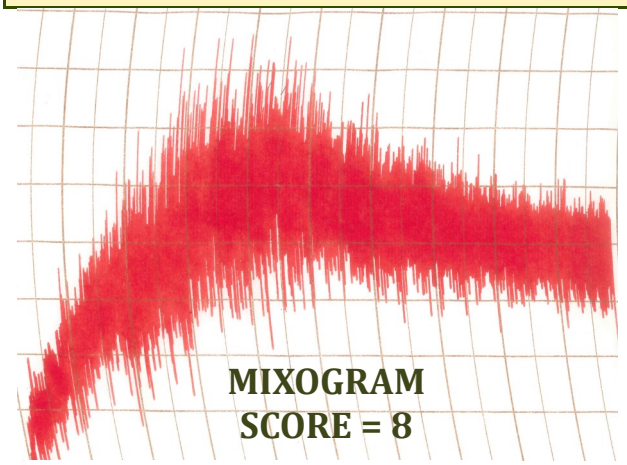
The 2016 Desert Durum® crop will deliver quality consistency for buyers. Desert Durum®'s typical kernel characteristics of high protein content, low kernel moisture, high test weight, and high vitreous kernel percentage are present in this year's crop.

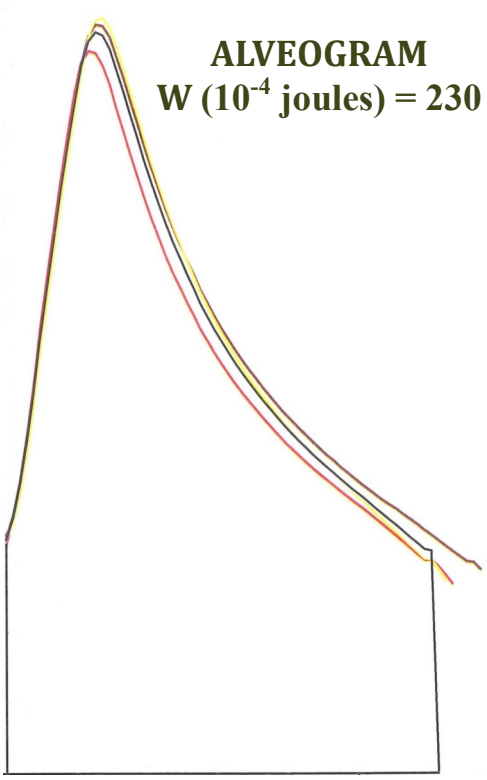
DESERT DURUM® PRODUCTION

METRIC TONS

YEAR	Arizona	California	Total
2016	275,000	100,000	375,000*
2015	384,832	166,778	551,610
2014	229,593	45,260	274,853
2013	205,425	86,682	292,107
2012	268,892	280,000	548,892
2011	197,913	220,448	418,361
2010	203,438	178,209	381,647

*California Wheat Commission estimate; final data available December 2016 from USDA.





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2016 DESERT DURUM® VARIETIES

	Desert King		Havasu		Helios		Kronos		Miwok
WHEAT	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**	**2016**
Protein (12% MB)	13.7	13.3	14.2	13.7	13.7	13.4	13.1	14.0	14.0
Protein (Dry Basis)	15.6	15.2	16.1	15.6	15.6	15.2	14.9	15.9	15.9
Protein (As-Is)	14.5	13.9	15.1	14.4	14.5	14.1	13.9	14.7	14.8
Ash (14% MB)	1.97	1.99	2.18	1.68	1.76	1.73	1.86	1.70	1.65
Ash (Dry Basis)	2.29	2.32	2.54	1.95	2.04	2.01	2.17	1.97	1.92
Moisture	7.0	8.0	6.2	7.5	7.1	7.2	6.8	7.4	7.1
Falling Number (sec)	485	442	942	570	659	799	480	535	464
Test Weight									
lb/bu	62.8	61.7	62.5	62.3	62.4	61.5	63.0	62.3	63.0
kg/hl	81.8	80.3	81.4	81.1	81.3	80.1	82.0	81.1	82.0
1000 Kernel Weight (g)	46.5	46.9	46.7	51.3	45.7	49.0	55.9	53.5	51.0
Kernel Size Distribution									
Large	90	88	92	92	87	87	94	93	94
Medium	10	11	8	8	13	13	6	7	6
Small	0	1	0	0	0	0	0	0	0
SEMOLINA									
Lab Mill Extraction (%)	76.4	74.9	76.9	77.5	77.8	76.8	74.5	76.9	77.4
Semolina Extraction (%)*	63.0	62.6	62.1	63.5	61.7	62.3	60.8	62.0	63.5
Protein (14% MB)	12.6	12.3	13.3	12.9	12.8	12.3	12.3	13.0	13.2
Protein (Dry Basis)	14.7	14.3	15.5	15.0	14.9	14.4	14.3	15.1	15.4
Ash (14% MB)	0.96	0.92	0.97	0.91	0.85	0.79	0.90	0.87	0.89
Ash (Dry Basis)	1.12	1.08	1.13	1.06	0.98	0.92	1.05	1.01	1.04
Specks (no/10 sp in)	34	25	17	26	14	20	20	14	17
Wet Gluten (14% MB)	31.6	31.7	33.2	33.9	31.6	31.5	31.4	34.7	36.6
Gluten Index	59.6	62.9	89.8	90.3	83.7	91.4	74.5	73.1	34.5
Color 'b' value	25.6	24.9	28.7	24.5	31.0	26.0	27.3	24.7	25.0
ALVEOGRAPH									
P/L Ratio	0.9	1.6	2.0	2.1	1.5	2.5	1.6	2.2	1.0
W (10^{-4} joules)	120.1	148.8	319.0	333.3	282.0	324.3	199.0	175.7	96.0
PASTA									
Color Score	6.3	5.9	8.5	7.6	8.5	8.5	8.0	7.4	7.5
Cooked weight (gm)	29.9	28.2	31.2	29.3	29.1	28.5	29.0	29.5	28.3
Cooking Loss (%)	5.8	5.8	5.3	6.1	5.3	5.7	5.7	5.4	5.1
Cooked Firmness (g/cm)	6.3	7.0	6.5	6.9	7.0	7.2	6.2	7.0	6.8

Data represent weighted means calculated to characterize the Arizona/California southwestern desert crop. Weather, soil, and cultural practices can influence the quality of all varieties between years and particular lots of any one variety. Wheat and semolina protein-Leco Combustion Nitrogen Analyzer Model TruSpec. Pasta and semolina color-Minolta Chromameter Model CR-200. ***The mill is not adjusted to optimize semolina extraction; results are usually lower than commercial mills and other test mills.**

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2016 DESERT DURUM® VARIETIES

	Orita		Tiburon		WB Mead		WB Mohave		Westmore HP	
WHEAT	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**	**2016**	**2015**
Protein (12% MB)	14.3	14.2	13.4	13.9	12.2	13.3	14.1	14.2	13.9	14.1
Protein (Dry Basis)	16.2	16.2	15.2	15.8	13.9	15.1	16.0	16.2	15.8	16.0
Protein (As-Is)	15.2	14.9	14.1	14.6	13.0	14.0	14.9	14.9	14.8	14.8
Ash (14% MB)	1.81	1.80	1.73	1.68	1.76	1.51	1.71	1.66	1.59	1.44
Ash (Dry Basis)	2.11	2.10	2.01	1.95	2.04	1.76	1.98	1.93	1.85	1.67
Moisture	6.3	7.9	7.3	7.4	6.4	7.6	6.7	7.6	6.7	7.5
Falling Number (sec)	549	560	529	562	711	546	650	632	548	600
Test Weight										
lb/bu	62.1	61.4	62.9	62.1	64.7	62.9	62.9	62.2	63.2	63.2
kg/hl	81.7	80.8	82.7	81.7	85.0	82.7	82.6	81.8	83.1	83.1
1000 Kernel Weight (g)	54.5	55.4	56.2	56.6	54.1	54.9	46.2	56.7	46.1	45.4
Kernel Size Distribution										
Large	95	94	96	98	94	93	89	92	83	87
Medium	5	6	4	2	6	7	11	8	17	13
Small	0	0	0	0	0	0	0	0	0	0
SEMOLINA										
Lab Mill Extraction (%)	75.7	73.9	76.5	78.3	75.1	74.4	75.6	75.7	76.8	77.2
Semolina Extraction (%)*	61.5	60.8	62.7	65.9	61.7	60.3	61.3	62.8	61.6	62.9
Protein (14% MB)	13.4	13.2	12.6	12.8	11.5	12.4	13.0	13.2	13.1	13.2
Protein (Dry Basis)	15.7	15.4	14.7	15.0	13.4	14.4	15.1	15.4	15.2	15.5
Ash (14% MB)	0.91	0.88	0.91	0.90	0.88	0.85	0.82	0.84	0.78	0.76
Ash (Dry Basis)	1.06	1.02	1.05	1.05	1.02	0.99	0.95	0.97	0.90	0.89
Specks (no/10 sp in)	35	33	23	18	29	26	21	22	14	14
Wet Gluten (14% MB)	35.4	35.4	31.9	34.0	29.8	33.5	33.2	34.8	33.6	36.4
Gluten Index	63.4	62.1	80.4	72.2	73.3	62.3	92.5	90.1	78.4	66.4
Color 'b' value	27	24.2	27.5	25.1	29.2	25.5	31.2	27.1	30.4	26.4
ALVEOGRAPH										
P/L Ratio	1.4	1.3	1.6	1.9	2.1	1.5	1.8	2.4	2.9	2.1
W (10^{-4} joules)	196.3	167.2	245.0	247.0	218.0	221.1	287.7	246.5	279.0	309.2
PASTA										
Color Score	7.5	7.0	8.5	7.5	9.0	7.5	9.1	8.5	9.0	8.5
Cooked weight (gm)	28.8	28.8	29.2	29.6	29.2	28.8	29.4	28.8	29.4	29.3
Cooking Loss (%)	5.9	5.8	5.8	6.4	5.5	6.2	5.4	5.5	5.9	6.2
Cooked Firmness (g/cm)	6.6	6.7	6.0	5.7	6.1	6.8	6.3	7.0	6.3	6.3

Data represent weighted means calculated to characterize the Arizona/California southwestern desert crop. Weather, soil, and cultural practices can influence the quality of all varieties between years and particular lots of any one variety. Wheat and semolina protein-Leco Combustion Nitrogen Analyzer Model TruSpec. Pasta and semolina color-Minolta Chromameter Model CR-200. ***The mill is not adjusted to optimize semolina extraction; results are usually lower than commercial mills and other test mills.**

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DESERT DURUM® AVERAGE GRADE RESULTS

	Harvest data			Export Cargo data		
	2016	2015	2014	15/16	14/15	13/14
Protein (12% MB)	13.7	13.8	13.3	13.9	13.2	13.4
Graded No. 1 (%)	Over 90% of samples graded No. 1			100	100	100
HVAC (%)	97.4	92.3	97.0	91.4	94.9	96.5
Test Weight: lb/bu	62.6	61.7	63.2	61.7	62.8	62.1
kg/hl	81.5	80.3	82.2	80.3	81.8	80.9
Moisture (%)	6.9	8.0	7.0	7.8	7.0	6.9
Damage (%)	0.2	0.4	0.2	0.6	0.4	0.4
Foreign Material* (%)	0.0	0.1	0.0	0.1	0.1	0.1
Shrunken/Broken* (%)	0.4	0.7	0.4	0.6	0.6	0.9
Total Defects (%)	0.8	1.1	0.6	1.3	1.2	1.4
Dockage* (%)	0.5	0.5	0.3	0.4	0.4	0.6
Total Screenings (%)	0.9	1.3	1.3	1.1	1.1	1.6
Net Wheat (%)	92.3	90.8	92.3	91.2	92.0	91.6
CTW (%)	109.8	108.1	109.9	108.5	109.5	109.1
MWVI (%)	91.1	92.5	91	92.2	91.3	91.7

*Total Screenings are those factors represented on the grade certificate that are cleaned out in the flour mill. Samples were either official samples collected by a licensee of FGIS or submitted by handlers to a licensee for grading. Desert Durum® cargo data represents information obtained from official export inspection certificates. Test weight conversion from lb/bu to kg/hl according to FGIS-PN-97-5, (1.292 x lb/bu) + 0.630. 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.

2016 DESERT DURUM® AVERAGE GRADE RESULTS BY VARIETY

WHEAT	Desert King	Havasu	Helios	Kronos	Miwok	Orita	Tiburon	WB Mead	WB Mohave	Westmore HP
Protein (12%mb)	13.2	13.9	13.3	13.6	13.9	13.5	13.4	12.2	14.2	14
Graded No. 1 (%)	Over 90% of samples graded No. 1									
HVAC (%)	98.0	98.0	95.0	96.0	98.0	96.8	96.0	94.0	98.9	98.0
Moisture (%)	7.0	6.1	7.8	7.0	7.4	6.6	7.1	6.8	6.8	7.1
Test Weight: lb/bu	61.8	62.7	62.4	61.7	62.8	62.3	63.0	64.7	62.4	63.3
kg/hl	80.5	81.6	81.3	80.3	81.8	81.1	82.0	84.2	81.3	82.4
Damage (%)	0.0	0.5	0.5	0.4	0.0	0.5	0.9	0.0	0.0	0.0
Foreign Material (%)	0.2	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1
Shrunken/Broken (%)	0.5	0.4	0.4	0.3	0.6	0.3	0.3	0.1	0.3	0.4
Total Defects (%)	0.7	0.9	1.0	0.7	0.7	0.9	1.2	0.1	0.4	0.5
Dockage (%)	0.7	0.6	0.1	0.4	1.0	0.5	0.2	0.4	0.5	0.4

Samples were either official samples collected by a licensee of FGIS or submitted by handlers to a licensee for grading. Test weight conversions from lb/bu to kg/hl according to FGIS-PN97-5, (1.292 x lb/bu) + 0.630.

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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

California Wheat Commission
1240 Commerce Avenue, Suite A
Woodland, CA 95776-5923

Phone: 530.661.1292
Fax: 530.661.1332
Web: californiawheat.org

Arizona Grain Research and Promotion Council
Arizona Department of Agriculture
1688 West Adams Street
Phoenix, AZ 85007

Phone: 602.542.3262
Fax: 602.364.0830