

2019-20 Regional Common Wheat, Triticale, Durum Wheat, and Barley Performance Tests in California

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1. INTRODUCTION

This report summarizes the results of small grains variety tests conducted by University of California Cooperative Extension during the 2019-20 season. It also includes multi-year summaries of trials conducted between the 2017-18 and 2019-20 growing seasons. The 2019-20 experiments had the following objectives: 1) Measure crop productivity, quality, disease resistance, and agronomic characteristics for commercially available small grain varieties and advanced breeding lines across a range of environmental and management conditions that represent Californian agro-ecosystems; 2) Study the magnitude of management effects on variety performance by directly manipulating crop water and nitrogen availability at a subset of trial locations; 3) Report results of the research and analysis on our program website, at extension meetings, and in other agricultural forums.

General Seasonal Overview

The 2019-20 California small grain crop consisted of approximately 440 thousand planted acres of wheat, triticale and barley. Approximately 26% of the planted area of wheat was harvested for grain. Total wheat production was down 8% over the previous year and total small grain acres in California were at their lowest in a decade but similar to the past two years. The declines in grain acreage are due to low grain prices and opportunity costs associated with other cropping system options, including the market for small grain forage.

Most of California had below average rainfall in 2019-20, with the exception of the southern growing regions of the San Joaquin Valley. In the northern San Joaquin Valley and the Sacramento Valley annual rainfall was between 60% and 80% of normal, and both areas experienced an unusually long 6-week period without rainfall between the end of January and early March. Rainfall during the remainder of the spring was at or above average in most locations. Yields in the San Joaquin Valley were normal to above-average in many locations, while yields of rainfed crops in the Sacramento Valley were generally lower than average. Overall, disease incidence was below average for the season. However, stripe rust was observed on wheat and triticale varieties in the central and southern parts of the San Joaquin Valley. This included infection observed on varieties previously classified as resistant to stripe rust. Statewide common wheat yields averaged 4500 lb/ac, durum wheat yields averaged 5220 lb/ac, and barley yields averaged 2256 lb/ac. Within UC small grain variety testing trials, average grain yields were 6698 lb/ac, which is approximately 110% of the 5-year average in these trials.

2. METHODS

2.1 UC Statewide Variety Trials

Entries & test locations

Commercially available and advanced breeding lines of common wheat, durum wheat, triticale, and barley were grown in statewide multi-environment trials between 2017-18 and 2019-20 (Table 1). Tests were conducted at University of California research stations

or in fields of cooperating growers. Location details including soil type, previous crops, and planting date for the previous three years of trials can be found in Table 2.

Trial design and methods

Field methods are reported for the 2019-20 season. For methodological details regarding earlier field seasons please consult previous [annual reports](#). A randomized complete block design with four replications was used at all trial locations. In the 2019-20 season, tests were sown at seeding rates of 1 to 1.2 million seeds/ac for all tests (equivalent to 61 to 107 lbs/acre for common wheat, 78 to 99 lbs/acre for triticale, 75 to 140 lbs/acre for durum wheat and 77 to 113 lbs/acre for barley, depending on the variety). Each plot was six or nine drill rows wide (5 to 9-inch row spacing) and 15 to 20 feet long. Grain was harvested with a Wintersteiger Seedmaster Universal 150 plot combine.

Table 1. The number of unique entries of each species tested in the statewide regional trials in each season at each location.

Location	Season	Fall Barley	Fall Common	Fall Durum	Fall Triticale	Fall Winterwheat	Spring Barley	Spring Springwheat
Colusa	2017-18	-	41	-	9	-	-	-
Colusa	2018-19	-	38	-	10	-	-	-
Davis	2017-18	17	41	30	9	-	-	-
Davis	2018-19	20	38	30	10	-	-	-
Davis	2019-20	9	28	18	10	-	-	-
Delta	2017-18	-	39	-	7	-	-	-
Delta	2018-19	-	38	-	10	-	-	-
Fresno	2017-18	17	41	30	9	-	-	-
Fresno	2019-20	12	28	18	10	-	-	-
Fresno1	2018-19	20	38	-	10	-	-	-
Fresno2	2018-19	-	-	30	-	-	-	-
Imperial	2017-18	-	41	30	9	-	-	-
Imperial	2018-19	-	-	30	-	-	-	-
Kern	2017-18	-	41	30	9	-	-	-
Kern	2018-19	-	38	30	10	-	-	-
Kings	2017-18	-	41	28	9	-	-	-
Merced	2018-19	20	38	-	10	-	-	-
Montague	2018-19	-	-	-	-	44	-	-
Siskiyou	2017-18	-	-	-	-	40	-	-
Solano	2017-18	11	41	-	9	-	-	-
Tehama	2017-18	17	41	-	9	-	-	-
Tulare	2017-18	17	-	-	-	-	-	-
Tulelake	2016-17	-	-	-	-	-	41	64
Tulelake	2017-18	-	-	-	-	40	6	59
Tulelake	2018-19	-	-	-	-	70	13	29
Tulelake	2019-20	5	-	-	-	25	13	32
Yolo2	2018-19	20	37	-	10	-	-	-
Yolo3	2018-19	19	-	-	-	-	-	-

Figure 1. Map depicting the California small grain regional trials and test locations conducted in the 2019-20 season.

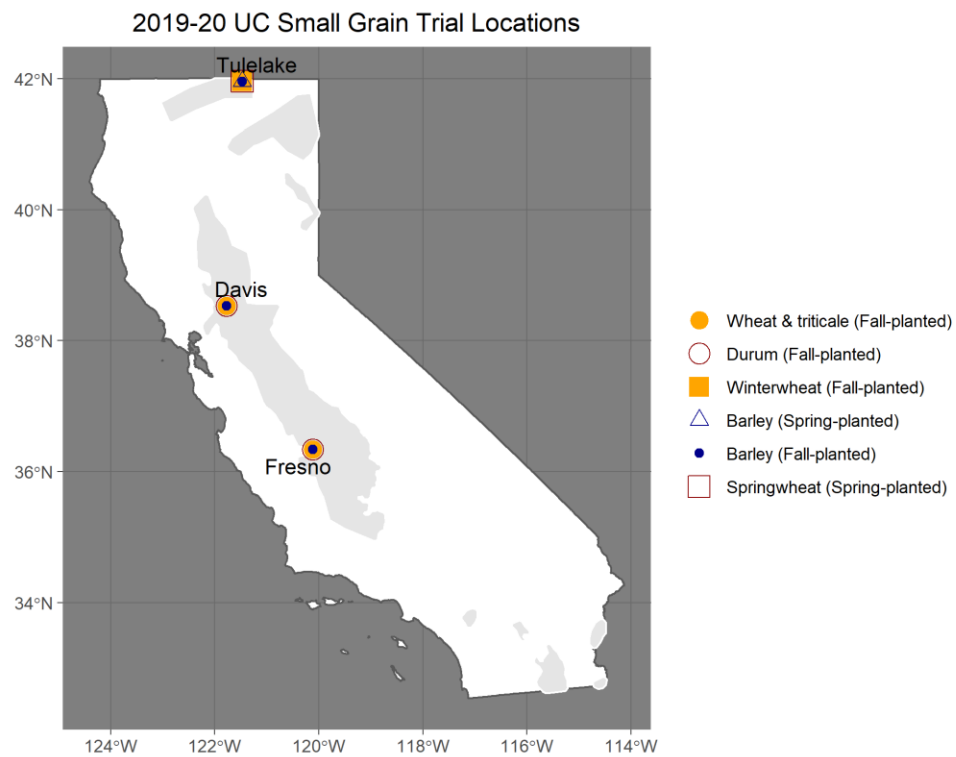


Table 2. Test locations for the statewide regional trials between the 2017-18 and 2019-20 seasons.

Common Name	Season	Crop Subtype	Latitude	Longitude	Soil Type	Previous Crop	Planting Date
Colusa	2017-18	COMMON, TRITICALE	38.93759	-121.837	Grandbend loam, 0 to 2 percent slopes	cucumber	11/22/2017
Colusa	2018-19	COMMON, TRITICALE	39.03386	-121.841	Grandbend loam, 0 to 2 percent slopes	sunflower	11/26/2018
Davis	2017-18	COMMON, TRITICALE	38.53722	-121.781	Yolo silt loam, 0 to 2 percent slopes, MLRA 17	safflower	11/20/2017
Davis	2017-18	BARLEY, COMMON, DURUM, TRITICALE	38.53722	-121.781	Yolo silt loam, 0 to 2 percent slopes, MLRA 17	safflower	11/21/2017
Davis	2017-18	COMMON, TRITICALE	38.53722	-121.781	Yolo silt loam, 0 to 2 percent slopes, MLRA 17	safflower	11/29/2017
Davis	2018-19	BARLEY, COMMON, DURUM, TRITICALE	38.53457	-121.771	Reiff very fine sandy loam	fallow	12/13/2018
Davis	2019-20	BARLEY, COMMON, DURUM, TRITICALE	38.53418	-121.772	Yolo silt loam, 0 to 2 percent slopes, MLRA 17	fallow	11/29/2019
Delta	2017-18	COMMON, TRITICALE	38.13365	-121.531	Rindge mucky silt loam, partially drained, 0 to 2 percent slopes, MLRA 16	wheat	11/15/2017
Delta	2018-19	COMMON, TRITICALE	38.19774	-121.486		tomato	11/14/2018
Fresno	2017-18	BARLEY, COMMON, TRITICALE	36.33729	-120.114	Panoche clay loam, 0 to 2 percent slopes	cotton	11/29/2017
Fresno	2017-18	DURUM	36.33729	-120.114	Panoche clay loam, 0 to 2 percent slopes	cotton	11/30/2017
Fresno	2019-20	BARLEY, COMMON, DURUM, TRITICALE	36.33954	-120.119	Panoche clay loam, 0 to 2 percent slopes	cotton	11/26/2019
Fresno1	2018-19	BARLEY, COMMON, TRITICALE	36.3394	-120.115	Panoche clay loam, 0 to 2 percent slopes	cotton	12/12/2018
Fresno2	2018-19	DURUM	36.3852	-120.075	Ciervo, wet-Ciervo complex, saline-sodic, 0 to 1 percent slopes	cotton	12/11/2018
Imperial	2017-18	COMMON, DURUM, TRITICALE	32.81164	-115.444	Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes		12/13/2017
Imperial	2018-19	DURUM	32.91821	-115.331	Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes	alfalfa	12/31/2018
Kern	2017-18	COMMON, DURUM, TRITICALE	35.37382	-119.332	Westhaven fine sandy loam	cotton	11/28/2017
Kern	2018-19	COMMON, DURUM, TRITICALE	35.51618	-119.493	Lerdo complex, drained	corn	11/20/2018
Kings	2017-18	COMMON, DURUM, TRITICALE	35.99178	-119.591	Gepford clay, partially drained	cotton	12/5/2017
Merced	2018-19	BARLEY, COMMON, TRITICALE	37.1411	-120.754	Escano clay loam, partially drained	alfalfa	11/19/2018
Montague	2018-19	WINTERWHEAT	41.78683	-122.442	Montague clay, 0 to 2 percent slopes	fallow	10/24/2018
Siskiyou	2017-18	WINTERWHEAT	41.78683	-122.442	Montague clay, 0 to 2 percent slopes		10/26/2017
Solano	2017-18	BARLEY, COMMON, TRITICALE	38.14819	-121.816	Altamont-San Ysidro-San Benito complex, 9 to 30 percent slopes	pasture	11/21/2017
Tehama	2017-18	BARLEY, COMMON, TRITICALE	39.88389	-122.361	Arbuckle gravelly loam, clayey substratum, channeled	pasture	12/15/2017
Tulare	2017-18	BARLEY	35.8218	-119.044	Centerville clay, 2 to 5 percent slopes	fallow	11/28/2017
Tulelake	2017-18	WINTERWHEAT	41.96606	-121.473	Tulana silt loam, 0 to 1 percent slopes	sudan grass	10/30/2017
Tulelake	2017-18	BARLEY, SPRINGWHEAT	41.96606	-121.473	Tulana silt loam, 0 to 1 percent slopes	sudan grass	4/26/2018

Tulelake	2018-19	WINTERWHEAT	41.9646	-121.473	Tulana silt loam, 0 to 1 percent slopes	sudan grass	10/23/2018
Tulelake	2018-19	BARLEY, SPRINGWHEAT	41.9646	-121.473	Tulana silt loam, 0 to 1 percent slopes	sudan grass	5/2/2019
Tulelake	2019-20	BARLEY, WINTERWHEAT	41.96181	-121.474	Tulebasin mucky silty clay loam	pea	10/23/2019
Tulelake	2019-20	SPRINGWHEAT	41.96181	-121.474	Tulebasin mucky silty clay loam	pea	4/17/2020
Tulelake	2019-20	BARLEY	41.96181	-121.474	Tulebasin mucky silty clay loam	sudan grass	4/17/2020
Yolo2	2018-19	BARLEY, COMMON, TRITICALE	38.796	-122.046	Rincon silty clay loam	fallow	11/27/2018
Yolo3	2018-19	BARLEY	38.77649	-121.83	Yolo silt loam, 0 to 2 percent slopes, MLRA 17		1/4/2019

Table 3. The number of unique entries of each species tested in the statewide regional trials between the 2017-18 and 2019-20 season.

Region	Crop Type	2017-18	2018-19	2019-20
IR	BARLEY	6	13	17
IR	SPRINGWHEAT	59	29	32
IR	WINTERWHEAT	40	69	25
NonIR	BARLEY	17	20	12
NonIR	COMMON	41	38	28
NonIR	DURUM	30	30	18
NonIR	TRITICALE	9	10	10

Pre-plant soil sampling

Pre-plant soil samples were taken at depths of 0-1 ft at all locations in the 2019-20 season. Sample collection was carried out using a manual bucket-type auger system. Soil nitrate-nitrogen content was measured using the nitrate quick test method described on our [program website](#), and the soil nitrate method of Doane and Horwath (2003) modified to use potassium chloride rather than ammonium chloride. Other soil handling and analytical methods were developed from Schoeneberger et al. (2013). Starting soil nitrate values in the top 0-1ft of soil for the 2019-20 locations is presented in Table 4.

Table 4. Soil nitrate concentration in the top 30 cm of soil.

Location	Trial	Soil Nitrate (ppm)
Davis	BARLEY	14.2
Davis	DURUM	14.2
Davis	WHEAT	14.2
Davis	WHEAT LOW N	14.2
Fresno	BARLEY	20
Fresno	WHEAT	20
Fresno	DURUM	20
Fresno	WHEAT LOW WATER	20
Tulelake	COMMON	31
Tulelake	BARLEY	2.9
Tulelake	COMMON	38
Tulelake	COMMON	38

Nitrogen fertilization & irrigation

A range of nitrogen (N) fertilizer types and amounts were used depending on location (Table 5). At the on-farm locations, the variety trial was fertilized along with surrounding small grains crops according to the fertility management program of that specific grower. In general, the common and durum wheat trials received between 100 and 200 lb of nitrogen per acre at high yield potential locations. Less fertilizer was applied to the barley trials and wheat trials located at sites with lower yield potential. Specific N fertilizer amounts applied at 2019-2020 test locations is presented in Table 5. A range of irrigation amounts were applied depending on location (Table 6). At the on-farm locations irrigation was managed by the cooperating grower.

At trial locations in the Davis and Fresno locations, the common wheat and triticale trials were replicated with contrasting nitrogen and water management to create the following management conditions:

1. *Conventional management:* Water and nitrogen fertility delivered to optimize productivity.
2. *Low nitrogen management:* No nitrogen fertilizer provided, with the objective of restricting nitrogen availability to limit crop growth. Water is not limiting.
3. *Low water management:* Irrigation is restricted such that water will limit crop growth. Nitrogen fertility is managed to avoid nitrogen deficiency.

These side-by-side trials permit quantitative differentiation of the effects of nitrogen and water limitation on the performance of common wheat and triticale in California. From these data varieties that perform well in conditions of abundance as well as under drought and nitrogen stress can be identified. See below for analytical details on how variety-specific stress stability is estimated.

Table 5. Nitrogen fertilizer management details for the regional trial test locations in the 2019-20 season.

Common Name	Trial Description	Date	Amount	Description
Davis	Barley	2/20/2020	50	applied by hand as urea
Davis	Durum, Wheat	2/20/2020	100	as urea
Davis	Durum, Wheat	3/12/2020	50	as urea
Fresno	Barley	1/28/2020	45	as urea
Fresno	Barley, Durum, Wheat, Wheat low water	1/30/2020	5	as ammonium nitrate for weed control along with MCPA
Fresno	Durum, Wheat	1/28/2020	95	as urea
Fresno	Wheat low water	1/28/2020	145	as urea
Tulelake	Barley spring	5/22/2020	40	as UAN 32
Tulelake	Barley spring	5/29/2020	30	as UAN 32
Tulelake	Springwheat hard	7/2/2020	40	as UAN 32
Tulelake	Springwheat hard, Springwheat soft	6/10/2020	20	as UAN 32
Tulelake	Springwheat hard, Springwheat soft, Winterwheat	4/15/2020	40	as UAN 32

Table 6. Irrigation management details for the regional trial test locations in the 2019-20 season.

Common Name	Trial Description	Total Amount	Irrigation Description
Davis	Barley	2.1	2020-02-21: 2.1 in
Davis	Durum	5.78	2020-02-21: 2.1 in, 2020-04-15: 3.68 in
Davis	Wheat	5.78	2020-02-21: 2.1 in, 2020-04-15: 3.68 in
Davis	Wheat low nitrogen	5.78	2020-02-21: 2.1 in, 2020-04-15: 3.68 in
Fresno	Barley	10.1	2019-12-18: 1 in, 2020-01-30: 1 in, 2020-02-05: 1 in, 2020-02-10: 1 in, 2020-03-03: 2.5 in, 2020-04-16: 3.6 in
Fresno	Durum	10.6	2019-12-18: 1 in, 2020-01-30: 1 in, 2020-02-05: 1 in, 2020-02-10: 1 in, 2020-03-03: 3 in, 2020-04-16: 3.6 in
Fresno	Wheat	10.6	2019-12-18: 1 in, 2020-01-30: 1 in, 2020-02-05: 1 in, 2020-02-10: 1 in, 2020-03-03: 3 in, 2020-04-16: 3.6 in
Fresno	Wheat low water	6	2019-12-18: 1 in, 2020-01-30: 1 in, 2020-02-05: 1 in, 2020-02-10: 1 in, 2020-03-03: 2 in
Tulelake	Barley spring	15.54	2020-04-17: 2.1 in, 2020-04-24: 0.84 in, 2020-04-30: 1.68 in, 2020-05-08: 1.26 in, 2020-05-22: 1.26 in, 2020-05-29: 1.68 in, 2020-06-09: 2.52 in, 2020-06-19: 2.1 in, 2020-06-26: 2.1 in
Tulelake	Barley winter	13.44	2019-10-24: 1.68 in (1.68), 2020-04-15: 2.1 in (2.1), 2020-04-24: 2.1 in, 2020-04-30: 2.52 in, 2020-05-08: 2.52 in, 2020-05-29: 2.52 in
Tulelake	Springwheat hard	19.32	2020-04-17: 2.1 in, 2020-04-23: 0.84 in, 2020-04-30: 1.68 in, 2020-05-08: 1.26 in, 2020-05-22: 1.26 in, 2020-05-28: 1.26 in, 2020-06-04: 1.68 in, 2020-06-12: 2.52 in, 2020-06-22: 2.52 in, 2020-07-01: 2.1 in, 2020-07-01: 2.1 in
Tulelake	Springwheat soft	19.32	2020-04-17: 2.1 in, 2020-04-23: 0.84 in, 2020-04-30: 1.68 in, 2020-05-08: 1.26 in, 2020-05-22: 1.26 in, 2020-05-28: 1.26 in, 2020-06-04: 1.68 in, 2020-06-12: 2.52 in, 2020-06-22: 2.52 in, 2020-07-01: 2.1 in, 2020-07-01: 2.1 in
Tulelake	Winterwheat	18.48	2019-10-24: 1.68 in, 2020-04-15: 2.1 in, 2020-04-24: 2.1 in, 2020-04-30: 2.52 in, 2020-05-08: 2.52 in, 2020-05-29: 2.52 in, 2020-06-09: 2.52 in, 2020-06-19: 2.52 in

Disease observations

When foliar diseases and other disease-like symptoms were present at a given trial location, variety-specific ratings were recorded. Diseases during the 2019-20 season included stripe rust, powdery mildew, barley yellow dwarf virus, spot blotch, and leaf rust. When present, diseases were assessed between the milk and dough stages of development. For most diseases, abundance was estimated as the percent area of a representatively-infected leaf (Table 7). Observations were made on the top two leaves of the plant. The

exception to this was Barley Yellow Dwarf Virus, for which assessments represent the percentage of plants showing symptoms within a plot. Stripe rust samples were sent for race analysis by Xianming Chen, Research Plant Pathologist with the USDA-ARS at Washington State University.

Table 7. Rating scale used for rating/reporting the occurrence of disease symptoms in the and lodging.

Rating	Area
1	0-3
2	4-14
3	15-29
4	30-49
5	50-69
6	70-84
7	85-95
8	96-100

Agronomic observations

In-season observations on the relative growth stage were recorded on a variety- and trial-specific basis at the Davis location. Relative heading and maturity dates were estimated from these observations. Heading is defined as when half the spike is visible in half of the plants in a plot. The stage of grain ripening (milk, soft dough, hard dough, hard kernel, and harvest ripe) representing the majority of plants within the plots was estimated. Both days to heading and days to maturity are calculated from January 1st. At harvest, mean plant height and percentage of plants in the plot affected by lodging were recorded on an individual plot basis. The same rating scale utilized to report disease incidence (Table 7) was used to report lodging. The lengths of individual plots were measured at harvest for yield determination. Locations at which agronomic traits were recorded are summarized in (Table 8).

Table 8. The locations where agronomic traits were recorded in the current season.

Common Name	Trial Group	Yield	Protein	Height	Lodging	Test Weight	Thousand Kernel
Davis	BARLEY	X	X	X	X	X	X
Davis	DURUM	X	X	X	X	X	X
Davis	WHEAT	X	X	X	X	X	X
Fresno	BARLEY	X	X	X	X	X	X
Fresno	DURUM	X	X	X	X	X	X
Fresno	WHEAT	X	X	X	X	X	X
Tulelake	BARLEY	X	X	X	X	X	-
Tulelake	COMMON	X	X	X	X	X	-
Tulelake	BARLEY	X	X	X	X	X	-
Tulelake	COMMON	X	X	X	X	X	-

Harvest procedures

Whole plots were harvested with a Wintersteiger Seedmaster Universal 150 plot combine. All seed from each plot was collected and weighed in field for the determination of plot yields at harvest moisture. A sub-sample of approximately 2.5lb was then taken from one of the four replicates and weighed in-field before returning the sample to the laboratory for additional processing.

Post-harvest seed processing & yield estimates

Grain yield, on a lb/acre basis, was estimated based on whole plot grain yield and plot area. The plot area for yield estimation was calculated using the measured plot length (average length ~12ft) and plot width of 4.3 to 5 ft, depending on the grain drills used.

Grain sub-samples were stored in seed processing facilities at the University of California, Davis until reaching equilibrium moisture content. Given average conditions in the seed processing facilities, equilibrium moisture content for grain of all species is approximately 10%. Grain sub-samples were reweighed and differences from the field weight were used to correct plot yields for changes in moisture content since harvest. The sub-sample was then cleaned with an air-blower to remove any chaff or other extraneous material. Weight loss after this cleaning was used to correct estimated final grain yields.

The protein and moisture content of the cleaned grain was measured using a Perten Instruments Inframatic Near Infrared Reflectance (NIR) Grain Analyzer. The two-hundred-seed-weight of clean grain was measured using an Old Mill Company electronic seed counter and the value converted to a thousand seed weight for the purpose of reporting. The test weight of clean grain was determined by weighing the mass of one dry quart of grain (AACCI Method 55-10.01).

Climate measurements

Climate data for each location was obtained from the PRISM Climate Group (PRISM Climate Group, 2021). Cumulative precipitation and growing degree-days from sowing are estimated for each location and compared to 10-year means. Degree-days were estimated using the corrected single triangle method. Temperature thresholds of 87°F (30°C) and 44°F (7°C) were used.

Grain & flour quality analyses

Grain samples from all the conventionally managed common wheat trials at the Davis and Fresno locations, and from the durum wheat trials at the Fresno and Davis locations, were bulked by variety and analyzed for grain and flour quality by the California Wheat Commission. Grain analyses for both common and durum wheat included protein content, ash content, kernel weight, kernel diameter, kernel hardness, 1000 kernel weight, and kernel size distribution. Flour quality analyses for the common wheat included flour yield, protein content, ash content, falling number, gluten index, wet gluten, absorption, development time, stability, MTI, baking, mixing time, loaf volume, dough handling, crumb color, crumb grain, crumb texture, and bread symmetry. Flour quality analyses for the

durum wheat included semolina extract, ash content, specks, protein, gluten index, falling number, alveograph values, semolina color, and the color, weight, loss and firmness of pasta (Table 9).

Table 9. The analytical procedures used by the California Wheat commission laboratory to measure grain and flour quality of common and durum wheat grain samples.

QUALITY TRAIT	METHOD
COMMON WHEAT	
GRAIN ANALYSIS	
Moisture	AACCI 44-15.02
Test Weight	AACCI 55-10.01
Protein	AACCI 46-30.01
Single Kernel Characterization (SKCS)	AACC 54-31.01 using Perten SKCS 4100
Ash	AACCI 08-01.01
Falling Number	AACCI 56-81.03
Sedimentation	AACC 56-63.01
Kernel Sizing	Wheat is sifted using a RoTap Sifter using U.S. No 7 and U.S. No. 10 Sieves. No. 7 Sieves (Large), No. 10 Sieves (medium), anything that passes through number 10 is small kernels.
FLOUR ANALYSIS	
Moisture	AACCI 44-15.02
Protein	AACCI 46-30.01
Ash	AACCI 08-01.01
Wet Gluten & Gluten Index	AACCI 38-12.02
Farinograph	AACC 54-21.02
Alveograph	Modified AACC 54-30-.02
BAKING ANALYSIS	
Puploaf baking	AACC 10-10.03
DURUM WHEAT	
GRAIN ANALYSIS	
Moisture	AACCI 44-15.02
Test Weight	AACCI 55-10.01
Protein	AACCI 46-30.01
Single Kernel Characterization (SKCS)	AACC 54-31.01 using Perten SKCS 4100
Ash	AACCI 08-01.01
Falling Number	AACCI 56-81.03
Sedimentation	AACC 56-63.01
Kernel Sizing	Wheat is sifted using a RoTap Sifter using U.S. No 7 and U.S. No. 10 Sieves. No. 7 Sieves (Large), No. 10 Sieves (medium), anything that passes through number 10 is small kernels.
SEMOLINA ANALYSIS	
Moisture	AACCI 44-15.02
Protein	AACCI 46-30.01
Ash	AACCI 08-01.01
Wet Gluten & Gluten Index	AACCI 38-12.02
Farinograph	AACC 54-21.02
Alveograph	Modified AACC 54-30-.02

Soil analyses

Pre-plant soil nitrogen content was measured using both WaterWorks nitrate/nitrite test strips (<https://sensafe.com/waterworks-nitrate-nitrite/>) and the nitrate quick test method described on our program website (http://smallgrains.ucanr.edu/Nutrient_Management/snqt/), and the soil nitrate method of Doane and Horwath (2003) modified to use potassium chloride rather than ammonium chloride. Other soil handling and analytical methods were developed from Schoeneberger et al. (2013).

2.2 Data summarization & analytical procedures

Single season summaries of regional trial data

Yield and protein data, corrected for chaff and moisture content, were standardized to 12% moisture. Mean and standard deviations of the data were then derived for individual varieties and species at each trial location. If the yield of a plot was found to be more than two standard deviations from either the variety mean or trial mean at a location, it was flagged as a potential outlier and the data checked for potential errors. Following this quality control step, the coefficient of variation for individual trials was used to assess overall data quality for that location. The “inter-variety method” for estimating coefficient of variation was used – whereby the coefficient of variation for a variety trial is calculated by averaging the coefficient of variation for individual varieties within the trial. A coefficient of variation of 16% was used as a threshold to indicate potential data quality problems with data from a specific location. Data from a location with a coefficient of variation of 16% or greater was then subject to further quality checks. Simple arithmetic means across replicates were calculated for the purpose of summarizing yield, protein content, test weights, thousand kernel weights, plant height, days to heading, and days to maturity for individual varieties at each test location. All data manipulation and analyses were conducted using the program R (R Core Team, 2020). Tables summarizing data for individual test locations in the 2019-20 season are available on the Small Grains website (http://smallgrains.ucanr.edu/Annual_Variety_Results/2020/ and <http://smallgrainselection.plantsciences.ucdavis.edu/explore/>), but are not presented within the body of this report.

Summary & analysis of multi-location & multi-year data

Multi-environment summary & analysis

To generate estimates of variety performance, data were analyzed and summarized across multiple years and locations using linear mixed-effects models and least squares means. All data manipulation and analyses were conducted using the computer program R (R Core Team, 2020). For the purpose of reporting and summarizing variety trial results, the UC Small Grains program has historically divided California into different sub-regions: the Sacramento Valley, the San Joaquin Valley, and the Imperial Valley. Variety evaluations conducted in the Intermountain region generally include a different population of varieties to other regions of California, and therefore the Intermountain region has also been

summarized separately. Genotype by environment patterns in the trial data suggest that the Northern and Southern San Joaquin Valleys may require different variety recommendations. Small grain performance in California is therefore currently summarized by grouping the test locations as follows: the Sacramento Valley (Colusa, Davis, Delta, Solano, Tehama, and Yolo locations); the North Central San Joaquin Valley (Fresno and Merced locations); the South San Joaquin Valley (Kern and Tulare locations); the Imperial Valley (Imperial location); and the Intermountain region (Siskiyou County and Tulelake locations). Within these regional groupings, variety performance was modeled as a fixed effect, and replication nested within location within year was modeled as a random effect.

For the purposes of discussing trial results we used the [UC Small Grain Variety Selection web tool](#) to identify the top-performing fall-planted commercial varieties in each sub-region. This tool develops least squares means from the mixed linear model. From this tool higher than average yields (95% confidence), lower than average protein (70% confidence) were determined, and further modified to select varieties with no stripe rust susceptibility. For general discussion we focus on the top five highest yielding varieties of each species in each location.

Stress Stability

In side-by-side trials where drought and N stress is imposed alongside normal N and water management, stress stability is calculated as:

$$Y = (A_i / \text{mean } A) + [(B_i - \text{mean } B) / (\text{mean } B)]$$

where A represents the unstressed trial condition, B represents the stressed trial condition and i represents an individual variety.

Variety performance is quantified according to the above equation for the 2019-20 season and the two previous seasons separately. Subsequently, a multi-year summary of stress stability for individual varieties are analyzed via mixed linear models and summarized via least squares means. Response variables for which stress stability are analyzed are yield, protein yield and grain protein content.

Summary of disease incidence & agronomic traits

For single season summaries, the disease incidences and agronomic ratings are reported as the 90th percentile of all plot-level observations for a given variety at a single location. The 90th percentile is used because it increases the likelihood of detecting susceptibility to a disease (or deleterious trait such as lodging), particularly if varieties have only been in the trial for short periods of time, but avoids potential bias from false-positives that could arise by using the maximum observed value. For the purpose of discussion, a disease rating of 3 or greater in a single season should be considered a problematic threshold.

For multi-environment summaries of disease and agronomic traits, the quartiles of the data for all 90th percentile observations of each disease and agronomic trait across all locations in the five years prior to and including 2019-20 were calculated. The four quartile values were then used to assign as thresholds for the following disease classifications: S =

Susceptible; MS = Moderately Susceptible; MR = Moderately Resistant; and R = Resistant. Likewise, the same method was used to determine the following classifications for the variety-specific relative-risk of lodging and seed shatter: Low; Medium; Medium High; High.

2.3 Extension of results

Results of the analyses were published on the [UC Small Grains website](#) and announcements of the availability of newly available results were made on the [UC Small Grains Blog](#). The web-tools available on the UC Small Grains Research and Information Center website (<http://smallgrainselection.plantsciences.ucdavis.edu/>; and <http://smallgrainselection.plantsciences.ucdavis.edu/explore/>) can be used for accessing and customizing results and assisting with variety selection in an interactive environment.

3. RESULTS

Statewide variety trials

Site conditions

The 2019-20 season started out drier than usual (Figure 2) and with warmer than normal temperatures (Figure 3). In the San Joaquin Valley and the Sacramento Valley rainfall between October 1 and March 1 was 64% and 55% of normal, respectively, and both areas experienced an unusually long 6-week period without rainfall between the end of January and early March. Rainfall from March 1 to June 1 was 128% and 57% of normal from the San Joaquin and Sacramento Valleys, respectively (Figure 4). Temperatures were cooler than average during the period from March 1 to April 30 as well (Figure 5).

Figure 2. Historical precipitation (10-year average, left) compared to precipitation totals during the 2019-20 season (right) between 10/1/19 and 3/1/20.

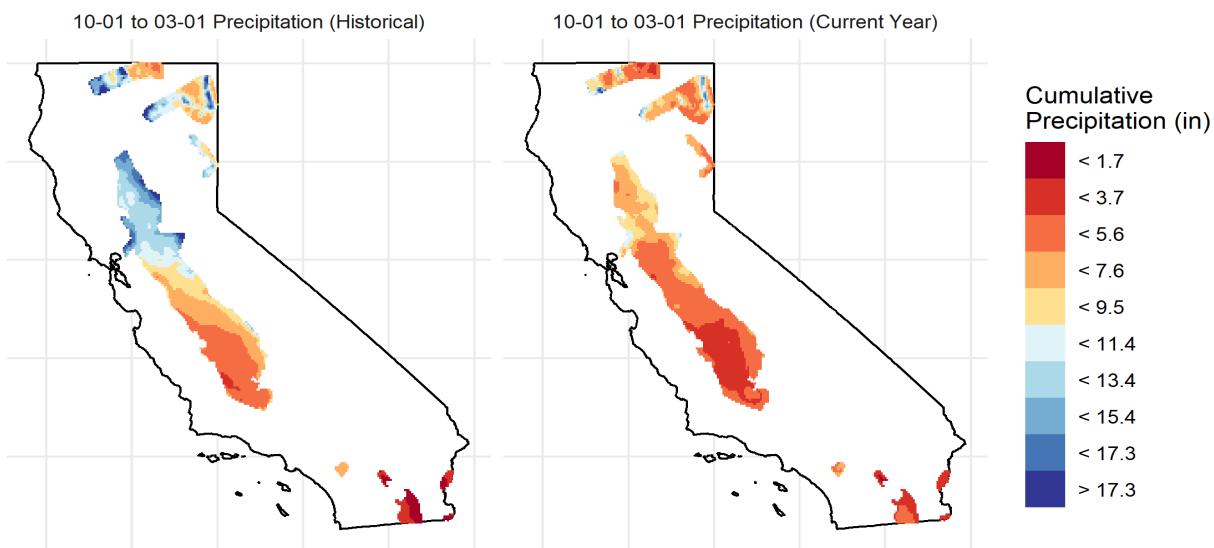


Figure 3. Historical growing degree day accumulation (GDD: 86F max, 45F min; 10-year average, left) compared to GDD totals during the 2019-20 season (right) between 11/15/19 and 3/1/20.

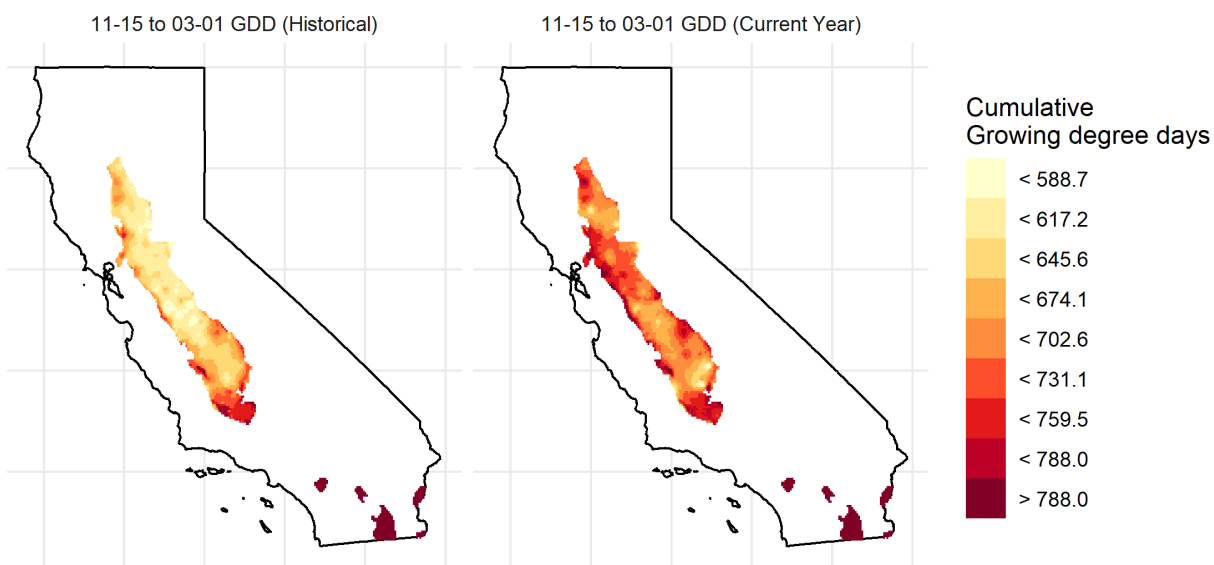


Figure 4. Historical precipitation (10-year average, left) compared to precipitation totals during the 2019-20 season (right) between 3/1/20 and 6/1/20.

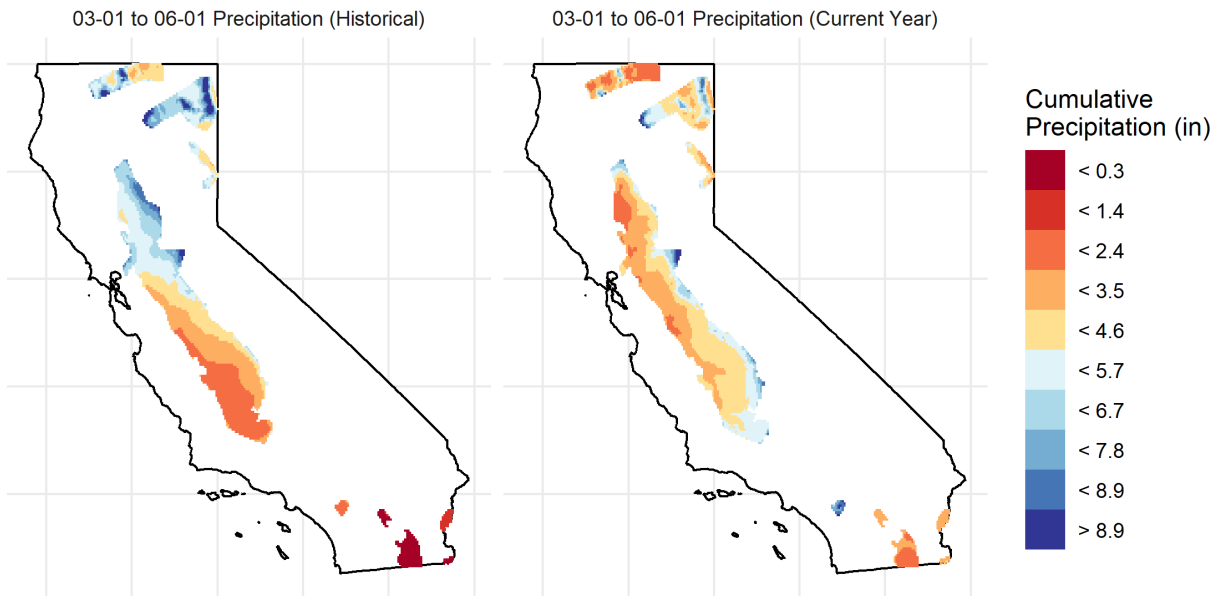
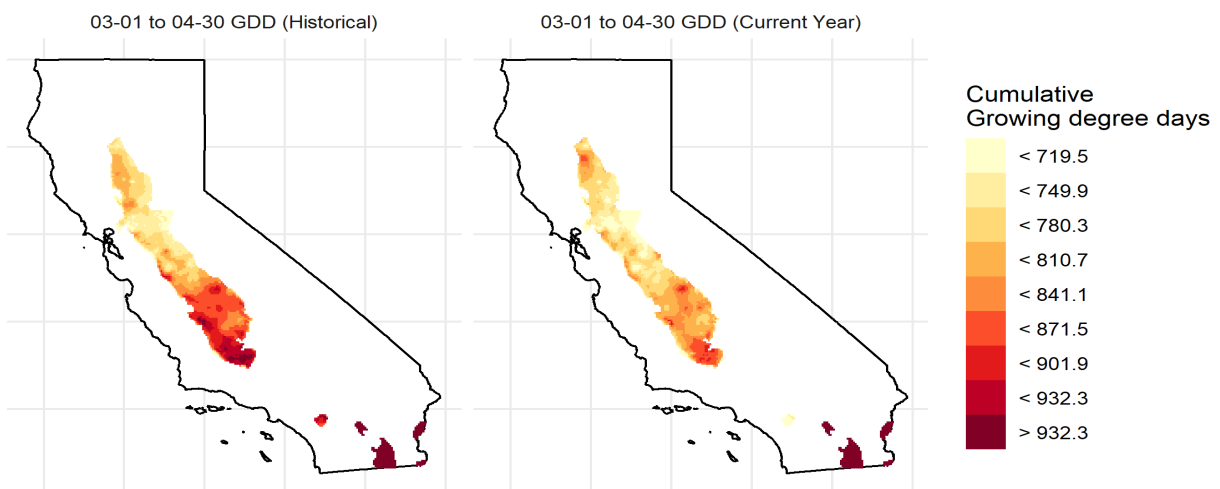


Figure 5. Historical growing degree day accumulation (GDD: 86F max, 45F min; 10-year average, left) compared to GDD totals during the 2019-20 season (right) between 3/1/20 and 4/30/2020.



Performance summaries

Overall performance summary

As a gauge of overall seasonal conditions, the mean yields per location for the past five seasons are presented in Table 10. Trial yields in the 2019-20 season were similar to or higher than previous seasons.

Table 10. The mean yield by location in the regional trials by crop type over the past five seasons.

Crop Type	Location	2015-16 Fall	2015-16 Spring	2016-17 Fall	2016-17 Spring	2017-18 Fall	2017-18 Spring	2018-19 Fall	2018-19 Spring	2019-20 Fall	2019-20 Spring
BARLEY	Davis	5208	-	6624	-	7102	-	6385	-	6397	-
BARLEY	Fresno	6860	-	5132	-	5621	-	6591	-	6410	-
COMMON	Davis	6529	-	8754	-	7825	-	8322	-	6907	-
COMMON	Fresno	7906	-	7528	-	9650	-	7161	-	9230	-
DURUM	Davis	6835	-	8802	-	8951	-	6417	-	8640	-
DURUM	Fresno	8322	-	7049	-	8189	-	-	-	9816	-
SPRINGWHEAT	Tulelake (Hard)	-	-	-	7577	-	10257	-	9991	-	9672
SPRINGWHEAT	Tulelake (Soft)	-	-	-	7782	-	11106	-	10934	-	10277
TRITICALE	Davis	7374	-	9810	-	9612	-	11192	-	9720	-
TRITICALE	Fresno	8399	-	7414	-	9574	-	7651	-	9710	-
WINTERWHEAT	Tulelake (Hard)	-	-	-	-	-	-	11432	-	-	-
WINTERWHEAT	Tulelake (Soft)	-	-	-	-	-	-	11602	-	-	-

Variety Performance

Table 11 reports top-performing varieties delineated by crop type and region. Top performing varieties met the following criteria for common wheat and durum wheat: commercial varieties with higher than average yields (80% confidence), average or above average protein (70% confidence), and no stripe rust susceptibility. For barley and triticale, there criteria were the same except that no protein parameter was included.

Comprehensive variety performance is reported in the supplementary variety performance tables (23-47).

Table 11. Top performing commercial varieties by region in the 2017-18 through 2019-20 seasons.

Crop Type	Region/Group	Top-performing varieties
BARLEY	Statewide	ISHI
BARLEY	Inter Mountain	LCS OPERA, LCS VESPA, LYON
BARLEY	North Central San Joaquin Valley	ISHI
BARLEY	Rainfed	ISHI
BARLEY	Sacramento Valley	ISHI
COMMON	Statewide	SY SUMMIT 515
COMMON	Imperial Valley	APB 500709
COMMON	North Central San Joaquin Valley	SY BLANCA GRANDE 515, LCS STAR
COMMON	Sacramento Valley	SY SUMMIT 515
DURUM	Statewide	UC DESERT KING, TIBURON, SHASTA
DURUM	Imperial Valley	POWELL, SHASTA
DURUM	North Central San Joaquin Valley	UC DESERT KING, TIBURON, SHASTA
DURUM	Sacramento Valley	UC DESERT KING, SY FORTISSIMO, TIBURON
DURUM	Southern San Joaquin Valley	SY FORTISSIMO, TIBURON
SPRINGWHEAT	Inter Mountain	AP RENEGADE, WB PATRON, WB 9717
TRITICALE	Statewide	NS GOLD RUSH 91
TRITICALE	Imperial Valley	WB PACHECO
TRITICALE	North Central San Joaquin Valley	NS GOLD RUSH 91
TRITICALE	Rainfed	NS GOLD RUSH 91, NS SWIFT 77
TRITICALE	Sacramento Valley	NS TRICAL 158EP, NS GOLD RUSH 91

Disease & agronomic summaries

The occurrence of diseases in the UC trial locations during the 2019-20 season is presented in Table 12. Overall disease incidence was moderate during the 2019-20 season, resulting in a 90th percentile value of 4 for the entire population of stripe rust observations in common wheat recorded during the season. Variety specific disease observations compiled during 2019-20 are presented in Tables 13 – 15. The 90th percentile disease incidence ratings for individual locations in the 2019-20 season and for the previous five seasons are presented in Tables 16 and 17.

Yecora Rojo (UC 112) was included as known stripe rust-susceptible check, and its 90th percentile value for stripe rust severity was a score of 6 (see Table 13). AP Venom (common wheat) and AS Colombo (durum wheat) had stripe rust scores of 3.7 or above (Table 13 & 15). In addition, the triticale NS Trical 158EP and two experimental triticale lines had a stripe rust severity scores of 4.6, 6, and 4.8 (Table 14). Stripe rust infection had not been observed for this variety in UC variety trials conducted in the past 5 years. Based on race analysis from the USDA stripe rust pathology lab located at Washington State University, races PSTv-37 and PSTv-47 were present on samples obtained from infected varieties in Tables 13–15.

A multi-year summary of disease and agronomic observations for common wheat, durum, triticale and barley are presented in Table 18, Table 19, Table 20, and Table 21, respectively. The varieties SY REDWING, SY ULTRA, LCS ATAOMO, KRONOS, APB 471400, ASC 100, MAX, ACC CONNECT, and THUNDER are considered moderately susceptible to stripe rust based on multi-year analyses. The varieties UC ANZA, YECORA ROJO, WB TRIPLE IV, DPG FV 2808, APB 501189, APB 510477, WB ORITA, WB HAVASU, WB MOHAVE, ASC 101, ASC 102, ASC 103, UC 603, UC 933, UC 969, CDC COPELAND, ACC SYNERGY, KLAGES, KWS CHRISSIE, and WINTMALT are considered susceptible to stripe rust based on multi-year analyses. The varieties WB ROCKLAND, WB 7618, APB 511829, YECORA ROJO 515 HP, UC 1885, XB T401, and OSU FULL PINT are susceptible (a 90th percentile value > 4) to barley yellow dwarf virus.

Variety-specific ratings of agronomic traits such as lodging and multi-year averages of traits such as test weight, plant height, and relative maturity can be found for the different crop types in Tables 18 – 20.

Table 12. Locations where disease and disease-like symptoms were observed and recorded in the 2017-18 season.

Common Name	Trial Group	BYDV	Leaf Rust	Powdery Mildew	Spot Blotch	Stripe Rust
Davis	WHEAT	-	-	-	-	X
Fresno	BARLEY	-	-	-	X	-
Fresno	DURUM	X	-	X	-	X
Fresno	WHEAT	-	X	-	-	X
Tulelake	BARLEY	-	-	-	-	X
Tulelake	COMMON	-	-	-	-	X

Table 13. 2020 common wheat disease observations by variety (90th percentile)

Crop Classification	UC Entry Number	Label	Leaf Rust	Stripe Rust
HRS	112	YECORA ROJO	-	5.7
HRS	1495	UC LASSIK	-	1
HRS	1728	WB JOAQUIN ORO	-	1
HRS	1730	WB 9229	-	1
HRS	1731	WB PATRON	-	1
HRS	1745	UC YUROC	-	1
HRS	1751	WB 9904	-	1
HRS	1817	UC CENTRAL RED	-	1
HRS	1835	SY SIENNA	-	1
HRS	1876	SY 64-1-9	-	1
HRS	1877	AP VENOM	-	4.6
HRS	1878	AP OCTANE	-	1
HRS	1879	YECORA ROJO 515 HP	-	1
HRS	1884	UC 1884	-	1
HRS	1888	WB 9699	-	1
HRS	1916	YECORA ROJO 515	-	1
HRS	1921	AP REDWING 204	2	1
HRS	1922	WB 9990	-	1
HRW	1906	WINCAL 158-5	-	1
HWS	1680	UC PATWIN 515	-	1
HWS	1743	UC PATWIN 515 HP	-	1
HWS	1815	UC CENTRAL WHITE	-	2.8
HWS	1907	UC 1907	-	1
HWS	1909	UC 1909	-	1
HWS	1917	UC 1917	-	1
SWS	1667	BAG NEW DIRKWIN	-	1

Table 14. 2020 triticale disease observations by variety (90th percentile)

Crop Classification	UC Entry Number	Label	Stripe Rust
TRITICALE	3164	WB PACHECO	1
TRITICALE	3169	NS TRICAL 158EP	4.6
TRITICALE	3170	NS TRICAL 115T	1
TRITICALE	3178	NS GOLD RUSH 91	2.8
TRITICALE	3184	UC 3184	1
TRITICALE	3185	UC ATREA	6
TRITICALE	3188	NS SWIFT 77	3
TRITICALE	3189	NS 13T00903	1
TRITICALE	3190	UC BOPAK	4.8
TRITICALE	3191	UC 3191	1.9

Table 15. 2020 durum wheat disease observations by variety (90th percentile)

UC Entry Number	Label	BYDV	Powdery Mildew	Stripe Rust
1375	UC DESERT KING	-	-	1
1429	SY FORTISSIMO	-	-	1
1431	SY VOLANTE	-	-	1
1582	AS MAESTRALE	-	-	1
1583	AS SARAGOLLA	-	-	1
1627	UC DESERT KING HP	3	-	1
1640	TIBURON	-	-	1
1690	UC MIWOK	-	-	1
1800	AS COLOMBO	-	-	3.7
1813	ALBERTO	-	-	1
1850	UC DESERT GOLD	-	-	1
1870	UC 1870	-	-	1
1900	APB 152308	-	2	1
1901	APB 153541	-	-	1
1902	APB 152356	-	3	1
1910	UC 1910	-	-	1
1918	UC 1918	-	-	1
1919	UC 1919	-	-	1
1924	APB 471389	-	-	1

Table 16. The 90th percentile for disease incidence across all individual test locations in the 2019-20 season.

Crop Subtype	Common Name	BYDV	Leaf Rust	Powdery Mildew	Spot Blotch	Stripe Rust
BARLEY	Fresno	-	-	-	3	-
BARLEY	Tulelake	-	-	-	-	4
COMMON	Davis	-	-	-	-	2
COMMON	Fresno	-	2	-	-	4
DURUM	Fresno	3	-	3	-	1
SPRINGWHEAT	Tulelake	-	-	-	-	2
TRITICALE	Fresno	-	-	-	-	5.3
WINTERWHEAT	Tulelake	-	-	-	-	1

Table 17. The 90th percentile for disease incidence across all test locations within individual season between the 2015-16 season and the 2019-20 season.

Crop Subtype	Season	BYDV	Leaf Blotch	Leaf Rust	Powdery Mildew	Scald	Spot Blotch	Stripe Rust
BARLEY	2015-16	3	-	2	-	-	-	2
BARLEY	2016-17	2	-	2	-	-	-	-
BARLEY	2018-19	-	2.7	3.9	5	5.1	4	3
BARLEY	2019-20	-	-	-	-	-	3	4
COMMON	2015-16	4	-	1	-	-	-	2
COMMON	2016-17	2	-	1	-	-	-	1
COMMON	2017-18	2	-	-	-	-	-	1
COMMON	2018-19	-	-	-	-	-	-	2
COMMON	2019-20	-	-	2	-	-	-	3.9
DURUM	2015-16	2	-	1	-	-	-	3
DURUM	2016-17	1	-	1	-	-	-	4
DURUM	2017-18	3	-	-	-	-	-	1
DURUM	2018-19	2	-	-	3	-	-	3
DURUM	2019-20	3	-	-	3	-	-	1
SPRINGWHEAT	2019-20	-	-	-	-	-	-	2
TRITICALE	2015-16	2	-	1	-	-	-	1
TRITICALE	2016-17	1	-	1	-	-	-	1
TRITICALE	2017-18	1	-	-	-	-	-	1
TRITICALE	2018-19	-	-	-	-	-	-	1
TRITICALE	2019-20	-	-	-	-	-	-	5.3
WINTERWHEAT	2015-16	2	-	-	-	-	-	-
WINTERWHEAT	2019-20	-	-	-	-	-	-	1

Table 18. A summary of common wheat disease and agronomic observations taken from the 2015-16 to 2019-20 seasons.

Crop Classification	Name	UC Number	2016-2020 S. Rust rating	2016-2020 L. Rust rating	2016-2020 BYDV rating	2016-2020 Septoria rating	Test Weight (lb/bu)	Thousand Kernel Wt (g)	Days to heading (from Jan. 1, Davis)	Days to maturity (from Jan. 1, Davis)	Plant Height (in)	Lodging risk	Shatter risk	Plots observed (n)	Status
HRS	UC ANZA	20	S	R	R	R	61.8	36.6	82	126	-	Med. Low	Low	51	Available
HRS	YECORA ROJO	112	S	R	R	MS	61.7	43.1	79	129	31	High	-	53	Available
HRS	SY CAL ROJO	1478	R	R	MR	R	60	40.3	79	125	32	Low	Low	85	Available
HRS	UC LASSIK	1495	R	R	MR	MR	61.5	34.8	82	126	35	High	Low	85	Available
HRS	SY REDWING	1521	MS	R	MR	R	60.2	39.2	78	123	33	Med. Low	Low	82	Released
HWS	SY BLANCA ROYALE	1522	R	R	MR	R	61	37.6	75	124	32	Med. Low	Low	72	Released
HRS	WB TRIPLE IV	1550	S	-	MS	S	61.4	41.3	72	117	35	High	Low	63	Available
HRS	SY ULTRA	1590	MS	R	R	MR	62.7	40.6	77	125	-	Low	Low	68	Available
HRS	DPG FV 2808	1608	S	R	MS	MR	61.8	38.3	85	127	39	High	Medium	78	Available
HRS	WB ROCKLAND	1650	R	-	S	-	62	38.1	76	121	-	Low	Low	51	Released
HWS	SY BLANCA GRANDE 515	1657	R	R	R	MS	63.4	40.5	77	125	34	High	Low	83	Available
HRS	SY SUMMIT 515	1658	R	R	MR	MR	61.5	38.9	79	125	33	Low	Low	85	Available
HRS	SY 314	1660	R	R	MR	R	60.6	40	81	123	-	Low	Low	69	Released
SWS	BAG NEW DIRKWIN	1667	R	R	MS	R	57.2	36	89	132	39	Med. High	Low	82	Available
HWS	UC PATWIN 515	1680	R	R	MR	R	60.9	37.1	82	126	33	Low	Low	85	Available
HWS	LCS STAR	1688	R	R	R	R	61	35.7	80	128	34	Med. High	Low	73	Available
HWS	LCS ATOMO	1723	MS	R	MS	R	62.2	38.9	76	124	34	Med. High	Low	83	Available
HRS	WB JOAQUIN ORO	1728	R	R	MS	MS	62.3	41.6	74	122	34	Med. Low	Low	84	Available
HRS	WB 9229	1730	R	R	MS	R	62.5	38.4	80	126	34	Med. High	Low	85	Available
HRS	WB PATRON	1731	R	R	MS	R	61	41.7	79	125	36	High	Low	85	Available
HWS	UC PATWIN 515 HP	1743	R	R	R	R	60.5	35.3	79	123	32	Med. High	Low	80	Available
HRS	UC YUOK	1745	R	R	MS	R	62.6	38.2	82	126	36	Med. High	Low	84	Available
HRS	WB 9112	1748	R	R	MR	R	62	36.3	74	124	34	Med. High	Low	72	Available
HWS	WB 7618	1749	R	-	S	-	62	37.5	76	121	-	Low	Low	54	Available
HWS	WB 7390	1750	R	-	MS	-	63.7	42.7	74	122	-	Low	Low	54	-
HRS	WB 9904	1751	R	R	MS	R	61.2	44.4	82	126	37	Med. High	Low	85	Available
SRS	SY VACA	1766	R	R	MR	MS	57.3	36.7	101	145	41	Med. Low	Low	76	Released
HRW	ASSL TAM 204	1778	MR	R	MR	R	59	32.3	87	128	38	Med. High	Low	86	Released
HWS	WB 7566	1802	R	R	R	R	61.6	40.1	81	126	32	Med. Low	Low	79	Available
HRS	APB 501189	1807	S	-	MS	-	60.9	36	72	119	-	Med. Low	Low	54	-
HRS	UC 15010 5	1814	R	-	R	-	60.4	38.5	78	120	-	Low	Low	36	-
HWS	UC CENTRAL WHITE	1815	R	R	R	R	60.8	40.3	81	127	33	Low	Low	69	Available
HWS	UC 15013 15	1816	R	-	R	-	64.1	39.8	75	122	-	Low	Low	36	-
HRS	UC CENTRAL RED	1817	R	R	MR	R	62.2	38.9	79	125	34	Med. Low	Low	80	Available
HRS	UC 15014 35	1818	R	-	R	-	63.6	34.9	78	121	-	Med. Low	Medium	36	-

HRS	APB 500709	1819	R	R	R	R	61.7	38.5	77	124	-	Low	Low	63	Available
NA	APB 501129	1820	MR	-	MR	-	60.4	38.5	77	123	-	Low	Low	36	-
HRS	APB 8238	1821	R	-	MR	-	61.3	38.8	76	121	-	Low	Low	35	-
HRS	APB 501089	1828	R	R	MR	R	60.9	39.6	76	122	-	Low	Low	47	Available
NA	APB 8155	1829	R	-	MR	-	62.2	39	75	121	-	Low	Medium	36	-
HRS	LCS 12SB0197	1830	R	R	MR	R	59.9	37.8	79	126	36	Med. Low	Medium	67	-
HWS	LCS 12SB0224	1831	R	R	MR	R	60.6	38	79	126	34	Med. Low	Low	67	-
HRS	SY 13W00850	1834	R	R	R	R	62.1	46.2	92	152	-	Low	-	16	-
HRS	SY SIENNA	1835	R	R	R	R	62.2	44.1	84	130	34	Low	-	60	Available
HRS	UC LASSIK RS	1836	R	R	R	R	58.1	40.4	92	152	-	Low	-	16	-
HWS	UC PATWIN RS	1837	R	R	R	R	57.5	37.9	88	149	-	High	-	16	-
HRS	UC 16010 20	1838	R	R	MR	R	62.8	43.1	92	149	-	Med. Low	-	16	-
HWS	UC 1839	1839	R	R	R	R	60.9	40.5	98	145	39	High	-	33	-
HRS	APB 410117	1840	R	R	R	R	61.3	46.7	92	149	-	Low	-	16	-
HRS	APB 510453	1841	R	R	R	R	62	45.7	92	152	-	Low	-	16	-
HRS	WB 9350	1842	R	R	R	MS	61.7	39.7	81	128	31	Low	-	53	Available
HRS	XA 9301	1843	R	R	R	R	62.2	47.3	88	152	-	Med. Low	-	16	-
HRS	XA 9302	1844	R	R	R	MR	63.5	43.3	88	142	-	Low	-	16	-
HRS	XA 9501	1845	R	R	R	R	62	46	92	145	-	Med. Low	-	16	-
HRS	XA 9502	1846	R	R	R	R	62.7	44.5	92	149	-	Med. Low	-	16	-
HRS	WB 9433	1847	R	R	R	MR	62.2	38.2	83	129	31	Med. High	-	53	Released
HRS	APB 510477	1874	S	-	MS	-	60.7	36.5	76	124	34	Med. High	-	23	-
HRS	APB 511829	1875	R	-	S	-	60.8	35	75	126	33	Med. High	-	23	-
HRS	SY 64-1-9	1876	R	-	MR	MR	61.2	37.2	83	127	32	Med. High	-	60	-
HRS	AP VENOM	1877	R	-	MR	R	60.3	36.6	84	128	38	High	-	60	Available
HRS	AP OCTANE	1878	R	-	R	MR	61.2	41.2	80	127	35	High	-	60	Available
HRS	YECORA ROJO 515 HP	1879	R	-	S	-	60	37.3	74	127	28	Low	-	32	-
HRS	UC 1880	1880	R	-	MS	MR	61	40	79	125	35	High	-	42	-
HRS	UC 1882	1882	R	-	MS	MS	61	39	78	125	33	Med. Low	-	44	-
HWS	UC 1883	1883	R	-	MS	-	60.7	36.8	76	124	32	Low	-	23	-
HRS	UC 1884	1884	R	-	MS	-	62.2	39.5	77	127	34	Med. High	-	32	-
HRS	UC 1885	1885	R	-	S	-	59.7	33.5	78	126	30	Low	-	23	-
HRS	XB 9512	1886	R	-	MR	-	62.5	35.3	76	125	32	Med. High	-	23	-
HRS	WB 9490	1887	MR	-	MS	MR	61.5	39.9	79	126	34	High	-	41	Available
HRS	WB 9699	1888	R	-	MR	MR	63.1	42.5	82	127	34	Med. High	-	61	Available
HRS	APB 410089	1903	R	-	-	MS	63	44.2	104	-	35	Med. Low	-	30	-
HRS	APB 510879	1904	R	-	-	MR	62.4	44.6	107	-	38	Med. High	-	26	-
HRS	XC 9407	1905	R	-	-	MR	62	41	107	-	34	High	-	29	-
HRW	WINCAL 158-5	1906	R	-	-	MS	62	42.1	110	147	35	High	-	42	-
HWS	UC 1907	1907	R	-	-	MR	63.3	43.5	108	147	34	High	-	44	-
HRS	UC 1908	1908	R	-	-	R	63.3	38.4	104	-	34	High	-	25	-
HWS	UC 1909	1909	R	-	-	R	62.1	35	108	147	34	High	-	44	-
HRS	YECORA ROJO 515	1916	R	-	-	-	59.8	44.7	112	147	29	-	-	16	-
HWS	UC 1917	1917	R	-	-	-	60.8	44.1	112	147	39	-	-	16	-
HRS	AP REDWING 204	1921	R	-	-	-	59.3	39.8	112	147	32	-	-	16	-
HRS	WB 9990	1922	R	-	-	-	59.2	36.8	112	147	37	-	-	16	-

Table 19. A summary of durum wheat disease and agronomic observations taken from the 2015-16 to 2019-20 seasons.

Name	UC Number	2016-2020 S. Rust rating	2016-2020 L. Rust rating	2016-2020 BYDV rating	2016-2020 Septoria rating	Test Weight (lb/bu)	Thousand Kernel Wt (g)	Days to heading (from Jan. 1, Davis)	Days to maturity (from Jan. 1, Davis)	Plant Height (in)	Lodging risk	Shatter risk	Plots observed (n)	Status
DPG DURAKING	878	R	-	MR	-	62	42.5	79	125	33	Low	-	12	Released
KRONOS	951	MS	-	MS	R	61.5	55.3	71	122	36	High	Low	60	Available
DPG PLATINUM	1210	R	-	MR	-	61.4	42.5	79	126	33	Med. Low	-	20	Available
DPG TOPPER	1211	R	-	R	-	62.5	42.1	86	105	36	Low	-	12	Released
WB ORITA	1215	S	-	MR	R	60.9	53.5	83	126	38	Low	Low	60	Available
UC DESERT KING	1375	R	-	R	R	61.9	51	86	124	39	Low	Low	60	Available
SY FORTISSIMO	1429	R	-	R	R	61.4	46.8	81	126	37	Med. Low	Low	60	Available
SY VOLANTE	1431	R	-	R	R	62.1	53.9	82	124	36	Med. Low	Low	55	Available
WB HAVASU	1479	S	-	MR	R	62.5	52.1	72	121	-	High	Low	40	Available
WESTMORE HP	1484	R	-	R	R	61.4	44.2	74	121	34	High	Low	59	Available
AS MAESTRALE	1582	R	-	MR	R	62.6	47.8	85	129	40	Med. High	Low	54	Available
AS SARAGOLLA	1583	MR	-	MR	R	62.9	49	80	125	38	Med. High	Low	60	Available
WB MEAD	1607	MR	-	MS	R	61	47	86	123	38	Low	Medium	60	Available
UC DESERT KING HP	1627	R	-	MR	R	59.7	44.9	86	126	37	Med. Low	Low	60	Available
TIBURON	1640	R	-	R	MR	61.4	57.1	76	125	36	Med. Low	Low	60	Available
WB MOHAVE	1654	S	-	MR	R	62	49.8	75	124	36	Med. Low	Low	60	Available
UC MIWOK	1690	MR	-	MR	R	62.5	55.4	81	127	35	Med. High	Medium	84	Available
LCS KIKO	1697	R	-	MR	R	61.3	56	76	123	-	Med. Low	Low	40	Released
UC 1771	1771	R	-	R	-	62.2	50.3	110	-	39	Med. High	-	12	-
AS COLOMBO	1800	MR	-	R	R	60.8	47.3	91	124	38	Low	-	40	Available
ALBERTO	1813	R	-	MR	R	61.1	51	77	125	33	Med. Low	Medium	59	Available
APB 540165	1827	R	-	R	MR	61.4	57.5	70	123	-	Med. Low	Low	36	-
UC DESERT KING RS	1848	R	-	-	R	57.9	44.2	106	156	-	Med. High	-	20	-
UC 16051 12	1849	R	-	-	R	60.6	49.1	106	159	-	Low	-	20	-
UC DESERT GOLD	1850	R	-	MR	R	61.1	48.8	92	132	40	Med. Low	-	40	Available
APB 450311	1851	MR	-	R	R	60.7	49.4	74	128	28	Med. Low	-	28	-
APB 470442	1852	R	-	-	R	62.2	52.2	99	152	-	Med. Low	-	20	-
APB 471400	1853	MS	-	R	R	63.3	50.9	78	126	34	Med. High	-	40	-
ASC 100	1854	MS	-	-	R	61.5	48.9	109	159	-	Low	-	20	-
ASC 101	1855	S	-	-	R	62	49.4	99	156	-	High	-	20	-
ASC 102	1856	S	-	-	R	62.6	55.2	92	152	-	High	-	20	-
ASC 103	1857	S	-	-	R	61.9	51	99	156	-	Med. Low	-	20	-
APB 450275	1865	R	-	MR	-	60	47.6	74	124	27	Low	-	12	-
APB 450333	1866	R	-	R	-	60.7	49	72	125	28	Low	-	12	-
DPG CANDURA	1867	R	-	R	-	61.4	43.1	80	126	35	Med. Low	-	12	Released
POWELL	1868	R	-	MS	-	63.2	53.4	75	125	36	Med. Low	-	20	Available
SHASTA	1869	R	-	MR	-	63.3	58.1	75	123	37	High	-	20	Available
UC 1870	1870	R	-	MR	-	62.3	48.6	87	128	37	Med. Low	-	25	-
UC 1871	1871	R	-	MR	-	63	49.1	75	126	36	Med. High	-	20	-
UC 1872	1872	R	-	MR	-	61	46.2	82	105	34	Med. Low	-	12	-
UC 1873	1873	R	-	R	-	62.4	46.4	83	126	34	Low	-	12	-
APB 152308	1900	MR	-	R	-	60.7	53.3	106	143	33	Low	-	20	-
APB 153541	1901	R	-	MR	-	61.1	57.2	110	147	37	Med. High	-	16	-
APB 152356	1902	R	-	MR	-	61.2	45.4	108	147	34	Med. High	-	19	-
UC 1910	1910	R	-	R	-	60.2	47.8	111	147	40	Med. Low	-	20	-
ASC 122	1912	R	-	R	-	62.3	55.8	104	-	41	High	-	12	-
ASC 123	1913	MR	-	R	-	60.8	54.7	107	-	42	Med. High	-	12	-
ASC 124	1914	MR	-	R	-	60.6	47	121	-	39	Med. Low	-	12	-
UC 1918	1918	R	-	-	-	61.1	48.7	112	147	36	-	-	8	-
UC 1919	1919	R	-	-	-	61.5	44	112	147	40	-	-	8	-
APB 471389	1924	R	-	-	-	63	50.7	112	147	36	-	-	8	-

Table 20. A summary of triticale disease and agronomic observations taken from the 2015-16 to 2019-20 seasons.

Name	UC Number	2016-2020 S. Rust rating	2016-2020 L. Rust rating	2016-2020 BYDV rating	2016-2020 Septoria rating	Test Weight (lb/bu)	Thousand Kernel Wt (g)	Days to heading (from Jan. 1, Davis)	Days to maturity (from Jan. 1, Davis)	Plant Height (in)	Lodging risk	Shatter risk	Plots observed (n)	Status
NS TRICAL 105	3097	R	R	MR	R	58.7	43	77	127	38	Med. High	Medium	85	Released
WB PACHECO	3164	R	R	R	R	58.9	42.6	77	123	38	Low	Medium	75	Available
NS CAMELOT	3168	R	R	R	R	57.2	39.1	75	120	38	Med. High	Medium	84	Released
NS TRICAL 158EP	3169	R	R	R	R	58.4	37.2	80	127	35	Low	Medium	85	Available
NS TRICAL 115T	3170	R	R	MR	MR	58.4	37.8	80	128	35	Med. High	Medium	87	Available
PRL 011TS 429	3177	R	-	R	-	57.2	37.8	75	125	-	High	Medium	36	-
NS GOLD RUSH 91	3178	R	-	R	R	56.3	40.8	79	128	35	Low	Medium	51	Available
NS 12T01486	3180	R	R	R	R	56.9	-	85	152	-	Med. Low	-	16	-
AGS 230	3181	MR	R	R	MR	59.7	-	88	156	-	Med. Low	-	16	-
AGS 133	3182	R	R	R	R	58.6	-	92	159	-	Low	-	16	-
UC 3183	3183	R	-	MR	-	59.7	40.4	70	100	37	High	-	23	-
UC 3184	3184	R	-	MR	R	57.1	48.8	77	128	42	High	-	58	-
UC ATREA	3185	S	-	R	R	57.5	49.6	80	127	40	Med. Low	-	60	-
XB T401	3186	R	-	S	-	56.9	37.8	78	103	35	Low	-	23	-
NS SWIFT 77	3188	R	-	-	R	57.3	45.6	105	147	41	High	-	49	Available
NS 13T00903	3189	R	-	-	R	55.7	44.6	108	147	40	Med. Low	-	49	-
UC BOPAK	3190	MR	-	-	R	59.2	48.9	108	147	43	High	-	43	-
UC 3191	3191	R	-	-	-	56.2	47.1	112	147	48	-	-	16	-

Table 21. A summary of barley disease and agronomic observations taken from the 2015-16 to 2019-20 seasons.

Crop Classification	Name	UC Number	2016-2020 S. Rust rating	2016-2020 L. Rust rating	2016-2020 BYDV rating	2016-2020 Septoria rating	Test Weight (lb/bu)	Thousand Kernel Wt (g)	Days to heading (from Jan. 1, Davis)	Days to maturity (from Jan. 1, Davis)	Plant Height (in)	Lodging risk	Shatter risk	Plots observed (n)	Status
6RSF	UC71 183 1	162	R	R	MR	-	42.6	36.4	99	135	41	Low	Low	19	-
6RSF	UC 603	603	S	S	MR	-	50.1	38.8	91	120	34	Low	Medium	51	Released
6RSF	MAX	816	MS	R	MR	-	50.6	39.8	94	132	31	Low	Low	25	-
6RSF	UC 933	933	S	MS	MS	-	48.9	40.8	89	130	31	Med. Low	Medium	50	Released
6RSN	UC 937	937	R	MR	-	-	48.2	40.7	97	134	29	Low	-	24	-
6RSF	UC 960	960	R	MS	-	-	47.9	38.3	100	134	29	Low	-	23	-
6RSF	UC 969	969	S	R	MS	-	51.7	41.5	88	132	35	Low	Low	56	Released
6RSF	ISHI	1047	R	R	MS	-	48.9	41.2	94	134	32	Med. High	Low	52	Available
6RSN	TAMALPAIS	1134	MR	R	R	-	53.4	38.7	92	135	31	Low	Low	53	Available
6RSF	UC B369	1255	R	R	R	-	48.9	44.2	86	126	33	Med. High	Low	24	-
6RSF	UC B398	1256	R	R	MS	-	48.9	43.1	90	128	34	Med. Low	Low	24	-
6RSF	UC A237	1261	R	R	MR	-	48.4	42.2	88	128	34	Med. Low	Low	23	-
6RSN	UC 1263	1263	R	R	R	-	53.8	40.5	88	132	35	Low	Low	23	-
6RSN	UC 1266	1266	R	R	MR	-	54.2	38.3	88	131	34	Med. Low	Low	23	-
6RSF	UC 1280	1280	R	R	R	-	50.9	43.8	88	129	35	High	Low	40	-
6RSN	UC 1317	1317	R	R	MR	-	51.5	37.7	92	127	33	Med. High	Low	22	-
6RSN	UC 1318	1318	R	R	R	-	51.7	41.3	88	130	35	High	Low	24	-

6RSF	UC UYP 210A	1351	R	R	R	-	48	40.4	88	128	33	Low	Low	24	-
6RSF(H)	SCHALLER	1355	R	MR	R	-	47.2	40.2	99	134	38	Med. Low	Low	44	Available
2RSM	UC BUTTA 12	1360	R	R	MS	-	53.2	46.2	99	131	34	Med. High	Low	58	Available
-	UC UYP 3B	1379	R	R	MS	-	50	43.4	84	132	31	High	Low	24	-
-	UC UYP 210B	1383	R	R	R	-	48.3	39.7	85	134	34	Med. Low	Low	24	-
-	UC 08YP 111 1231 LATE	1385	R	R	MR	-	48.6	45.5	90	128	35	Med. Low	Low	24	-
2RSM	UC CAPAY	1390	R	R	R	-	53.2	50.9	87	131	38	Med. High	Low	55	Available
2RSM	UC UOP 95	1399	R	R	MR	-	49.7	44	87	125	33	High	Low	24	-
-	UC UOP 96	1400	R	R	MR	-	50.2	47.1	87	130	34	Med. Low	Low	23	-
-	UC UOP 97	1401	R	R	R	-	50	42.5	88	131	35	Med. Low	Low	23	-
-	UC UOP 98	1402	R	MR	MR	-	49.3	39.3	84	130	35	High	Low	24	-
-	UC UOP 99	1403	R	R	R	-	48.7	40.7	86	133	35	High	Low	22	-
-	UC UOP 100	1404	R	R	MR	-	48.8	39.6	92	134	34	High	Low	24	-
-	UC UOP 102	1405	R	R	R	-	48.6	43.1	88	127	35	Med. Low	Low	24	-
-	UC UOP 105	1406	R	MR	MR	-	50.1	43	87	130	34	Med. High	Low	24	-
2RSM	UC UOP 111	1408	R	R	MR	-	58.1	41.9	91	131	34	Med. High	Low	23	-
2RSM	UC TAHOE	1409	R	R	R	-	53	39.7	97	132	32	High	Low	57	Available
2RSM	UC 1410	1410	R	R	R	-	51.4	40.6	98	126	31	High	Low	26	-
2RSM	OSU FULL PINT	1411	R	R	S	-	51.7	40.3	95	132	29	Med. Low	Low	46	Released
2RSM	LCS GENIE	1414	MR	-	R	-	51.7	37.3	108	135	30	Low	-	50	Available
2RSM	LCS ODYSSEY	1415	MR	-	R	-	50.8	39.1	110	143	30	Med. Low	-	35	Available
2RSM	CDC COPELAND	1858	S	-	-	-	51.1	36.1	98	138	35	Med. Low	-	31	Available
2RSM	ACC SYNERGY	1859	S	-	-	-	52.6	39.2	98	137	35	Low	-	30	Available
2RSM	KLAGES	1860	S	-	-	-	51.8	38.2	97	134	32	High	-	24	Released
2RSM	UC B9K94	1861	R	-	-	-	-	32.2	94	134	32	Low	-	8	-
2RSM	UC 1911	1911	R	-	-	-	52.1	45.1	110	147	33	Low	-	28	-
2RSM	UC 1915	1915	R	-	-	-	52.3	44.8	111	147	33	Med. High	-	26	-
2RSM	UC CAPAY	9018	R	-	-	-	53.2	-	178	225	44	Low	-	12	Available
2RSM	UC BUTTA 12	9049	R	-	-	-	53.1	-	170	224	38	Med. Low	-	8	Available
2RSM	CDC COPELAND	9054	S	-	-	-	52.1	-	183	216	43	High	-	16	Available
2RSM	OSU FULL PINT	9059	R	-	-	-	53.5	-	189	228	29	Low	-	11	Released

2RSM	UC TAHOE	9085	R	-	-	-	55.6	-	184	221	42	Med. Low	-	8	Available
2RSM	UC 1410	9086	R	-	-	-	53.1	-	186	225	31	High	-	12	-
2RSM	FRANCIN	9148	MR	-	-	-	54	-	179	216	34	Low	-	12	-
2RSM	LCS GENIE	9149	R	-	-	-	54.1	-	189	225	30	Low	-	7	Available
2RSM	ACC SYNERGY	9154	R	-	-	-	57.1	-	186	222	-	Low	-	4	Available
2RSM	UC B9K94	9155	R	-	-	-	-	-	160	212	45	-	-	4	-
-	DH120058	9156	R	-	-	-	51.2	-	-	-	23	-	-	3	-
-	DH120285	9157	R	-	-	-	51	-	-	-	24	-	-	3	-
2RSM	LCS OPERA	9158	R	-	-	-	50.7	-	181	217	31	-	-	7	Released
2RSF	LCS VESPA	9159	R	-	-	-	51.4	-	-	-	27	-	-	3	Released
2RSF	LYON	9160	R	-	-	-	51.5	-	-	-	29	-	-	3	Released
-	AD120341	9161	R	-	-	-	52.5	-	-	-	24	-	-	3	-
2RSF	CLAYMORE	9162	MR	-	-	-	51.8	-	180	212	40	-	-	7	-
-	MEG'S SONG	9163	MR	-	-	-	61.8	-	178	212	41	-	-	7	-
2RSM	LCS ODYSSEY	9164	R	-	-	-	50	-	-	-	26	-	-	3	Available
-	OREANA	9165	MR	-	-	-	52.5	-	180	214	33	-	-	4	-
-	LCS DIABLO	9166	R	-	-	-	48.6	-	181	217	34	-	-	4	-
-	CHARGER	9167	MR	-	-	-	53.8	-	176	210	43	-	-	4	-
-	KWS JESSIE	9168	MR	-	-	-	50.2	-	181	212	32	-	-	4	-
-	KWS CHRISSIE	9169	S	-	-	-	51.9	-	181	212	33	-	-	4	-
-	AAC CONNECT	9170	MS	-	-	-	52.2	-	178	206	43	-	-	4	-
-	ALTORADO	9171	R	-	-	-	53.8	-	179	210	40	-	-	4	-
-	ALBA	29259	R	-	-	-	50.6	-	156	203	47	Low	-	4	-
-	STRIDER	29260	R	-	-	-	49	-	154	202	47	Low	-	4	-
-	WINTMALT	29261	S	-	-	-	50	-	158	206	41	Med. Low	-	4	-
-	THUNDER	29262	MS	-	-	-	50.7	-	156	204	43	Low	-	4	-
-	DH130910	29263	MR	-	-	-	50	-	156	200	44	Low	-	3	-
-	DH130910	29263	R	-	-	-	50.8	-	181	210	41	-	-	4	-

Genotype-by-environment analyses

Summaries of the yield data across trial environments during the 2019-20 season are provided in Figures 6-8 for common wheat, durum wheat and triticale. As illustrated in the figures, there are large changes in variety ranking among environments for certain varieties, indicating potentially important genotype-by-environment effects. However, as has been reported previously for common wheat in California (George and Lundy, 2019) genotype-by-environment effects are unstable across years. Therefore, multi-year summaries across all trial environments may best predict variety performance for a randomly chosen environment within the testing region. Tables 23-47 present multi-year summaries for common wheat, durum wheat, triticale and barley across all trial environments. Nevertheless, for locations where conditions resemble a particular trial environment (e.g. low-water and/or rainfed environments), more customized sub-groupings may more appropriately predict yield performance. For this reason, customized groupings of trial results are available at <http://smallgrainselection.plantsciences.ucdavis.edu/explore/>.

Figure 6. Heatmap of common wheat yield data from the 2019-20 regional variety trials.

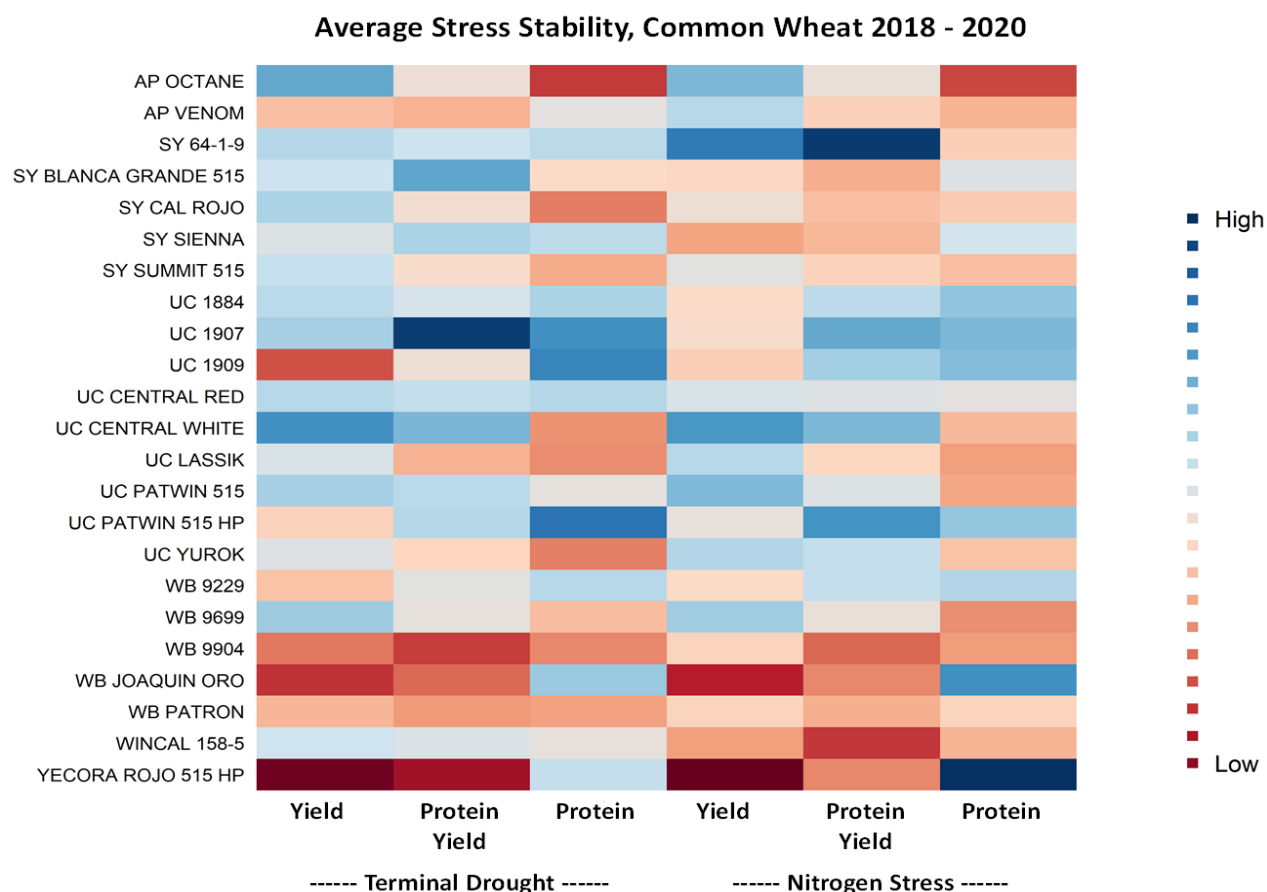


Figure 7. Heatmap of durum wheat yield data from the 2019-20 regional variety trials.

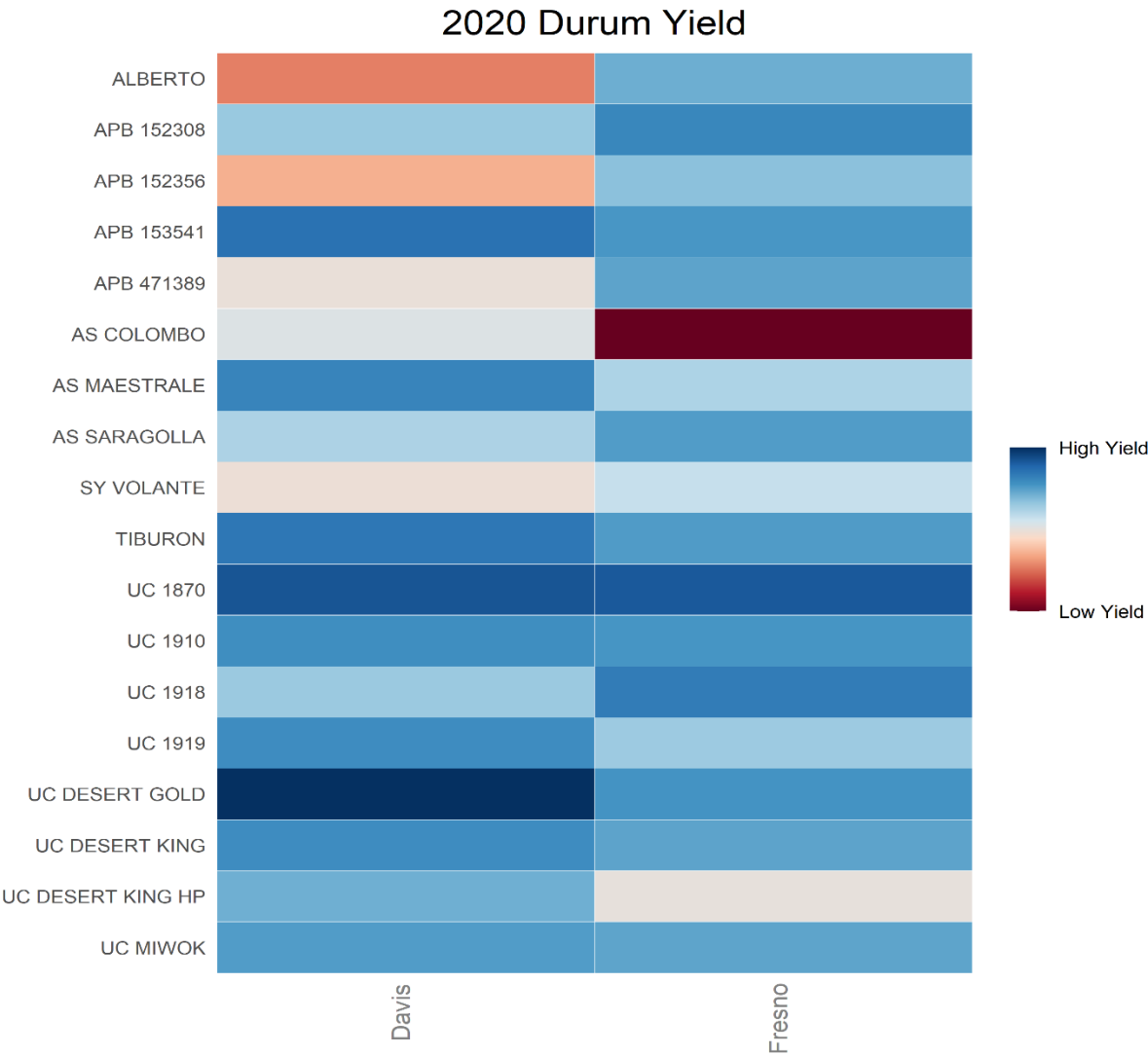
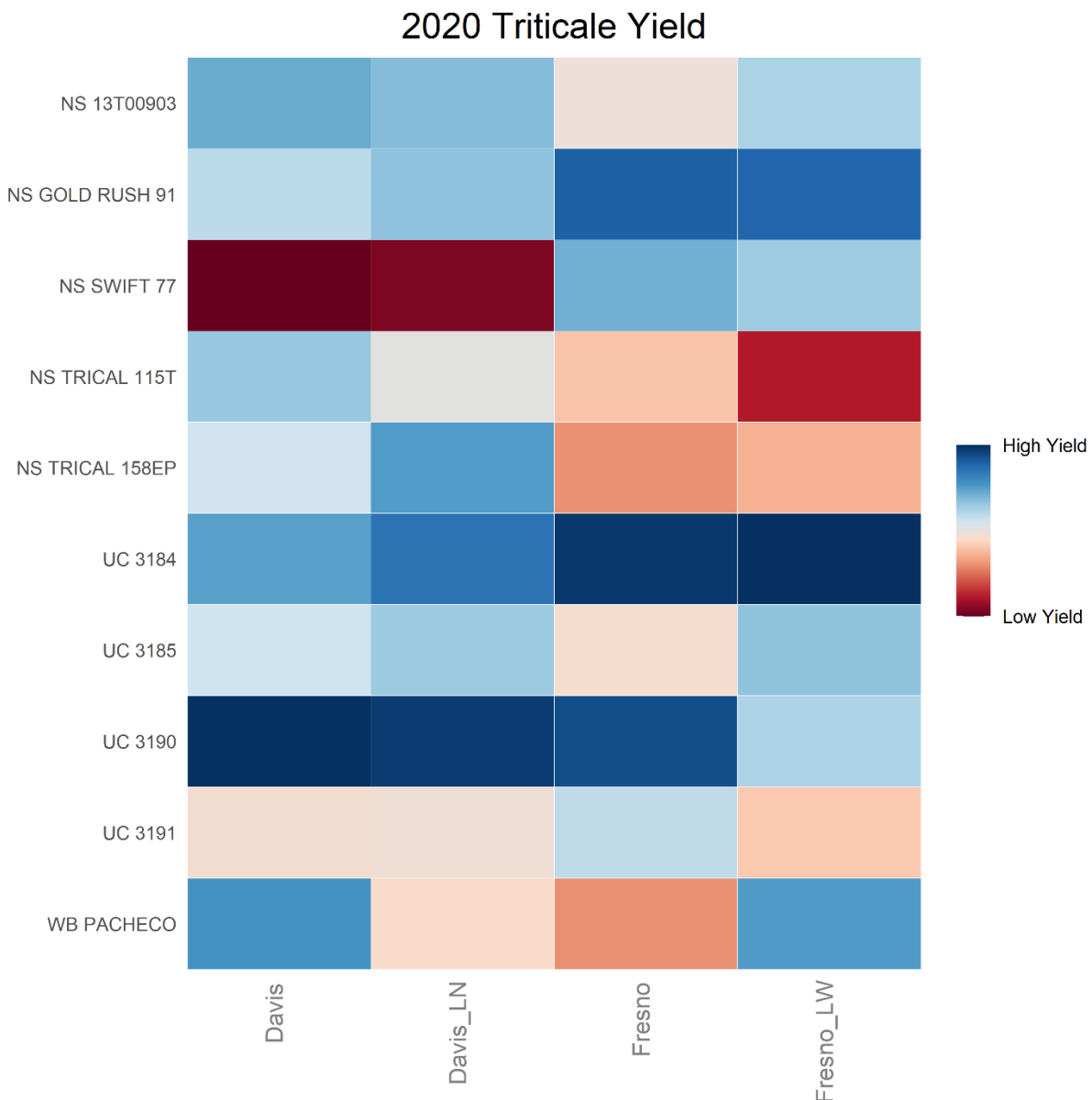


Figure 8. Heatmap of triticale yield data from the 2019-20 regional variety trials.



Stress Stability

Water availability and nitrogen regulations continue to impact small grain production in the state of California, and the information developed from managed drought and nitrogen stress trials will assist in selecting varieties that are robust under uncertain and resource-limited management conditions. Yields in the 2019-2020 Davis common wheat and triticale trials where no N fertilizer was added were 20.7% and 20.7% lower than the fertilized trial, and protein was 23.8% and 26.1% lower, respectively. At the Fresno location, where 4.6 inches of irrigation were withheld at grain fill, wheat and triticale yields were 49.3 and 56.8% lower than where full irrigation was provided and grain protein content was 30.4

and 26.2% higher, respectively. These observations were combined with managed stress trials conducted in the previous two seasons to develop a multi-year summary of variety-specific stress stability (see methods).

Among the common wheat varieties tested, yield stable varieties were generally protein instable and protein stable varieties were generally yield instable (Figure 9). However, there were notable exceptions including UC Patwin 515, UC Central Red, and SY Sienna under drought stress. Of note as well is that varieties were not consistent in their responses to drought and N stress. Table 22 summarizes the variety-specific yield, protein yield and protein stability of individual common wheat varieties in response to drought and N stress across the 2017-18, 2018-19, and 2019-20 season. Further analysis that include triticale and additional seasons are available at http://smallgrains.ucanr.edu/Stress_Stability/.

Figure 9. Average Stress Stability, Common wheat 2018-2020

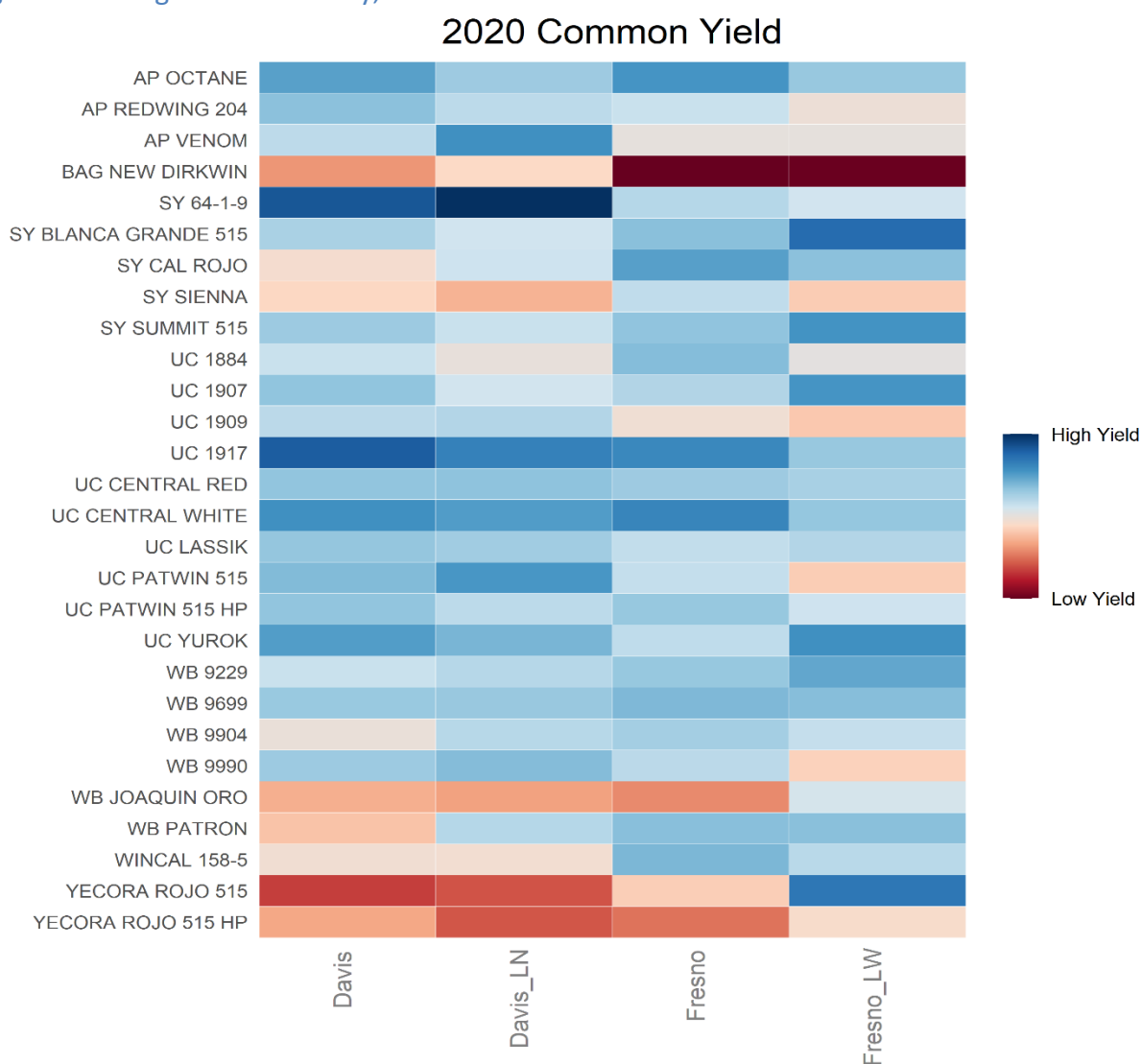


Table 22. Stress Stability summary table, common wheat 2018-2020

Summary Table: 2018-2020 Normalized Stress Response, Common Wheat. Average normalized response of common hard spring wheat varieties to terminal drought and nitrogen (N) stress in trials conducted in Yolo and Fresno Counties of California during the 2017-18, 2018-19 and 2019-2020 seasons. Terminal drought and N stress responses are based on averages of 3 and 4 site-years of data, respectively. The normalized stress response is calculated as: $(A_i / \text{mean } A) + [(B_i - \text{mean } B) / (\text{mean } B)]$, where A is a fully watered/fertilized control, B is a managed stress trial grown at the same location, and i is an individual variety. Stress trials are managed identically except for the exclusion of irrigation after the vegetative growth period (terminal drought) or the exclusion of N fertilizer additions throughout the season (N stress).

Variety Name	Terminal Drought Stress Response									Nitrogen Stress Response															
	Yield					Protein Yield				Protein				Yield					Protein Yield				Protein		
	Rank	Response (%)	SE Response	p-value		Response (%)	SE Response	p-value		Response (%)	SE Response	p-value		Rank	Response (%)	SE Response	p-value		Response (%)	SE Response	p-value		Response (%)	SE Response	p-value
AP OCTANE	2	13.9	7.1	0.057		-0.4	8.2	0.962		-12.2	6.5	0.068		3	17.9	5.3	0.001		0	8.2	0.995		-23.4	3.6	0
AP VENOM	18	-6	7.1	0.399		-9.1	8.2	0.271		0.7	6.5	0.919		8	9.4	5.3	0.085		-4.6	8.2	0.572		-9.6	3.6	0.01
SY 64-1-9	7	6.6	7.1	0.355		4.6	8.2	0.576		3.9	6.5	0.549		1	30.7	5.3	0		33.4	8.2	0		-5.4	3.6	0.138
SY BLANCA GRANDE 515	11	4	7.1	0.579		16.9	8.2	0.045		-1.7	6.5	0.795		16	-4.7	5.3	0.377		-9.6	8.2	0.246		2.2	3.6	0.547
SY CAL ROJO	6	7.4	7.1	0.3		-1.2	8.2	0.888		-8.3	6.5	0.208		12	-0.7	5.3	0.891		-7	8.2	0.392		-6	3.6	0.104
SY SIENNA	14	2	7.1	0.775		8.6	8.2	0.297		3.7	6.5	0.575		20	-13.8	5.3	0.012		-8.3	8.2	0.312		4.3	3.6	0.241
SY SUMMIT 515	10	4.8	7.1	0.5		-2.2	8.2	0.792		-5.4	6.5	0.409		10	1.8	5.3	0.733		-4.3	8.2	0.597		-7.8	3.6	0.034
UC 1884	9	6.2	7.1	0.388		3.4	8.2	0.68		4.7	6.5	0.469		14	-4	6.1	0.517		6.9	9.4	0.464		13.3	4.1	0.002
UC 1907	4	8.2	12	0.5		33.1	13.9	0.022		10.9	11	0.325		13	-3.4	7.4	0.648		16.3	11.4	0.158		15.3	5	0.003
UC 1909	21	-17.1	12	0.162		-0.7	13.9	0.962		12	11	0.281		19	-6.2	7.4	0.406		9.9	11.4	0.388		14.8	5	0.005
UC CENTRAL RED	8	6.4	7.1	0.374		5.9	8.2	0.478		4.2	6.5	0.523		9	3.7	5.3	0.492		2.1	8.2	0.799		1.4	3.6	0.696
UC CENTRAL WHITE	1	17.1	7.1	0.021		14.2	8.2	0.091		-6.9	6.5	0.294		2	24.2	6.1	0		13.8	9.4	0.146		-8.9	4.1	0.036
UC LASSIK	13	2.4	7.1	0.741		-9.1	8.2	0.272		-7.4	6.5	0.258		7	9.5	5.3	0.081		-3.7	8.2	0.651		-12.6	3.6	0.001
UC PATWIN 515	5	8.1	7.1	0.259		7.1	8.2	0.391		0.3	6.5	0.958		4	17.5	5.3	0.002		2.4	8.2	0.77		-11.5	3.6	0.002
UC PATWIN 515 HP	16	-3.8	7.1	0.593		7.8	8.2	0.348		13.6	6.5	0.042		11	0.6	5.3	0.914		19.6	8.2	0.02		13.1	3.6	0.001
UC YUOK	15	1.7	7.1	0.812		-3.9	8.2	0.639		-8.1	6.5	0.219		6	10.2	5.3	0.06		5.8	8.2	0.48		-7.2	3.6	0.05
WB 9229	17	-5.5	7.1	0.438		1.6	8.2	0.844		4.1	6.5	0.531		15	-4.1	5.3	0.448		5.8	8.2	0.48		8.8	3.6	0.018
WB 9699	3	9	7.1	0.211		0.6	8.2	0.942		-4	6.5	0.54		5	13.1	5.3	0.017		0.1	8.2	0.992		-14.6	3.6	0
WB 9904	20	-13.5	7.1	0.064		-22.2	8.2	0.01		-7.7	6.5	0.244		17	-5.2	5.3	0.334		-17.7	8.2	0.034		-13.1	3.6	0.001
WB JOAQUIN ORO	22	-20	7.1	0.008		-17.4	8.2	0.04		6	6.5	0.361		22	-32.8	5.3	0		-14.1	8.2	0.091		22.3	3.6	0
WB PATRON	19	-7.2	7.1	0.315		-12.1	8.2	0.148		-6	6.5	0.358		18	-5.3	5.3	0.322		-9.7	8.2	0.242		-4.7	3.6	0.195
WINCAL 158-5	12	3.8	12	0.752		2.5	13.9	0.86		0.3	11	0.981		21	-14.6	7.4	0.054		-22.7	11.4	0.051		-9.6	5	0.061
YECORA ROJO 515 HP	23	-28.3	7.1	0		-28	8.2	0.001		3.2	6.5	0.621		23	-43.5	6.1	0		-14.3	9.4	0.134		38.8	4.1	0

Crop Quality

Analyses of grain quality performed by the California Wheat Commission quality lab on common wheat and durum wheat samples grown at the Davis and Fresno locations are presented online at http://smallgrains.ucanr.edu/Grain_Quality/. Further analyses will be made available on the UC Small Grains Agronomy Research and Information Center website when they are completed. In addition, a system of quality classification was developed in cooperation with the California Wheat Commission and released in 2019. Quality results from the UC variety trials are incorporated into this quantitative quality metric and reported as the California Preferred Wheat Varieties Based on Baking Quality list (available: <https://ucanr.edu/sites/small-grains/files/323784.pdf>). This list is slated for update on a 2-year basis. Therefore, the sample from the 2019-2020 trials will be incorporated into updates to the Preferred Varieties Based on Baking Quality list in 2021.

Supplementary variety performance tables (Tables 23-47)

All data presented here can be accessed as single site data or multi-year summaries at <http://smallgrainselection.plantsciences.ucdavis.edu/explore/> and <http://smallgrainselection.plantsciences.ucdavis.edu/>, respectively. Tables herein are also available in .pdf and .xls formats at: http://smallgrains.ucanr.edu/Variety_Results/2020/. In addition to the multi-year summary tables included here and at the above website single site data for the 2019-20 season are available .pdf and .xls formats at the following web locations: Fall planted Common Spring Wheat: http://smallgrains.ucanr.edu/Variety_Results/Common_Wheat_2020_Variety_Results_Single_Site/ Fall planted Durum Wheat: http://smallgrains.ucanr.edu/Variety_Results/Durum_2020_Variety_Results_Single_Site/ Fall planted Triticale: http://smallgrains.ucanr.edu/Variety_Results/Tritcale_2020_Variety_Results_Single_Site/ Fall planted Barley: http://smallgrains.ucanr.edu/Variety_Results/Barley_2020_Variety_Results_Single_Site/ Winter Wheat: http://smallgrains.ucanr.edu/Variety_Results/Winter_Wheat_2020_Variety_Results_Single_Site/ Spring planted spring wheat: http://smallgrains.ucanr.edu/Variety_Results/2020/ Spring planted spring barley: http://smallgrains.ucanr.edu/Variety_Results/2020/

Common performance tables

Table 23. Sacramento Valley region, common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
HWS	2018-2020	UC 1917	1917	7075	531	1	1358	318	0	6906	672	2	10.25	0.82	53	-0.77	0.62	0.3	9.95	1.52	21	-
HWS	2018-2020	LCS ATOMO	1723	6597	444	2	880	138	0	-	-	-	10.33	0.56	52	-0.7	0.17	0	-	-	-	Available
HWS	2018-2020	UC PATWIN 515	1680	6396	442	3	679	131	0	6195	672	5	10.74	0.56	37	-0.29	0.17	0.16	9.62	1.52	27	Available
HWS	2018-2020	UC CENTRAL WHITE	1815	6363	455	4	646	169	0	6429	672	3	10.7	0.57	39	-0.33	0.21	0.19	10.68	1.52	16	Available
HRS	2018-2020	WB 9350	1842	6358	444	5	641	138	0	-	-	-	10.58	0.56	41	-0.45	0.16	0.02	-	-	-	Available
HRS	2018-2020	SY 64-1-9	1876	6341	442	6	623	131	0	7332	672	1	11.25	0.55	21	0.22	0.16	0.25	11.09	1.52	12	-
HRS	2018-2020	LCS 12SB0197	1830	6309	470	7	592	205	0.01	-	-	-	10.35	0.58	50	-0.68	0.22	0.01	-	-	-	-
HRS	2018-2020	AP OCTANE	1878	6266	443	8	549	136	0	6085	672	6	10.34	0.56	51	-0.69	0.17	0	9.53	1.52	28	Available
HWS	2018-2020	WB 7566	1802	6245	486	9	527	238	0.07	-	-	-	10.39	0.59	48	-0.64	0.24	0.02	-	-	-	Available
HWS	2018-2020	LCS 12SB0224	1831	6227	468	10	510	200	0.03	-	-	-	10.35	0.58	49	-0.67	0.22	0.01	-	-	-	-
HRS	2018-2020	WB 9433	1847	6197	446	11	480	143	0	-	-	-	10.47	0.56	46	-0.56	0.17	0	-	-	-	Released
HRS	2018-2020	WB 9699	1888	6173	441	12	456	129	0	5840	672	10	10.56	0.55	43	-0.46	0.16	0.01	9.72	1.52	24	Available
HRS	2018-2020	WB 9990	1922	6062	531	13	344	318	0.43	5892	672	9	11.06	0.82	26	0.04	0.62	0.95	10.76	1.52	15	-
HRS	2018-2020	XB 9512	1886	6038	470	14	321	205	0.22	-	-	-	10.52	0.57	45	-0.51	0.21	0.04	-	-	-	-
HRS	2018-2020	SY SUMMIT 515	1658	6015	441	15	298	129	0.06	5637	672	15	10.96	0.55	28	-0.07	0.16	0.74	9.66	1.52	26	Available

HRS	2018-2020	SY REDWING	1521	6010	448	16	293	151	0.12	-	-	-	10.83	0.56	34	-0.19	0.17	0.34	-	-	-	Released
HRS	2018-2020	UC YUOK	1745	6008	441	17	291	128	0.06	6226	672	4	10.58	0.55	42	-0.45	0.16	0.01	9.77	1.52	23	Available
HRS	2018-2020	UC LASSIK	1495	5984	443	18	267	133	0.11	5835	672	11	10.72	0.56	38	-0.31	0.16	0.12	9.82	1.52	22	Available
HRS	2018-2020	WB 9490	1887	5980	446	19	263	145	0.15	-	-	-	10.1	0.56	54	-0.93	0.17	0	-	-	-	Available
SRS	2018-2020	SY VACA	1766	5947	476	20	230	217	0.44	-	-	-	9.04	0.59	56	-1.99	0.25	0	-	-	-	Released
HRS	2018-2020	AP REDWING 204	1921	5940	531	21	223	318	0.68	5771	672	12	11.5	0.82	10	0.48	0.62	0.53	11.2	1.52	11	-
HRS	2018-2020	UC CENTRAL RED	1817	5906	441	22	189	127	0.25	5915	672	8	11.27	0.56	19	0.25	0.16	0.21	11.43	1.52	7	Available
HRS	2018-2020	AP VENOM	1877	5845	443	23	127	133	0.49	5954	672	7	10.81	0.55	35	-0.22	0.16	0.25	10.87	1.52	13	Available
HWS	2018-2020	UC 1883	1883	5813	462	24	95	187	0.75	-	-	-	11.38	0.57	13	0.35	0.21	0.18	-	-	-	-
HRS	2018-2020	UC 1880	1880	5807	446	25	89	143	0.7	-	-	-	11.01	0.56	27	-0.01	0.16	0.95	-	-	-	-
HRS	2018-2020	APB 410089	1903	5803	470	26	86	206	0.79	-	-	-	12.26	0.59	3	1.23	0.25	0	-	-	-	-
HRS	2018-2020	XC 9407	1905	5786	466	27	69	196	0.83	-	-	-	11.55	0.59	9	0.52	0.25	0.08	-	-	-	-
HRS	2018-2020	UC 1884	1884	5766	456	28	49	172	0.87	5273	672	20	11.11	0.58	24	0.08	0.22	0.76	11.83	1.52	6	-
HRS	2018-2020	APB 510477	1874	5762	470	29	45	205	0.89	-	-	-	11.36	0.58	14	0.33	0.22	0.21	-	-	-	-
HWS	2018-2020	SY BLANCA GRANDE 515	1657	5749	444	30	31	136	0.89	5547	672	17	11.07	0.56	25	0.04	0.17	0.84	10.86	1.52	14	Available
HRS	2018-2020	SY CAL ROJO	1478	5742	442	31	24	131	0.9	5128	672	21	10.44	0.55	47	-0.59	0.16	0	11.29	1.52	10	Available
HWS	2018-2020	SY BLANCA ROYALE	1522	5736	470	32	19	205	0.94	-	-	-	11.23	0.58	23	0.2	0.23	0.5	-	-	-	Released
HRS	2018-2020	APB 510879	1904	5707	468	33	-10	201	0.96	-	-	-	10.9	0.59	31	-0.13	0.25	0.68	-	-	-	-
HRS	2018-2020	UC 1882	1882	5704	445	34	-13	142	0.94	-	-	-	11.29	0.56	17	0.27	0.16	0.19	-	-	-	-
HRS	2018-2020	WB 9112	1748	5634	462	35	-83	187	0.78	-	-	-	10.87	0.57	32	-0.16	0.21	0.53	-	-	-	Available
HWS	2018-2020	UC PATWIN 515 HP	1743	5632	441	36	-86	127	0.68	5745	672	13	11.8	0.55	6	0.78	0.16	0	11.93	1.52	5	Available
HRW	2018-2020	WINCAL 158-5	1906	5631	456	37	-86	173	0.75	4958	672	23	10.85	0.58	33	-0.18	0.23	0.53	10.26	1.52	20	-
HWS	2018-2020	UC 1907	1907	5606	456	38	-112	173	0.69	5660	672	14	12.17	0.58	5	1.14	0.23	0	11.31	1.52	9	-
HWS	2018-2020	LCS STAR	1688	5584	478	39	-133	223	0.7	-	-	-	11.25	0.58	22	0.22	0.23	0.44	-	-	-	Available
HRS	2018-2020	WB PATRON	1731	5533	441	40	-184	129	0.27	5026	672	22	10.94	0.55	30	-0.08	0.16	0.67	10.51	1.52	17	Available
HRS	2018-2020	UC 1885	1885	5513	468	41	-204	200	0.45	-	-	-	10.95	0.58	29	-0.08	0.23	0.76	-	-	-	-
HRS	2018-2020	WB 9229	1730	5497	442	42	-220	132	0.18	5497	672	18	11.43	0.56	12	0.41	0.17	0.03	10.47	1.52	18	Available
HRS	2018-2020	WB 9904	1751	5489	441	43	-228	129	0.16	5284	672	19	10.6	0.56	40	-0.43	0.16	0.02	9.7	1.52	25	Available
HRS	2018-2020	SY SIENNA	1835	5487	441	44	-231	128	0.15	4618	672	24	11.29	0.55	18	0.26	0.16	0.18	11.32	1.52	8	Available
HRS	2018-2020	APB 511829	1875	5456	468	45	-262	200	0.31	-	-	-	11.26	0.57	20	0.23	0.21	0.34	-	-	-	-
HRS	2018-2020	UC 1908	1908	5442	468	46	-275	201	0.29	-	-	-	11.73	0.59	7	0.7	0.25	0.02	-	-	-	-

HRS	2018-2020	DPG FV 2808	1608	5425	483	47	-292	231	0.33	-	-	-	9.52	0.59	55	-1.51	0.25	0	-	-	-	Available
HWS	2018-2020	UC 1909	1909	5325	455	48	-393	170	0.06	5584	672	16	11.35	0.58	15	0.32	0.23	0.25	12.53	1.52	3	-
HWS	2018-2020	UC 1839	1839	5258	473	49	-459	211	0.07	-	-	-	11.6	0.59	8	0.57	0.25	0.05	-	-	-	-
HRS	2018-2020	WB JOAQUIN ORO	1728	4974	442	50	-743	131	0	4315	672	26	12.19	0.56	4	1.16	0.17	0	12.31	1.52	4	Available
HRS	2018-2020	YECORA ROJO	112	4925	448	51	-792	151	0	-	-	-	11.47	0.56	11	0.44	0.18	0.03	-	-	-	Available
HRW	2018-2020	ASSL TAM 204	1778	4819	448	52	-898	149	0	-	-	-	10.52	0.56	44	-0.51	0.18	0.01	-	-	-	Released
HRS	2018-2020	WB TRIPLE IV	1550	4692	468	53	-1025	201	0	-	-	-	11.31	0.59	16	0.28	0.25	0.35	-	-	-	Available
SWS	2018-2020	BAG NEW DIRKWIN	1667	4482	442	54	-1236	132	0	4440	672	25	10.77	0.55	36	-0.25	0.16	0.19	10.28	1.52	19	Available
HRS	2018-2020	YECORA ROJO 515 HP	1879	4410	454	55	-1307	166	0	4011	672	27	13.41	0.57	1	2.38	0.21	0	13.22	1.52	1	-
HRS	2018-2020	YECORA ROJO 515	1916	3700	531	56	-2017	318	0	3531	672	28	12.96	0.82	2	1.93	0.62	0.01	12.66	1.52	2	-

Table 24. North Central San Joaquin Valley region, common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
HRS	2018-2020	WB 9433	1847	7396	575	1	793	154	0	-	-	-	12.6	0.82	40	-0.34	0.26	0.36	-	-	-	Released
HRS	2018-2020	WB 9490	1887	7265	577	2	662	161	0	-	-	-	11.99	0.82	54	-0.95	0.26	0	-	-	-	Available
HRS	2018-2020	WB 9699	1888	7193	570	3	590	135	0	6528	2047	7	12.64	0.81	39	-0.3	0.24	0.38	14.38	2.09	19	Available
HWS	2018-2020	LCS ATOMO	1723	7188	576	4	585	158	0	-	-	-	12.21	0.82	51	-0.74	0.26	0.02	-	-	-	Available
HWS	2018-2020	UC CENTRAL WHITE	1815	7119	575	5	516	155	0.01	6762	2047	1	12.57	0.82	42	-0.37	0.26	0.32	14.48	2.09	18	Available
HWS	2018-2020	UC 1917	1917	7113	615	6	510	264	0.14	6744	2047	2	12.53	1.03	43	-0.41	0.68	0.68	14.22	2.09	22	-
HRS	2018-2020	LCS 12SB0197	1830	7066	589	7	463	198	0.06	-	-	-	12.73	0.82	35	-0.21	0.28	0.66	-	-	-	-
HWS	2018-2020	LCS STAR	1688	7059	594	8	456	214	0.1	-	-	-	13.39	0.83	14	0.45	0.3	0.31	-	-	-	Available
HRS	2018-2020	WB 9350	1842	7056	575	9	452	154	0.02	-	-	-	12.33	0.82	48	-0.62	0.26	0.07	-	-	-	Available
HRS	2018-2020	XB 9512	1886	7022	589	10	419	198	0.1	-	-	-	12.25	0.82	50	-0.69	0.28	0.06	-	-	-	-
HRS	2018-2020	APB 510879	1904	7011	614	11	408	262	0.23	-	-	-	13.32	1.03	18	0.38	0.67	0.68	-	-	-	-
HWS	2018-2020	SY BLANCA GRANDE 515	1657	6955	570	12	352	135	0.04	6694	2047	3	12.78	0.81	33	-0.16	0.24	0.66	14.83	2.09	14	Available
HRS	2018-2020	AP OCTANE	1878	6939	570	13	336	135	0.05	6678	2047	4	12.04	0.81	53	-0.9	0.25	0	14.2	2.09	23	Available
HWS	2018-2020	LCS 12SB0224	1831	6924	587	14	321	192	0.2	-	-	-	12.09	0.82	52	-0.86	0.28	0.02	-	-	-	-
HRS	2018-2020	SY REDWING	1521	6922	576	15	318	158	0.12	-	-	-	13.09	0.82	23	0.15	0.26	0.68	-	-	-	Released
HWS	2018-2020	WB 7566	1802	6879	587	16	276	192	0.28	-	-	-	12.26	0.82	49	-0.69	0.28	0.06	-	-	-	Available
HRS	2018-2020	UC 1880	1880	6876	576	17	272	158	0.19	-	-	-	13.13	0.82	21	0.19	0.28	0.66	-	-	-	-
HRS	2018-2020	UC YUROK	1745	6854	570	18	251	133	0.14	6404	2047	12	12.77	0.81	34	-0.17	0.24	0.66	14.05	2.09	27	Available
HRS	2018-2020	SY 64-1-9	1876	6849	571	19	246	140	0.19	6198	2047	18	13.36	0.82	17	0.42	0.26	0.27	15.74	2.09	2	-
HRS	2018-2020	XC 9407	1905	6848	614	20	245	262	0.5	-	-	-	13.42	1.03	13	0.48	0.67	0.66	-	-	-	-
HRW	2018-2020	WINCAL 158-5	1906	6828	587	21	224	192	0.39	6446	2047	10	13.07	0.91	24	0.13	0.48	0.86	14.81	2.09	15	-
HWS	2018-2020	UC 1907	1907	6820	585	22	217	186	0.39	6446	2047	11	14.02	0.91	3	1.08	0.48	0.09	15.44	2.09	7	-
HRS	2018-2020	SY SUMMIT 515	1658	6820	570	23	217	133	0.21	6574	2047	6	12.52	0.81	44	-0.42	0.24	0.25	14.28	2.09	21	Available

HRS	2018-2020	WB 9112	1748	6803	587	24	200	192	0.45	-	-	-	13.39	0.82	16	0.45	0.28	0.28	-	-	-	Available
HRS	2018-2020	UC 1908	1908	6799	622	25	195	279	0.61	-	-	-	13.67	1.03	9	0.72	0.67	0.49	-	-	-	-
HWS	2018-2020	UC PATWIN 515	1680	6759	570	26	156	133	0.39	5996	2047	23	13.06	0.81	25	0.11	0.24	0.74	15.46	2.09	6	Available
HRS	2018-2020	AP VENOM	1877	6748	571	27	144	138	0.45	5928	2047	24	13.02	0.81	26	0.08	0.25	0.85	14.53	2.09	17	Available
HRS	2018-2020	UC 1884	1884	6742	575	28	139	155	0.52	6326	2047	14	13.68	0.82	7	0.74	0.26	0.02	15.43	2.09	8	-
HRS	2018-2020	APB 410089	1903	6736	614	29	133	262	0.73	-	-	-	13.99	1.03	5	1.05	0.67	0.29	-	-	-	-
HRS	2018-2020	UC 1882	1882	6713	576	30	110	158	0.61	-	-	-	13.11	0.82	22	0.17	0.26	0.66	-	-	-	-
HWS	2018-2020	UC 1883	1883	6677	587	31	73	192	0.77	-	-	-	12.91	0.82	31	-0.03	0.28	0.97	-	-	-	-
HRS	2018-2020	APB 511829	1875	6674	587	32	71	192	0.77	-	-	-	12.58	0.82	41	-0.37	0.28	0.36	-	-	-	-
HRS	2018-2020	WB PATRON	1731	6663	570	33	60	135	0.75	6491	2047	9	12.7	0.81	36	-0.25	0.25	0.51	14.09	2.09	26	Available
HRS	2018-2020	APB 510477	1874	6647	589	34	43	198	0.87	-	-	-	12.96	0.82	28	0.01	0.28	0.98	-	-	-	-
HRS	2018-2020	SY CAL ROJO	1478	6609	570	35	6	133	0.96	6644	2047	5	12.93	0.81	30	-0.01	0.25	0.98	15.2	2.09	10	Available
HRS	2018-2020	UC LASSIK	1495	6593	570	36	-10	133	0.96	6206	2047	17	12.45	0.81	46	-0.49	0.24	0.15	14.17	2.09	25	Available
HWS	2018-2020	UC 1839	1839	6578	614	37	-25	262	0.96	-	-	-	14.1	1.03	2	1.16	0.67	0.25	-	-	-	-
HRS	2018-2020	SY SIENNA	1835	6555	570	38	-49	135	0.77	6008	2047	22	12.97	0.81	27	0.03	0.24	0.97	15.47	2.09	5	Available
HWS	2018-2020	UC PATWIN 515 HP	1743	6528	570	39	-75	133	0.7	6320	2047	15	14.1	0.81	1	1.16	0.24	0	15.78	2.09	1	Available
HRS	2018-2020	WB 9229	1730	6478	570	40	-125	133	0.5	6504	2047	8	13.67	0.81	8	0.73	0.25	0.02	15.51	2.09	4	Available
HRS	2018-2020	YECORA ROJO 515	1916	6473	615	41	-130	264	0.73	6105	2047	19	12.93	1.03	29	-0.01	0.68	0.99	14.62	2.09	16	-
HRS	2018-2020	UC 1885	1885	6467	587	42	-136	192	0.61	-	-	-	13.24	0.82	20	0.3	0.28	0.49	-	-	-	-
HRS	2018-2020	UC CENTRAL RED	1817	6434	570	43	-169	133	0.36	6367	2047	13	13.39	0.81	15	0.45	0.24	0.21	15.33	2.09	9	Available
HRS	2018-2020	AP REDWING 204	1921	6420	615	44	-183	264	0.61	6052	2047	20	13.43	1.03	12	0.49	0.68	0.66	15.12	2.09	11	-
HRS	2018-2020	WB 9990	1922	6413	615	45	-190	264	0.61	6044	2047	21	12.5	1.03	45	-0.44	0.68	0.66	14.18	2.09	24	-
HRS	2018-2020	YECORA ROJO	112	6394	575	46	-209	154	0.32	-	-	-	13.3	0.82	19	0.36	0.27	0.36	-	-	-	Available
HWS	2018-2020	SY BLANCA ROYALE	1522	6279	589	47	-324	198	0.21	-	-	-	13.43	0.83	11	0.49	0.29	0.25	-	-	-	Released
HRS	2018-2020	WB 9904	1751	6258	570	48	-345	133	0.04	6287	2047	16	12.69	0.81	38	-0.26	0.24	0.49	14.32	2.09	20	Available
HRW	2018-2020	ASSL TAM 204	1778	6233	575	49	-371	154	0.05	-	-	-	12.83	0.82	32	-0.12	0.26	0.75	-	-	-	Released
HWS	2018-2020	UC 1909	1909	6066	585	50	-538	186	0.02	5769	2047	25	13.67	0.91	10	0.72	0.48	0.3	15.7	2.09	3	-
HRS	2018-2020	DPG FV 2808	1608	5876	614	51	-727	262	0.02	-	-	-	10.73	1.03	56	-2.21	0.67	0.01	-	-	-	Available
HRS	2018-2020	WB JOAQUIN ORO	1728	5867	570	52	-736	133	0	5506	2047	26	13.71	0.81	6	0.77	0.24	0.01	15.01	2.09	12	Available
HRS	2018-2020	YECORA ROJO 515 HP	1879	5781	577	53	-822	162	0	5237	2048	27	14.02	0.82	4	1.07	0.26	0	12.19	2.09	28	-
HRS	2018-2020	WB TRIPLE IV	1550	5244	614	54	-1359	262	0	-	-	-	12.41	1.03	47	-0.53	0.67	0.66	-	-	-	Available
SWS	2018-2020	BAG NEW DIRKWIN	1667	5023	572	55	-1581	142	0	4193	2048	28	12.69	0.81	37	-0.25	0.24	0.49	14.86	2.09	13	Available
SRS	2018-2020	SY VACA	1766	4247	614	56	-2356	262	0	-	-	-	11.44	1.03	55	-1.5	0.67	0.09	-	-	-	Released

Table 25. South San Joaquin Valley region, common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	Status
HRS	2017-2019	XB 9512	1886	7853	1266	1	1181	1219	1	12.95	0.96	55	-0.67	0.84	0.73	-
HWS	2017-2019	LCS ATOMO	1723	7737	680	2	1065	610	1	12.93	0.6	56	-0.69	0.4	0.35	Available
HRS	2017-2019	XA 9301	1843	7706	925	3	1035	864	1	13.26	0.67	45	-0.36	0.49	0.75	-
HRS	2017-2019	XA 9302	1844	7557	925	4	885	864	1	12.9	0.67	57	-0.72	0.49	0.42	-
HWS	2017-2019	LCS 12SB0224	1831	7528	770	5	857	705	1	13.56	0.6	37	-0.06	0.4	0.97	-
HWS	2017-2019	UC CENTRAL WHITE	1815	7467	770	6	795	705	1	13.38	0.6	41	-0.24	0.4	0.83	Available
HRS	2017-2019	XA 9501	1845	7449	925	7	777	864	1	12.67	0.67	64	-0.95	0.49	0.35	-
HRS	2017-2019	UC 1884	1884	7438	1266	8	767	1219	1	14.22	0.83	15	0.6	0.69	0.72	-
HRS	2017-2019	WB 9433	1847	7417	680	9	745	610	1	13.65	0.59	32	0.03	0.38	0.97	Released
HRS	2017-2019	XA 9502	1846	7381	925	10	709	864	1	12.77	0.67	60	-0.85	0.49	0.35	-
HRS	2017-2019	APB 500709	1819	7376	925	11	704	864	1	13.11	0.67	51	-0.51	0.49	0.69	Available
HRS	2017-2019	SY SUMMIT 515	1658	7292	698	12	620	630	1	13.29	0.59	44	-0.33	0.38	0.72	Available
HRS	2017-2019	SY SIENNA	1835	7283	680	13	612	610	1	13.97	0.59	18	0.35	0.38	0.7	Available
HRS	2017-2019	APB 501089	1828	7257	925	14	586	864	1	13.04	0.67	52	-0.58	0.49	0.6	Available
HRS	2017-2019	APB 410117	1840	7199	925	15	528	864	1	13.74	0.67	28	0.12	0.49	0.97	-
HRS	2017-2019	APB 511829	1875	7190	1448	16	518	1402	1	13.46	0.96	39	-0.16	0.84	0.97	-
HWS	2017-2019	UC 1839	1839	7150	770	17	478	705	1	13.78	0.64	25	0.16	0.45	0.93	-
HRW	2017-2019	WINCAL 158-5	1906	7141	1266	18	470	1220	1	13.8	1.28	24	0.18	1.19	0.97	-
HRS	2017-2019	WB 9699	1888	7116	915	19	445	863	1	14.55	0.75	7	0.93	0.59	0.38	Available
HRS	2017-2019	WB 9350	1842	7091	698	20	420	630	1	13.25	0.59	47	-0.37	0.38	0.69	Available
HRS	2017-2019	SY CAL ROJO	1478	7054	680	21	382	610	1	13.02	0.59	53	-0.6	0.38	0.38	Available
HRS	2017-2019	XC 9407	1905	7040	1266	22	369	1220	1	13.86	1.28	23	0.24	1.19	0.97	-
HRS	2017-2019	SY REDWING	1521	7002	698	23	330	630	1	13.57	0.6	35	-0.05	0.4	0.97	Released
HWS	2017-2019	WB 7566	1802	6981	770	24	309	705	1	12.89	0.6	58	-0.73	0.4	0.35	Available
HWS	2017-2019	SY BLANCA GRANDE 515	1657	6971	680	25	299	610	1	13.47	0.59	38	-0.15	0.38	0.93	Available
HRS	2017-2019	SY 64-1-9	1876	6960	915	26	288	863	1	14.36	0.75	11	0.74	0.59	0.6	-
HRS	2017-2019	WB 9490	1887	6930	915	27	259	863	1	12.68	0.75	63	-0.95	0.59	0.38	Available
HRS	2017-2019	SY 13W00850	1834	6925	925	28	254	864	1	13.22	0.67	48	-0.4	0.49	0.73	-
HRS	2017-2019	APB 510453	1841	6916	925	29	245	864	1	13.88	0.67	22	0.26	0.49	0.88	-
HRS	2017-2019	UC 1880	1880	6905	1042	30	233	992	1	13.73	0.82	29	0.11	0.68	0.97	-
HRS	2017-2019	AP OCTANE	1878	6843	915	31	171	863	1	13.35	0.75	43	-0.27	0.59	0.91	Available
HRS	2017-2019	AP VENOM	1877	6827	915	32	155	863	1	14.25	0.75	13	0.63	0.59	0.69	Available
HWS	2017-2019	UC PATWIN 515 HP	1743	6823	680	33	151	610	1	14.48	0.59	9	0.86	0.38	0.32	Available
HRS	2017-2019	UC CENTRAL RED	1817	6796	718	34	124	651	1	12.44	0.59	66	-1.18	0.38	0.04	Available
HRS	2017-2019	LCS 12SB0197	1830	6757	770	35	85	705	1	13.13	0.6	50	-0.49	0.4	0.6	-
HRS	2017-2019	SY ULTRA	1590	6673	925	36	1	864	1	12.58	0.67	65	-1.04	0.49	0.32	Available
HRS	2017-2019	SY 314	1660	6672	980	37	1	922	1	13.16	0.67	49	-0.47	0.49	0.69	Released
HRS	2017-2019	UC 16010 20	1838	6649	925	38	-23	864	1	13.75	0.67	26	0.13	0.49	0.97	-
HRS	2017-2019	APB 510879	1904	6644	1266	39	-27	1220	1	13.59	1.28	34	-0.03	1.19	0.99	-
HRS	2017-2019	UC LASSIK	1495	6622	698	40	-50	630	1	12.87	0.6	59	-0.75	0.4	0.35	Available
HRS	2017-2019	UC 1882	1882	6606	1043	41	-66	994	1	13.99	0.82	17	0.37	0.68	0.88	-
HRS	2017-2019	WB 9904	1751	6602	698	42	-69	630	1	12.95	0.59	54	-0.67	0.38	0.35	Available
HWS	2017-2019	SY BLANCA ROYALE	1522	6600	834	43	-71	771	1	13.91	0.62	21	0.29	0.42	0.8	Released
HRS	2017-2019	UC YUOK	1745	6576	680	44	-95	610	1	12.76	0.59	61	-0.86	0.38	0.32	Available

HRW	2017-2019	ASSL TAM 204	1778	6450	698	45	-222	630	1	13.75	0.59	27	0.13	0.38	0.93	Released
HRS	2017-2019	APB 410089	1903	6410	1449	46	-261	1403	1	14.82	1.28	3	1.2	1.19	0.69	-
HWS	2017-2019	UC 1907	1907	6336	1266	47	-336	1220	1	15.34	1.28	2	1.72	1.19	0.43	-
HRS	2017-2019	APB 510477	1874	6324	1266	48	-348	1219	1	13.67	0.83	31	0.05	0.69	0.97	-
HWS	2017-2019	LCS STAR	1688	6304	770	49	-367	705	1	14.34	0.6	12	0.72	0.4	0.35	Available
HRS	2017-2019	UC 1908	1908	6256	1266	50	-415	1220	1	14.53	1.28	8	0.91	1.19	0.74	-
HRS	2017-2019	WB 9112	1748	6254	872	51	-418	811	1	13.35	0.62	42	-0.27	0.42	0.82	Available
HWS	2017-2019	UC PATWIN 515	1680	6243	698	52	-428	630	1	14.39	0.59	10	0.77	0.38	0.35	Available
HWS	2017-2019	UC PATWIN RS	1837	6221	925	53	-450	864	1	14.68	0.67	6	1.06	0.49	0.32	-
HRS	2017-2019	YECORA ROJO	112	6184	797	54	-487	733	1	13.63	0.62	33	0.01	0.42	0.99	Available
HRS	2017-2019	WB PATRON	1731	6172	680	55	-499	610	1	13.71	0.59	30	0.09	0.38	0.97	Available
HWS	2017-2019	UC 1909	1909	6108	1266	56	-564	1220	1	14.77	1.28	4	1.15	1.19	0.69	-
HRS	2017-2019	WB JOAQUIN ORO	1728	5991	698	57	-681	630	1	14.22	0.59	14	0.6	0.38	0.38	Available
HRS	2017-2019	DPG FV 2808	1608	5914	770	58	-757	705	1	11.76	0.64	67	-1.86	0.45	0	Available
HRS	2017-2019	WB 9229	1730	5902	698	59	-770	630	1	13.94	0.59	19	0.32	0.38	0.73	Available
HWS	2017-2019	UC 1883	1883	5891	1266	60	-781	1219	1	14.72	0.83	5	1.1	0.69	0.38	-
HRS	2017-2019	UC 1885	1885	5768	1448	61	-903	1402	1	13.93	0.83	20	0.31	0.69	0.91	-
HRS	2017-2019	UC LASSIK RS	1836	5719	925	62	-952	864	1	13.45	0.67	40	-0.17	0.49	0.93	-
HRS	2017-2019	UC ANZA	20	5543	925	63	-1129	864	1	12.68	0.67	62	-0.94	0.49	0.35	Available
HRS	2017-2019	YECORA ROJO 515 HP	1879	5537	1266	64	-1134	1219	1	15.87	0.83	1	2.25	0.69	0.04	-
SRS	2017-2019	SY VACA	1766	5467	770	65	-1204	705	1	13.57	0.64	36	-0.05	0.45	0.97	Released
SWS	2017-2019	BAG NEW DIRKWIN	1667	4521	680	66	-2150	610	0.03	13.25	0.59	46	-0.37	0.38	0.69	Available
HRS	2017-2019	WB TRIPLE IV	1550	4474	1757	67	-2197	1711	1	14.02	1.28	16	0.4	1.19	0.93	Available

Table 26. Imperial Valley region, common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	Status
HRS	2016-2018	XA 9301	1843	8119	465	1	1618	361	0	11.87	0.41	64	-0.82	0.38	0.1	-
HRS	2016-2018	XA 9501	1845	7747	465	2	1246	361	0	12.38	0.41	43	-0.31	0.38	0.52	-
HRS	2016-2018	APB 500709	1819	7604	387	3	1103	255	0	13.01	0.32	23	0.32	0.29	0.38	Available
HRS	2016-2018	APB 510453	1841	7271	465	4	770	361	0.12	13.06	0.41	22	0.37	0.38	0.45	-
HWS	2016-2018	UC CENTRAL WHITE	1815	7266	357	5	765	208	0	12.64	0.28	31	-0.05	0.24	0.87	Available
HRS	2016-2018	XA 9502	1846	7255	465	6	754	361	0.12	11.12	0.41	68	-1.57	0.38	0	-
HRS	2016-2018	WB 9433	1847	7165	387	7	664	255	0.04	12.37	0.32	44	-0.32	0.29	0.38	Released
HRS	2016-2018	APB 510477	1874	7122	466	8	621	362	0.26	12.11	0.47	57	-0.57	0.44	0.31	-
HRS	2016-2018	UC 1885	1885	7119	466	9	618	362	0.26	12.5	0.47	38	-0.19	0.44	0.76	-
HRS	2016-2018	AP OCTANE	1878	7100	466	10	599	362	0.26	13.82	0.47	7	1.13	0.44	0.04	Available
HRS	2016-2018	SY REDWING	1521	7094	357	11	593	208	0.02	12.23	0.28	50	-0.46	0.24	0.15	Released
HRS	2016-2018	SY ULTRA	1590	7057	387	12	556	255	0.11	11.84	0.32	65	-0.85	0.29	0.02	Available
HWS	2016-2018	WB 7390	1750	6988	466	13	487	362	0.42	11.98	0.47	61	-0.7	0.44	0.22	-
HRS	2016-2018	APB 511829	1875	6974	466	14	474	362	0.43	11.97	0.47	62	-0.71	0.44	0.22	-
HRS	2016-2018	YECORA ROJO	112	6960	387	15	460	255	0.23	12.63	0.32	32	-0.06	0.29	0.87	Available
HRS	2016-2018	SY 13W00850	1834	6916	465	16	415	361	0.48	12.16	0.41	53	-0.53	0.38	0.28	-
HWS	2016-2018	UC 15013 15	1816	6870	466	17	369	362	0.55	11.42	0.47	67	-1.27	0.44	0.02	-
HRS	2016-2018	UC LASSIK	1495	6850	357	18	349	208	0.26	12.12	0.28	56	-0.57	0.24	0.07	Available
HRS	2016-2018	AP VENOM	1877	6844	466	19	343	362	0.6	12.55	0.47	36	-0.13	0.44	0.83	Available
HRS	2016-2018	SY SUMMIT 515	1658	6840	357	20	339	208	0.27	12.93	0.28	25	0.24	0.24	0.44	Available
HRS	2016-2018	WB 9904	1751	6828	357	21	327	208	0.28	12.03	0.28	59	-0.66	0.24	0.03	Available
HRS	2016-2018	UC 15010 5	1814	6809	466	22	309	362	0.67	13.22	0.47	17	0.53	0.44	0.35	-
HRS	2016-2018	WB 9350	1842	6795	387	23	294	255	0.48	12.17	0.32	52	-0.51	0.29	0.17	Available
HRS	2016-2018	UC LASSIK RS	1836	6763	465	24	262	361	0.72	13.81	0.41	8	1.12	0.38	0.02	-
HWS	2016-2018	UC PATWIN 515	1680	6743	357	25	243	208	0.48	12.39	0.28	41	-0.29	0.24	0.35	Available
HWS	2016-2018	WB 7566	1802	6730	357	26	229	208	0.5	12.52	0.28	37	-0.17	0.24	0.61	Available
HWS	2016-2018	UC PATWIN RS	1837	6727	465	27	226	361	0.78	14.76	0.41	2	2.07	0.38	0	-
-	2016-2018	APB 501129	1820	6697	466	28	196	362	0.83	12.48	0.47	39	-0.2	0.44	0.75	-
HWS	2016-2018	WB 7618	1749	6676	466	29	175	362	0.83	13.45	0.47	12	0.76	0.44	0.19	Available
HRS	2016-2018	APB 8238	1821	6654	466	30	153	362	0.87	12.82	0.47	27	0.13	0.44	0.83	-
HWS	2016-2018	LCS 12SB0224	1831	6653	357	31	152	208	0.72	12.13	0.28	55	-0.56	0.24	0.07	-
HRS	2016-2018	UC YUOK	1745	6647	357	32	146	208	0.72	12.3	0.28	47	-0.39	0.24	0.22	Available
HRS	2016-2018	UC 1882	1882	6639	466	33	138	362	0.88	12.06	0.47	58	-0.62	0.44	0.27	-
HRS	2016-2018	WB 9112	1748	6607	357	34	106	208	0.83	13.13	0.28	20	0.44	0.24	0.16	Available
HWS	2016-2018	LCS ATOMO	1723	6606	357	35	105	208	0.83	12.3	0.28	46	-0.38	0.24	0.22	Available
HRS	2016-2018	WB 9229	1730	6605	357	36	104	208	0.83	13.47	0.28	11	0.78	0.24	0.01	Available
HRS	2016-2018	UC 1884	1884	6588	466	37	87	362	0.9	12.39	0.47	42	-0.29	0.44	0.61	-
HRS	2016-2018	APB 501089	1828	6560	387	38	59	255	0.9	12.25	0.32	49	-0.44	0.29	0.24	Available
HWS	2016-2018	SY BLANCA GRANDE 515	1657	6560	357	39	59	208	0.9	13.16	0.28	19	0.48	0.24	0.13	Available
HRS	2016-2018	SY SIENNA	1835	6558	387	40	57	255	0.9	12.92	0.32	26	0.24	0.29	0.52	Available
HRS	2016-2018	WB 9490	1887	6538	466	41	37	362	0.95	12.62	0.47	33	-0.06	0.44	0.9	Available
HRS	2016-2018	UC CENTRAL RED	1817	6522	357	42	22	208	0.95	13.27	0.28	16	0.59	0.24	0.06	Available

HWS	2016-2018	UC PATWIN 515 HP	1743	6484	357	43	-17	208	0.95	12.99	0.28	24	0.31	0.24	0.33	Available
HWS	2016-2018	UC 1883	1883	6478	466	44	-23	362	0.95	13.63	0.47	9	0.95	0.44	0.1	-
HRS	2016-2018	UC ANZA	20	6466	387	45	-35	255	0.95	10.68	0.32	69	-2.01	0.29	0	Available
HRS	2016-2018	XA 9302	1844	6459	465	46	-42	361	0.95	11.89	0.41	63	-0.8	0.38	0.11	-
HRS	2016-2018	SY 314	1660	6427	387	47	-74	255	0.9	12.45	0.32	40	-0.24	0.29	0.52	Released
HRS	2016-2018	APB 501189	1807	6414	466	48	-87	362	0.9	13.35	0.47	14	0.66	0.44	0.24	-
HRS	2016-2018	YECORA ROJO 515 HP	1879	6383	466	49	-118	362	0.9	12.28	0.47	48	-0.41	0.44	0.47	-
HRS	2016-2018	UC 1880	1880	6376	466	50	-125	362	0.9	12.19	0.47	51	-0.5	0.44	0.38	-
HRS	2016-2018	WB ROCKLAND	1650	6365	466	51	-136	362	0.88	14.08	0.47	6	1.4	0.44	0.01	Released
HRS	2016-2018	SY CAL ROJO	1478	6330	362	52	-171	217	0.7	12.13	0.28	54	-0.56	0.24	0.07	Available
HRS	2016-2018	WB 9699	1888	6246	466	53	-255	362	0.72	13.59	0.47	10	0.91	0.44	0.11	Available
HWS	2016-2018	SY BLANCA ROYALE	1522	6237	357	54	-264	208	0.44	12.02	0.28	60	-0.66	0.24	0.03	Released
HRS	2016-2018	WB PATRON	1731	6231	357	55	-270	208	0.43	12.71	0.28	29	0.03	0.24	0.92	Available
HRS	2016-2018	XB 9512	1886	6205	466	56	-296	362	0.69	13.11	0.47	21	0.43	0.44	0.45	-
HRS	2016-2018	LCS 12SB0197	1830	6168	357	57	-333	208	0.28	12.32	0.28	45	-0.37	0.24	0.24	-
HWS	2016-2018	UC 1839	1839	6087	465	58	-414	361	0.48	13.21	0.41	18	0.52	0.38	0.29	-
HRS	2016-2018	WB JOAQUIN ORO	1728	5816	357	59	-685	208	0.01	14.16	0.28	3	1.47	0.24	0	Available
HRW	2016-2018	ASSL TAM 204	1778	5790	357	60	-711	208	0	12.64	0.28	30	-0.04	0.24	0.88	Released
HRS	2016-2018	DPG FV 2808	1608	5731	387	61	-770	255	0.01	10.58	0.32	70	-2.11	0.29	0	Available
HRS	2016-2018	APB 410117	1840	5675	465	62	-826	361	0.09	13.31	0.41	15	0.62	0.38	0.22	-
HRS	2016-2018	SY 64-1-9	1876	5674	466	63	-827	362	0.09	14.1	0.47	5	1.41	0.44	0.01	-
HWS	2016-2018	LCS STAR	1688	5640	377	64	-861	240	0	12.59	0.3	34	-0.1	0.27	0.8	Available
SWS	2016-2018	BAG NEW DIRKWIN	1667	5578	357	65	-923	208	0	11.81	0.28	66	-0.88	0.24	0	Available
-	2016-2018	APB 8155	1829	5530	466	66	-971	362	0.04	14.12	0.47	4	1.43	0.44	0.01	-
SRS	2016-2018	SY VACA	1766	5224	387	67	-1277	255	0	12.55	0.32	35	-0.13	0.29	0.75	Released
HRS	2016-2018	WB TRIPLE IV	1550	4883	466	68	-1618	362	0	12.82	0.47	28	0.13	0.44	0.83	Available
HRS	2016-2018	UC 16010 20	1838	4636	465	69	-1865	361	0	13.42	0.41	13	0.73	0.38	0.14	-
HRS	2016-2018	UC 15014 35	1818	3867	510	70	-2634	416	0	15	0.56	1	2.31	0.54	0	-

Table 27. Rainfed locations, common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
HWS	2018-2020	UC PATWIN 515	1680	5902	557	1	924	394	0.35	3806	220	25	13.63	1.82	12	0.43	0.52	1	17.22	0	7	Available
HRS	2018-2020	WB 9350	1842	5714	574	2	736	413	0.98	-	-	-	12.76	1.82	44	-0.44	0.49	1	-	-	-	Available
HWS	2018-2020	UC CENTRAL WHITE	1815	5698	580	3	720	424	0.98	4323	220	10	12.91	1.82	39	-0.3	0.51	1	16.35	0	18	Available
HWS	2018-2020	LCS ATOMO	1723	5640	574	4	662	413	0.98	-	-	-	12.15	1.82	54	-1.06	0.51	0.53	-	-	-	Available
HRS	2018-2020	SY REDWING	1521	5563	589	5	585	433	0.98	-	-	-	13.59	1.82	13	0.39	0.51	1	-	-	-	Released
HRS	2018-2020	SY SUMMIT 515	1658	5496	546	6	518	379	0.98	4568	220	4	13.28	1.81	26	0.08	0.48	1	15.62	0	26	Available
HRS	2018-2020	YECORA ROJO 515	1916	5472	1031	7	494	946	0.98	4713	220	2	13.48	2.56	21	0.27	1.86	1	16.77	0	13	-
HRS	2018-2020	UC LASSIK	1495	5435	557	8	457	394	0.98	4214	220	14	13.02	1.82	38	-0.18	0.51	1	15.76	0	25	Available
HRS	2018-2020	LCS 12SB0197	1830	5393	634	9	415	489	0.98	-	-	-	13.22	1.83	30	0.02	0.53	1	-	-	-	-
HRS	2018-2020	UC 1880	1880	5386	574	10	409	413	0.98	-	-	-	13.57	1.82	14	0.36	0.49	1	-	-	-	-
HRS	2018-2020	UC YUOK	1745	5378	541	11	400	372	0.98	4584	220	3	12.52	1.81	50	-0.68	0.48	0.88	15.24	0	28	Available
HRS	2018-2020	WB 9699	1888	5366	546	12	388	379	0.98	4367	220	7	12.82	1.81	43	-0.38	0.48	1	16.23	0	20	Available
HRS	2018-2020	APB 510879	1904	5338	1029	13	360	940	0.98	-	-	-	13.52	2.56	16.5	0.32	1.85	1	-	-	-	-
HRS	2018-2020	XC 9407	1905	5326	1029	14	349	940	0.98	-	-	-	13.09	2.56	34	-0.11	1.85	1	-	-	-	-
HRS	2018-2020	APB 410089	1903	5258	1029	15	280	940	0.98	-	-	-	13.25	2.56	29	0.04	1.85	1	-	-	-	-
HRS	2018-2020	UC 1884	1884	5230	580	16	252	424	0.98	4004	220	20	13.26	1.82	28	0.06	0.53	1	16.89	0	12	-
HRW	2018-2020	WINCAL 158-5	1906	5221	775	17	243	666	0.98	4189	220	15	13.32	2.18	25	0.12	1.31	1	16.72	0	14	-
HRS	2018-2020	UC CENTRAL RED	1817	5220	541	18	242	372	0.98	4252	220	13	13.85	1.82	6	0.65	0.51	0.88	16.91	0	10	Available
HRS	2018-2020	WB 9433	1847	5175	581	19	197	423	0.98	-	-	-	12.65	1.82	46	-0.55	0.51	0.92	-	-	-	Released
HRS	2018-2020	UC 1885	1885	5136	622	20	158	474	0.98	-	-	-	13.51	1.83	18	0.31	0.55	1	-	-	-	-
HRS	2018-2020	SY CAL ROJO	1478	5105	551	21	127	386	0.98	4354	220	9	12.49	1.81	51	-0.71	0.48	0.88	17.78	0	4	Available
HWS	2018-2020	SY BLANCA ROYALE	1522	5092	622	22	114	474	0.98	-	-	-	13.49	1.83	19	0.29	0.55	1	-	-	-	Released
HWS	2018-2020	WB 7566	1802	5086	679	23	108	544	0.98	-	-	-	13.04	1.85	37	-0.16	0.6	1	-	-	-	Available

HRS	2018-2020	SY SIENNA	1835	5078	546	24	100	379	0.98	3801	220	26	13.08	1.81	36	-0.12	0.48	1	17.4	0	6	Available
HWS	2018-2020	UC 1883	1883	5073	593	25	95	437	0.98	-	-	-	13.45	1.82	22	0.24	0.51	1	-	-	-	-
HWS	2018-2020	UC 1917	1917	5070	1031	26	92	946	0.98	4312	220	12	12.72	2.56	45	-0.48	1.86	1	16.02	0	22	-
HRS	2018-2020	APB 510477	1874	5066	611	27	88	460	0.98	-	-	-	13.74	1.82	10	0.54	0.51	0.92	-	-	-	-
HRS	2018-2020	WB 9112	1748	5048	593	28	70	437	0.98	-	-	-	12.84	1.82	42	-0.36	0.5	1	-	-	-	Available
HWS	2018-2020	UC 1907	1907	5027	775	29	49	666	0.98	4563	220	5	13.53	2.18	15	0.33	1.31	1	16.29	0	19	-
HWS	2018-2020	LCS 12SB0224	1831	4990	622	30	12	474	0.98	-	-	-	12.49	1.83	52	-0.71	0.53	0.88	-	-	-	-
HRS	2018-2020	AP OCTANE	1878	4970	563	31	-8	403	0.98	4313	220	11	13.09	1.82	35	-0.11	0.51	1	16.9	0	11	Available
SRS	2018-2020	SY VACA	1766	4955	1029	32	-23	940	0.98	-	-	-	10.91	2.56	56	-2.3	1.85	0.88	-	-	-	Released
HRS	2018-2020	WB JOAQUIN ORO	1728	4946	551	33	-32	386	0.98	4076	220	19	13.88	1.82	5	0.68	0.52	0.88	16.42	0	17	Available
HRS	2018-2020	XB 9512	1886	4939	634	34	-39	489	0.98	-	-	-	12.55	1.82	49	-0.65	0.51	0.88	-	-	-	-
HRS	2018-2020	UC 1882	1882	4926	574	35	-52	413	0.98	-	-	-	13.81	1.82	9	0.61	0.49	0.88	-	-	-	-
HRS	2018-2020	SY 64-1-9	1876	4885	551	36	-93	386	0.98	4097	220	18	14.26	1.81	2	1.06	0.49	0.53	18.3	0	1	-
HRS	2018-2020	APB 511829	1875	4884	622	37	-94	474	0.98	-	-	-	13.12	1.82	32	-0.08	0.5	1	-	-	-	-
HRS	2018-2020	WB 9229	1730	4864	557	38	-113	394	0.98	4479	220	6	13.49	1.82	20	0.28	0.52	1	17.14	0	8	Available
HRS	2018-2020	WB 9904	1751	4853	551	39	-125	386	0.98	4144	220	16	13.28	1.82	27	0.07	0.51	1	15.93	0	23.5	Available
HRS	2018-2020	WB 9490	1887	4841	589	40	-136	433	0.98	-	-	-	12.1	1.82	55	-1.11	0.51	0.53	-	-	-	Available
HWS	2018-2020	UC PATWIN 515 HP	1743	4817	541	41	-161	372	0.98	4110	220	17	14.13	1.81	3	0.92	0.47	0.53	17.67	0	5	Available
HWS	2018-2020	SY BLANCA GRANDE 515	1657	4795	563	42	-183	403	0.98	4771	220	1	12.64	1.82	47	-0.56	0.51	0.92	16.03	0	21	Available
HRS	2018-2020	AP REDWING 204	1921	4711	1031	43	-267	946	0.98	3953	220	22	13.42	2.56	23	0.22	1.86	1	16.71	0	15	-
HRS	2018-2020	YECORA ROJO	112	4629	607	44	-349	457	0.98	-	-	-	13.2	1.85	31	0	0.59	1	-	-	-	Available
HRS	2018-2020	WB PATRON	1731	4612	546	45	-366	379	0.98	4359	220	8	12.88	1.81	40	-0.33	0.47	1	15.51	0	27	Available
HRS	2018-2020	WB 9990	1922	4588	1031	46	-390	946	0.98	3829	220	24	12.64	2.56	48	-0.56	1.86	1	15.93	0	23.5	-
HRS	2018-2020	AP VENOM	1877	4582	551	47	-396	386	0.98	3991	220	21	13.34	1.81	24	0.13	0.49	1	16.63	0	16	Available
HRS	2018-2020	WB TRIPLE IV	1550	4549	1029	48	-429	940	0.98	-	-	-	13.11	2.56	33	-0.09	1.85	1	-	-	-	Available
HRS	2018-2020	YECORA ROJO 515 HP	1879	4350	581	49	-628	424	0.98	3874	247	23	15.34	1.82	1	2.14	0.53	0	17.8	0	3	-
HWS	2018-2020	LCS STAR	1688	4337	662	50	-641	523	0.98	-	-	-	13.84	1.83	7	0.64	0.55	0.91	-	-	-	Available
HWS	2018-2020	UC 1909	1909	4315	775	51	-663	666	0.98	3784	220	27	13.81	2.18	8	0.61	1.31	1	17.99	0	2	-
HRS	2018-2020	UC 1908	1908	4281	1029	52	-697	940	0.98	-	-	-	12.85	2.56	41	-0.35	1.85	1	-	-	-	-
HWS	2018-2020	UC 1839	1839	4011	1029	53	-967	940	0.98	-	-	-	13.52	2.56	16.5	0.32	1.85	1	-	-	-	-
HRW	2018-2020	ASSL TAM 204	1778	3834	617	54	-1144	471	0.35	-	-	-	13.94	1.84	4	0.74	0.57	0.88	-	-	-	Released
SWS	2018-2020	BAG NEW DIRKWIN	1667	3328	564	55	-1650	403	0	2915	247	28	13.64	1.81	11	0.43	0.48	1	16.97	0	9	Available
HRS	2018-2020	DPG FV 2808	1608	-	-	-	-	-	-	-	-	-	12.27	2.56	53	-0.93	1.85	1	-	-	-	Available

Table 28. Statewide common wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
HWS	2018-2020	UC 1917	1917	7059	377	1	926	219	0	6825	908	1	11.3	0.64	50	-0.6	0.47	0.3	12.08	1.58	22	-
HWS	2018-2020	LCS ATOMO	1723	6841	320	2	708	100	0	-	-	-	11.27	0.45	52	-0.62	0.14	0	-	-	-	Available
HRS	2018-2020	WB 9433	1847	6760	321	3	627	102	0	-	-	-	11.49	0.45	44	-0.41	0.14	0.01	-	-	-	Released
HRS	2018-2020	WB 9350	1842	6704	320	4	571	100	0	-	-	-	11.46	0.45	46	-0.44	0.13	0	-	-	-	Available
HWS	2018-2020	UC CENTRAL WHITE	1815	6649	325	5	516	114	0	6595	908	3	11.6	0.46	39	-0.29	0.15	0.1	12.58	1.58	16	Available
HRS	2018-2020	WB 9699	1888	6600	318	6	467	92	0	6184	908	6	11.66	0.45	37	-0.24	0.13	0.11	12.05	1.58	23	Available
HWS	2018-2020	LCS 12SB0224	1831	6595	332	7	462	133	0	-	-	-	11.11	0.46	53	-0.79	0.16	0	-	-	-	-
HRS	2018-2020	LCS 12SB0197	1830	6578	334	8	445	137	0	-	-	-	11.45	0.46	47	-0.44	0.16	0.02	-	-	-	-
HRS	2018-2020	AP OCTANE	1878	6572	318	9	439	95	0	6381	908	4	11.29	0.45	51	-0.61	0.13	0	11.87	1.58	28	Available
HRS	2018-2020	SY 64-1-9	1876	6537	318	10	404	94	0	6765	908	2	12.28	0.45	13	0.39	0.13	0.01	13.41	1.58	6	-
HWS	2018-2020	WB 7566	1802	6520	337	11	387	144	0.02	-	-	-	11.32	0.46	49	-0.58	0.17	0	-	-	-	Available
HRS	2018-2020	XB 9512	1886	6515	334	12	382	137	0.01	-	-	-	11.38	0.46	48	-0.51	0.16	0.01	-	-	-	-
HRS	2018-2020	WB 9490	1887	6501	321	13	368	104	0	-	-	-	11.01	0.45	54	-0.89	0.14	0	-	-	-	Available
HWS	2018-2020	UC PATWIN 515	1680	6476	318	14	343	92	0	6096	908	10	11.82	0.45	31	-0.07	0.13	0.69	12.54	1.58	18	Available
HRS	2018-2020	SY REDWING	1521	6464	322	15	331	106	0	-	-	-	11.82	0.45	32	-0.08	0.14	0.69	-	-	-	Released
HRS	2018-2020	UC YUOK	1745	6426	317	16	293	91	0	6315	908	5	11.54	0.45	40	-0.35	0.13	0.01	11.91	1.58	27	Available
HRS	2018-2020	SY SUMMIT 515	1658	6386	318	17	253	92	0.01	6105	908	9	11.75	0.45	34	-0.14	0.13	0.37	11.97	1.58	26	Available
HWS	2018-2020	SY BLANCA GRANDE 515	1657	6280	318	18	147	95	0.21	6121	908	8	11.89	0.45	27	0	0.13	0.97	12.85	1.58	13	Available
HRS	2018-2020	UC 1880	1880	6279	321	19	146	104	0.26	-	-	-	11.91	0.45	26	0.02	0.14	0.93	-	-	-	-
HRS	2018-2020	AP VENOM	1877	6278	318	20	145	94	0.21	5941	908	16	11.83	0.45	29	-0.07	0.13	0.7	12.7	1.58	15	Available
HRS	2018-2020	XC 9407	1905	6277	341	21	144	152	0.47	-	-	-	12.42	0.5	9	0.52	0.24	0.06	-	-	-	-
HRS	2018-2020	UC 1884	1884	6270	325	22	137	115	0.35	5800	908	19	12.23	0.46	15	0.33	0.16	0.07	13.63	1.58	5	-
HWS	2018-2020	LCS STAR	1688	6263	338	23	130	146	0.5	-	-	-	12.2	0.46	17	0.31	0.17	0.12	-	-	-	Available

HRS	2018-2020	UC LASSIK	1495	6243	318	24	110	94	0.35	6020	908	13	11.5	0.45	43	-0.39	0.13	0.01	12	1.58	25	Available
HRS	2018-2020	APB 510879	1904	6222	342	25	89	155	0.72	-	-	-	11.86	0.5	28	-0.03	0.24	0.93	-	-	-	-
HRS	2018-2020	WB 9990	1922	6202	377	26	69	219	0.86	5968	908	15	11.69	0.64	36	-0.21	0.47	0.73	12.47	1.58	20	-
HRS	2018-2020	APB 510477	1874	6199	334	27	66	137	0.79	-	-	-	12	0.46	23	0.1	0.16	0.67	-	-	-	-
HRS	2018-2020	APB 410089	1903	6193	344	28	60	160	0.84	-	-	-	13.12	0.5	2	1.23	0.24	0	-	-	-	-
HRW	2018-2020	WINCAL 158-5	1906	6190	331	29	57	129	0.8	5702	908	22	11.82	0.48	30	-0.07	0.22	0.79	12.53	1.58	19	-
HRS	2018-2020	UC CENTRAL RED	1817	6162	317	30	29	91	0.86	6141	908	7	12.04	0.45	22	0.14	0.13	0.37	13.38	1.58	8	Available
HRS	2018-2020	UC 1882	1882	6160	321	31	27	103	0.89	-	-	-	12.09	0.45	20	0.19	0.14	0.25	-	-	-	-
HRS	2018-2020	AP REDWING 204	1921	6145	377	32	12	219	0.99	5911	908	17	12.37	0.64	11	0.48	0.47	0.41	13.16	1.58	11	-
HWS	2018-2020	UC 1883	1883	6138	331	33	5	129	0.99	-	-	-	12.22	0.46	16	0.32	0.16	0.08	-	-	-	-
HRS	2018-2020	WB 9112	1748	6137	332	34	4	132	0.99	-	-	-	11.93	0.46	25	0.04	0.16	0.86	-	-	-	Available
HRS	2018-2020	SY CAL ROJO	1478	6131	318	35	-2	93	0.99	5886	908	18	11.47	0.45	45	-0.43	0.13	0	13.24	1.58	10	Available
HRS	2018-2020	APB 511829	1875	6118	333	36	-15	135	0.98	-	-	-	11.81	0.46	33	-0.08	0.16	0.7	-	-	-	-
HWS	2018-2020	UC 1907	1907	6109	330	37	-24	128	0.93	6053	908	11	13.07	0.48	3	1.17	0.22	0	13.37	1.58	9	-
HRS	2018-2020	SY SIENNA	1835	6060	318	38	-73	92	0.56	5313	908	24	12.08	0.45	21	0.18	0.13	0.25	13.39	1.58	7	Available
HWS	2018-2020	UC PATWIN 515 HP	1743	6025	317	39	-108	91	0.35	6032	908	12	12.71	0.45	6	0.81	0.13	0	13.86	1.58	2	Available
HWS	2018-2020	SY BLANCA ROYALE	1522	5991	335	40	-142	140	0.44	-	-	-	12.11	0.46	18	0.21	0.17	0.32	-	-	-	Released
HRS	2018-2020	UC 1885	1885	5984	333	41	-149	135	0.39	-	-	-	11.96	0.46	24	0.07	0.16	0.75	-	-	-	-
HRS	2018-2020	WB PATRON	1731	5962	318	42	-171	92	0.11	5759	908	21	11.74	0.45	35	-0.15	0.13	0.33	12.3	1.58	21	Available
HRS	2018-2020	UC 1908	1908	5942	343	43	-191	157	0.35	-	-	-	12.64	0.5	7	0.74	0.24	0.01	-	-	-	-
HRS	2018-2020	WB 9229	1730	5909	318	44	-224	93	0.03	6001	908	14	12.4	0.45	10	0.51	0.13	0	12.99	1.58	12	Available
HRS	2018-2020	WB 9904	1751	5896	318	45	-237	92	0.02	5785	908	20	11.52	0.45	42	-0.37	0.13	0.01	12.01	1.58	24	Available
HWS	2018-2020	UC 1839	1839	5804	344	46	-329	160	0.07	-	-	-	12.61	0.5	8	0.71	0.24	0.01	-	-	-	-
HRS	2018-2020	DPG FV 2808	1608	5690	349	47	-443	168	0.02	-	-	-	10.28	0.5	55	-1.61	0.24	0	-	-	-	Available
SRS	2018-2020	SY VACA	1766	5688	346	48	-445	162	0.01	-	-	-	9.97	0.5	56	-1.92	0.24	0	-	-	-	Released
HWS	2018-2020	UC 1909	1909	5673	330	49	-460	126	0	5677	908	23	12.36	0.48	12	0.47	0.22	0.06	14.12	1.58	1	-
HRS	2018-2020	YECORA ROJO	112	5642	323	50	-490	107	0	-	-	-	12.27	0.45	14	0.37	0.14	0.02	-	-	-	Available
HRW	2018-2020	ASSL TAM 204	1778	5641	321	51	-492	104	0	-	-	-	11.53	0.45	41	-0.36	0.14	0.02	-	-	-	Released
HRS	2018-2020	WB JOAQUIN ORO	1728	5418	318	52	-715	93	0	4910	908	25	12.84	0.45	5	0.94	0.13	0	13.66	1.58	3	Available
HRS	2018-2020	YECORA ROJO 515 HP	1879	5096	325	53	-1037	115	0	4605	909	27	13.54	0.46	1	1.64	0.16	0	12.71	1.58	14	-
HRS	2018-2020	YECORA ROJO 515	1916	5051	377	54	-1082	219	0	4818	908	26	12.85	0.64	4	0.95	0.47	0.08	13.64	1.58	4	-
HRS	2018-2020	WB TRIPLE IV	1550	4938	344	55	-1195	160	0	-	-	-	12.1	0.5	19	0.2	0.24	0.51	-	-	-	Available
SWS	2018-2020	BAG NEW DIRKWIN	1667	4859	318	56	-1274	95	0	4348	909	28	11.63	0.45	38	-0.26	0.13	0.08	12.57	1.58	17	Available

Durum performance tables

Table 29. Sacramento Valley region, durum wheat yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
2018-2020	UC 1870	1870	7973	762	1	880	222	0	8818	308	2	12.33	0.52	29	-0.22	0.33	0.78	11.69	0	16	-
2018-2020	UC 1771	1771	7941	826	2	848	382	0.09	-	-	-	11.57	0.85	38	-0.98	0.73	0.47	-	-	-	-
2018-2020	UC DESERT GOLD	1850	7871	762	3	778	222	0.01	9177	308	1	11.46	0.52	39	-1.09	0.33	0.02	10.78	0	18	Available
2018-2020	UC DESERT KING	1375	7796	762	4	703	222	0.01	8212	308	6	12.06	0.52	32	-0.49	0.33	0.42	13.69	0	7	Available
2018-2020	DPG DURAKING	878	7716	827	5	623	382	0.22	-	-	-	11.94	0.6	35	-0.61	0.43	0.43	-	-	-	Released
2018-2020	UC 1919	1919	7658	828	6	565	390	0.29	8210	308	7	12.56	0.85	22	0.01	0.74	0.99	13.28	0	12	-
2018-2020	SY FORTISSIMO	1429	7656	779	7	563	270	0.11	-	-	-	12	0.55	33	-0.54	0.37	0.42	-	-	-	Available
2018-2020	UC MIWOK	1690	7648	747	8	555	165	0.01	8042	308	9	12.37	0.46	26	-0.17	0.22	0.7	13.91	0	5	Available
2018-2020	AS SARAGOLLA	1583	7637	765	9	544	232	0.07	7393	308	13	10.95	0.52	41	-1.6	0.33	0	11.23	0	17	Available
2018-2020	WB MEAD	1607	7572	779	10	479	270	0.19	-	-	-	12.51	0.55	24	-0.04	0.37	0.99	-	-	-	Available
2018-2020	UC 1910	1910	7543	779	11	450	273	0.22	8191	308	8	12.36	0.66	27	-0.19	0.52	0.96	12.28	0	15	-
2018-2020	TIBURON	1640	7522	762	12	429	222	0.15	8452	308	4	12.6	0.52	18	0.05	0.33	0.99	13.42	0	9	Available
2018-2020	ASC 124	1914	7517	826	13	424	382	0.41	-	-	-	12.34	0.85	28	-0.21	0.73	0.96	-	-	-	-
2018-2020	ASC 123	1913	7453	826	14	360	382	0.51	-	-	-	12.52	0.85	23	-0.03	0.73	0.99	-	-	-	-
2018-2020	DPG PLATINUM	1210	7439	779	15	346	270	0.37	-	-	-	12.5	0.55	25	-0.04	0.37	0.99	-	-	-	Available

2018-2020	UC 1871	1871	7302	779	16	209	270	0.56	-	-	-	12.57	0.55	21	0.02	0.37	0.99	-	-	-	-
2018-2020	UC 1873	1873	7296	827	17	203	382	0.7	-	-	-	12.7	0.67	16	0.16	0.52	0.96	-	-	-	-
2018-2020	UC DESERT KING HP	1627	7275	762	18	182	222	0.54	7842	308	10	13.47	0.52	4	0.92	0.33	0.04	14.42	0	2	Available
2018-2020	AS MAESTRALE	1582	7242	762	19	150	222	0.62	8306	308	5	11.61	0.52	37	-0.94	0.33	0.04	12.88	0	13	Available
2018-2020	APB 471400	1853	7188	779	20	95	270	0.82	-	-	-	12.15	0.55	31	-0.4	0.37	0.51	-	-	-	-
2018-2020	DPG TOPPER	1211	7169	827	21	76	382	0.84	-	-	-	11.94	0.67	34	-0.61	0.52	0.5	-	-	-	Released
2018-2020	SHASTA	1869	7153	779	22	60	270	0.84	-	-	-	12.96	0.55	12	0.41	0.37	0.5	-	-	-	Available
2018-2020	APB 153541	1901	7149	779	23	56	273	0.84	8515	308	3	12.57	0.66	20	0.03	0.52	0.99	12.64	0	14	-
2018-2020	UC 1918	1918	6986	828	24	-107	390	0.84	7538	308	12	12.59	0.85	19	0.04	0.74	0.99	13.31	0	11	-
2018-2020	UC 1872	1872	6966	827	25	-127	382	0.82	-	-	-	11.89	0.67	36	-0.66	0.52	0.47	-	-	-	-
2018-2020	WB ORITA	1215	6942	779	26	-151	270	0.7	-	-	-	12.69	0.55	17	0.15	0.37	0.94	-	-	-	Available
2018-2020	WB MOHAVE	1654	6847	779	27	-246	270	0.51	-	-	-	13.27	0.55	7	0.72	0.37	0.2	-	-	-	Available
2018-2020	APB 152308	1900	6788	779	28	-305	273	0.41	7553	308	11	13.81	0.66	1	1.26	0.52	0.1	13.96	0	4	-
2018-2020	DPG CANDURA	1867	6759	827	29	-334	382	0.52	-	-	-	12.21	0.6	30	-0.34	0.43	0.7	-	-	-	Released
2018-2020	POWELL	1868	6756	779	30	-337	270	0.38	-	-	-	13.59	0.55	2	1.04	0.37	0.04	-	-	-	Available
2018-2020	AS COLOMBO	1800	6726	765	31	-366	231	0.23	6959	343	14	11.29	0.52	40	-1.26	0.33	0.01	13.34	0	10	Available
2018-2020	APB 450311	1851	6672	827	32	-421	382	0.41	-	-	-	13.03	0.6	10	0.49	0.43	0.5	-	-	-	-
2018-2020	ASC 122	1912	6637	826	33	-455	382	0.4	-	-	-	12.91	0.85	13	0.36	0.73	0.92	-	-	-	-
2018-2020	SY VOLANTE	1431	6437	762	34	-656	222	0.02	6777	308	16	12.79	0.55	15	0.25	0.37	0.78	14.38	0	3	Available
2018-2020	WESTMORE HP	1484	6387	779	35	-706	270	0.04	-	-	-	13.02	0.55	11	0.47	0.37	0.47	-	-	-	Available
2018-2020	KRONOS	951	6383	786	36	-710	288	0.06	-	-	-	13.33	0.55	5	0.79	0.37	0.18	-	-	-	Available
2018-2020	APB 450275	1865	6373	827	37	-720	382	0.16	-	-	-	13.27	0.6	6	0.72	0.43	0.32	-	-	-	-
2018-2020	APB 471389	1924	6252	828	38	-841	390	0.1	6804	308	15	12.88	0.85	14	0.33	0.74	0.93	13.6	0	8	-
2018-2020	APB 152356	1902	6217	779	39	-876	273	0.01	6166	308	17	13.58	0.66	3	1.03	0.52	0.2	13.87	0	6	-
2018-2020	ALBERTO	1813	6101	762	40	-992	222	0	5777	308	18	13.2	0.52	8	0.65	0.33	0.2	15.53	0	1	Available
2018-2020	APB 450333	1866	5863	827	41	-1230	382	0.01	-	-	-	13.07	0.6	9	0.52	0.43	0.48	-	-	-	-

Table 30. North Central San Joaquin Valley region, durum wheat yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
2018-2020	APB 152308	1900	9841	887	1	1105	337	0.02	9237	270	3	11.47	0.85	39	-0.92	0.69	0.52	10.82	0	17	-
2018-2020	SHASTA	1869	9491	866	2	755	273	0.04	-	-	-	12.16	0.62	25	-0.23	0.37	0.84	-	-	-	Available
2018-2020	TIBURON	1640	9437	854	3	700	237	0.03	9052	270	7	12.51	0.61	15	0.12	0.35	0.92	10.86	0	16	Available
2018-2020	UC 1918	1918	9410	952	4	674	480	0.55	9343	270	2	11.96	1.11	31	-0.43	0.98	0.87	11.5	0	10	-
2018-2020	UC DESERT KING	1375	9399	854	5	662	237	0.04	8979	270	9	12.39	0.61	19	0	0.35	0.99	11.81	0	9	Available
2018-2020	UC 1870	1870	9353	856	6	616	245	0.06	9665	270	1	12.31	0.61	21	-0.07	0.35	0.96	11.94	0	8	-
2018-2020	UC 1771	1771	9222	989	7	485	542	0.72	-	-	-	12.09	1.1	27	-0.3	0.97	0.92	-	-	-	-
2018-2020	APB 471400	1853	9217	866	8	481	273	0.33	-	-	-	11.57	0.64	38	-0.82	0.46	0.3	-	-	-	-
2018-2020	DPG DURAKING	878	9091	890	9	355	335	0.7	-	-	-	12.34	0.65	20	-0.05	0.46	0.96	-	-	-	Released
2018-2020	UC DESERT GOLD	1850	9087	862	10	351	262	0.57	9115	270	4	11.78	0.64	33	-0.61	0.48	0.4	11.36	0	13	Available
2018-2020	APB 471389	1924	9045	952	11	309	480	0.76	8978	270	10	12.91	1.11	11	0.53	0.98	0.86	12.45	0	7	-

2018-2020	APB 153541	1901	9017	887	12	280	337	0.76	9095	270	6	13.26	0.85	6	0.87	0.69	0.52	12.88	0	5	-
2018-2020	DPG TOPPER	1211	8971	890	13	234	335	0.76	-	-	-	11.62	0.67	36	-0.77	0.44	0.43	-	-	-	Released
2018-2020	UC 1873	1873	8858	890	14	122	335	0.93	-	-	-	12.6	0.65	14	0.21	0.4	0.86	-	-	-	-
2018-2020	UC 1910	1910	8855	887	15	119	337	0.93	9105	270	5	13.22	0.85	7	0.83	0.69	0.52	13.12	0	2	-
2018-2020	ALBERTO	1813	8839	856	16	103	245	0.92	8884	270	12	11.93	0.61	32	-0.45	0.35	0.52	10.79	0	18	Available
2018-2020	ASC 123	1913	8827	989	17	91	542	0.95	-	-	-	11.37	1.1	40	-1.02	0.97	0.6	-	-	-	-
2018-2020	APB 450333	1866	8809	890	18	72	335	0.95	-	-	-	12.63	0.65	13	0.24	0.4	0.85	-	-	-	-
2018-2020	WB MEAD	1607	8766	866	19	29	273	0.95	-	-	-	13.09	0.62	9	0.71	0.37	0.41	-	-	-	Available
2018-2020	DPG PLATINUM	1210	8728	870	20	-8	285	0.98	-	-	-	12.03	0.62	30	-0.36	0.37	0.61	-	-	-	Available
2018-2020	SY VOLANTE	1431	8716	854	21	-21	237	0.95	8314	270	16	12.15	0.61	26	-0.23	0.35	0.83	11.41	0	12	Available
2018-2020	ASC 124	1914	8685	951	22	-52	472	0.95	-	-	-	11.12	1.1	41	-1.27	0.97	0.52	-	-	-	-
2018-2020	AS SARAGOLLA	1583	8684	859	23	-53	253	0.95	9044	270	8	12.05	0.61	29	-0.34	0.35	0.61	11.25	0	14	Available
2018-2020	UC 1919	1919	8671	952	24	-65	480	0.95	8604	270	14	13.43	1.11	3	1.04	0.98	0.6	12.97	0	3	-
2018-2020	APB 450275	1865	8625	898	25	-112	357	0.94	-	-	-	12.45	0.67	17	0.06	0.44	0.96	-	-	-	-
2018-2020	APB 152356	1902	8562	887	26	-174	337	0.86	8711	270	13	13.02	0.85	10	0.63	0.69	0.62	12.91	0	4	-
2018-2020	WB ORITA	1215	8536	875	27	-201	298	0.76	-	-	-	13.16	0.66	8	0.77	0.44	0.43	-	-	-	Available
2018-2020	SY FORTISSIMO	1429	8525	866	28	-211	273	0.76	-	-	-	12.46	0.62	16	0.07	0.37	0.96	-	-	-	Available
2018-2020	KRONOS	951	8487	908	29	-249	382	0.76	-	-	-	11.77	0.7	34	-0.62	0.49	0.52	-	-	-	Available
2018-2020	POWELL	1868	8417	866	30	-319	273	0.63	-	-	-	13.53	0.62	2	1.15	0.37	0.05	-	-	-	Available
2018-2020	APB 450311	1851	8397	898	31	-340	357	0.7	-	-	-	12.4	0.67	18	0.01	0.44	0.99	-	-	-	-

2018-2020	WB MOHAVE	1654	8367	875	32	-370	298	0.59	-	-	-	13.33	0.62	4	0.94	0.37	0.18	-	-	-	Available
2018-2020	UC 1871	1871	8362	908	33	-374	382	0.7	-	-	-	12.23	0.7	23	-0.16	0.49	0.92	-	-	-	-
2018-2020	UC 1872	1872	8334	926	34	-402	420	0.7	-	-	-	11.6	0.7	37	-0.79	0.49	0.48	-	-	-	-
2018-2020	ASC 122	1912	8256	1062	35	-481	660	0.76	-	-	-	12.24	1.1	22	-0.15	0.97	0.96	-	-	-	-
2018-2020	DPG CANDURA	1867	8239	910	36	-497	385	0.58	-	-	-	11.71	0.67	35	-0.67	0.44	0.48	-	-	-	Released
2018-2020	AS MAESTRALE	1582	8221	859	37	-515	253	0.19	8482	270	15	12.21	0.62	24	-0.18	0.37	0.87	10.95	0	15	Available
2018-2020	WESTMORE HP	1484	8148	897	38	-588	354	0.36	-	-	-	13.28	0.66	5	0.89	0.44	0.36	-	-	-	Available
2018-2020	AS COLOMBO	1800	8091	854	39	-645	237	0.04	6022	270	18	12.05	0.61	28	-0.34	0.35	0.61	14.94	0	1	Available
2018-2020	UC MIWOK	1690	8059	841	40	-678	183	0.01	8971	270	11	12.67	0.55	12	0.28	0.24	0.52	11.45	0	11	Available
2018-2020	UC DESERT KING HP	1627	7549	862	41	-1187	262	0	8018	270	17	13.82	0.64	1	1.43	0.4	0.02	12.83	0	6	Available

Table 31. South San Joaquin Valley region, durum wheat yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein sterr.diff. from overall mean	Protein p-Value	Status
2017-2019	APB 540165	1827	9831	829	1	2247	512	0	13.34	0.6	41	-0.78	0.32	0.06	-
2017-2019	ASC 124	1914	8783	788	2	1199	446	0.04	13.33	0.75	43	-0.79	0.55	0.33	-
2017-2019	TIBURON	1640	8700	699	3	1116	268	0	13.84	0.54	32	-0.27	0.2	0.34	Available
2017-2019	SY VOLANTE	1431	8559	695	4	975	257	0	13.54	0.53	39	-0.57	0.19	0.02	Available
2017-2019	SY FORTISSIMO	1429	8314	695	5	729	257	0.03	13.88	0.54	30	-0.24	0.21	0.46	Available
2017-2019	UC 1910	1910	8310	788	6	726	446	0.26	15.92	0.75	2	1.81	0.55	0.01	-
2017-2019	UC 1870	1870	8296	742	7	712	362	0.18	13.31	0.6	44	-0.8	0.32	0.05	-
2017-2019	UC MIWOK	1690	8291	672	8	707	190	0	13.83	0.52	33	-0.29	0.14	0.12	Available
2017-2019	DPG TOPPER	1211	8249	787	9	665	444	0.3	13.03	0.6	48	-1.09	0.32	0.01	Released
2017-2019	APB 450311	1851	8210	719	10	626	314	0.18	14.66	0.56	7	0.55	0.25	0.09	-
2017-2019	POWELL	1868	8172	719	11	588	315	0.22	13.85	0.59	31	-0.27	0.32	0.59	Available
2017-2019	DPG DURAKING	878	8063	787	12	479	444	0.44	13.33	0.64	42	-0.79	0.39	0.12	Released
2017-2019	UC 1872	1872	8040	787	13	455	444	0.46	14.06	0.6	23	-0.05	0.32	0.91	-
2017-2019	UC 1771	1771	8003	788	14	419	446	0.5	13.78	0.75	34	-0.34	0.55	0.72	-
2017-2019	UC DESERT KING	1375	7988	695	15	404	257	0.28	14.34	0.54	15	0.22	0.21	0.5	Available
2017-2019	ALBERTO	1813	7981	699	16	396	268	0.3	14.19	0.54	19	0.08	0.2	0.84	Available
2017-2019	APB 471400	1853	7919	699	17	334	268	0.4	13.07	0.54	47	-1.05	0.2	0	-
2017-2019	UC DESERT GOLD	1850	7878	695	18	293	257	0.44	14.14	0.54	21	0.03	0.2	0.91	Available
2017-2019	SHASTA	1869	7864	719	19	280	315	0.5	14.04	0.57	24	-0.08	0.28	0.86	Available
2017-2019	APB 152308	1900	7857	788	20	273	446	0.63	13.77	0.75	35	-0.35	0.55	0.72	-
2017-2019	WB MOHAVE	1654	7714	695	21	130	257	0.68	14.15	0.54	20	0.04	0.2	0.91	Available
2017-2019	DPG CANDURA	1867	7620	787	22	36	444	0.98	13.49	0.64	40	-0.62	0.39	0.25	Released
2017-2019	WB ORITA	1215	7597	695	23	13	257	0.98	14.7	0.54	6	0.58	0.2	0.02	Available
2017-2019	APB 450333	1866	7578	787	24	-6	444	0.99	14.22	0.6	17	0.1	0.32	0.86	-
2017-2019	UC 16051 12	1849	7551	788	25	-33	446	0.98	14.6	0.58	11	0.49	0.28	0.21	-
2017-2019	WB MEAD	1607	7463	695	26	-121	257	0.7	14.6	0.54	10	0.49	0.21	0.07	Available
2017-2019	UC DESERT KING HP	1627	7400	695	27	-184	257	0.57	15.33	0.54	4	1.21	0.2	0	Available
2017-2019	AS MAESTRALE	1582	7341	699	28	-243	268	0.5	13.57	0.54	38	-0.55	0.21	0.04	Available
2017-2019	UC 1873	1873	7323	787	29	-261	444	0.64	14.45	0.6	13	0.33	0.32	0.51	-
2017-2019	AS SARAGOLLA	1583	7305	695	30	-279	257	0.44	13.31	0.54	45	-0.81	0.2	0	Available

2017-2019	AS COLOMBO	1800	7292	695	31	-292	257	0.44	14.29	0.54	16	0.18	0.21	0.59	Available
2017-2019	DPG PLATINUM	1210	7276	729	32	-308	336	0.5	13.97	0.59	25	-0.15	0.32	0.79	Available
2017-2019	APB 450275	1865	7255	787	33	-330	444	0.56	14.42	0.6	14	0.3	0.32	0.56	-
2017-2019	LCS KIKO	1697	7224	788	34	-360	446	0.53	14.2	0.58	18	0.08	0.28	0.86	Released
2017-2019	ASC 123	1913	7215	788	35	-370	446	0.53	13.19	0.75	46	-0.93	0.55	0.22	-
2017-2019	WB HAVASU	1479	7087	788	36	-497	446	0.44	13.97	0.58	26	-0.15	0.28	0.76	Available
2017-2019	UC 1871	1871	7057	742	37	-527	361	0.3	13.96	0.57	27	-0.16	0.28	0.74	-
2017-2019	ASC 101	1855	7032	788	38	-552	446	0.4	13.74	0.58	36	-0.38	0.28	0.34	-
2017-2019	UC DESERT KING RS	1848	6847	829	39	-737	512	0.3	16.22	0.6	1	2.1	0.32	0	-
2017-2019	APB 470442	1852	6809	788	40	-776	446	0.22	14.45	0.58	12	0.33	0.28	0.44	-
2017-2019	WESTMORE HP	1484	6805	699	41	-779	268	0.03	14.64	0.54	8	0.52	0.2	0.04	Available
2017-2019	ASC 100	1854	6805	788	42	-779	446	0.22	14.63	0.58	9	0.51	0.28	0.18	-
2017-2019	APB 152356	1902	6800	788	43	-784	446	0.22	13.68	0.75	37	-0.43	0.55	0.62	-
2017-2019	ASC 122	1912	6686	828	44	-898	511	0.22	13.91	0.75	29	-0.2	0.55	0.84	-
2017-2019	KRONOS	951	6535	704	45	-1050	280	0	13.92	0.54	28	-0.19	0.21	0.57	Available
2017-2019	ASC 102	1856	6500	788	46	-1084	446	0.07	14.14	0.58	22	0.02	0.28	0.95	-
2017-2019	ASC 103	1857	6428	788	47	-1156	446	0.05	14.9	0.58	5	0.79	0.28	0.03	-
2017-2019	APB 153541	1901	6188	828	48	-1396	511	0.04	15.69	0.75	3	1.58	0.55	0.03	-

Table 32. Imperial Valley region, durum wheat yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	Status
2017-2019	APB 471400	1853	7843	460	1	840	221	0.01	-	-	-	-	-	-	-
2017-2019	POWELL	1868	7739	487	2	736	271	0.11	-	-	-	-	-	-	Available
2017-2019	APB 540165	1827	7669	561	3	666	384	0.31	-	-	-	-	-	-	-
2017-2019	APB 152308	1900	7642	560	4	639	383	0.31	-	-	-	-	-	-	-
2017-2019	APB 470442	1852	7642	561	5	638	384	0.31	-	-	-	-	-	-	-
2017-2019	ASC 101	1855	7597	561	6	594	384	0.36	-	-	-	-	-	-	-
2017-2019	SHASTA	1869	7585	487	7	581	271	0.18	-	-	-	-	-	-	Available
2017-2019	LCS KIKO	1697	7558	561	8	555	384	0.36	-	-	-	-	-	-	Released
2017-2019	DPG DURAKING	878	7452	560	9	449	383	0.48	-	-	-	-	-	-	Released
2017-2019	ASC 124	1914	7430	560	10	427	383	0.51	-	-	-	-	-	-	-
2017-2019	TIBURON	1640	7317	460	11	313	221	0.36	-	-	-	-	-	-	Available
2017-2019	UC DESERT KING	1375	7311	460	12	308	221	0.36	-	-	-	-	-	-	Available
2017-2019	ASC 103	1857	7270	561	13	267	384	0.72	-	-	-	-	-	-	-
2017-2019	UC MIWOK	1690	7250	434	14	247	163	0.36	-	-	-	-	-	-	Available
2017-2019	UC DESERT GOLD	1850	7242	460	15	238	221	0.52	-	-	-	-	-	-	Available
2017-2019	APB 450311	1851	7230	487	16	226	271	0.67	-	-	-	-	-	-	-
2017-2019	UC 1771	1771	7209	560	17	206	383	0.77	-	-	-	-	-	-	-
2017-2019	APB 153541	1901	7171	560	18	168	383	0.81	-	-	-	-	-	-	-
2017-2019	SY VOLANTE	1431	7169	460	19	165	221	0.7	-	-	-	-	-	-	Available
2017-2019	ASC 102	1856	7151	561	20	147	384	0.82	-	-	-	-	-	-	-
2017-2019	AS SARAGOLLA	1583	7145	460	21	142	221	0.72	-	-	-	-	-	-	Available
2017-2019	SY FORTISSIMO	1429	7137	460	22	134	221	0.73	-	-	-	-	-	-	Available
2017-2019	UC 1873	1873	7087	560	23	84	383	0.88	-	-	-	-	-	-	-
2017-2019	KRONOS	951	7067	460	24	64	221	0.86	-	-	-	-	-	-	Available
2017-2019	ALBERTO	1813	7067	460	25	63	221	0.86	-	-	-	-	-	-	Available
2017-2019	APB 450275	1865	7016	560	26	13	383	0.97	-	-	-	-	-	-	-
2017-2019	WB ORITA	1215	6976	460	27	-28	221	0.92	-	-	-	-	-	-	Available
2017-2019	APB 450333	1866	6943	560	28	-60	383	0.91	-	-	-	-	-	-	-
2017-2019	ASC 123	1913	6914	560	29	-89	383	0.88	-	-	-	-	-	-	-
2017-2019	WB MEAD	1607	6896	460	30	-107	221	0.79	-	-	-	-	-	-	Available
2017-2019	ASC 122	1912	6856	560	31	-147	383	0.82	-	-	-	-	-	-	-
2017-2019	UC 1871	1871	6825	487	32	-179	271	0.72	-	-	-	-	-	-	-
2017-2019	APB 152356	1902	6751	560	33	-252	383	0.72	-	-	-	-	-	-	-
2017-2019	WESTMORE HP	1484	6721	460	34	-282	221	0.42	-	-	-	-	-	-	Available
2017-2019	UC 1872	1872	6717	560	35	-286	383	0.7	-	-	-	-	-	-	-
2017-2019	UC 1910	1910	6668	560	36	-335	383	0.65	-	-	-	-	-	-	-
2017-2019	AS COLOMBO	1800	6654	471	37	-350	241	0.36	-	-	-	-	-	-	Available
2017-2019	DPG TOPPER	1211	6624	560	38	-379	383	0.57	-	-	-	-	-	-	Released
2017-2019	WB MOHAVE	1654	6531	460	39	-472	221	0.18	-	-	-	-	-	-	Available

2017-2019	UC 1870	1870	6520	487	40	-483	271	0.31	-	-	-	-	-	-	-
2017-2019	AS MAESTRALE	1582	6450	460	41	-553	221	0.13	-	-	-	-	-	-	Available
2017-2019	WB HAVASU	1479	6440	561	42	-563	384	0.36	-	-	-	-	-	-	Available
2017-2019	UC DESERT KING HP	1627	6400	460	43	-603	221	0.11	-	-	-	-	-	-	Available
2017-2019	DPG CANDURA	1867	6338	560	44	-665	383	0.31	-	-	-	-	-	-	Released
2017-2019	DPG PLATINUM	1210	6329	487	45	-674	271	0.13	-	-	-	-	-	-	Available
2017-2019	UC 16051 12	1849	6321	561	46	-682	384	0.31	-	-	-	-	-	-	-
2017-2019	ASC 100	1854	6184	561	47	-820	384	0.18	-	-	-	-	-	-	-
2017-2019	UC DESERT KING RS	1848	6104	561	48	-899	384	0.16	-	-	-	-	-	-	-
2017-2018	DPG PLATINUM	1210	-	-	-	-	-	-	13.12	0.52	25	-0.19	0.13	0.2	Available
2017-2018	DPG TOPPER	1211	-	-	-	-	-	-	12.56	0.52	32	-0.75	0.13	0	Released
2017-2018	WB ORITA	1215	-	-	-	-	-	-	13.99	0.51	7	0.68	0.09	0	Available
2017-2018	UC DESERT KING	1375	-	-	-	-	-	-	13.17	0.51	24	-0.14	0.09	0.19	Available
2017-2018	SY FORTISSIMO	1429	-	-	-	-	-	-	13.28	0.51	20	-0.02	0.09	0.8	Available
2017-2018	SY VOLANTE	1431	-	-	-	-	-	-	12.38	0.51	35	-0.92	0.09	0	Available
2017-2018	WB HAVASU	1479	-	-	-	-	-	-	13.9	0.52	9	0.6	0.13	0	Available
2017-2018	WESTMORE HP	1484	-	-	-	-	-	-	14.26	0.51	3	0.95	0.09	0	Available
2017-2018	AS MAESTRALE	1582	-	-	-	-	-	-	13.1	0.51	26	-0.21	0.09	0.04	Available
2017-2018	AS SARAGOLLA	1583	-	-	-	-	-	-	12.2	0.51	37	-1.1	0.09	0	Available
2017-2018	WB MEAD	1607	-	-	-	-	-	-	13.84	0.51	10	0.53	0.09	0	Available
2017-2018	UC DESERT KING HP	1627	-	-	-	-	-	-	14.6	0.51	2	1.3	0.09	0	Available
2017-2018	TIBURON	1640	-	-	-	-	-	-	13.24	0.51	22	-0.06	0.09	0.55	Available
2017-2018	WB MOHAVE	1654	-	-	-	-	-	-	14.02	0.51	6	0.71	0.09	0	Available
2017-2018	UC MIWOK	1690	-	-	-	-	-	-	13.61	0.5	15	0.31	0.06	0	Available
2017-2018	LCS KIKO	1697	-	-	-	-	-	-	11.91	0.52	39	-1.39	0.13	0	Released
2017-2018	AS COLOMBO	1800	-	-	-	-	-	-	14.08	0.51	4	0.78	0.09	0	Available
2017-2018	ALBERTO	1813	-	-	-	-	-	-	13.6	0.51	16	0.3	0.09	0	Available
2017-2018	APB 540165	1827	-	-	-	-	-	-	13.09	0.52	27	-0.21	0.13	0.14	-
2017-2018	UC DESERT KING RS	1848	-	-	-	-	-	-	15.7	0.52	1	2.39	0.13	0	-
2017-2018	UC 16051 12	1849	-	-	-	-	-	-	14.04	0.52	5	0.74	0.13	0	-
2017-2018	UC DESERT GOLD	1850	-	-	-	-	-	-	13.2	0.51	23	-0.11	0.09	0.28	Available
2017-2018	APB 450311	1851	-	-	-	-	-	-	13.67	0.51	14	0.36	0.09	0	-
2017-2018	APB 470442	1852	-	-	-	-	-	-	12.7	0.52	31	-0.6	0.13	0	-
2017-2018	APB 471400	1853	-	-	-	-	-	-	12.15	0.51	38	-1.16	0.09	0	-
2017-2018	ASC 100	1854	-	-	-	-	-	-	13.76	0.52	11	0.46	0.13	0	-
2017-2018	ASC 101	1855	-	-	-	-	-	-	12.25	0.52	36	-1.06	0.13	0	-
2017-2018	ASC 102	1856	-	-	-	-	-	-	13.25	0.52	21	-0.05	0.13	0.72	-
2017-2018	ASC 103	1857	-	-	-	-	-	-	11.86	0.52	40	-1.44	0.13	0	-
2017-2018	APB 450275	1865	-	-	-	-	-	-	13.74	0.52	13	0.43	0.13	0	-
2017-2018	APB 450333	1866	-	-	-	-	-	-	13.93	0.52	8	0.62	0.13	0	-
2017-2018	DPG CANDURA	1867	-	-	-	-	-	-	12.97	0.52	28	-0.33	0.13	0.02	Released
2017-2018	POWELL	1868	-	-	-	-	-	-	13.75	0.52	12	0.45	0.13	0	Available
2017-2018	SHASTA	1869	-	-	-	-	-	-	12.94	0.52	29	-0.36	0.13	0.01	Available
2017-2018	UC 1870	1870	-	-	-	-	-	-	12.55	0.52	33	-0.75	0.13	0	-
2017-2018	UC 1871	1871	-	-	-	-	-	-	13.48	0.52	18	0.17	0.13	0.23	-
2017-2018	UC 1872	1872	-	-	-	-	-	-	13.52	0.52	17	0.21	0.13	0.14	-
2017-2018	UC 1873	1873	-	-	-	-	-	-	12.85	0.52	30	-0.45	0.13	0	-
2017-2018	DPG DURAKING	878	-	-	-	-	-	-	12.49	0.52	34	-0.81	0.13	0	Released
2017-2018	KRONOS	951	-	-	-	-	-	-	13.42	0.51	19	0.11	0.09	0.25	Available

Table 33. Statewide durum wheat yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank	Status
2018-2020	UC DESERT GOLD	1850	8236	380	1	541	138	0	9146	583	2	12.41	0.47	36	-0.53	0.15	0	11.07	1.01	18	Available
2018-2020	UC DESERT KING	1375	8209	379	2	515	133	0	8595	583	6	12.82	0.47	24	-0.12	0.15	0.51	12.75	1.01	9	Available
2018-2020	UC 1870	1870	8167	380	3	472	138	0.01	9242	583	1	12.54	0.47	30	-0.4	0.15	0.02	11.81	1.01	16	-
2018-2020	ASC 124	1914	8160	419	4	465	220	0.1	-	-	-	12.22	0.59	38	-0.72	0.37	0.1	-	-	-	-
2018-2020	UC 1771	1771	8146	423	5	451	227	0.11	-	-	-	12.43	0.59	33	-0.51	0.37	0.28	-	-	-	-
2018-2020	DPG DURAKING	878	8137	407	6	442	197	0.09	-	-	-	12.41	0.48	35	-0.53	0.17	0.01	-	-	-	Released
2018-2020	SHASTA	1869	8130	384	7	435	147	0.02	-	-	-	12.81	0.48	25	-0.13	0.15	0.5	-	-	-	Available
2018-2020	APB 471400	1853	8130	385	8	435	149	0.02	-	-	-	11.97	0.48	40	-0.97	0.16	0	-	-	-	-
2018-2020	TIBURON	1640	8127	379	9	433	135	0.01	8752	583	4	12.92	0.47	22	-0.02	0.14	0.93	12.14	1.01	14	Available
2018-2020	APB 152308	1900	8081	399	10	386	181	0.1	8395	583	10	13.03	0.54	18	0.09	0.29	0.81	12.39	1.01	13	-
2018-2020	UC 1918	1918	7949	478	11	254	315	0.55	8440	583	8	12.77	0.65	26	-0.17	0.46	0.78	12.4	1.01	12	-
2018-2020	SY FORTISSIMO	1429	7934	384	12	239	147	0.21	-	-	-	12.82	0.48	23	-0.12	0.16	0.53	-	-	-	Available
2018-2020	UC 1910	1910	7917	399	13	222	181	0.37	8648	583	5	13.59	0.54	7	0.65	0.29	0.06	12.7	1.01	10	-
2018-2020	UC 1919	1919	7915	478	14	220	315	0.59	8407	583	9	13.49	0.65	9	0.54	0.46	0.34	13.12	1.01	5	-
2018-2020	DPG TOPPER	1211	7851	407	15	156	197	0.55	-	-	-	12.13	0.48	39	-0.81	0.18	0	-	-	-	Released
2018-2020	WB MEAD	1607	7840	384	16	145	147	0.46	-	-	-	13.36	0.48	11	0.42	0.16	0.02	-	-	-	Available
2018-2020	UC MIWOK	1690	7809	367	17	114	96	0.37	8506	583	7	13.05	0.46	16	0.11	0.09	0.34	12.68	1.01	11	Available

2018-2020	POWELL	1868	7787	384	18	92	147	0.62	-	-	-	13.62	0.48	5	0.68	0.16	0	-	-	-	Available
2018-2020	AS SARAGOLLA	1583	7765	380	19	70	138	0.68	8218	583	12	11.92	0.47	41	-1.02	0.14	0	11.24	1.01	17	Available
2018-2020	UC 1873	1873	7738	407	20	43	197	0.86	-	-	-	12.93	0.48	21	-0.01	0.17	0.93	-	-	-	-
2018-2020	WB ORITA	1215	7670	386	21	-25	151	0.87	-	-	-	13.59	0.48	6	0.65	0.16	0	-	-	-	Available
2018-2020	ASC 123	1913	7648	423	22	-46	227	0.86	-	-	-	12.31	0.59	37	-0.63	0.37	0.15	-	-	-	-
2018-2020	APB 153541	1901	7628	401	23	-67	184	0.77	8805	583	3	13.64	0.54	3	0.7	0.29	0.04	12.76	1.01	8	-
2018-2020	SY VOLANTE	1431	7619	379	24	-76	133	0.64	7546	583	15	12.63	0.47	29	-0.31	0.14	0.07	12.89	1.01	7	Available
2018-2020	UC 1872	1872	7546	416	25	-149	213	0.59	-	-	-	12.72	0.49	27	-0.22	0.18	0.34	-	-	-	-
2018-2020	DPG PLATINUM	1210	7531	386	26	-164	151	0.41	-	-	-	12.67	0.48	28	-0.27	0.16	0.15	-	-	-	Available
2018-2020	AS COLOMBO	1800	7479	380	27	-216	138	0.23	6348	590	18	12.47	0.47	31	-0.47	0.15	0	14.14	1.01	1	Available
2018-2020	APB 450311	1851	7475	410	28	-220	202	0.41	-	-	-	13.32	0.49	12	0.38	0.18	0.08	-	-	-	-
2018-2020	UC 1871	1871	7469	392	29	-226	166	0.31	-	-	-	13.04	0.48	17	0.1	0.16	0.65	-	-	-	-
2018-2020	APB 450333	1866	7454	407	30	-241	197	0.37	-	-	-	13.25	0.48	14	0.31	0.17	0.12	-	-	-	-
2018-2020	APB 450275	1865	7416	410	31	-279	202	0.31	-	-	-	13.28	0.48	13	0.34	0.17	0.09	-	-	-	-
2018-2020	ALBERTO	1813	7414	380	32	-281	136	0.1	7330	583	17	13.02	0.47	19	0.08	0.14	0.65	13.16	1.01	4	Available
2018-2020	APB 471389	1924	7399	478	33	-295	315	0.48	7891	583	14	13.39	0.65	10	0.45	0.46	0.46	13.02	1.01	6	-
2018-2020	WB MOHAVE	1654	7390	386	34	-304	151	0.11	-	-	-	13.63	0.48	4	0.69	0.15	0	-	-	-	Available
2018-2020	AS MAESTRALE	1582	7328	380	35	-367	138	0.03	8394	583	11	12.43	0.47	34	-0.51	0.15	0	11.91	1.01	15	Available
2018-2020	DPG CANDURA	1867	7286	413	36	-409	208	0.11	-	-	-	12.44	0.48	32	-0.5	0.18	0.01	-	-	-	Released
2018-2020	KRONOS	951	7241	394	37	-454	169	0.03	-	-	-	13.08	0.48	15	0.14	0.17	0.51	-	-	-	Available
2018-2020	ASC 122	1912	7189	433	38	-506	244	0.1	-	-	-	12.98	0.59	20	0.04	0.37	0.93	-	-	-	-
2018-2020	APB 152356	1902	7139	399	39	-556	181	0.01	7438	583	16	13.55	0.54	8	0.61	0.29	0.08	13.39	1.01	3	-
2018-2020	UC DESERT KING HP	1627	7138	380	40	-557	138	0	7930	583	13	14.21	0.47	1	1.27	0.15	0	13.62	1.01	2	Available
2018-2020	WESTMORE HP	1484	7001	390	41	-694	161	0	-	-	-	13.68	0.48	2	0.74	0.16	0	-	-	-	Available

Triticale performance tables

Table 34. Sacramento Valley region, triticale yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err.Yield (lb/acre)	2020 Yield Rank	Status
2018-2020	NS GOLD RUSH 91	3178	7737	629	1	750	196	0	7821	947	6	Available
2018-2020	UC BOPAK	3190	7690	630	2	703	199	0	8984	947	1	-
2018-2020	UC 3184	3184	7548	614	3	562	153	0	8355	947	2	-
2018-2020	UC ATREA	3185	7467	612	4	480	147	0	7725	947	8	-
2018-2020	NS TRICAL 158EP	3169	7260	614	5	273	152	0.11	7865	947	5	Available
2018-2020	NS 13T00903	3189	7151	630	6	164	199	0.53	8088	947	3	-
2018-2020	NS TRICAL 115T	3170	7099	613	7	112	149	0.53	7742	947	7	Available
2018-2020	WB PACHECO	3164	7045	623	8	59	184	0.75	7905	947	4	Available
2018-2020	NS SWIFT 77	3188	6824	630	9	-162	199	0.53	5941	954	10	Available
2018-2020	UC 3191	3191	6822	709	10	-165	361	0.7	7350	947	9	-
2018-2020	UC 3183	3183	6408	640	11	-578	229	0.02	-	-	-	-
2018-2020	NS TRICAL 105	3097	6360	616	12	-626	162	0	-	-	-	Released
2018-2020	XB T401	3186	6274	635	13	-713	220	0	-	-	-	-
2018-2020	NS CAMELOT	3168	6128	617	14	-859	166	0	-	-	-	Released

Table 35. North Central San Joaquin Valley region, triticale yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield	3-yr Yield Rank	Yield diff. from	Yield st.err.diff. from	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err.Yield	2020 Yield Rank	Status
2018-2020	UC 3184	3184	7719	663	1	874	160	0	7103	2469	1	-
2018-2020	UC BOPAK	3190	7544	681	2	699	212	0	6720	2469	3	-
2018-2020	NS GOLD RUSH 91	3178	7363	678	3	518	206	0.03	6879	2469	2	Available
2018-2020	UC ATREA	3185	7294	660	4	449	149	0.01	6033	2469	5	-
2018-2020	NS SWIFT 77	3188	6983	678	5	138	206	0.59	6394	2469	4	Available
2018-2020	NS 13T00903	3189	6921	678	6	76	206	0.77	6030	2469	6	-
2018-2020	UC 3191	3191	6861	713	7	16	290	0.96	6006	2469	7	-

2018-2020	NS TRICAL 158EP	3169	6675	661	8	-171	151	0.36	5532	2469	9	Available
2018-2020	WB PACHECO	3164	6674	666	9	-171	173	0.41	5857	2469	8	Available
2018-2020	NS TRICAL 115T	3170	6583	660	10	-263	149	0.12	5472	2469	10	Available
2018-2020	NS CAMELOT	3168	6532	668	11	-313	177	0.12	-	-	-	Released
2018-2020	UC 3183	3183	6340	690	12	-505	241	0.07	-	-	-	-
2018-2020	NS TRICAL 105	3097	6270	668	13	-575	178	0	-	-	-	Released
2018-2020	XB T401	3186	6074	681	14	-771	218	0	-	-	-	-

Table 36. South San Joaquin Valley region, triticale yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	Status
2017-2019	UC BOPAK	3190	8624	1613	1	1288	1500	0.87	-
2017-2019	NS 13T00903	3189	8413	1418	2	1077	1316	0.87	-
2017-2019	NS SWIFT 77	3188	7937	1418	3	602	1316	0.87	Available
2017-2019	NS GOLD RUSH 91	3178	7922	869	4	587	783	0.87	Available
2017-2019	UC ATREA	3185	7877	1021	5	542	941	0.87	-
2017-2019	WB PACHECO	3164	7799	903	6	464	819	0.87	Available
2017-2019	NS 12T01486	3180	7632	1055	7	297	964	0.93	-
2017-2019	NS TRICAL 115T	3170	7386	762	8	50	682	0.94	Available
2017-2019	NS TRICAL 158EP	3169	7272	762	9	-63	682	0.94	Available
2017-2019	UC 3184	3184	7240	1157	10	-95	1070	0.94	-
2017-2019	AGS 230	3181	6898	1055	11	-437	964	0.87	-
2017-2019	NS TRICAL 105	3097	6710	762	12	-625	682	0.87	Released
2017-2019	NS CAMELOT	3168	6676	762	13	-659	682	0.87	Released
2017-2019	AGS 133	3182	6571	1055	14	-764	964	0.87	-
2017-2019	XB T401	3186	6388	1418	15	-947	1325	0.87	-
2017-2019	UC 3183	3183	6019	1946	16	-1317	1819	0.87	-

Table 37. Imperial Valley region, triticale yield and protein from the 2017-18 to 2019-20 seasons.

Common Name	Trial Group	Yield	Protein	Height	Lodging	Test Weight	Thousand Kernel
Davis	BARLEY	X	X	X	X	X	X
Davis	DURUM	X	X	X	X	X	X
Davis	WHEAT	X	X	X	X	X	X
Fresno	BARLEY	X	X	X	X	X	X
Fresno	DURUM	X	X	X	X	X	X
Fresno	WHEAT	X	X	X	X	X	X
Tulelake	BARLEY	X	X	X	X	X	-
Tulelake	COMMON	X	X	X	X	X	-
Tulelake	BARLEY	X	X	X	X	X	-
Tulelake	COMMON	X	X	X	X	X	-

Table 38. Rainfed locations, triticale yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err.Yield (lb/acre)	2020 Yield Rank	Status
2018-2020	UC BOPAK	3190	5922	1208	1	658	830	1	3758	269	7	-
2018-2020	NS GOLD RUSH 91	3178	5905	1208	2	642	830	1	4202	269	2	Available
2018-2020	UC ATREA	3185	5711	978	3	448	464	1	3843	269	4	-
2018-2020	NS TRICAL 158EP	3169	5460	992	4	197	492	1	3337	269	9	Available
2018-2020	UC 3184	3184	5444	988	5	181	484	1	4386	269	1	-
2018-2020	WB PACHECO	3164	5423	1005	6	159	505	1	3993	269	3	Available
2018-2020	NS SWIFT 77	3188	5303	1208	7	40	830	1	3803	269	5	Available
2018-2020	NS TRICAL 115T	3170	5286	992	8	23	492	1	2930	269	10	Available
2018-2020	NS 13T00903	3189	5261	1208	9	-2	830	1	3763	269	6	-
2018-2020	UC 3191	3191	5041	1500	10	-222	1171	1	3415	269	8	-
2018-2020	NS CAMELOT	3168	4971	1021	11	-293	536	1	-	-	-	Released
2018-2020	NS TRICAL 105	3097	4810	1016	12	-454	526	1	-	-	-	Released
2018-2020	XB T401	3186	4756	1051	13	-508	576	1	-	-	-	-
2018-2020	UC 3183	3183	4393	1068	14	-870	602	1	-	-	-	-

Table 39. Statewide triticale yield and protein from the 2017-18 to 2019-20 seasons.

Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	Status
2018-2020	UC BOPAK	3190	7723	413	1	724	141	0	7852	1183	1	-
2018-2020	NS GOLD RUSH 91	3178	7641	411	2	643	137	0	7350	1183	3	Available
2018-2020	UC 3184	3184	7589	400	3	591	105	0	7729	1183	2	-
2018-2020	UC ATREA	3185	7440	398	4	441	99	0	6879	1183	6	-
2018-2020	NS 13T00903	3189	7189	412	5	190	138	0.27	7059	1183	4	-
2018-2020	NS TRICAL 158EP	3169	7116	398	6	117	101	0.35	6698	1183	7	Available
2018-2020	WB PACHECO	3164	6986	405	7	-12	122	0.92	6881	1183	5	Available
2018-2020	NS SWIFT 77	3188	6982	412	8	-17	139	0.92	6237	1184	10	Available
2018-2020	NS TRICAL 115T	3170	6970	398	9	-28	100	0.91	6607	1183	9	Available
2018-2020	UC 3191	3191	6933	460	10	-65	235	0.91	6678	1183	8	-
2018-2020	UC 3183	3183	6418	417	11	-581	155	0	-	-	-	-
2018-2020	NS TRICAL 105	3097	6387	401	12	-611	111	0	-	-	-	Released
2018-2020	NS CAMELOT	3168	6351	401	13	-648	112	0	-	-	-	Released
2018-2020	XB T401	3186	6256	412	14	-743	144	0	-	-	-	-

Barley performance tables

Table 40. Sacramento Valley region, barley yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall	Yield p-Value	Status
6RSF	2017-2019	ISHI	1047	5539	591	1	1262	190	0	Available
6RSF	2017-2019	UC 1280	1280	5503	636	2	1226	294	0	-
2RSM	2017-2019	LCS ODYSSEY	1415	4822	586	3	545	179	0.01	Available
6RSN	2017-2019	UC 937	937	4758	600	4	481	215	0.07	-
6RSF	2017-2019	UC 933	933	4734	586	5	457	179	0.03	Released
6RSF	2017-2019	UC 960	960	4616	606	6	339	229	0.27	-
6RSF	2017-2019	UC 969	969	4551	585	7	273	173	0.24	Released
2RSM	2017-2019	UC 1410	1410	4547	660	8	269	343	0.62	-
2RSM	2017-2019	LCS GENIE	1414	4407	578	9	130	154	0.61	Available
6RSF	2017-2019	UC 603	603	4326	589	10	48	186	0.87	Released
6RSN	2017-2019	TAMALPAIS	1134	4302	586	11	24	179	0.93	Available
2RSM	2017-2019	UC 1911	1911	4268	623	12	-10	268	0.97	-
2RSM	2017-2019	UC TAHOE	1409	4218	590	13	-59	190	0.87	Available
6RSF	2017-2019	MAX	816	4175	660	14	-103	343	0.87	-
2RSM	2017-2019	OSU FULL PINT	1411	4140	606	15	-137	229	0.74	Released

2RSM	2017-2019	UC B9K94	1861	4135	645	16	-143	316	0.83	-
2RSM	2017-2019	UC BUTTA 12	1360	4061	585	17	-217	176	0.39	Available
2RSM	2017-2019	UC 1915	1915	4028	629	18	-249	280	0.61	-
6RSF(H)	2017-2019	SCHALLER	1355	3781	629	19	-497	280	0.18	Available
2RSM	2017-2019	CDC COPELAND	1858	3657	594	20	-620	201	0.01	Available
2RSM	2017-2019	UC CAPAY	1390	3503	590	21	-774	190	0	Available
2RSM	2017-2019	ACC SYNERGY	1859	3426	600	22	-852	216	0	Available
2RSM	2017-2019	KLAGES	1860	2884	600	23	-1393	215	0	Released

Table 41. North Central San Joaquin Valley region, barley yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	Status
6RSF	2018-2020	UC 1280	1280	6926	456	1	1381	365	0	-	-	-	-
6RSN	2018-2020	TAMALPAIS	1134	6717	363	2	1172	260	0	7447	772	1	Available
6RSF	2018-2020	ISHI	1047	6673	369	3	1128	268	0	7322	772	2	Available
6RSF	2018-2020	UC 603	603	6394	408	4	849	311	0.02	-	-	-	Released
6RSF	2018-2020	UC 933	933	6327	408	5	781	311	0.02	-	-	-	Released
6RSF	2018-2020	UC 969	969	6228	373	6	683	270	0.02	-	-	-	Released
2RSM	2018-2020	LCS ODYSSEY	1415	5919	376	7	373	277	0.27	5955	772	7	Available
2RSM	2018-2020	OSU FULL PINT	1411	5900	407	8	354	311	0.36	-	-	-	Released
2RSM	2018-2020	UC 1911	1911	5800	396	9	255	301	0.46	6651	772	4	-
2RSM	2018-2020	LCS GENIE	1414	5477	336	10	-68	226	0.76	6868	772	3	Available
6RSN	2018-2020	UC 937	937	5342	397	11	-203	299	0.55	-	-	-	-
2RSM	2018-2020	UC B9K94	1861	5329	665	12	-216	593	0.75	-	-	-	-
2RSM	2018-2020	UC TAHOE	1409	5308	369	13	-237	268	0.46	6126	772	5	Available
6RSF	2018-2020	UC 960	960	5263	397	14	-282	299	0.45	-	-	-	-
2RSM	2018-2020	UC BUTTA 12	1360	5006	385	15	-539	288	0.11	5983	772	6	Available
2RSM	2018-2020	UC 1915	1915	4984	407	16	-561	313	0.12	5209	772	8	-
2RSM	2018-2020	ACC SYNERGY	1859	4767	363	17	-778	260	0.01	4337	772	10	Available
6RSF(H)	2018-2020	SCHALLER	1355	4760	407	18	-785	313	0.02	4315	772	11	Available
2RSM	2018-2020	UC CAPAY	1390	4515	363	19	-1031	260	0	3519	772	12	Available
2RSM	2018-2020	CDC COPELAND	1858	4495	369	20	-1050	268	0	4881	772	9	Available
2RSM	2018-2020	KLAGES	1860	4317	397	21	-1228	299	0	-	-	-	Released

Table 42. South San Joaquin Valley region, barley yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	Status
-	2016-2018	UC UOP 98	1402	3262	803	1	1193	423	0.21	-
-	2016-2018	UC UOP 100	1404	2893	803	2	825	423	0.44	-
6RSF	2016-2018	UC B398	1256	2821	803	3	753	423	0.53	-
6RSF	2016-2018	UC 1280	1280	2697	803	4	629	423	0.8	-
-	2016-2018	UC UOP 105	1406	2661	803	5	592	423	0.8	-
2RSM	2016-2018	UC CAPAY	1390	2482	735	6	413	302	0.8	Available
2RSM	2016-2018	ACC SYNERGY	1859	2424	909	7	355	611	0.98	Available
6RSF	2016-2018	UC A237	1261	2384	803	8	316	423	0.98	-
6RSN	2016-2018	UC 1318	1318	2373	803	9	305	423	0.98	-
-	2016-2018	UC UYP 210B	1383	2366	803	10	298	423	0.98	-
-	2016-2018	UC UYP 3B	1379	2355	803	11	286	423	0.98	-
2RSM	2016-2018	LCS GENIE	1414	2272	743	12	203	337	0.98	Available
2RSM	2016-2018	UC B9K94	1861	2238	909	13	170	611	0.98	-
-	2016-2018	UC 08YP 111 1231 LATE	1385	2223	803	14	154	423	0.98	-
2RSM	2016-2018	UC 1410	1410	2158	765	15	89	364	0.98	-
2RSM	2016-2018	UC UOP 111	1408	2139	803	16	70	423	0.98	-
6RSN	2016-2018	UC 937	937	2138	909	17	69	611	0.98	-
2RSM	2016-2018	LCS ODYSSEY	1415	2087	795	18	19	438	0.99	Available
2RSM	2016-2018	UC UOP 95	1399	2069	803	19	1	423	1	-
6RSF	2016-2018	UC 603	603	2043	735	20	-25	302	0.98	Released
-	2016-2018	UC UOP 99	1403	2024	803	21	-45	423	0.98	-
2RSM	2016-2018	KLAGES	1860	2015	909	22	-53	611	0.98	Released
6RSN	2016-2018	UC 1263	1263	1985	803	23	-84	423	0.98	-
6RSF	2016-2018	UC 933	933	1976	739	24	-93	312	0.98	Released
2RSM	2016-2018	UC BUTTA 12	1360	1958	735	25	-110	302	0.98	Available
6RSN	2016-2018	UC 1266	1266	1940	803	26	-128	423	0.98	-
-	2016-2018	UC UOP 96	1400	1939	803	27	-130	423	0.98	-
6RSF	2016-2018	ISHI	1047	1937	744	28	-131	322	0.98	Available
6RSF	2016-2018	UC 969	969	1935	725	29	-133	282	0.98	Released
2RSM	2016-2018	CDC COPELAND	1858	1921	909	30	-147	611	0.98	Available
6RSF	2016-2018	UC 960	960	1919	909	31	-150	611	0.98	-
6RSF	2016-2018	UC B369	1255	1863	803	32	-205	423	0.98	-
2RSM	2016-2018	UC TAHOE	1409	1848	735	33	-220	302	0.98	Available
6RSN	2016-2018	TAMALPAIS	1134	1846	735	34	-222	302	0.98	Available
2RSM	2016-2018	OSU FULL PINT	1411	1779	758	35	-290	344	0.98	Released
-	2016-2018	UC UOP 102	1405	1763	803	36	-305	423	0.98	-
6RSN	2016-2018	UC 1317	1317	1637	803	37	-431	423	0.98	-
-	2016-2018	UC UOP 97	1401	1628	803	38	-441	423	0.98	-
6RSF(H)	2016-2018	SCHALLER	1355	1618	803	39	-450	423	0.98	Available
6RSF	2016-2018	MAX	816	1338	765	40	-730	364	0.44	-
6RSF	2016-2018	UC UYP 210A	1351	1246	803	41	-823	423	0.44	-
6RSF	2016-2018	UC71 183 1	162	673	907	42	-1395	591	0.39	-

Table 43. Rainfed locations, barley yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	Status
6RSF	2017-2019	ISHI	1047	4566	629	1	1104	420	0.2	Available
6RSF	2017-2019	UC 1280	1280	4522	1136	2	1060	999	0.88	-
6RSF	2017-2019	UC 933	933	3840	613	3	378	399	0.88	Released
2RSM	2017-2019	UC 1410	1410	3825	791	4	363	628	0.88	-
2RSM	2017-2019	UC 1911	1911	3793	1136	5	331	999	0.88	-
2RSM	2017-2019	LCS GENIE	1414	3781	564	6	319	323	0.88	Available
6RSN	2017-2019	UC 937	937	3766	711	7	304	523	0.88	-
2RSM	2017-2019	LCS ODYSSEY	1415	3760	618	8	298	406	0.88	Available
6RSF	2017-2019	UC 969	969	3577	588	9	115	361	0.88	Released
2RSM	2017-2019	OSU FULL PINT	1411	3572	739	10	110	558	0.88	Released
6RSF	2017-2019	UC 960	960	3433	711	11	-29	523	0.96	-
6RSF	2017-2019	UC 603	603	3375	623	12	-87	413	0.88	Released
2RSM	2017-2019	UC TAHOE	1409	3329	629	13	-133	420	0.88	Available
6RSN	2017-2019	TAMALPAIS	1134	3326	613	14	-136	398	0.88	Available
2RSM	2017-2019	UC BUTTA 12	1360	3263	609	15	-199	393	0.88	Available
6RSF	2017-2019	MAX	816	3218	791	16	-244	628	0.88	-
6RSF(H)	2017-2019	SCHALLER	1355	3201	1136	17	-261	999	0.88	Available
2RSM	2017-2019	UC B9K94	1861	3158	766	18	-304	589	0.88	-
2RSM	2017-2019	UC CAPAY	1390	3078	623	19	-384	412	0.88	Available
2RSM	2017-2019	UC 1915	1915	3004	1136	20	-458	999	0.88	-
2RSM	2017-2019	ACC SYNERGY	1859	2854	724	21	-608	540	0.88	Available
2RSM	2017-2019	CDC COPELAND	1858	2718	678	22	-744	482	0.88	Available
2RSM	2017-2019	KLAGES	1860	2667	724	23	-795	540	0.88	Released

Table 44. Statewide barley yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err.Yield (lb/acre)	2020 Yield Rank	Status
6RSF	2018-2020	UC 1280	1280	5543	619	1	1301	227	0	-	-	-	-
6RSF	2018-2020	ISHI	1047	5292	596	2	1050	161	0	7322	772	2	Available
6RSF	2018-2020	UC 933	933	4754	596	3	512	163	0	-	-	-	Released
6RSN	2018-2020	TAMALPAIS	1134	4676	593	4	434	151	0.01	7447	772	1	Available
6RSF	2018-2020	UC 603	603	4666	598	5	424	168	0.03	-	-	-	Released
2RSM	2018-2020	LCS ODYSSEY	1415	4616	594	6	374	157	0.03	5955	772	7	Available
6RSF	2018-2020	UC 969	969	4531	591	7	288	144	0.07	-	-	-	Released
6RSN	2018-2020	UC 937	937	4426	597	8	184	163	0.37	-	-	-	-
2RSM	2018-2020	UC 1911	1911	4377	607	9	135	196	0.65	6651	772	4	-
6RSF	2018-2020	UC 960	960	4276	598	10	34	169	0.91	-	-	-	-
2RSM	2018-2020	OSU FULL PINT	1411	4261	599	11	19	171	0.91	-	-	-	Released
2RSM	2018-2020	LCS GENIE	1414	4224	585	12	-18	124	0.91	6868	772	3	Available
2RSM	2018-2020	UC TAHOE	1409	4182	595	13	-60	159	0.87	6126	772	5	Available
2RSM	2018-2020	UC B9K94	1861	4170	625	14	-72	244	0.9	-	-	-	-
2RSM	2018-2020	UC BUTTA 12	1360	3918	595	15	-324	159	0.07	5983	772	6	Available
2RSM	2018-2020	UC 1915	1915	3827	611	16	-415	205	0.07	5209	772	8	-
2RSM	2018-2020	UC CAPAY	1390	3610	594	17	-632	157	0	3519	772	12	Available
6RSF(H)	2018-2020	SCHALLER	1355	3592	611	18	-650	205	0	4315	772	11	Available
2RSM	2018-2020	ACC SYNERGY	1859	3558	594	19	-684	155	0	4337	772	10	Available
2RSM	2018-2020	CDC COPELAND	1858	3509	592	20	-733	151	0	4881	772	9	Available
2RSM	2018-2020	KLAGES	1860	3074	597	21	-1168	164	0	-	-	-	Released

Intermountain region performance tables

Table 45. Intermountain region, winter wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err. Protein (%)	2020 Protein Rank
SWW	2018-2020	LCS BLACKJACK	29199	10890	1000	1	1950	443	0	10745	325	2	10.56	0.85	55	-0.63	0.16	0	11.27	0.22	20
SWW	2018-2020	LWW16 71088	29216	10660	1069	2	1720	580	0.05	11002	325	1	9.72	0.87	86	-1.47	0.24	0	10.97	0.22	23
SWW	2018-2020	LCS GHOST	29138	10391	1000	3	1450	443	0.02	10064	325	4	9.92	0.85	85	-1.27	0.16	0	10.45	0.22	25
SWW	2018-2020	WB 1783	29146	10204	1000	4	1264	443	0.06	10039	325	5	10.53	0.85	58	-0.66	0.16	0	11.25	0.22	21
SWW	2018-2020	IDO 1005	29197	10114	1131	5	1174	685	0.52	-	-	-	10.22	0.87	80	-0.96	0.23	0	-	-	-
SWW	2018-2020	ROSALYN	29090	10114	1000	6	1174	443	0.07	9820	325	7	9.98	0.85	83	-1.21	0.16	0	10.57	0.22	24
SWW	2018-2020	MARY	29059	9993	1000	7	1053	443	0.14	10024	325	6	10.34	0.85	75	-0.85	0.16	0	11.55	0.22	14.5
SWW	2018-2020	WA 8293	29210	9948	1131	8	1008	685	0.68	-	-	-	10.56	0.87	54	-0.63	0.23	0.01	-	-	-
SWW	2018-2020	BOBTAIL	29011	9948	1000	9	1008	443	0.17	10158	325	3	10.39	0.85	73	-0.8	0.16	0	11.4	0.22	19
SWW	2018-2020	SY BANKS	29205	9872	1131	10	931	685	0.76	-	-	-	10.57	0.87	53	-0.61	0.23	0.01	-	-	-
HRW	2018-2020	WB 4303	29237	9850	1428	11	910	1096	0.99	-	-	-	12.35	0.91	12	1.16	0.36	0	-	-	-
HRW	2018-2020	LCS JET	29241	9823	1428	12	883	1096	0.99	-	-	-	12.01	0.91	22	0.83	0.36	0.03	-	-	-
SWW	2018-2020	LCS BIANCOR	29042	9748	1159	13	808	722	0.83	-	-	-	10.35	0.91	74	-0.84	0.36	0.03	-	-	-
SWW	2018-2020	LCS SONIC	29137	9744	1131	14	804	685	0.82	-	-	-	10.54	0.87	57	-0.65	0.23	0.01	-	-	-
SWW	2018-2020	NIXON	29075	9632	1000	15	692	443	0.61	9552	325	9	10.27	0.85	78	-0.92	0.16	0	11.45	0.22	17
SWW	2018-2020	OR2150346	29256	9612	1321	16	671	972	0.99	9524	325	10	10.52	0.89	59	-0.66	0.32	0.05	11.7	0.22	13
SWW	2018-2020	SY CANDOR	29142	9593	1046	17	653	534	0.82	-	-	-	10.59	0.86	52	-0.59	0.2	0.01	-	-	-
SWW	2018-2020	NORTHWEST DUET	29044	9572	1000	18	632	443	0.71	9487	325	11	10.42	0.85	68	-0.77	0.16	0	11.55	0.22	16
SWW	2018-2020	OR2150141	29257	9571	1321	19	631	972	0.99	9483	325	12	11.17	0.89	33	-0.01	0.32	0.97	12.35	0.22	5
HRW	2018-2020	UI BRONZE JADE	29230	9526	1428	20	586	1096	1	-	-	-	11.41	0.91	29	0.23	0.36	0.58	-	-	-
SWW	2018-2020	LCS HULK	29058	9521	1000	21	581	443	0.79	9810	325	8	10.51	0.85	61	-0.68	0.16	0	11.4	0.22	18
SWW	2018-2020	LCS SHARK	29057	9490	1028	22	550	497	0.83	-	-	-	10.74	0.86	45	-0.45	0.19	0.03	-	-	-
SWW	2018-2020	SY OVATION	29102	9471	1005	23	530	456	0.82	9335	325	14	10.8	0.85	42	-0.39	0.16	0.03	11.72	0.22	11.5
SWW	2018-2020	STEPHENS	29093	9423	1000	24	483	443	0.83	9160	325	17	10.42	0.85	69	-0.77	0.16	0	11.55	0.22	14.5

-	2018-2020	WA 8292	29209	9413	1131	25	473	685	0.99	-	-	-	10.44	0.87	66	-0.75	0.23	0	-	-	-
SWW	2018-2020	TUBBS 06	29105	9403	1131	26	463	685	0.99	-	-	-	10.04	0.87	82	-1.15	0.23	0	-	-	-
SWW	2018-2020	LWW15 71898	29215	9401	1159	27	460	722	0.99	-	-	-	10.61	0.91	51	-0.57	0.36	0.14	-	-	-
SWW	2018-2020	LCS SHINE	29136	9360	1000	28	420	443	0.97	9137	325	18	10.46	0.85	64	-0.73	0.16	0	11.87	0.22	8
HRW	2018-2020	KELDIN	29039	9345	1428	29	405	1096	1	-	-	-	11.71	0.91	28	0.53	0.36	0.17	-	-	-
HRW	2018-2020	AP REDEYE	29236	9344	1428	30	404	1096	1	-	-	-	12.31	0.91	13	1.13	0.36	0	-	-	-
SWW	2018-2020	LCS ARTDECO	29041	9319	1028	31	378	497	0.99	-	-	-	10.75	0.86	44	-0.44	0.19	0.03	-	-	-
SWW	2018-2020	SY RAPTOR	29143	9307	1028	32	367	497	0.99	-	-	-	10.7	0.86	46	-0.48	0.19	0.02	-	-	-
SWW	2018-2020	YS 201	29213	9271	1131	33	330	685	1	-	-	-	10.14	0.87	81	-1.05	0.23	0	-	-	-
SWW	2018-2020	VI BULLDOG	29035	9270	1000	34	329	443	0.99	8970	325	20	10.5	0.85	62	-0.69	0.16	0	11.83	0.22	9
SWW	2018-2020	IDO 1708	29198	9260	1131	35	320	685	1	-	-	-	10.76	0.87	43	-0.43	0.23	0.08	-	-	-
HRW	2018-2020	SCORPIO	29232	9236	1428	36	295	1096	1	-	-	-	11.81	0.91	27	0.63	0.36	0.1	-	-	-
HRW	2018-2020	WB 4394	29239	9185	1428	37	244	1096	1	-	-	-	12.08	0.91	21	0.89	0.36	0.02	-	-	-
SWW	2018-2020	OR2121285	29203	9184	1131	38	244	685	1	-	-	-	10.51	0.87	60	-0.68	0.23	0.01	-	-	-
SWW	2018-2020	UI MAGIC CL+	29255	9138	1321	39	198	972	1	9050	325	19	11.32	0.89	31	0.14	0.32	0.69	12.5	0.22	4
SWW	2018-2020	OR2140233	29221	9087	1159	40	146	722	1	-	-	-	10.45	0.91	65	-0.74	0.36	0.05	-	-	-
SWW	2018-2020	OR2140401	29220	9052	1069	41	112	580	1	9207	325	16	9.66	0.87	87	-1.52	0.24	0	11.1	0.22	22
SWW	2018-2020	ORI2161244 CL+	29225	9050	1196	42	109	779	1	-	-	-	10.65	0.91	49	-0.54	0.36	0.16	-	-	-
SWW	2018-2020	11 163 1C	29222	9046	1159	43	106	722	1	-	-	-	10.31	0.91	76	-0.87	0.36	0.02	-	-	-
HRW	2018-2020	OR2160008R	29250	9040	1428	44	100	1096	1	-	-	-	12.15	0.91	19	0.96	0.36	0.01	-	-	-
SWW	2018-2020	LCS DRIVE	29052	9032	1028	45	92	497	1	-	-	-	10.55	0.86	56	-0.64	0.19	0	-	-	-
SWW	2018-2020	KASEBERG	29038	8996	1037	46	56	514	1	-	-	-	9.92	0.86	84	-1.27	0.19	0	-	-	-
HRW	2018-2020	OR2160089R	29252	8973	1428	47	33	1096	1	-	-	-	12.41	0.91	11	1.23	0.36	0	-	-	-
SWW	2018-2020	06PN212 25	29217	8956	1159	48	16	722	1	-	-	-	10.81	0.91	41	-0.37	0.36	0.34	-	-	-
SWW	2018-2020	OR2130081	29204	8945	1131	49	4	685	1	-	-	-	10.4	0.87	72	-0.79	0.23	0	-	-	-
SWW	2018-2020	SY DAYTON	29207	8938	1000	50	-3	443	1	8303	325	22	10.48	0.85	63	-0.71	0.16	0	12	0.22	6
SWW	2018-2020	WB 1604	29116	8937	1000	51	-3	443	1	8031	325	23	10.94	0.85	40	-0.25	0.16	0.16	12.7	0.22	3
HRW	2018-2020	OR2160011R	29251	8920	1428	52	-20	1096	1	-	-	-	11.38	0.91	30	0.19	0.36	0.64	-	-	-
SWW	2018-2020	NORTHWEST TANDEM	29045	8910	1028	53	-30	497	1	-	-	-	10.69	0.86	47	-0.49	0.19	0.02	-	-	-
HRW	2018-2020	LCS AYMERIC	29243	8900	1428	54	-40	1096	1	-	-	-	11.85	0.91	26	0.66	0.36	0.09	-	-	-
SWW	2018-2020	DYNA GRO IMPACT	29218	8888	1159	55	-52	722	1	-	-	-	10.95	0.91	39	-0.24	0.36	0.56	-	-	-
HRW	2018-2020	OR2150169R	29249	8862	1428	56	-78	1096	1	-	-	-	11.91	0.91	25	0.73	0.36	0.06	-	-	-
SWW	2018-2020	WB 1532	29211	8861	1000	57	-79	443	1	9222	325	15	11.06	0.85	36	-0.13	0.16	0.51	13.1	0.22	2
SWW	2018-2020	M PRESS	29200	8823	1000	58	-117	443	1	8470	325	21	10.41	0.85	70	-0.78	0.16	0	11.87	0.22	7
HRW	2018-2020	WA 8289	29233	8805	1428	59	-135	1096	1	-	-	-	11.95	0.91	23	0.76	0.36	0.05	-	-	-
SWW	2018-2020	OR2130755	29219	8797	1159	60	-144	722	1	-	-	-	11.01	0.91	37	-0.17	0.36	0.67	-	-	-

HWW	2018-2020	OR2150168H	29247	8766	1428	61	-174	1096	1	-	-	-	12.48	0.91	9	1.29	0.36	0	-	-	-
HRW	2018-2020	LCS ROCKET	29242	8749	1428	62	-192	1096	1	-	-	-	12.18	0.91	18	0.99	0.36	0.01	-	-	-
SWW	2018-2020	STINGRAY CL+	29223	8727	1069	63	-213	580	1	9455	325	13	10.41	0.87	71	-0.78	0.24	0	11.72	0.22	11.5
HWW	2018-2020	IRV	29245	8689	1428	64	-251	1096	1	-	-	-	12.08	0.91	20	0.89	0.36	0.02	-	-	-
HRW	2018-2020	LCS EVINA	29240	8650	1428	65	-290	1096	1	-	-	-	12.88	0.91	6	1.69	0.36	0	-	-	-
SWW	2018-2020	APPLEBY CL+	29226	8645	1159	66	-295	722	1	-	-	-	10.65	0.91	48	-0.54	0.36	0.16	-	-	-
SWW	2018-2020	SY ASSURE	29144	8613	1028	67	-327	497	0.99	-	-	-	10.64	0.86	50	-0.55	0.19	0.01	-	-	-
SWW	2018-2020	SY COMMAND	29096	8607	1028	68	-333	497	0.99	-	-	-	10.29	0.86	77	-0.89	0.19	0	-	-	-
HRW	2018-2020	LCS ZOOM	29244	8576	1428	69	-364	1096	1	-	-	-	11.91	0.91	24	0.73	0.36	0.06	-	-	-
-	2018-2020	MANDALA	29253	8558	1428	70	-382	1096	1	-	-	-	12.21	0.91	16	1.03	0.36	0.01	-	-	-
HWW	2018-2020	MILLIE	29246	8500	1428	71	-440	1096	1	-	-	-	12.18	0.91	17	0.99	0.36	0.01	-	-	-
HRW	2018-2020	SY CLEARSTONE CL2	29235	8470	1428	72	-470	1096	1	-	-	-	12.28	0.91	14	1.09	0.36	0.01	-	-	-
SWW	2018-2020	OR 2 X 2 CL+	29224	8457	1159	73	-483	722	0.99	-	-	-	11.01	0.91	38	-0.17	0.36	0.67	-	-	-
SWW	2018-2020	WB 1529	29115	8457	1028	74	-484	497	0.96	-	-	-	11.1	0.86	35	-0.08	0.19	0.69	-	-	-
-	2018-2020	ARS DH08X117 83C	29196	8356	1131	75	-584	685	0.99	-	-	-	11.2	0.87	32	0.01	0.23	0.97	-	-	-
HRW	2018-2020	SY TOUCHSTONE	29234	8340	1428	76	-601	1096	1	-	-	-	12.25	0.91	15	1.06	0.36	0.01	-	-	-
SWW	2018-2020	XB 1104 (EXP)	29212	8104	1131	77	-836	685	0.82	-	-	-	10.25	0.87	79	-0.94	0.23	0	-	-	-
SWW	2018-2020	OR5170022	29258	8072	1321	78	-868	972	0.99	7984	325	24	12.47	0.89	10	1.29	0.32	0	13.65	0.22	1
-	2018-2020	ARS DH08X028 9C	29195	7774	1131	79	-1166	685	0.52	-	-	-	11.11	0.87	34	-0.08	0.23	0.76	-	-	-
HWW	2018-2020	OR2160065H	29248	7610	1428	80	-1330	1096	0.82	-	-	-	12.95	0.91	5	1.76	0.36	0	-	-	-
HRW	2018-2020	WB 4623 CLP	29214	7339	1089	81	-1602	607	0.07	-	-	-	12.85	0.88	7	1.66	0.26	0	-	-	-
-	2018-2020	PRITCHETT	29254	7259	1321	82	-1681	972	0.52	7171	325	25	10.42	0.95	67	-0.76	0.44	0.11	11.76	0.27	10
HRW	2018-2020	WB 4311	29238	7189	1428	83	-1751	1096	0.6	-	-	-	13.81	0.91	2	2.63	0.36	0	-	-	-
-	2018-2020	CAL 1	29227	6890	1159	84	-2050	722	0.06	-	-	-	12.75	0.91	8	1.56	0.36	0	-	-	-
-	2018-2020	CAL 3	29229	5817	1159	85	-3123	722	0	-	-	-	13.45	0.91	4	2.26	0.36	0	-	-	-
-	2018-2020	CAL 2	29228	5328	1108	86	-3613	639	0	-	-	-	13.59	0.89	3	2.4	0.31	0	-	-	-
HRW	2018-2020	BRAWL CL+	29231	5295	1627	87	-3646	1340	0.07	-	-	-	14.85	0.91	1	3.66	0.36	0	-	-	-

Table 46. Intermountain region, spring wheat yield and protein from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err.Yield (lb/acre)	2020 Yield Rank	3-yr Protein (%)	3-yr St.Err. Protein (%)	3-yr Protein Rank	Protein diff. from overall mean	Protein st.err.diff. from overall mean	Protein p-Value	2020 Protein (%)	2020 St.Err.Protein (%)	2020 Protein Rank
SWS	2018-2020	IDO01405S	29190	10781	328	1	1810	157	0	10284	248	1	11.39	0.82	73	-2.02	0.13	0	11.82	0.14	26
SWS	2018-2020	WB 6341	19091	10708	328	2	1736	157	0	10179	248	2	10.65	0.82	84	-2.76	0.13	0	10.95	0.14	32
SWS	2018-2020	WB 6430	19092	10526	330	3	1554	158	0	-	-	-	11.3	0.82	76	-2.11	0.14	0	-	-	-
SWS	2018-2020	IDO1401S	29269	10406	391	4	1434	265	0	9897	248	3	11.19	0.84	79	-2.22	0.23	0	11.57	0.14	28
SWS	2018-2020	WA TEKOA	29150	10352	328	5	1380	157	0	9888	248	4	11.41	0.82	72	-2	0.13	0	11.9	0.14	24
-	2018-2020	SY TETON	29266	10312	391	6	1340	265	0	9802	248	5	13.06	0.84	54	-0.35	0.23	0.16	13.45	0.14	18
SWS	2018-2020	UI STONE	19078	10233	350	7	1261	196	0	-	-	-	11.21	0.83	78	-2.2	0.17	0	-	-	-
HRS	2018-2020	WALKER	19117	10183	418	8	1211	303	0	-	-	-	13.02	0.85	56	-0.39	0.26	0.17	-	-	-
SWS	2018-2020	IDO1404S	29268	10076	391	9	1104	265	0	9566	248	6	10.66	0.84	83	-2.75	0.23	0	11.05	0.14	30
HRS	2018-2020	12SB0224	19008	10004	391	10	1032	259	0	-	-	-	12.85	0.85	60	-0.56	0.25	0.04	-	-	-
HRS	2018-2020	WB 9699	1888	9999	391	11	1027	265	0	9489	248	7	13.34	0.84	49	-0.07	0.23	0.78	13.72	0.14	16
SWS	2018-2020	10PN2013-02	29270	9996	391	12	1024	265	0	9486	248	8	11.36	0.84	74	-2.05	0.23	0	11.75	0.14	27
SWS	2018-2020	ALTURAS	19015	9891	418	13	919	303	0.01	-	-	-	11.06	0.85	81	-2.35	0.26	0	-	-	-
HWS	2018-2020	IDO1203S A	19033	9665	328	14	693	157	0	9264	248	10	13.94	0.82	30	0.53	0.14	0	14.55	0.14	10
HRS	2018-2020	AP RENEGADE	19113	9644	350	15	672	200	0	9019	248	13	13.6	0.83	40	0.19	0.17	0.31	13.9	0.14	14
-	2018-2020	WB 9668	29206	9498	391	16	526	265	0.08	8989	248	14	14.84	0.84	10	1.43	0.23	0	15.22	0.14	2
SWS	2018-2020	YS 603	29161	9463	350	17	491	196	0.03	-	-	-	12.38	0.83	68	-1.03	0.17	0	-	-	-
HRS	2018-2020	XB 9610	29175	9460	391	18	488	259	0.1	-	-	-	13.91	0.85	33	0.5	0.25	0.07	-	-	-
SWS	2018-2020	IDO01702S	29191	9457	328	19	485	157	0.01	9083	248	12	11.33	0.82	75	-2.08	0.13	0	11.03	0.14	31
-	2018-2020	LNR16-1485	29265	9453	391	20	481	265	0.11	8943	248	15	13.46	0.84	45	0.05	0.23	0.85	13.85	0.14	15
SWS	2018-2020	IDO01403S	29189	9448	391	21	476	259	0.11	-	-	-	11.79	0.84	71	-1.62	0.22	0	-	-	-
SWS	2018-2020	-	29148	9424	343	22	452	183	0.03	8897	248	16	11.83	0.83	70	-1.58	0.16	0	12.35	0.14	22
DURUM	2018-2020	SOFT SVEVO	19118	9422	350	23	451	200	0.05	9359	248	9	14.36	0.83	21	0.95	0.17	0	14.57	0.14	9

HRS	2018-2020	UC 16010 20	29181	9398	391	24	426	259	0.15	-	-	-	13.61	0.85	39	0.2	0.25	0.49	-	-	-
SWS	2018-2020	WB 1035 CLP	19089	9394	391	25	422	259	0.15	-	-	-	13.14	0.84	53	-0.27	0.22	0.27	-	-	-
HRS	2018-2020	WB 9904	19119	9388	350	26	416	200	0.07	8773	248	19	13.02	0.83	57	-0.39	0.17	0.03	13.27	0.14	20
SWS	2018-2020	ALPOWA	19014	9386	350	27	414	200	0.07	8743	248	21	11.15	0.83	80	-2.26	0.17	0	11.88	0.14	25
HRS	2018-2020	WB PATRON	29147	9380	350	28	408	200	0.07	8885	248	17	13.89	0.83	35	0.48	0.17	0.01	14	0.14	13
HWS	2018-2020	IDO1202S	19032	9373	391	29	401	259	0.18	-	-	-	14.06	0.84	27	0.65	0.22	0.01	-	-	-
HRS	2018-2020	WB 9717	29172	9346	350	30	374	196	0.1	-	-	-	13.4	0.83	47	-0.01	0.18	0.96	-	-	-
-	2018-2020	WA 8315	29201	9336	391	31	364	265	0.23	8826	248	18	14.24	0.84	24	0.83	0.23	0	14.62	0.14	8
SWS	2018-2020	WB 6121	19090	9334	328	32	362	157	0.05	9123	248	11	12.44	0.82	67	-0.97	0.13	0	12.57	0.14	21
SWS	2018-2020	WA MELBA	19050	9313	328	33	342	157	0.06	8062	248	27	11.22	0.82	77	-2.19	0.13	0	12.03	0.14	23
HRS	2018-2020	AP VENOM	1877	9263	391	34	291	265	0.36	8753	248	20	14.16	0.84	26	0.75	0.23	0	14.55	0.14	11
HRS	2018-2020	SY3017 9	29179	9206	391	35	235	259	0.45	-	-	-	14.77	0.85	13	1.36	0.25	0	-	-	-
HRS	2018-2020	SY COHO	19064	9149	350	36	177	196	0.45	-	-	-	13.91	0.83	34	0.5	0.18	0.01	-	-	-
HRS	2018-2020	LCS IRON	19045	9145	391	37	173	259	0.6	-	-	-	13.05	0.85	55	-0.36	0.25	0.2	-	-	-
HRS	2018-2020	UC CENTRAL RED	29180	9138	391	38	167	259	0.6	-	-	-	13.76	0.85	38	0.35	0.25	0.2	-	-	-
SWS	2018-2020	14 FAC 2043	29187	9101	391	39	129	259	0.69	-	-	-	12.94	0.84	59	-0.47	0.22	0.05	-	-	-
HRS	2018-2020	XB 9591	29174	9088	391	40	116	259	0.71	-	-	-	12.51	0.85	65	-0.9	0.25	0	-	-	-
HRS	2018-2020	WB 9518	19096	9048	328	41	76	157	0.69	8724	248	22	14.75	0.82	14	1.34	0.15	0	15.17	0.14	3
-	2018-2020	IDO1804S	29267	9043	391	42	71	265	0.83	8534	248	23	13.96	0.84	29	0.55	0.23	0.02	14.35	0.14	12
SWS	2018-2020	SY SALTESE	29149	8957	391	43	-15	259	0.95	-	-	-	12.5	0.84	66	-0.91	0.22	0	-	-	-
HRS	2018-2020	SY SELWAY	19065	8945	350	44	-26	196	0.91	-	-	-	13.93	0.83	31	0.52	0.18	0.01	-	-	-
HRS	2018-2020	WB 9350	29152	8941	391	45	-31	259	0.92	-	-	-	13.4	0.85	48	-0.01	0.25	0.96	-	-	-
HWS	2018-2020	WB 7566	29167	8926	391	46	-46	259	0.89	-	-	-	13.52	0.85	43	0.11	0.25	0.7	-	-	-
HRS	2018-2020	WB 9990	1922	8884	391	47	-88	265	0.79	8374	248	24	12.94	0.84	58	-0.47	0.23	0.05	13.32	0.14	19
HRS	2018-2020	XB 9290	29173	8857	391	48	-115	259	0.71	-	-	-	13.57	0.85	42	0.16	0.25	0.58	-	-	-
HRS	2018-2020	WB 9668	19097	8842	350	49	-130	196	0.6	-	-	-	15.24	0.83	5	1.83	0.18	0	-	-	-
HWS	2018-2020	WB 7202 CLP	29171	8840	391	50	-132	259	0.69	-	-	-	12.78	0.85	62	-0.63	0.25	0.02	-	-	-
HRS	2018-2020	GLEE	19025	8804	391	51	-168	259	0.6	-	-	-	13.59	0.85	41	0.18	0.25	0.54	-	-	-
HWS	2018-2020	UI PLATINUM	19077	8796	391	52	-176	259	0.6	-	-	-	13.28	0.85	50	-0.13	0.25	0.68	-	-	-
HRS	2018-2020	LCS TRIGGER	29193	8720	391	53	-252	259	0.42	-	-	-	12.78	0.85	61	-0.63	0.25	0.02	-	-	-
HRS	2018-2020	UC LASSIK	19043	8713	391	54	-258	259	0.41	-	-	-	13.44	0.87	46	0.03	0.31	0.94	-	-	-
HRS	2018-2020	SY GUNSIGHT	29178	8679	391	55	-293	259	0.35	-	-	-	13.81	0.85	37	0.4	0.25	0.15	-	-	-
-	2018-2020	WB 9303	29202	8663	391	56	-309	265	0.33	8153	248	25	14.54	0.84	15.5	1.13	0.23	0	14.92	0.14	5

HRS	2018-2020	WB 9662	29154	8609	391	57	-363	259	0.23	-	-	-	14.82	0.85	11	1.41	0.25	0	-	-	-
HRS	2018-2020	12SB0197	19006	8606	391	58	-366	259	0.23	-	-	-	12.51	0.85	64	-0.9	0.25	0	-	-	-
HRS	2018-2020	ALUM	19016	8559	343	59	-413	183	0.05	8092	248	26	14.31	0.83	23	0.9	0.17	0	14.75	0.14	7
HRS	2018-2020	AP OCTANE	1878	8528	391	60	-444	265	0.14	8018	248	28	14.49	0.84	18	1.08	0.23	0	14.87	0.14	6
HRS	2018-2020	YS 802	19110	8524	391	61	-448	259	0.13	-	-	-	15.06	0.85	8	1.65	0.25	0	-	-	-
HRS	2018-2020	WA 8282 HRS	29186	8461	350	62	-511	196	0.02	-	-	-	13.97	0.83	28	0.56	0.18	0	-	-	-
SWS	2018-2020	WA SEAHAWK	19054	8440	391	63	-532	259	0.07	-	-	-	12.03	0.84	69	-1.38	0.22	0	-	-	-
SWS	2018-2020	14 SSW 1059	29188	8380	391	64	-592	259	0.05	-	-	-	13.49	0.84	44	0.08	0.22	0.75	-	-	-
HWS	2018-2020	IDO1602S	29182	8318	391	65	-654	259	0.03	-	-	-	13.91	0.85	32	0.5	0.25	0.07	-	-	-
HRS	2018-2020	16 HRS 5172	29170	8300	391	66	-671	259	0.02	-	-	-	13.86	0.87	36	0.45	0.31	0.18	-	-	-
HRS	2018-2020	LCS BUCK PRONTO	19018	8293	350	67	-679	196	0	-	-	-	15.14	0.83	7	1.73	0.18	0	-	-	-
HRS	2018-2020	IDO1603S	29183	8276	391	68	-696	259	0.02	-	-	-	14.51	0.85	17	1.1	0.25	0	-	-	-
-	2018-2020	LNR16-1223	29264	8237	391	69	-735	265	0.01	7728	248	29	13.19	0.84	52	-0.22	0.23	0.38	13.57	0.14	17
HRS	2018-2020	MSU LANNING	29176	8230	350	70	-742	196	0	-	-	-	15.76	0.83	3	2.35	0.18	0	-	-	-
HRS	2018-2020	WB 9879 CLP	19099	8224	391	71	-748	259	0.01	-	-	-	14.45	0.85	19	1.04	0.25	0	-	-	-
HRS	2018-2020	YECORA ROJO	19106	8148	328	72	-824	157	0	7704	248	30	15.03	0.82	9	1.62	0.14	0	15.85	0.14	1
HRS	2018-2020	LCS LUNA	29169	8132	391	73	-840	259	0	-	-	-	13.22	0.85	51	-0.19	0.25	0.53	-	-	-
HRS	2018-2020	IDO1701S	29184	8117	391	74	-855	259	0	-	-	-	14.22	0.87	25	0.81	0.31	0.01	-	-	-
HRS	2018-2020	WA 8280 CLP	29185	8086	391	75	-886	259	0	-	-	-	14.32	0.85	22	0.91	0.25	0	-	-	-
HRS	2018-2020	AP KIMBER CL2	19116	7916	418	76	-1056	303	0	-	-	-	14.79	0.85	12	1.38	0.26	0	-	-	-
HRS	2018-2020	KELSE	19042	7714	391	77	-1257	259	0	-	-	-	15.22	0.85	6	1.81	0.25	0	-	-	-
HRS	2018-2020	LCS REBEL	29194	7711	391	78	-1261	259	0	-	-	-	15.67	0.85	4	2.26	0.25	0	-	-	-
SWS	2018-2020	AP COACHMAN	19115	7679	350	79	-1293	200	0	6808	248	32	11.03	0.83	82	-2.38	0.17	0	11.32	0.14	29
-	2018-2020	IDO1805S	29208	7634	391	80	-1338	265	0	7124	248	31	14.54	0.84	15.5	1.13	0.23	0	14.92	0.14	4
SWS	2018-2020	WA LOUISE	19048	7436	391	81	-1536	259	0	-	-	-	12.72	0.84	63	-0.69	0.22	0	-	-	-
DURUM	2018-2020	UC DESERT KING HP	19120	7383	418	82	-1589	303	0	-	-	-	14.39	0.85	20	0.98	0.26	0	-	-	-
HRS	2018-2020	YECORA ROJO 515 HP	29160	7279	391	83	-1693	259	0	-	-	-	16.6	0.85	1	3.19	0.25	0	-	-	-
HRS	2018-2020	MSU VIDA	29177	6626	391	84	-2346	259	0	-	-	-	15.93	0.85	2	2.52	0.25	0	-	-	-

Table 47. Intermountain region, barley yield from the 2017-18 to 2019-20 seasons.

Crop Classification	Years	Name	UC Number	3-yr Yield (lb/acre)	3-yr St.Err. Yield (lb/acre)	3-yr Yield Rank	Yield diff. from overall mean	Yield st.err.diff. from overall mean	Yield p-Value	2020 Yield (lb/acre)	2020 St.Err. Yield (lb/acre)	2020 Yield Rank
-	2020	STRIDER	29260	7033	730	1	1062	417	0.12	7033	651	1
-	2020	ALBA	29259	6356	730	2	385	417	0.46	6356	651	2
-	2020	THUNDER	29262	5871	730	3	-100	417	0.81	5871	651	3
-	2020	DH130910	29263	5397	778	4	-574	465	0.4	5366	692	4
-	2020	WINTMALT	29261	5198	730	5	-773	417	0.21	5198	651	5
2RSF	2018-2020	LCS VESPA	9159	9283	577	1	1877	468	0	-	-	-
-	2018-2020	OREANA	9165	8930	527	2	1524	410	0	8519	482	1
2RSM	2018-2020	LCS OPERA	9158	8751	443	3	1345	303	0	8430	482	2
2RSF	2018-2020	CLAYMORE	9162	8614	443	4	1208	303	0	7848	482	6
-	2018-2020	CHARGER	9167	8493	527	5	1087	410	0.02	8082	482	3
-	2018-2020	KWS CHRISSIE	9169	8445	527	6	1039	410	0.03	8034	482	4
2RSF	2018-2020	LYON	9160	8421	577	7	1015	468	0.06	-	-	-
-	2018-2020	KWS JESSIE	9168	8406	527	8	1000	410	0.03	7996	482	5
-	2018-2020	LCS DIABLO	9166	8246	527	9	840	410	0.07	7835	482	7
2RSM	2018-2020	FRANCIN	9148	7832	392	10	426	248	0.13	7022	482	10
-	2018-2020	AD120341	9161	7726	577	11	320	468	0.59	-	-	-
2RSM	2018-2020	CDC COPELAND	9054	7707	392	12	301	248	0.29	7767	482	8
2RSM	2018-2020	OSU FULL PINT	9059	7665	577	13	259	468	0.64	-	-	-
2RSM	2018-2020	LCS GENIE	9149	7644	577	14	238	468	0.64	-	-	-
-	2018-2020	ALTORADO	9171	7615	527	15	210	410	0.64	7205	482	9
2RSM	2018-2020	UC BUTTA 12	9049	7194	543	16	-212	462	0.65	-	-	-
-	2018-2020	AAC CONNECT	9170	6837	527	17	-569	410	0.22	6426	482	11
2RSM	2018-2020	LCS ODYSSEY	9164	6748	577	18	-658	468	0.22	-	-	-
-	2018-2020	MEG'S SONG	9163	6604	443	19	-802	303	0.02	6163	482	12
2RSM	2018-2020	UC TAHOE	9085	6538	543	20	-868	462	0.1	-	-	-
-	2018-2020	DH120285	9157	6145	577	21	-1261	468	0.02	-	-	-
2RSM	2018-2020	UC CAPAY	9018	5893	543	22	-1513	462	0	-	-	-
-	2018-2020	DH130910	29263	5606	527	23	-1800	410	0	5195	482	13
-	2018-2020	DH120058	9156	4966	577	24	-2440	468	0	-	-	-
2RSM	2018-2020	UC B9K94	9155	4840	543	25	-2566	462	0	-	-	-

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