



2023 California Almond Objective Measurement Report

Pacific Regional Office · 650 Capitol Mall, Suite 6-100 · Sacramento, CA 95814 · (916) 738-6600 · www.nass.usda.gov/ca

Released: July 12, 2023 - 9:00 a.m. PDT

2023 CALIFORNIA ALMOND FORECAST UP 1 PERCENT

California's 2023 almond production is forecast at 2.60 billion meat pounds, up 4% from May's subjective forecast and 1% higher than last year's crop of 2.57 billion meat pounds. The forecast is based on 1.38 million bearing acres. Production for the Nonpareil variety is forecast at 1.10 billion meat pounds, 10% above last year's deliveries of 1.00 billion meat pounds. The Nonpareil variety represents 42% of California's total almond production.

The almond bloom began in the middle of February and peaked at the end of the month. Record level rainfall and unprecedented stormy conditions hindered bee pollination activity in orchards across the state. Cooler than normal temperatures continued through early summer and delayed the maturity of the crop. Growers have been irrigating, applying pest treatments, and preparing for harvest, which is expected to begin in the next month.

The average nut set per tree is 3,953, a decrease of 3% compared to 2022. The Nonpareil average nut set of 4,004 is 1% higher than last year. The average kernel weight for all varieties sampled was 1.67 grams, up 14% from the 2022 average weight. The Nonpareil average kernel weight was 1.69 grams, up 9% from the 2022 average weight. A total of 98.4% 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 and arrive 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 31 and sampling was completed by July 3. There were 1,824 trees sampled for the 2023 survey in 912 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 2,240 million meat pounds to 2,960 million meat pounds. This means that the results of our sampling procedures will encompass the true mean 80 percent of the time.

TABLE 1: OBJECTIVE MEASUREMENT SURVEY COUNTS; COMPARISON OF NUT ESTIMATES AND ORCHARDS SAMPLED BY COUNTY AND VARIETY, 2022-2023

| County and Variety | 2022 | | 2023 | |
|--------------------|---------------|------------------|---------------|------------------|
| | Nuts per tree | Orchards sampled | Nuts per tree | Orchards sampled |
| STATE LEVEL | 4,082 | 880 | 3,953 | 912 |
| BY COUNTY | | | | |
| Colusa | 2,631 | 44 | 4,336 | 39 |
| Fresno | 3,929 | 181 | 2,946 | 171 |
| Kern | 4,099 | 134 | 4,374 | 158 |
| Madera | 2,614 | 97 | 3,001 | 114 |
| Merced | 6,780 | 128 | 4,686 | 138 |
| San Joaquin | 3,954 | 44 | 3,196 | 39 |
| Stanislaus | 3,369 | 147 | 4,260 | 148 |
| Tulare | 5,297 | 38 | 4,677 | 38 |
| Other ¹ | 3,344 | 67 | 4,771 | 67 |
| BY VARIETY | | | | |
| Butte | 4,173 | 66 | 4,043 | 54 |
| Carmel | 4,417 | 38 | 4,959 | 39 |
| Independence | 4,624 | 89 | 4,048 | 91 |
| Monterey | 3,908 | 177 | 3,598 | 178 |
| Nonpareil | 3,966 | 347 | 4,004 | 376 |
| Padre | 4,928 | 48 | 4,055 | 40 |
| Other ² | 3,763 | 115 | 3,856 | 134 |

¹ Other includes: Butte, Glenn, Kings, Solano, Tehama, and Yolo.

² Other includes: Aldrich, Bennett, Fritz, Mission, Price Cluster, Shasta, Sonora, Supareil, Winters, and Wood Colony.

TABLE 2: WEIGHT, SIZE AND GRADE OF AVERAGE ALMOND SAMPLE, 2022-2023

| District and variety | 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 | | | | | | |
| STATE LEVEL | | | | | | | | | | | | |
| 2022 | 1.47 | 22.12 | 12.69 | 10.03 | 94.2 | 4.5 | ² | 1.0 | 0.1 | ² | 0.1 | |
| 2023 | 1.67 | 23.90 | 13.15 | 9.92 | 90.6 | 7.8 | ² | 1.4 | 0.1 | ² | 0.1 | |
| BY COUNTY | | | | | | | | | | | | |
| Colusa | | | | | | | | | | | | |
| 2022 | 1.48 | 21.93 | 13.03 | 9.85 | 94.0 | 2.9 | ² | 2.8 | 0.3 | ² | 0.1 | |
| 2023 | 1.58 | 22.78 | 13.70 | 9.80 | 92.9 | 6.0 | ² | 1.0 | ² | 0.1 | ² | |
| Fresno | | | | | | | | | | | | |
| 2022 | 1.43 | 22.08 | 12.75 | 10.04 | 95.0 | 3.3 | ² | 1.1 | 0.1 | ² | 0.3 | |
| 2023 | 1.60 | 23.56 | 12.97 | 9.77 | 92.7 | 5.9 | ² | 1.3 | ² | ² | 0.1 | |
| Kern | | | | | | | | | | | | |
| 2022 | 1.31 | 21.05 | 12.06 | 9.77 | 93.8 | 4.4 | ² | 1.6 | ² | ² | 0.2 | |
| 2023 | 1.59 | 23.43 | 12.59 | 9.76 | 93.0 | 6.3 | ² | 0.6 | ² | 0.1 | ² | |
| Madera | | | | | | | | | | | | |
| 2022 | 1.47 | 22.01 | 12.77 | 10.18 | 92.4 | 6.1 | ² | 0.8 | 0.4 | ² | 0.4 | |
| 2023 | 1.78 | 25.17 | 13.82 | 10.21 | 89.8 | 10.2 | ² | ² | ² | ² | ² | |
| Merced | | | | | | | | | | | | |
| 2022 | 1.46 | 21.98 | 12.47 | 10.13 | 93.7 | 6.2 | ² | 0.1 | ² | ² | ² | |
| 2023 | 1.69 | 23.83 | 12.88 | 10.00 | 88.3 | 9.6 | ² | 2.0 | 0.1 | ² | ² | |
| San Joaquin | | | | | | | | | | | | |
| 2022 | 1.63 | 22.82 | 13.12 | 10.19 | 97.7 | 1.8 | ² | 0.5 | 0.1 | ² | ² | |
| 2023 | 1.99 | 24.70 | 13.99 | 10.33 | 87.3 | 7.0 | ² | 4.4 | 1.2 | ² | ² | |
| Stanislaus | | | | | | | | | | | | |
| 2022 | 1.56 | 22.44 | 12.87 | 10.24 | 94.0 | 4.5 | ² | 1.0 | 0.6 | ² | ² | |
| 2023 | 1.70 | 23.85 | 13.09 | 9.99 | 89.0 | 9.1 | ² | 1.5 | 0.4 | ² | 0.1 | |
| Tulare | | | | | | | | | | | | |
| 2022 | 1.57 | 23.37 | 13.16 | 9.95 | 92.8 | 5.6 | ² | 1.2 | ² | ² | 0.3 | |
| 2023 | 1.67 | 24.76 | 13.44 | 9.88 | 88.3 | 8.7 | 0.4 | 1.6 | ² | ² | 1.0 | |
| Other ³ | | | | | | | | | | | | |
| 2022 | 1.58 | 22.97 | 13.55 | 9.66 | 95.8 | 1.9 | 0.1 | 2.0 | 0.1 | ² | 0.1 | |
| 2023 | 1.68 | 23.94 | 13.73 | 9.71 | 92.7 | 5.2 | ² | 2.0 | ² | ² | ² | |
| BY VARIETY | | | | | | | | | | | | |
| Butte | | | | | | | | | | | | |
| 2022 | 1.13 | 18.20 | 11.79 | 9.92 | 95.8 | 2.8 | ² | 1.1 | 0.1 | ² | 0.2 | |
| 2023 | 1.36 | 20.33 | 12.16 | 9.99 | 89.0 | 9.8 | ² | 0.8 | 0.2 | 0.2 | ² | |
| Carmel | | | | | | | | | | | | |
| 2022 | 1.47 | 22.17 | 12.20 | 10.16 | 88.4 | 9.9 | ² | 1.6 | 0.1 | ² | ² | |
| 2023 | 1.72 | 25.31 | 12.41 | 10.13 | 83.0 | 15.2 | ² | 1.7 | 0.1 | ² | ² | |
| Independence | | | | | | | | | | | | |
| 2022 | 1.68 | 24.00 | 13.47 | 10.17 | 97.5 | 1.0 | ² | 1.0 | 0.1 | ² | 0.4 | |
| 2023 | 1.88 | 25.32 | 13.93 | 10.05 | 93.3 | 4.6 | ² | 1.6 | 0.3 | ² | 0.2 | |
| Monterey | | | | | | | | | | | | |
| 2022 | 1.55 | 23.74 | 12.30 | 10.18 | 88.6 | 10.3 | ² | 0.7 | 0.1 | 0.1 | 0.3 | |
| 2023 | 1.82 | 25.75 | 12.95 | 10.25 | 81.0 | 17.9 | ² | 0.8 | 0.2 | ² | ² | |
| Nonpareil | | | | | | | | | | | | |
| 2022 | 1.55 | 22.61 | 13.33 | 9.99 | 95.9 | 3.0 | ² | 1.0 | 0.1 | ² | ² | |
| 2023 | 1.69 | 23.85 | 13.59 | 9.78 | 94.0 | 4.0 | ² | 1.8 | 0.1 | ² | 0.1 | |
| Padre | | | | | | | | | | | | |
| 2022 | 1.10 | 18.28 | 11.51 | 9.90 | 96.9 | 2.0 | ² | 0.9 | ² | ² | 0.2 | |
| 2023 | 1.21 | 19.66 | 11.73 | 9.56 | 95.8 | 2.7 | ² | 1.5 | ² | ² | ² | |
| Other ⁴ | | | | | | | | | | | | |
| 2022 | 1.33 | 21.02 | 12.04 | 9.85 | 94.4 | 3.8 | ² | 1.1 | 0.4 | 0.2 | 0.1 | |
| 2023 | 1.54 | 23.00 | 12.66 | 9.80 | 93.0 | 6.0 | ² | 0.8 | 0.2 | ² | ² | |

¹ Percentages may not add to 100 due to rounding.

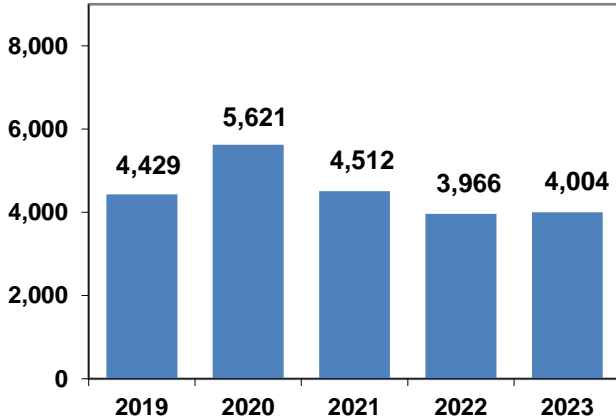
² Not shown if less than 0.05 percent.

³ Other includes: Butte, Glenn, Kings, Solano, Tehama, and Yolo.

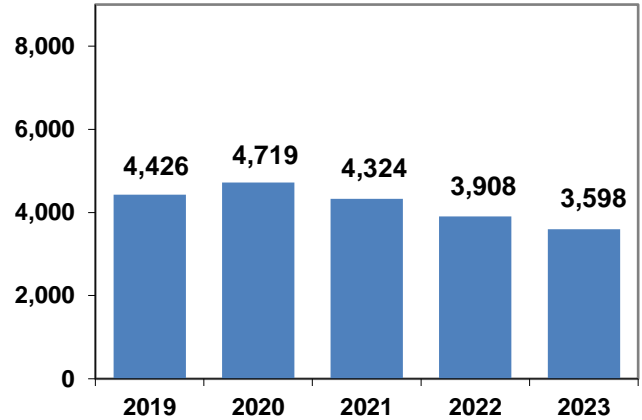
⁴ Other includes: Aldrich, Bennett, Fritz, Mission, Price Cluster, Shasta, Sonora, Supareil, Winters, and Wood Colony.

ALMONDS NUT SET BY VARIETY

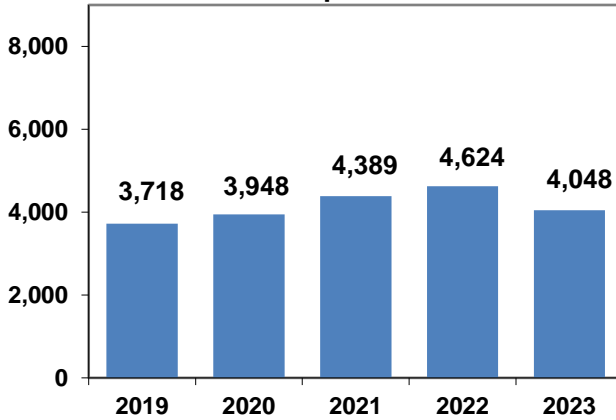
NONPAREIL TYPE
Nuts per Tree



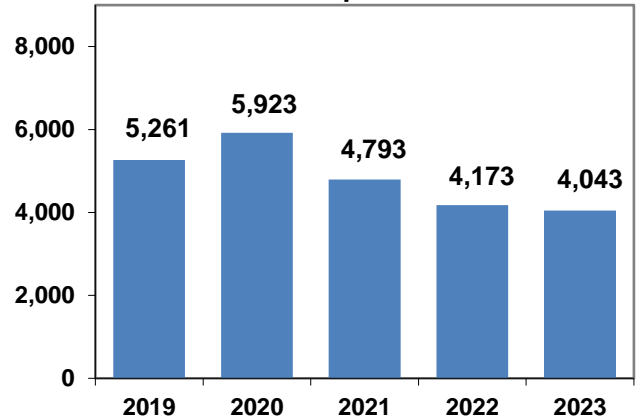
MONTEREY TYPE
Nuts per Tree



INDEPENDENCE TYPE
Nuts per Tree



BUTTE TYPE
Nuts per Tree



ALMONDS NUTS PER TREE, BY COUNTY & STATE

■ Colusa
 ■ Fresno
 ■ Kern
 ■ Madera
 ■ Merced
 ■ San Joaquin
 ■ Stanislaus
 ■ Tulare
 ■ State

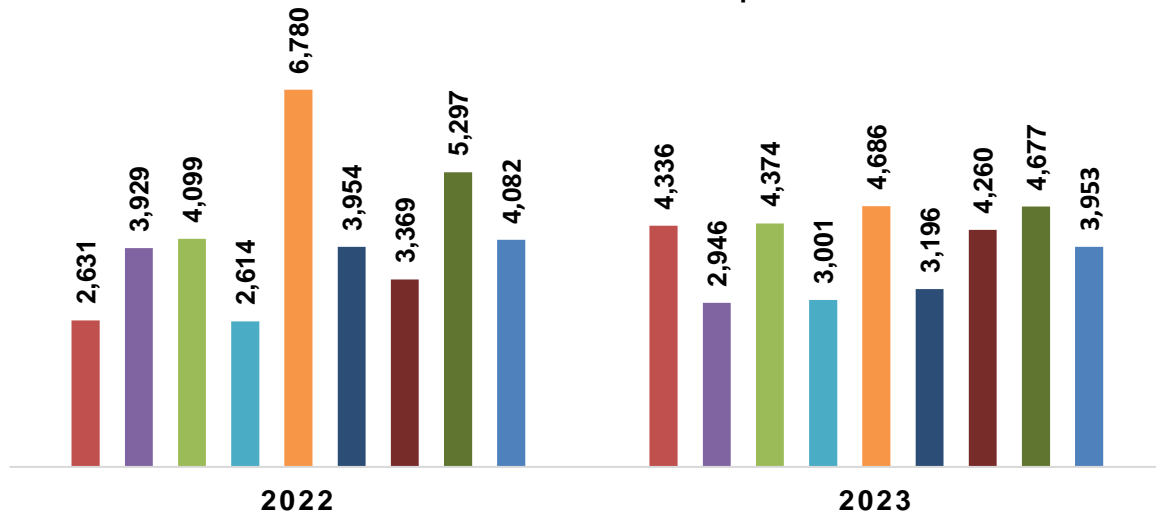


TABLE 3: CALIFORNIA ALMOND ACREAGE, PRODUCTION AND TREES PER ACRE, 1991-2023

| 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 |
| 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 | 1,161,000 | 2,560 | 2,170 | 2.45 | 6,169,100 |
| 2020 | 1,250,000 | 122.0 | 1,413,000 | 3,115 | 2,490 | 1.71 | 5,251,410 |
| 2021 | 1,320,000 | 122.0 | 1,329,000 | 2,930 | 2,220 | 1.86 | 5,341,920 |
| 2022 | 1,350,000 | 122.5 | 1,163,000 | 2,565 | 1,900 | 1.40 | 3,515,400 |
| 2023 ^{3,4} | 1,380,000 | 124.7 | 1,179,000 | 2,600 | 1,880 | — | — |

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 2024.⁴ Preliminary estimate of bearing acres is based on the Almond Acreage Report and the Almond Nursery Sales Survey.

2023 ALMOND OM SAMPLE DISTRIBUTION

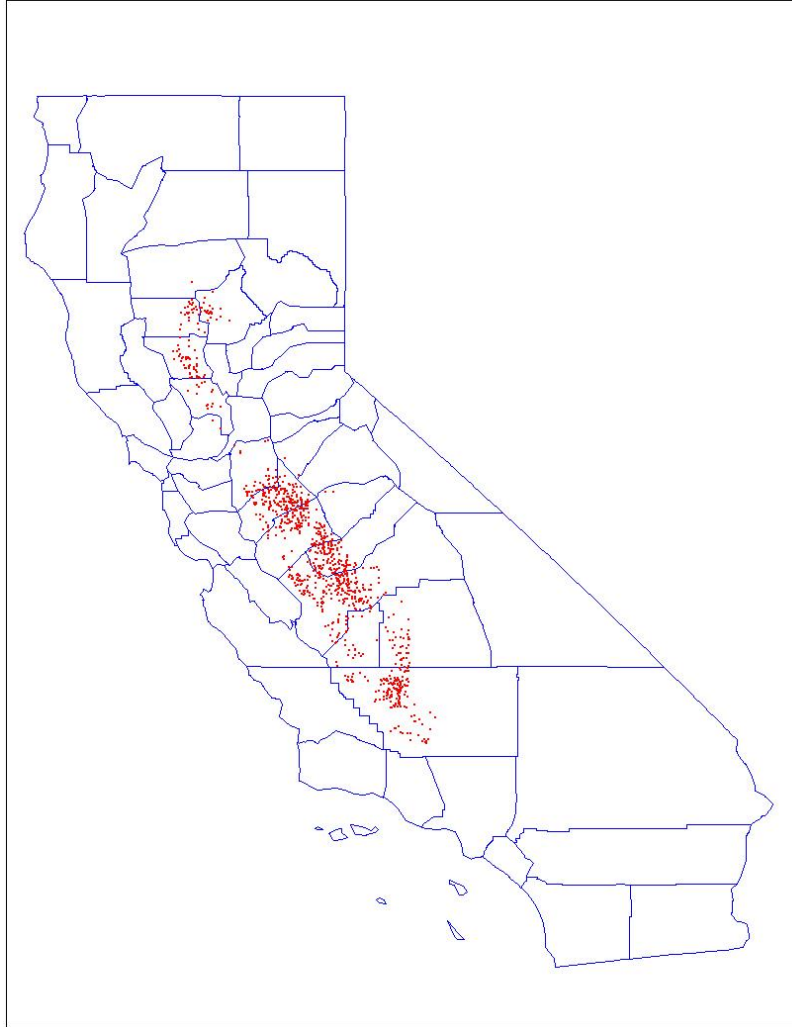


TABLE 4: 2023 ALMOND OM SAMPLE DISTRIBUTION BY COUNTY AND VARIETY

| | Butte | Carmel | Independence | Monterey | Nonpareil | Padre | Other ¹ | Total |
|--------------|-----------|-----------|--------------|------------|------------|-----------|--------------------|------------|
| Butte | 0 | 0 | 0 | 1 | 15 | 0 | 0 | 16 |
| Colusa | 5 | 0 | 0 | 5 | 22 | 1 | 6 | 39 |
| Fresno | 10 | 0 | 23 | 35 | 61 | 9 | 33 | 171 |
| Glenn | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 23 |
| Kern | 13 | 1 | 7 | 43 | 61 | 5 | 28 | 158 |
| Kings | 0 | 0 | 2 | 4 | 5 | 0 | 1 | 12 |
| Madera | 5 | 1 | 8 | 31 | 46 | 6 | 17 | 114 |
| Merced | 10 | 13 | 17 | 25 | 45 | 11 | 17 | 138 |
| San Joaquin | 2 | 2 | 8 | 0 | 24 | 0 | 3 | 39 |
| Solano | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 3 |
| Stanislaus | 8 | 22 | 21 | 19 | 44 | 8 | 26 | 148 |
| Tehama | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Tulare | 1 | 0 | 3 | 13 | 20 | 0 | 1 | 38 |
| Yolo | 0 | 0 | 0 | 2 | 7 | 0 | 2 | 11 |
| Total | 54 | 39 | 91 | 178 | 376 | 40 | 134 | 912 |

¹ Other includes Aldrich, Bennett, Fritz, Mission, Price Cluster, Shasta, Sonora, Supareil, Winters, and Wood Colony.