



2020 California Walnut Objective Measurement Report

Cooperating with the California Department of Food and Agriculture

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WALNUT PRODUCTION FORECAST UP

The 2020 California walnut production is forecast at a record 780,000 tons, up 19 percent from 2019's production of 653,000 tons. The forecast is based on 380,000 bearing acres, up 4 percent from 2019's estimated bearing acreage of 365,000.

A warm and dry January and February meant growers started irrigating early. The 2020 chilling hours were low. Leaf-out was prolonged, which resulted in uneven canopy and nut development. April rains increased blight risk. Nut sets looked good, with reports of tree limbs heavy with nuts. Harvest is expected to begin in early September, ahead of last year.

Survey data indicated an average nut set per tree of 1,197, up 22 percent from 2019's average of 983. Percent of sound kernels in-shell was 98.5 percent statewide. In-shell weight per nut was 22.0 grams, while the average in-shell suture measurement was 32.2 millimeters. The in-shell cross-width measurement was 33.2 and the average length in-shell was 38.6 millimeters. All of the sizing measurements were either the same or below the previous year's levels.

Estimated nut sets, sizing measurements, average number of trees per acre, and estimated bearing acreage were used in the statistical models.

SURVEY HISTORY

The Walnut O.M. Survey began in 1958 to fulfill industry needs for an accurate walnut production forecast prior to harvest. The original sample was chosen proportionally to county and variety of bearing acreage. With each succeeding year, additions and deletions have been made in the sample to adjust for acreage removed, new bearing acreage, and operations that choose not to participate in the survey.

SAMPLING PROCEDURES

The 2020 Walnut Objective Measurement (O.M.) Survey was officially conducted from August 1 through August 20, 2020. There were a few samples completed before August 1 for training and scheduling purposes. There were 1,450 trees sampled from 725 orchards.

Once a block is randomly selected and permission is granted by the operation for enumerators to enter the block, two trees are randomly selected. An accessible branch is chosen which is 5-15 percent of the total cross-sectional area of the primary limbs and reachable with a twelve-foot ladder. Measurements are made on the trunk, each primary, and each split leading to and including the accessible branch. The sample tree and accessible branch are marked by a single tag, so that the same trees are sampled the following year if that orchard is selected. On the accessible branch, every nut is counted and the first of every five nuts is picked for use in size and grade determinations. If available, at least ten nuts are harvested from the accessible branch for this purpose.

The following measurements are made on nuts selected for sizing:

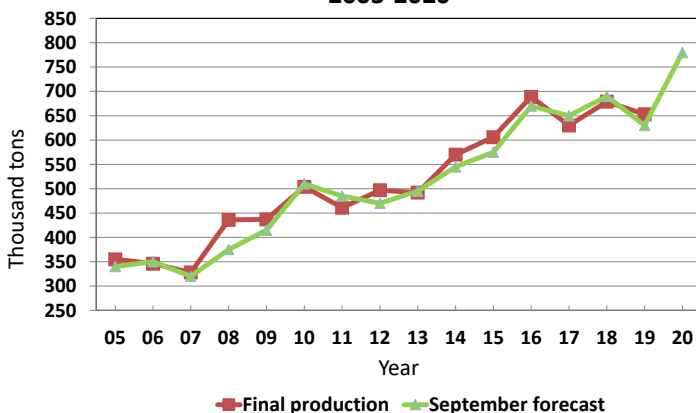
1. Weight of nut including hull
2. Width of shell at suture
3. Width of shell 90 degrees to suture line (cross-suture)
4. Length of shell
5. Kernel grade
6. Weight of nut in-shell

The Objective Measurement Survey is funded by the California Walnut Board.

DATA RELIABILITY

The 80 percent confidence interval is from 712,000 tons to 848,000 tons.

CALIFORNIA WALNUTS
Sept. Objective Forecast vs. Final Production
2005-2020



California English Walnut Acreage, Production, Price And Value In-Shell

Year	Bearing acres	Trees per acre	Per bearing acre	Total production	Price per ton	Total value
			Tons	Dollars	1,000 Dollars	
2001	204,000	55.6	1.50	305,000	1,120	341,600
2002	210,000	56.5	1.34	282,000	1,170	329,940
2003	213,000	57.7	1.53	326,000	1,160	378,160
2004	214,000	60.3	1.52	325,000	1,390	451,750
2005	215,000	61.1	1.65	355,000	1,570	557,350
2006	216,000	62.4	1.60	346,000	1,630	563,980
2007	218,000	62.9	1.50	328,000	2,290	751,120
2008	230,000	65.0	1.90	436,000	1,280	558,080
2009	240,000	65.1	1.82	437,000	1,710	747,270
2010	255,000	67.0	1.98	504,000	2,040	1,028,160
2011	265,000	67.0	1.74	461,000	2,900	1,336,900
2012	270,000	68.6	1.84	497,000	3,030	1,505,910
2013	280,000	69.2	1.76	492,000	3,710	1,825,320
2014	290,000	71.6	1.97	571,000	3,340	1,907,140
2015	300,000	72.0	2.02	606,000	1,670	1,012,020
2016	315,000	73.3	2.19	689,000	1,850	1,274,650
2017	335,000	74.1	1.88	630,000	2,490	1,568,700
2018	350,000	75.5	1.94	679,000	1,350	916,650
2019 ^{1/}	365,000	76.9	1.79	653,000	1,970	1,286,410
2020 ^{2/ 3/}	380,000	76.8	2.05	780,000	NA	NA

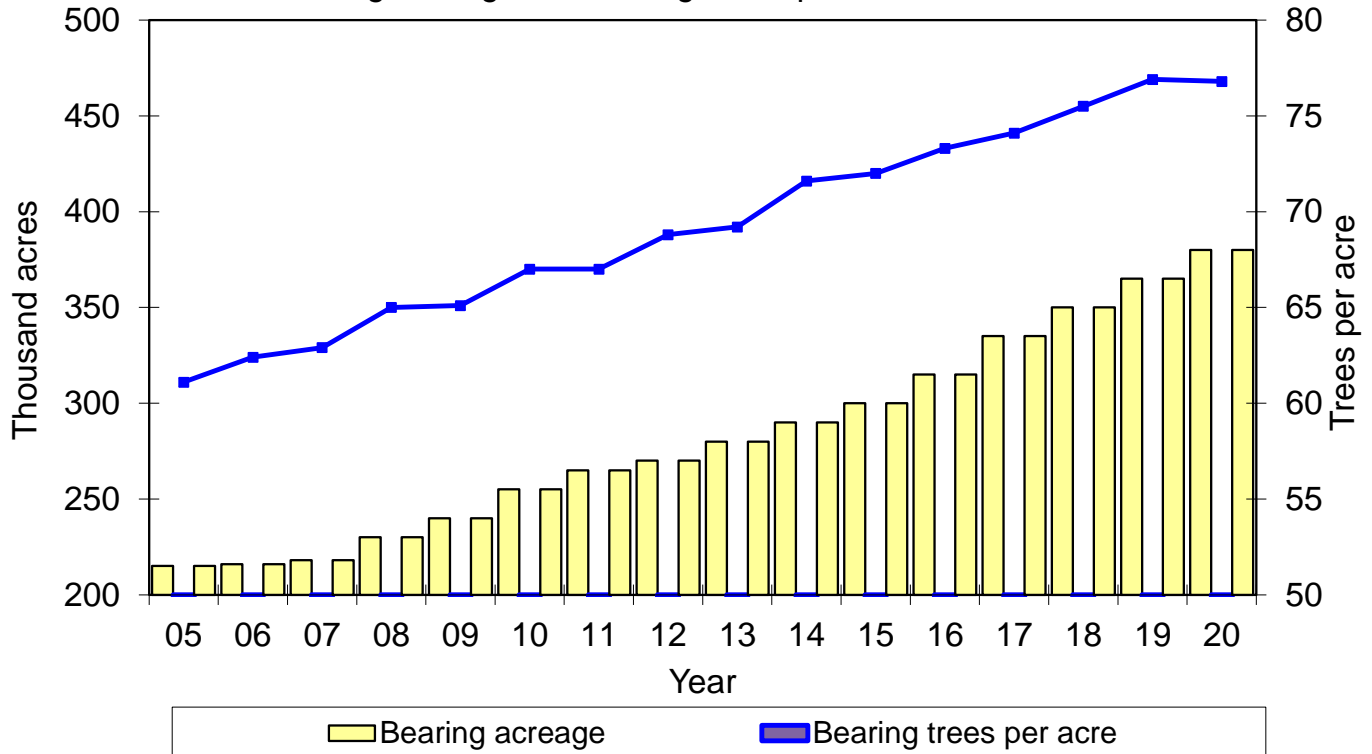
^{1/} Price per ton and total value are May 2020 preliminary data.

^{2/} Bearing years include plantings of the following: Chandler, Chico, Howard, Tulare (2016 & Earlier); 50-55, 59-124, 4946, Amigo, Ashley, Bardoni, Cisco, Earhorn, Grove, Gustine, Honeycutt, Houston, Jensen, Lompoc, Marchetti, Nuggett, Payne, Pedro, Serr, Sunland, Tehama, Trinta, UCD 67-13, Vina, Westside (2015 and Earlier); Franquette, Franquette Scharsch, Mayette, Placentia, Poe, Willsons/Willsons Wonder, Woodland (2013 & Earlier); all other varieties not specified (2014 & Earlier).

^{3/} Price per ton and total value preliminary data will be released May 2021.

NA Not Available

CALIFORNIA WALNUTS
Bearing Acreage vs. Bearing Trees per Acre, 2005 - 2020



Walnut Objective Measurement Survey Date, By District

Measurement	Year	Coast ^{1/}	Sacramento Valley ^{2/}	San Joaquin Valley ^{3/}	State ^{4/}
In-Shell Weight (gm)	2011	20.6	25.1	21.3	23.6
	2012	17.6	23.7	19.8	22.1
	2013	19.5	24.9	20.8	23.3
	2014	17.2	22.6	19.2	21.2
	2015	19.6	24.0	20.8	22.7
	2016	19.2	22.7	19.5	21.6
	2017	20.2	24.0	22.4	23.4
	2018	20.7	23.7	20.5	22.3
	2019	23.0	23.8	21.2	22.7
	2020	20.6	23.5	20.0	22.0
In-Shell Width (mm)	2011	31.6	32.8	32.6	32.7
	2012	30.5	32.3	32.0	32.1
	2013	31.3	33.3	32.8	33.1
	2014	30.6	32.8	32.2	32.5
	2015	31.6	33.0	32.6	32.8
	2016	31.3	32.1	32.3	32.2
	2017	31.3	32.5	33.3	32.7
	2018	31.7	32.0	32.9	32.3
	2019	32.1	31.9	32.7	32.3
	2020	30.9	32.0	32.4	32.2
In-Shell Cross-Width (mm)	2011	31.3	33.3	32.9	33.1
	2012	30.5	32.9	32.3	32.6
	2013	30.6	33.0	33.4	33.1
	2014	30.7	32.3	32.7	32.4
	2015	31.9	32.7	33.0	32.8
	2016	31.4	32.8	32.7	32.7
	2017	31.1	33.1	33.9	33.3
	2018	31.9	32.9	33.4	33.1
	2019	32.6	33.0	33.4	33.2
	2020	31.2	33.4	33.1	33.2
In-Shell Length (mm)	2011	39.0	39.4	39.3	39.4
	2012	36.9	38.7	38.4	38.5
	2013	37.8	39.1	38.8	39.0
	2014	36.6	38.1	38.1	38.1
	2015	38.4	38.6	38.4	38.5
	2016	37.9	38.1	38.4	38.2
	2017	38.4	38.2	39.4	38.6
	2018	37.9	37.8	38.5	38.1
	2019	39.7	38.6	39.0	38.8
	2020	37.8	38.7	38.5	38.6
Kernel Grade - Percent Sound	2011	99.4	98.2	99.6	98.7
	2012	97.2	97.5	99.1	98.0
	2013	97.9	98.8	99.0	98.8
	2014	99.0	98.5	99.0	98.7
	2015	99.0	97.8	99.6	98.5
	2016	93.4	98.4	99.5	98.7
	2017	97.2	97.5	99.4	98.1
	2018	98.0	98.9	98.7	98.8
	2019	97.9	98.6	99.2	98.9
	2020	91.8	98.4	98.8	98.5
Nuts Set Per Tree	2011	1,594	1,606	1,119	1,388
	2012	1,461	1,582	1,120	1,375
	2013	857	1,402	1,050	1,239
	2014	1,021	1,509	1,214	1,372
	2015	851	1,355	1,164	1,272
	2016	950	1,561	1,215	1,406
	2017	879	1,302	938	1,141
	2018	1,055	1,166	1,196	1,176
	2019	808	935	1,056	983
	2020	847	1,199	1,203	1,197

^{1/} Coast includes: Contra Costa, Lake, Monterey, Napa, San Benito, San Luis Obispo, Santa Clara, and Sonoma counties.

^{2/} Sacramento Valley includes: Butte, Colusa, El Dorado, Glenn, Sacramento, Solano, Sutter, Tehama, Yolo, and Yuba counties.

^{3/} San Joaquin Valley includes: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties.

^{4/} District and State averages are derived by weighting county averages by county bearing acreage figures.

Walnut Objective Measurement Survey Date, By Variety

Measurement	Year	Ashley ^{1/}	Chandler	Eureka	Franquette	Hartley	Howard	Payne	Serr	Tehama ^{1/}	Tulare	Vina	Other
In-Shell Weight (gm)	2011	21.0	23.7	20.4	20.4	25.7	23.5	20.3	20.5	19.9	23.6	21.1	21.5
	2012	18.6	22.8	20.8	18.9	23.6	23.2	18.3	18.3	20.7	21.4	19.9	20.5
	2013	21.4	23.8	22.7	21.6	24.3	25.3	18.9	17.8	20.6	22.6	21.4	18.5
	2014	17.8	21.8	20.7	19.8	22.8	22.2	21.2	16.1	14.6	20.5	19.2	20.5
	2015	19.9	23.2	20.4	20.5	24.7	23.8	19.3	18.0	18.5	22.5	20.1	22.3
	2016	17.8	21.9	21.2	20.8	23.1	22.2	19.9	17.1	18.7	20.5	19.6	18.8
	2017	22.5	23.6	21.9	19.6	25.6	22.6	18.6	18.7	20.5	23.2	22.1	19.0
	2018	---	22.6	20.1	20.9	24.4	22.7	21.7	19.2	---	21.0	20.8	17.0
	2019	---	22.4	22.9	22.1	24.5	23.7	22.1	19.6	---	22.3	22.1	19.4
	2020	---	22.4	21.7	21.2	24.2	22.4	22.5	16.1	---	20.5	19.0	18.3
In-Shell Width (mm)	2011	32.3	32.5	30.9	30.8	33.3	31.9	33.7	33.5	33.2	34.6	31.0	31.2
	2012	31.7	32.0	30.1	29.9	32.7	31.7	32.0	32.4	32.3	33.3	30.5	31.1
	2013	32.8	32.8	31.9	31.3	33.5	33.4	33.1	33.4	33.0	34.8	31.8	30.5
	2014	31.6	32.4	31.1	31.1	33.3	32.6	32.2	32.1	31.2	33.7	31.1	31.6
	2015	32.1	32.6	31.1	31.6	33.5	32.9	32.9	32.8	31.7	34.3	31.3	32.5
	2016	31.9	31.9	31.8	31.0	33.2	31.4	33.3	32.6	32.7	33.6	31.2	31.1
	2017	32.2	32.6	31.7	30.3	33.2	31.9	32.2	33.2	33.3	34.8	32.1	30.9
	2018	---	32.1	31.0	30.7	32.9	31.3	34.0	33.5	---	34.1	30.5	30.2
	2019	---	31.8	33.6	30.8	32.9	31.8	33.1	33.6	---	34.5	32.7	31.9
	2020	---	32.0	31.7	31.9	32.9	31.5	32.5	32.1	---	33.6	30.4	31.1
In-Shell Cross-Width (mm)	2011	31.9	33.3	31.5	30.5	33.4	33.0	32.8	32.2	32.3	34.6	31.7	31.7
	2012	31.3	32.9	31.2	30.6	32.6	33.2	31.9	31.7	32.1	33.3	31.2	31.9
	2013	32.4	33.0	33.0	31.0	33.0	33.6	33.5	32.8	32.6	34.8	32.4	30.8
	2014	31.0	32.4	32.2	30.9	33.0	32.3	32.5	31.5	30.2	33.9	31.8	30.7
	2015	32.2	32.7	32.1	31.5	33.5	32.6	33.0	32.4	31.3	34.3	32.0	32.5
	2016	31.7	32.8	31.8	31.6	33.0	33.0	32.7	31.7	32.2	33.5	32.0	32.4
	2017	33.0	33.4	32.0	31.1	33.5	32.8	32.8	32.2	32.6	34.9	33.0	32.1
	2018	---	33.1	31.3	31.2	33.0	33.0	34.1	32.9	---	34.1	31.6	31.6
	2019	---	32.9	34.1	31.4	33.1	33.8	33.9	33.0	---	34.6	33.6	33.4
	2020	---	33.3	33.4	32.3	33.2	33.5	33.4	31.2	---	33.8	31.5	32.8
In-Shell Length (mm)	2011	38.0	39.5	43.6	37.8	40.5	37.1	39.3	38.6	37.8	39.4	38.7	39.2
	2012	37.3	38.6	45.0	36.7	39.4	37.2	38.7	37.6	37.8	38.8	38.0	39.4
	2013	37.0	39.3	42.2	38.5	39.8	37.6	38.4	37.1	37.3	39.0	38.2	37.5
	2014	36.7	38.2	42.6	37.1	39.3	36.7	40.4	36.5	36.3	38.1	37.7	37.1
	2015	36.9	38.9	41.6	36.9	39.5	37.3	39.0	36.0	35.7	38.4	37.8	40.2
	2016	37.1	38.3	42.9	37.6	39.2	36.4	40.7	36.8	37.3	38.3	38.1	38.4
	2017	38.7	38.7	41.3	37.2	40.1	36.0	39.7	37.0	37.3	39.2	39.0	37.0
	2018	---	38.5	41.6	36.9	38.9	36.0	41.0	37.4	---	37.8	37.5	35.8
	2019	---	38.9	41.2	38.1	39.9	36.7	41.6	37.9	---	39.3	39.6	37.7
	2020	---	38.9	40.0	38.2	40.1	36.6	40.2	36.4	---	38.9	37.4	38.0
Kernel Grade - Percent Sound	2011	95.5	99.3	100.0	96.7	98.2	98.2	99.7	97.7	97.5	99.5	99.1	97.9
	2012	94.6	98.8	100.0	96.9	97.6	97.0	94.9	96.9	98.7	98.3	98.0	97.3
	2013	95.4	99.4	99.9	98.9	98.7	98.4	95.7	97.8	99.3	98.5	99.0	98.1
	2014	99.2	98.8	99.8	99.7	98.6	98.2	93.5	98.1	99.3	98.9	99.3	98.9
	2015	95.7	99.1	100.0	96.3	97.1	98.4	100.0	97.7	96.7	99.1	99.1	97.7
	2016	94.1	99.4	98.8	97.0	97.4	98.6	98.3	98.1	99.9	99.0	99.7	92.2
	2017	97.2	98.5	97.4	95.7	97.5	98.3	97.7	97.7	91.5	98.3	98.0	94.2
	2018	---	99.0	90.2	99.9	99.1	99.3	97.3	98.7	---	98.1	98.6	93.7
	2019	---	98.8	100.0	99.8	98.8	98.2	98.0	99.8	---	99.5	99.9	98.7
	2020	---	98.4	87.9	95.0	98.5	98.9	100.0	99.3	---	99.3	97.5	98.7
Nuts Set Per Tree	2011	1,093	1,415	1,052	1,670	1,840	1,272	906	1,129	721	1,065	1,197	984
	2012	1,535	1,344	1,373	1,710	1,750	1,020	1,175	1,298	1,627	1,239	1,195	1,532
	2013	1,966	1,229	1,786	832	1,525	1,192	1,032	1,089	1,312	908	1,196	1,056
	2014	2,380	1,338	1,274	2,360	1,615	1,137	2,165	1,399	2,864	1,054	1,313	888
	2015	2,082	1,263	1,580	2,673	1,537	994	1,613	1,431	911	1,048	1,062	977
	2016	1,781	1,446	996	3,332	1,806	1,070	1,510	1,292	1,136	1,076	1,262	1,052
	2017	1,543	1,194	947	2,048	1,491	1,032	724	993	486	748	774	1,123
	2018	---	1,125	1,602	1,564	1,551	960	972	1,310	---	1,180	1,182	1,762
	2019	---	1,071	1,052	1,284	1,077	719	804	659	---	837	970	1,273
	2020	---	1,174	1,139	1,779	1,472	1,009	1,272	1,594	---	1,077	1,380	1,588

^{1/} Beginning in 2018, the Ashley and Tehama varieties were included in "Other" and not published separately.

Percentage Distribution of Walnut Shell Suture Size, by District, and Variety

District and Variety	U.S. Standards Size Intervals ¹																													
	2016					2017					2018					2019					2020									
	Mth	Jmb	Lge	Med	Bby	Oth	Mth	Jmb	Lge	Med	Bby	Oth	Mth	Jmb	Lge	Med	Bby	Oth	Mth	Jmb	Lge	Med	Bby	Oth	Mth	Jmb	Lge	Med	Bby	Oth
	----- Percent of Total ² -----																													
DISTRICTS:																														
Coast	0	42	25	19	13	0	0	43	21	16	19	1	0	50	19	21	10	0	0	60	17	17	6	0	0	39	24	20	15	2
Sacramento Vly.	0	61	20	13	5	0	1	65	16	11	8	0	0	57	20	14	8	1	0	55	20	16	8	1	0	59	21	14	5	0
San Joaquin Vly.	0	59	21	14	5	0	1	77	13	7	1	0	1	69	18	9	3	0	2	65	18	12	4	0	0	62	19	15	4	0
VARIETIES:																														
Ashley ^{3/}	0	52	25	13	10	0	2	55	22	11	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chandler	0	56	24	15	5	0	0	68	16	10	5	0	0	60	22	13	5	0	0	53	23	17	7	0	0	58	23	15	4	0
Eureka	0	43	32	13	12	1	0	50	30	8	12	1	0	28	28	32	12	0	0	72	18	11	0	0	3	54	18	9	15	0
Franquette	0	34	23	32	12	0	0	26	20	29	25	0	0	29	19	35	16	1	0	42	18	17	18	5	0	58	24	15	3	0
Hartley	0	80	11	6	3	0	0	79	11	7	3	0	0	71	16	9	4	0	0	74	14	8	4	0	0	76	15	6	2	0
Howard	0	47	24	19	10	1	1	56	17	12	13	1	0	45	23	17	13	1	0	55	18	15	10	1	0	47	24	21	8	0
Payne	0	80	12	5	2	0	0	58	18	21	3	0	0	91	7	1	1	0	0	77	18	4	0	0	0	83	13	4	0	0
Serr	0	68	18	9	5	0	1	77	14	5	2	0	1	82	12	4	2	0	3	77	11	8	2	0	1	61	13	14	11	1
Tehama ^{3/}	0	73	21	4	1	0	0	84	7	5	5	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tulare	2	80	10	6	3	0	5	84	5	3	2	0	3	83	8	5	2	0	5	83	7	3	2	0	1	79	9	8	2	0
Vina	0	39	28	23	11	0	0	57	24	10	7	1	0	39	21	19	15	6	0	73	17	7	3	0	0	21	21	46	12	0
Other	0	40	19	24	16	0	0	37	18	20	24	1	0	25	12	33	30	0	1	49	23	21	6	0	0	42	20	25	12	0
STATE	0	60	21	13	5	0	1	69	15	10	6	0	1	62	19	12	6	0	1	60	19	14	6	0	0	60	20	15	5	0
Number of Shells Measured	14,426					14,369					14,336					13,775					14,319									

^{1/} Sizes used are as follows: Mammoth -- Larger than 96/64" in diameter; Jumbo -- 80/64" to 96/64"; Large -- 76/64" to 80/64" for Eureka variety, 77/64" to 80/64" for all other varieties; Medium -- 73/64" to 76/64" for Eureka, 73/64" to 77/64" for all others; Baby -- 60/64" to 73/64"; and Others -- below 60/64".

^{2/} Percentage distributions based upon nut samples taken in the field, may not equal 100 percent due to rounding.

^{3/} Beginning in 2018, the Ashley and Tehama varieties were included in "Other" and not published separately.

***The California Walnut Industry has been very supportive.
We appreciate your continued cooperation!***

For more California agricultural statistics, visit www.nass.usda.gov/ca