United States Department of Agriculture
National Agricultural Statistics Service

2020 California Almond Objective Measurement Report

Cooperating with the California Department of Food and Agriculture
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Released: July 7, 2020 - 12:00 p.m. PDT

2020 CALIFORNIA ALMOND FORECAST UP 18 PERCENT

California's 2020 almond production is forecast at 3.00 billion meat pounds, unchanged from May's subjective forecast and 18 percent higher than last year's crop. The forecast is based on 1.26 million bearing acres. Production for the Nonpareil variety is forecast at 1.30 billion meat pounds, up 24 percent over last year's deliveries. The Nonpareil variety represents 43 percent of California's total almond production.

February was very dry throughout most of California, which provided excellent bloom conditions and plenty of opportunity for pollination. There was little concern for frost damage this year. Isolated storms in late March and early April brought inches of rain and even hail to some areas. There were reports of wind gusts toppling trees that were heavy with nuts as well as limbs breaking from the weight. High temperatures in late May and through June helped develop the crop through its final stages. Irrigation was needed and water availability was not an issue. Coupled with a large increase in bearing acreage, the 2020 crop is estimated to be the largest on record.

The average nut set per tree is 5,645, which is an increase of 21 percent compared to 2019. The Nonpareil average nut set of 5,621 is 27 percent higher than last year's set of 4,429. The average kernel weight for all varieties sampled was 1.51 grams, down 2 percent from the 2019 average weight. The Nonpareil average kernel weight was 1.60, down 2 percent from last year. A total of 98.5 percent of all nuts sized were sound.

SAMPLING PROCEDURES

To determine tree set, nuts are counted along a path within a randomly selected tree. Work begins at the trunk and progresses to the end of the terminal branch. Using a random number table, one branch is selected at each forking to continue the path. A branch's probability of selection is directly proportional to its cross-sectional area. This methodology is used because of its statistical efficiency. The method also makes it possible to end up at any one of the tree's numerous terminal branches.

Since the selected path has a probability of selection associated with it, this probability is used to expand nut counts arriving at an estimated set for the entire tree.

Along intermediate stages (i.e., the bearing surface between forkings), every fifth nut is picked. All nuts on the terminal branch are picked. These nuts are used to determine size and weight measurements.

FIELD SAMPLING ACTIVITIES

The survey began May 26 and sampling was completed by June 26. There were 1,818 trees sampled for the 2020 survey in 909 orchards. Additional orchards were not sampled for one of the following reasons:

1) Orchard had been sprayed.
2) Orchard had been recently irrigated and was wet.
3) Orchard had been pulled.
4) Grower would not grant permission or could not be contacted.

The Objective Measurement Survey is funded by the Almond Board of California.

DATA RELIABILITY

The 80 percent confidence interval is from 2,720 million meat pounds to 3,280 million meat pounds. This means that the results of our sampling procedures will encompass the true mean 80 percent of the time.

TABLE 1: JUNE OBJECTIVE MEASUREMENT SURVEY COUNTS; COMPARISON OF NUT ESTIMATES AND ORCHARDS SAMPLED BY REGION AND VARIETY, 2016-2020

District and Variety	2016		2017		2018		2019		2020	
	Nuts per tree	Orchards sampled	Nuts per tree	Orchards sampled	Nuts per tree	Orchards sampled	Nuts per tree	Orchards sampled	Nuts per tree	Orchards sampled
ALL REGIONS										
(All Varieties)	6,159	873	5,714	852	5,677	853	4,667	817	5,645	909
BY REGION [1/]										
North	6,114	121	5,583	118	5,015	117	4,401	103	7,369	115
Central	6,094	298	5,704	293	6,181	302	4,739	297	6,549	312
South	6,213	454	5,756	441	5,506	434	4,682	417	4,648	482
BY VARIETY										
Butte	7,051	112	6,574	97	5,989	91	5,261	78	5,923	81
Carmel	5,849	105	5,456	95	6,353	91	4,865	83	5,797	51
Independence	2,868	7	4,032	12	4,762	38	3,718	41	3,948	80
Monterey	5,739	136	4,655	137	5,362	138	4,426	145	4,719	166
Nonpareil	5,583	343	5,717	343	4,924	333	4,429	324	5,621	358
Padre	7,788	70	7,168	65	6,732	63	4,928	56	8,137	54
Other CA Types [2/]	7,240	70	5,944	74	8,369	68	6,204	57	7,505	80

[1/] North includes Butte, Colusa, Glenn, Solano, Sutter, Tehama, Yolo, and Yuba counties.
Central includes Merced, San Joaquin, and Stanislaus counties. South includes Fresno, Kern, Kings, Madera, and Tulare counties.
[2/] For survey purposes, the California classification includes the following varieties: Aldrich, Ballico, Davey, Fritz, Harvey, Le Grand, Mono, Norman, Price Cluster, Ruby, Sonora, Tokyo and Yosemite.

TABLE 2: WEIGHT, SIZE AND GRADE OF AVERAGE ALMOND SAMPLE, 2016-2020

District and variety	Year	Kernel weight (grams)	Kernel size (millimeters)			Grade (percent of nuts) [1/]						
						Edible nuts		Insect damage	Shrivel	Natural gum	Blank	Other
			Length	Width	Thickness	Singles	Doubles					
ALL REGIONS	2016	1.48	22.09	12.44	9.93	95.9	2.9	2/	1.1	2/	2/	2/
(All Varieties)	2017	1.57	22.50	12.83	10.40	92.2	6.2	2/	1.5	0.1	2/	2/
	2018	1.54	21.32	12.79	10.37	90.9	7.9	2/	1.0	2/	2/	0.1
	2019	1.54	22.89	12.86	9.93	92.7	6.0	2/	1.2	2/	2/	2/
	2020	**1.51**	**21.79**	**12.60**	**10.12**	**95.5**	**3.0**	**2/**	**1.2**	**0.1**	**2/**	**0.2**
BY REGION [3/]												
North	2016	1.51	22.67	13.19	10.02	97.2	1.2	2/	1.4	2/	2/	0.1
	2017	1.69	23.85	13.59	10.46	88.3	9.1	2/	2.3	0.3	2/	2/
	2018	1.61	20.91	13.26	10.45	91.6	7.4	2/	0.8	2/	2/	0.2
	2019	1.56	23.44	13.42	9.70	89.8	8.8	2/	1.4	2/	2/	2/
	2020	**1.51**	**21.62**	**12.88**	**9.92**	**94.5**	**4.0**	**2/**	**1.1**	**2/**	**2/**	**0.3**
Central	2016	1.56	22.54	12.63	10.14	96.6	2.8	2/	2/	2/	2/	2/
	2017	1.61	22.75	12.72	10.53	91.6	7.4	2/	0.9	0.1	2/	2/
	2018	1.62	21.96	12.87	10.65	89.2	10.3	2/	0.5		2/	2/
	2019	1.64	22.54	12.87	10.08	92.1	6.7	2/	1.0	0.1	2/	2/
	2020	**1.52**	**21.74**	**12.47**	**10.16**	**96.2**	**2.8**	**2/**	**0.8**	**0.2**	**2/**	**2/**
South	2016	1.42	21.65	12.13	9.76	95.2	3.3	2/	1.4	0.1	2/	2/
	2017	1.51	21.98	12.71	10.30	93.5	4.5	2/	1.7	0.1	2/	2/
	2018	1.46	20.93	12.62	10.14	92.1	6.2	2/	1.5	2/	2/	0.1
	2019	1.46	22.29	12.72	9.88	93.8	4.9	2/	1.2	2/	2/	2/
	2020	**1.50**	**21.90**	**12.61**	**10.15**	**95.1**	**2.8**	**2/**	**1.6**	**0.1**	**2/**	**0.3**
BY VARIETY												
Butte	2016	1.20	18.93	11.76	9.84	96.1	2.6	2/	1.2	0.1	2/	2/
	2017	1.25	19.14	11.89	10.43	89.3	9.6	2/	0.9	0.2	2/	2/
	2018	1.19	17.97	11.97	10.09	92.9	6.0	2/	0.9	2/	2/	0.2
	2019	1.18	19.46	11.89	9.64	92.9	6.0	2/	1.1	2/	2/	2/
	2020	**1.22**	**18.37**	**11.84**	**10.00**	**94.6**	**4.2**	**2/**	**1.1**	**0.1**	**2/**	**2/**
Carmel	2016	1.51	23.08	12.07	9.86	96.0	3.0	2/	1.0	2/	2/	2/
	2017	1.60	23.72	12.31	10.38	89.7	9.2	2/	1.0	0.1	2/	2/
	2018	1.61	22.43	12.52	10.57	87.0	12.6	2/	0.4	2/	2/	2/
	2019	1.60	23.99	12.43	10.02	89.8	9.0	2/	1.1	2/	2/	2/
	2020	**1.51**	**22.61**	**12.05**	**9.99**	**94.7**	**4.2**	**2/**	**0.8**	**0.3**	**2/**	**2/**
Independence	2016	1.99	25.86	14.36	10.32	95.4	4.6	2/	2/	2/	2/	2/
	2017	1.92	25.00	13.92	10.74	92.1	4.7	2/	3.2	2/	2/	2/
	2018	1.86	23.50	14.16	10.84	92.1	6.0	2/	1.7	0.2	2/	2/
	2019	1.88	25.38	14.43	10.30	94.2	3.7	2/	1.7	2/	2/	0.3
	2020	**1.85**	**24.95**	**14.11**	**10.38**	**96.6**	**1.1**	**2/**	**1.1**	**1.0**	**2/**	**0.1**
Monterey	2016	1.69	24.68	12.49	10.03	92.1	6.9	2/	0.8	0.1	2/	2/
	2017	1.83	25.20	13.06	10.64	85.4	12.8	2/	1.3	0.5	2/	2/
	2018	1.76	23.42	12.93	10.74	83.0	16.2	2/	0.8	2/	2/	2/
	2019	1.69	24.77	12.84	10.15	86.3	12.7	2/	0.8	2/	2/	2/
	2020	**1.67**	**24.23**	**12.52**	**10.23**	**91.8**	**6.3**	**2/**	**1.2**	**0.2**	**2/**	**0.5**
Padre	2016	1.14	18.47	11.42	9.86	96.7	1.7	2/	1.4	0.1	0.1	2/
	2017	1.26	19.13	11.85	10.51	94.0	4.2	2/	1.7	2/	2/	2/
	2018	1.15	17.54	11.72	10.16	94.0	4.4	2/	1.3	2/	2/	0.4
	2019	1.23	19.42	11.97	9.85	97.2	2.0	2/	0.6	0.1	2/	2/
	2020	**1.25**	**18.41**	**11.66**	**10.17**	**97.6**	**1.1**	**2/**	**1.2**	**2/**	**2/**	**2/**
Nonpareil	2016	1.65	23.36	13.34	10.01	97.1	1.7	2/	1.1	2/	2/	2/
	2017	1.70	23.50	13.60	10.32	95.1	3.0	2/	1.8	0.1	2/	2/
	2018	1.70	22.36	13.66	10.37	94.0	4.8	2/	1.2	2/	2/	2/
	2019	1.63	23.46	13.48	9.85	95.4	3.2	2/	1.4	2/	2/	2/
	2020	**1.60**	**22.29**	**13.26**	**10.14**	**96.4**	**1.9**	**2/**	**1.5**	**2/**	**2/**	**0.2**
Other CA Types[4/]	2016	1.25	20.62	11.43	9.62	96.9	1.8	2/	1.3	2/	2/	2/
	2017	1.33	20.85	12.01	10.19	94.3	4.2	2/	1.2	0.2	2/	2/
	2018	1.26	19.62	11.61	10.74	92.0	6.7	2/	1.0	2/	2/	0.1
	2019	1.36	21.47	12.14	9.95	93.0	5.8	2/	1.1	2/	2/	0.1
	2020	**1.22**	**19.88**	**11.32**	**9.79**	**97.1**	**2.0**	**2/**	**0.6**	**2/**	**2/**	**0.3**

[1/] Percentages may not add to 100 due to rounding.

[2/] Not shown if less than 0.07 percent.

[3/] North includes Butte, Colusa, Glenn, Solano, Sutter, Tehama, Yolo, and Yuba counties.
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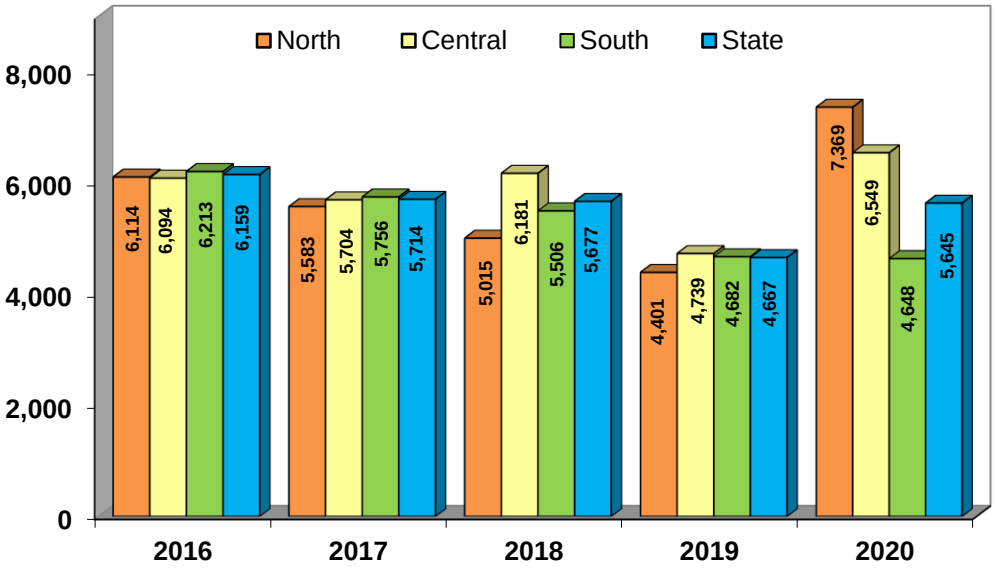
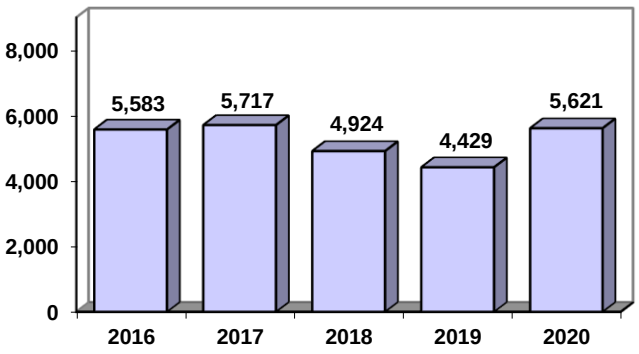
[4/] For survey purposes, the California classification includes the following varieties: Aldrich, Ballico, Davey, Fritz, Harvey, Le Grand, Mono, Norman, Price Cluster, Ruby, Sonora, Tokyo and Yosemite.

ALMONDS
Nuts per Tree, by Region

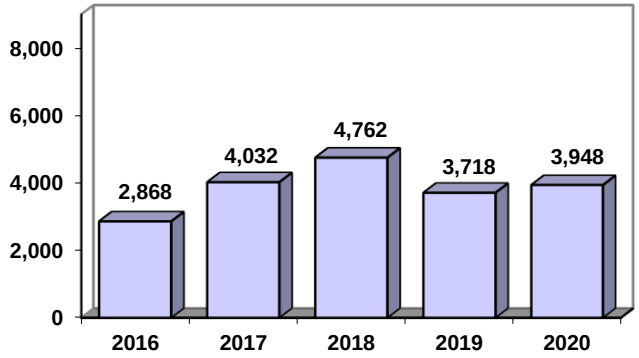


ALMONDS BY VARIETY

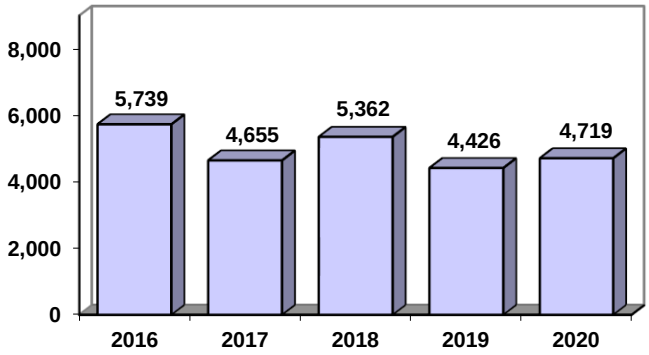
NONPAREIL TYPE
Nuts per Tree



INDEPENDENCE TYPE
Nuts per Tree



MONTEREY TYPE
Nuts per Tree



BUTTE TYPE
Nuts per Tree

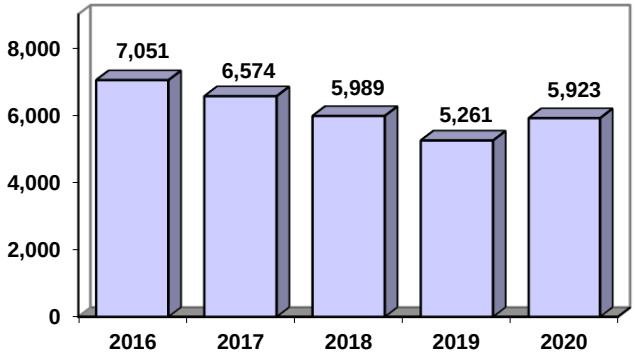


TABLE 3: CALIFORNIA ALMOND ACREAGE, PRODUCTION AND TREES PER ACRE, 1986-2020

Year	Bearing acres [1/]	Trees per acre	Total Meat Production			Price per lb.	Value of production
			Metric Tons [2/]	Million lbs.	Lbs. per acre	dollars	1,000 dollars
1986	416,000	84.5	113,000	250	601	1.92	461,568
1987	417,000	84.0	299,000	660	1,580	1.00	648,000
1988	419,000	86.3	268,000	590	1,410	1.05	600,075
1989	411,000	87.3	222,000	490	1,190	1.02	480,930
1990	411,000	88.4	299,000	660	1,610	0.93	597,990
1991	405,000	89.6	222,000	490	1,210	1.19	564,179
1992	401,000	90.5	249,000	548	1,370	1.30	691,340
1993	413,000	92.0	222,000	490	1,190	1.94	930,618
1994	433,000	92.6	333,000	735	1,700	1.34	965,202
1995	418,000	93.7	168,000	370	885	2.48	880,896
1996	428,000	94.4	231,000	510	1,190	2.08	1,018,368
1997	442,000	95.5	344,000	759	1,720	1.56	1,160,640
1998	460,000	96.3	236,000	520	1,130	1.41	703,590
1999	485,000	97.3	378,000	833	1,720	0.86	687,742
2000	510,000	99.0	319,000	703	1,380	0.97	666,487
2001	530,000	101.0	376,000	830	1,570	0.91	740,012
2002	545,000	101.0	494,000	1,090	2,000	1.11	1,200,687
2003	550,000	103.0	472,000	1,040	1,890	1.57	1,600,144
2004	570,000	103.0	456,000	1,005	1,760	2.21	2,189,005
2005	590,000	104.0	415,000	915	1,550	2.81	2,525,909
2006	610,000	105.0	508,000	1,120	1,840	2.06	2,258,790
2007	640,000	105.0	630,000	1,390	2,170	1.75	2,401,875
2008	710,000	107.0	739,000	1,630	2,300	1.45	2,343,200
2009	750,000	108.0	640,000	1,410	1,880	1.65	2,293,500
2010	770,000	108.0	744,000	1,640	2,130	1.79	2,903,380
2011	800,000	111.0	921,000	2,030	2,540	1.99	4,007,860
2012	820,000	112.0	857,000	1,890	2,300	2.58	4,816,860
2013	880,000	112.0	912,000	2,010	2,280	3.21	6,384,690
2014	930,000	114.0	848,000	1,870	2,010	4.00	7,388,000
2015	950,000	114.0	862,000	1,900	2,000	3.13	5,868,750
2016	970,000	116.0	971,000	2,140	2,210	2.39	5,052,460
2017	1,030,000	117.0	1,030,000	2,270	2,200	2.53	5,603,950
2018	1,090,000	119.0	1,034,000	2,280	2,090	2.50	5,602,500
2019	1,180,000	122.0	1,157,000	2,550	2,160	2.43	6,094,440
2020 [3/ 4/]	1,260,000	122.0	1,361,000	3,000	2,380	---	---

[1/] Bearing acreage is defined as plantings four years and older
[2/] Rounded to nearest thousand, metric ton = 2,204.62 pounds.
[3/] Price and value will be available in the annual Noncitrus Fruits & Nuts publication, released in May 2021.
[4/] Preliminary estimate of bearing acres.
— Not available.

2020 ALMOND SAMPLE DISTRIBUTION