2000 California Pistachio Objective Measurement Survey Report

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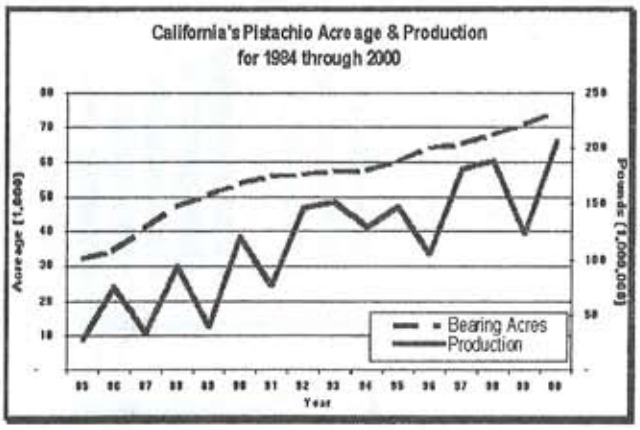
CALIFORNIA AGRICULTURAL STATISTICS SERVICE

2000 PISTACHIO PRODUCTION FORECAST AT 205 MILLION POUNDS

California pistachio production for 2000 is forecast at 205 million pounds. The 80 percent confidence interval is from 180 to 230 million pounds. This means that the results of our sampling procedures will encompass the true mean 80 percent of the time. This forecast is based on an objective measurement survey conducted by the California Agricultural Statistics Service under the sponsorship of the California Pistachio Commission. The survey collects data such as clusters per tree, nuts per cluster, percent of bearing trees, as well as weight and size information. In recent years, production has remained relatively stable as Pioneer Gold rootstock (verticillium wilt resistant) has increasingly replaced the older Atlantica rootstock.



HISTORY

Forecasting research on California's pistachio crop began in 1980 by the California Agriculture Statistics Service under the sponsorship of the California Pistachio Commission. The Pistachio Objective Measurement Survey uses randomly selected trees throughout the State. These trees are used to gather information on the total number of clusters, nuts within clusters, frequency of blank nuts, and other measurements. The Pistachio Objective Measurement Survey began in 1982 to meet grower and processor needs for accurate production data. An objective measurement survey was not conducted in 1993.

The August Pistachio Objective Measurement Survey procedures consist of sampling 1,100 randomly selected trees. For each tree, the cross-sectional area (CSA) for each primary branch is recorded and a primary branch (path) is randomly selected to obtain additional data. Along this path, CSA measurements are recorded at every branching fork and one branch at each fork is randomly selected until a terminal branch is reached (where only one branch at a fork is greater than 0.9 square inches). Along the path, the number of clusters is recorded. The number of clusters also is recorded for the terminal branch. In addition, randomly selected clusters from the terminal branch are picked so measurements can be obtained. The number of clusters collected from the random path is expanded according to the corresponding branch sizes in order to estimate the total number of clusters on the sample tree. The estimated number of clusters for each sample tree are combined to estimate the number of clusters by rootstock, county, and state. (Starting in 1998, two random paths were performed for each tree.)

Field staff also obtain a "Ten Tree Count" of bearing (female) and pollinator (male) trees. From these counts the "Estimated Percent Of All Spaces That Contain Bearing Trees" and the "Estimated Percent Of All Spaces That Contain Pollinators" are determined. A tree may be classified as too young, or too diseased to be counted as a bearing or pollinator tree.

The clusters are sent to a sizing station where field staff count the nuts on each cluster, determine the number of filled and blank nuts per cluster, and obtain in-hull weight, in-hull cross-suture width, kernel weight, kernel cross-suture width, kernel suture width, and kernel length measurements for each nut on the cluster. Beginning in 1995, the weight of in-hull filled nuts was obtained.

THE 2000 PISTACHIO OBJECTIVE MEASUREMENT SURVEY

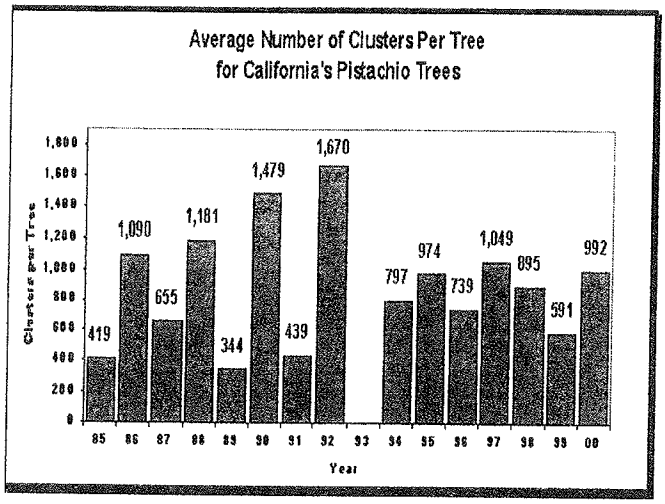
The Pistachio Objective Measurement Survey was completed by August 25. All samplers are employees of the National Association of State Departments of Agriculture and work in cooperation with the California Agricultural Statistics Service. Equipment and supplies were furnished, and survey procedures were discussed at training schools prior to the survey. Supervisors also trained enumerators on an individual basis. Quality control checks were made by all field supervisors to assure uniform procedures were followed statewide.

THE SAMPLE

Data were collected from 555 samples. These samples consist of two trees per sample and two random paths per tree (i.e., 1,100 trees and 2,200 random paths). This year, 207, 310 and 19 samples were obtained from trees with Atlantica, Pioneer Gold I and Pioneer Gold II rootstocks, respectively. Data for some samples could not be obtained due to wet or pulled orchards, or other conditions that prevented the field staff from entering an orchard.

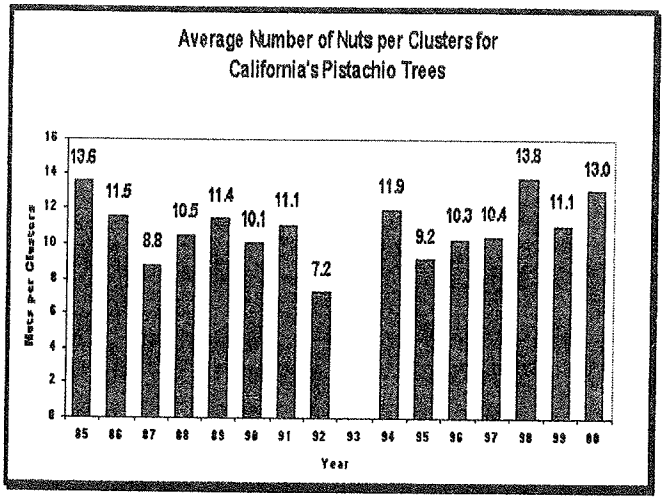
CLUSTER COUNT

For 2000, the overall average number of clusters per tree increased 68 percent to 992 from the previous year. The average cluster per tree for Atlantica (985 clusters per tree) and Pioneer Gold I (1,006 clusters per tree) rootstocks increased by 43 percent and 111 percent, respectively. In contrast, the average cluster per tree for Pioneer Gold II (696 clusters per tree) rootstock decreased by 18 percent.



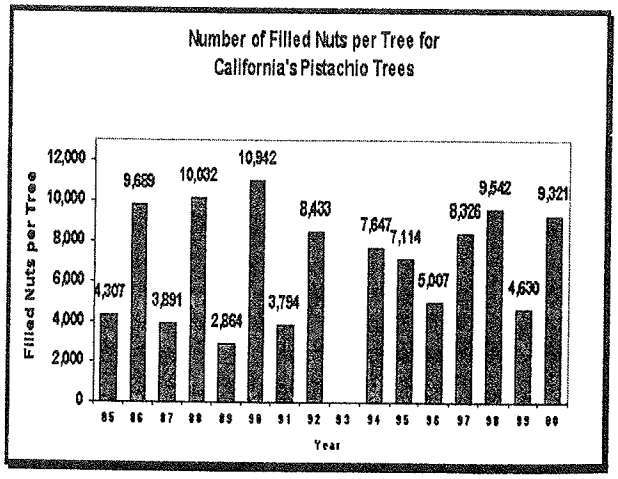
BEARING AND POLLINATOR TREES

The percentage of female trees in California's bearing pistachio orchards increased from 90.5 percent in 1999 to 92.8 percent in 2000. In contrast, the percentage of male trees decreased from 5.6 percent in 1999 to 4.5 percent in 2000.



FILLED NUTS AND NUTS PER CLUSTER

The number of filled nuts per tree increased substantially from 4,630 in 1999 to 9,321 in 2000. However, for 2000 the average number of nuts per cluster (13 nuts per cluster) and percent of nuts filled (72.2%) are relatively similar compared to 1999.



IN-HULL AND KERNEL MEASUREMENTS

The in-hull weight per nut including blanks (2.57 grams) and in-hull cross-suture measurements (14.86 millimeters) decreased by nine and three percent, respectively, compared to 1999. In addition, the weight per kernel (0.870 grams), kernel suture (10.01 millimeters), kernel cross-suture (9.33 millimeters) and kernel length (16.25 millimeters) measurements decreased by six, one, five and three percent, respectively, compared to 1999.

TABLE 1 -- PISTACHIO OBJECTIVE MEASUREMENT SURVEY DATA, 1987-2000 1/

Area	Year	Samples Completed 2/	Estimated Average Number Of Clusters Per Tree	Estimated Percent Of All Spaces That Contain		Count Data			In-Hull Data 3/			Kernel Data 3/			
				Bearing Trees	Pollinators	Nuts Per Cluster (Filled & Blank)	Percent Of Nuts Filled	Est. Total Number Of Filled Nuts Per Tree	Weight Per Nut (Includes Blanks)	Weight Per Nut (Filled)	In-Hull Cross Suture	Average Weight Per Kernel	Suture	Cross Suture	Length
Kern	1988	123	1,665	79.2	5.4	11.9	84.1	16,677	2.69	---	14.29	0.840	9.93	9.46	15.95
	1989	125	333	82.3	5.3	14.6	72.8	3,540	2.94	---	14.70	0.998	10.69	9.97	17.58
	1990	126	2,002	83.1	6.7	10.3	76.7	15,884	2.47	---	14.29	0.888	10.22	9.43	16.14
	1991	134	503	84.6	6.3	11.9	77.5	4,627	3.09	---	15.65	0.986	10.65	10.02	16.42
	1992	145	2,068	85.9	7.7	7.5	65.9	10,269	3.16	---	15.59	1.452	10.90	10.46	17.79
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	177	984	87.4	5.4	12.1	79.5	9,460	3.04	---	15.34	0.986	10.42	9.71	17.10
	1995	215	1,000	90.5	5.0	9.8	77.7	7,651	3.17	3.29	15.50	0.995	10.22	9.96	16.23
	1996	211	702	89.1	5.2	11.7	58.8	4,848	2.44	2.60	14.49	0.757	9.51	9.14	15.73
	1997	236	1,200	89.7	5.1	10.4	76.3	9,563	2.82	3.00	14.83	0.947	10.77	9.62	16.67
	1998	251	1,102	91.5	5.4	13.9	76.2	11,700	2.87	3.07	15.35	0.897	10.35	9.21	16.27
	1999	239	479	92.7	5.2	11.2	66.8	3,589	2.86	3.09	15.16	0.971	10.45	9.88	16.74
	2000	225	1,217	93.5	4.7	13.1	68.3	10,771	2.61	2.85	14.60	0.885	9.96	9.24	16.18
Kings	1988	32	1,332	77.8	5.2	9.1	80.4	9,732	2.81	---	14.70	0.938	10.45	9.83	16.55
	1989	35	452	78.4	4.9	13.7	68.8	4,276	2.88	---	14.89	0.977	10.71	9.98	17.01
	1990	44	1,739	84.5	4.7	10.0	71.3	12,338	2.60	---	14.34	0.914	10.45	9.75	16.85
	1991	39	493	86.7	4.6	12.7	79.9	5,014	2.82	---	15.29	0.867	10.50	10.19	16.49
	1992	34	2,122	78.0	3.9	9.2	72.8	14,215	2.98	---	15.05	1.093	11.37	10.58	18.20
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	49	776	86.5	3.5	13.4	78.5	8,133	3.08	---	15.10	1.047	11.08	10.34	17.72
	1995	55	1,165	90.7	3.7	10.8	79.6	10,050	3.09	3.35	15.68	0.983	10.50	10.35	16.86
	1996	39	359	91.0	5.1	20.0	62.5	4,485	2.56	2.76	14.28	0.826	9.75	9.47	16.15
	1997	55	1,319	92.9	3.8	11.8	68.3	10,659	2.69	2.76	14.62	0.885	10.33	9.76	16.51
	1998	58	828	93.2	4.1	15.6	76.4	9,899	2.94	3.14	14.78	0.948	10.50	9.96	17.20
	1999	51	626	93.3	2.4	13.9	71.0	6,179	2.79	3.32	16.06	0.912	10.25	9.74	17.00
	2000	53	995	94.9	2.8	11.0	71.5	7,834	2.34	2.78	15.56	0.713	9.59	8.95	15.61
Madera	1988	120	980	86.8	6.3	8.7	72.0	6,111	2.39	---	13.61	0.778	9.93	8.94	15.27
	1989	125	326	89.4	6.4	8.7	73.5	2,080	2.74	---	14.75	0.979	10.86	10.05	17.53
	1990	117	1,232	87.5	6.4	9.4	70.9	8,168	2.31	---	14.06	0.842	10.06	9.07	15.94
	1991	123	311	89.6	6.4	9.0	75.4	2,112	3.08	---	15.34	1.053	11.00	10.28	17.13
	1992	112	1,466	87.3	7.5	5.8	76.1	6,499	2.87	---	14.87	1.046	10.68	9.98	17.29
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	132	673	87.2	7.1	10.8	80.8	5,895	2.70	---	14.67	0.872	10.36	9.46	16.49
	1995	147	850	88.0	6.2	7.8	81.5	5,385	2.99	3.19	15.55	0.896	10.58	9.77	16.21
	1996	162	932	88.3	5.7	7.9	74.2	5,464	2.54	2.69	15.47	0.751	9.82	8.71	15.11
	1997	162	715	89.3	5.5	8.1	78.4	4,527	2.80	2.92	16.38	0.995	11.15	9.98	17.48
	1998	136	634	89.7	3.9	13.0	79.1	6,511	2.74	2.93	14.85	0.672	9.97	9.99	16.10
	1999	144	637	87.1	7.7	11.5	71.4	5,232	2.87	3.03	15.22	0.911	9.86	9.86	16.71
	2000	116	670	92.6	4.7	13.7	71.7	6,567	2.66	2.93	14.73	0.939	10.28	9.86	16.84
Merced	1988	33	585	88.5	6.9	11.6	81.9	5,577	2.36	---	13.57	0.742	10.07	9.12	14.86
	1989	32	209	92.5	7.7	9.9	78.0	1,613	2.68	---	14.56	0.941	10.40	9.74	16.74
	1990	34	897	89.4	7.0	9.4	67.8	5,722	2.11	---	13.34	0.801	9.65	8.73	15.34
	1991	30	269	89.7	5.8	14.7	70.7	2,796	2.94	---	15.39	1.051	11.30	10.77	17.48
	1992	32	1,217	88.0	6.1	5.8	72.1	5,088	2.79	---	14.80	1.030	10.65	9.91	17.16
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	21	525	84.3	7.1	14.5	84.4	6,443	2.61	---	14.35	0.848	10.31	9.39	16.42
	1995	34	753	88.2	5.7	11.2	79.8	6,745	2.91	3.11	15.36	0.852	9.93	9.46	16.44
	1996	29	802	87.2	6.8	10.9	70.6	6,195	2.66	2.86	16.47	0.811	10.23	9.51	16.18
	1997	47	953	85.6	9.3	12.2	80.5	9,380	2.74	2.82	14.23	0.906	9.69	8.89	14.41
	1998	44	655	87.8	7.7	14.9	76.3	7,434	2.98	3.16	15.19	0.859	10.83	9.70	16.96
	1999	35	1,087	86.2	6.5	11.0	71.1	8,490	2.68	2.93	14.60	0.944	10.04	9.79	16.67
	2000	36	1,022	86.9	6.4	15.0	63.9	12,890	2.60	2.86	14.91	0.868	10.22	9.24	15.63
Tulare	1988	16	837	81.9	4.4	8.7	81.9	5,931	2.40	---	13.90	0.790	10.54	9.60	16.86
	1989	23	449	86.7	5.7	8.5	74.1	2,840	2.64	---	14.31	0.940	10.84	9.99	17.72
	1990	26	1,128	87.3	6.2	11.8	67.3	8,944	2.39	---	13.82	0.852	9.66	8.90	15.62
	1991	33	495	92.9	4.8	10.2	82.9	4,172	2.87	---	15.24	0.906	10.66	10.24	17.28
	1992	36	1,377	89.6	5.4	6.7	74.6	6,904	3.03	---	15.14	1.086	11.27	10.55	18.41
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	49	941	90.4	5.1	11.8	86.5	9,585	2.74	---	14.34	0.866	10.18	9.63	16.81
	1995	59	1,002	91.0	4.5	9.9	82.5	8,190	2.97	3.23	15.33	0.950	10.41	10.12	17.20
	1996	48	793	92.5	4.4	11.5	70.6	6,435	2.53	2.76	14.10	0.819	9.86	9.33	16.41
	1997	58	901	90.1	4.7	12.4	74.3	8,322	2.59	2.69	14.12	0.821	9.91	9.26	16.18
	1998	62	859	91.1	4.8	12.0	81.3	8,383	2.79	3.00	14.48	0.878	10.12	9.49	16.72
	1999	63	645	89.5	4.0	8.3	73.4	3,949	2.82	3.32	16.07	0.870	9.83	9.41	16.76
	2000	62	714	90.6	3.7	12.1	77.7	6,695	2.54	2.73	15.78	0.797	9.92	9.16	16.35
State	1988	347	1,181	83.2	5.7	10.5	80.7	10,032	2.61	---	14.13	0.832	10.02	9.37	15.87
	1989	367	344	85.8	6.1	11.4	72.9	2,864	2.84	---	14.70	0.979	10.71	9.97	17.40
	1990	373	1,479	85.6	6.3	10.1	73.5	10,942	2.43	---	14.14	0.871	10.12	9.32	16.11
	1991	389	439	87.7	5.9	11.1	77.8	3,794	2.99	---	15.41	0.963	10.69	10.11	16.68
	1992	394	1,670	86.3	6.8	7.2	70.4	8,433	3.04	---	15.26	1.240	10.96	10.35	17.79
	1993	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	1994	491	797	87.4	6.0	11.9	80.6	7,647	2.92	---	15.02	0.952	10.43	9.68	16.97
	1995	586	974	89.9	5.4	9.2	78.9	7,114	3.07	3.26	15.51	0.949	10.33	9.94	16.40
	1996	562	739	89.3	5.3	10.3	65.7	5,007	2.52	2.72	14.87	0.775	9.76	9.08	15.70
	1997	642	1,049	89.5	5.4	10.4	76.0	8,326	2.78	2.92	14.92	0.896	10.56	9.60	16.55
	1998	610	895	90.9	5.0	13.8	77.2	9,542	2.86	3.04	15.05	0.828	10.31	9.51	16.48
	1999	603	591	90.5	5.6	11.1	70.4	4,630	2.82	3.09	15.29	0.928	10.16	9.78	16.72
	2000	555	992	92.8	4.5	13.0	72.2	9,321	2.57	2.84	14.86	0.870	10.01	9.33	16.25

1/ Survey was not conducted in 1993.
2/ Number of samples is based on the August Pistachio Objective Measurement Survey. There are two trees per sample.
3/ All weights are in grams. Suture, cross suture and length measurements are in millimeters.

TABLE 2 -- PISTACHIO OBJECTIVE MEASUREMENT SURVEY DATA, 2000

Area & Variety	Samples Completed b/	Estimated Average Number Of Clusters Per Tree	Est. Percent Of All Spaces That Contain		Count Data			In-Hull Data			Kernel Data a/			
			Bearing Trees	Pollinators	Nuts Per Cluster (Filled & Blank)	Percent Of Nuts Filled	Est. Total Number Of Filled Nuts Per Tree	Weight Per Nut (Includes Blanks)	Weight Per Nut (Filled)	In-Hull Cross Suture	Average Weight Per Kernel	Suture	Cross Suture	Length
KERN														
Kerman/ Atlantica	49	1,620	88.8	6.5	11.8	64.5	12,357	2.58	2.82	14.73	0.841	10.16	9.23	16.01
Kerman/ Pioneer Gold I	159	1,110	94.9	4.0	13.1	69.6	10,151	2.63	2.89	14.53	0.910	9.89	9.26	16.28
Kerman/ Pioneer Gold II	4	972	98.8	1.3	13.8	62.8	8,421	2.72	2.91	14.99	0.973	10.42	9.47	16.37
TOTAL	225	1,217	93.5	4.7	13.0	68.3	10,771	2.61	2.85	14.60	0.885	9.96	9.24	16.18
KINGS														
Kerman/ Atlantica	13	1,047	95.0	1.9	9.2	70.1	6,737	2.51	2.73	15.90	0.709	9.40	8.94	15.35
Kerman/ Pioneer Gold I	34	1,024	96.0	3.0	11.7	73.0	8,722	2.25	2.81	15.36	0.704	9.59	8.93	15.64
Kerman/ Pioneer Gold II	3	454	83.3	5.0	14.8	55.0	3,709	3.11	2.95	17.35	0.948	10.78	9.55	17.10
TOTAL	53	995	94.9	2.8	11.0	71.5	7,834	2.34	2.78	15.56	0.713	9.59	8.95	15.61
MADERA														
Kerman/ Atlantica	76	750	91.6	5.5	13.7	73.1	7,529	2.62	2.88	14.63	0.932	10.32	9.82	16.90
Kerman/ Pioneer Gold I	32	505	94.9	3.3	13.0	67.1	4,415	2.79	3.13	15.13	0.960	10.12	10.03	16.64
Kerman/ Pioneer Gold II	3	653	98.3	0.0	12.1	79.3	6,252	2.85	3.06	14.96	1.014	10.03	9.81	16.79
TOTAL	116	670	92.6	4.7	13.7	71.7	6,567	2.66	2.93	14.73	0.939	10.28	9.86	16.84
MERCED														
Kerman/ Atlantica	32	962	88.3	6.3	15.9	84.3	12,902	2.60	2.86	14.93	0.866	10.20	9.21	15.57
Kerman/ Pioneer Gold I	2	1,770	65.0	1.0	9.2	78.1	12,698	2.48	2.86	14.68	0.904	10.62	9.75	16.77
Kerman/ Pioneer Gold II	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	36	1,022	86.9	6.4	15.0	83.9	12,870	2.60	2.86	14.91	0.868	10.22	9.24	15.63
TULARE														
Kerman/ Atlantica	14	532	78.6	3.9	15.1	76.1	6,127	2.86	2.76	16.04	0.807	10.10	9.48	16.90
Kerman/ Pioneer Gold I	42	841	93.7	4.1	11.6	78.8	7,687	2.46	2.71	15.69	0.793	9.89	9.08	16.21
Kerman/ Pioneer Gold II	4	447	100.0	0.0	37.4	63.6	2,247	2.28	2.94	15.51	0.826	9.40	8.88	16.07
TOTAL	62	714	90.6	3.7	12.1	77.7	6,695	2.54	2.73	15.78	0.797	9.92	9.16	16.35
STATE														
Kerman/ Atlantica	207	985	89.6	5.5	13.1	73.0	9,624	2.60	2.83	14.83	0.871	10.19	9.41	16.18
Kerman/ Pioneer Gold I	310	1,006	94.8	3.8	12.7	71.7	9,194	2.56	2.89	14.91	0.873	9.87	9.27	16.28
Kerman/ Pioneer Gold II	19	696	95.8	2.1	12.9	70.4	6,309	2.65	2.83	14.95	0.938	10.49	9.57	16.83
TOTAL	555	992	92.8	4.5	13.0	72.2	9,321	2.57	2.84	14.86	0.870	10.01	9.33	16.25

a/ All weights are in grams. Suture, cross suture and length measurements are in millimeters.
b/ Number of samples is based on the August Pistachio Objective Measurement Survey. There are two trees per sample. Samples completed may not add to "Total" due to other miscellaneous variety/rootstock which are not listed.

SOURCE: CALIFORNIA AGRICULTURAL STATISTICS SERVICE

TABLE 3 --- CALIFORNIA PISTACHIO ACREAGE, PRODUCTION, PRICE AND VALUE, 1980-00

Year	Acreage			Production				Value of Production	
	Bearing a/	Non-Bearing	Total Acres	Marketable In-Hull	Shelling Stock	Total	Yield Per Bearing Acre	Grower Return Per Pound	Total Value
	Acres			1,000 Pounds (In-Hull Basis)			Pounds	Cents	$1,000
1980	26,000	9,000	35,000	18,600	8,300	26,900	1,030	205.0	55,145
1981	27,500	13,100	40,600	11,300	3,200	14,500	527	136.0	19,720
1982	29,900	15,600	45,500	39,600	4,400	44,000	1,470	149.0	66,560
1983	31,100	16,000	47,100	20,700	5,700	26,400	849	141.0	37,224
1984	30,800	16,800	47,600	45,200	17,900	63,100	2,050	97.6	61,586
1985	32,300	18,700	51,000	23,100	4,000	27,100	839	137.0	37,127
1986	34,200	20,400	54,600	57,500	17,400	74,900	2,190	112.0	83,888
1987	41,000	16,400	57,400	27,200	5,900	33,100	807	137.0	45,347
1988	47,200	10,300	57,500	76,100	17,900	94,000	1,990	122.0	114,680
1989	50,900	12,000	62,900	33,000	6,000	39,000	766	163.0	63,570
1990	53,700	11,100	64,800	94,600	25,400	120,000	2,230	102.0	122,400
1991	55,700	13,300	69,000	59,000	18,000	77,000	1,280	125.0	96,250
1992	56,500	13,900	70,400	114,500	32,500	147,000	2,600	103.0	151,410
1993	57,000	15,700	72,700	113,000	39,000	152,000	2,670	107.0	162,640
1994	57,500	16,600	74,100	94,600	34,400	129,000	2,235	92.1	118,809
1995	60,300	13,400	73,700	107,500	40,500	148,000	2,454	109.0	161,320
1996	64,300	17,100	81,400	85,000	20,000	105,000	1,630	116.0	121,800
1997	65,400	17,000	82,400	137,000	43,000	180,000	2,750	113.0	203,400
1998	68,000	19,300	87,300	138,000	50,000	188,000	2,760	103.0	193,640
1999	71,000	21,000	92,000	105,000	18,000	123,000	1,730	131.0	161,130
2000	74,600	21,700	96,300	b/	b/	b/	b/	b/	b/

a/ Bearing acreage for 1988 to date is defined as plantings that are six years old and older. Bearing acreage for 1980 through 1987 is defined as plantings that are seven years old and older.

b/ Pistachio price, total crop value, and production will be available in January 2001.

Arizona's 2000 pistachio production is expected to increase by six percent to 2,600,000 pounds compared to 1999. This year marks the first time Arizona's pistachio production will be estimated and published by the Arizona Statistics Service Office.

The California Agriculture Statistics Service would like to thank the California Pistachio Industry for their cooperation and support!

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California Agricultural Statistic Service publications are available on the Internet at:
http://www.nass.usda.gov/ca

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