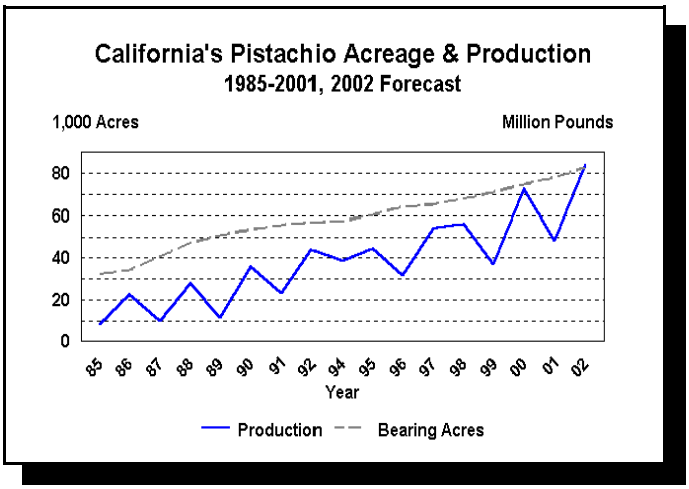
2002 California Pistachio Objective Measurement Survey Report

Released: August 29, 2002
12:00 NOON PDT

CALIFORNIA AGRICULTURAL STATISTICS SERVICE

2002 PISTACHIO PRODUCTION FORECAST AT A RECORD 280 MILLION POUNDS

California pistachio production for 2002 is forecast at a record 280 million pounds. The 80 percent confidence interval is from 245 to 315 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 (CASS) under the sponsorship of the California Pistachio Commission (CPC). 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 CASS under the sponsorship of the CPC. The Pistachio Objective Measurement (O. M.) 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. This 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 O. M. Survey procedures consist of sampling 1,300 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 2002 PISTACHIO OBJECTIVE MEASUREMENT SURVEY

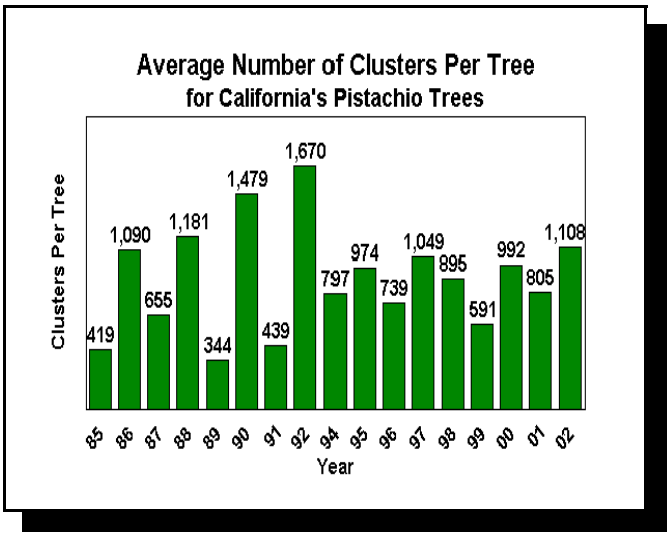
The Pistachio O. M. Survey was completed by August 23. All samplers are employees of the National Association of State Departments of Agriculture and work in cooperation with CASS. Equipment and supplies were furnished, and survey procedures were discussed at training schools prior to the survey. Supervisors 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 623 samples. These samples consist of two trees per sample and two random paths per tree (i.e., 1,246 trees and 2,492 random paths). This year, 210, 378 and 14 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.

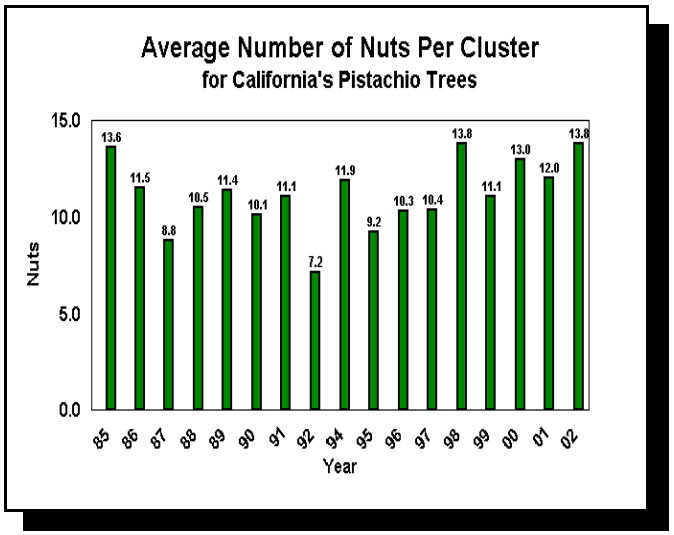
CLUSTER COUNT

For 2002, the overall average number of clusters per tree increased 38 percent to 1,108 from the previous year. The average cluster per tree for Atlantica (1,297 clusters per tree), Pioneer Gold I (984 clusters per tree) and Pioneer Gold II (1,396 clusters per tree) all increased from the previous year by 60 percent, 24 percent and 24 percent, respectively. This is in contrast to 2001 during which Atlantica and Pioneer Gold I rootstocks decreased from the previous year.



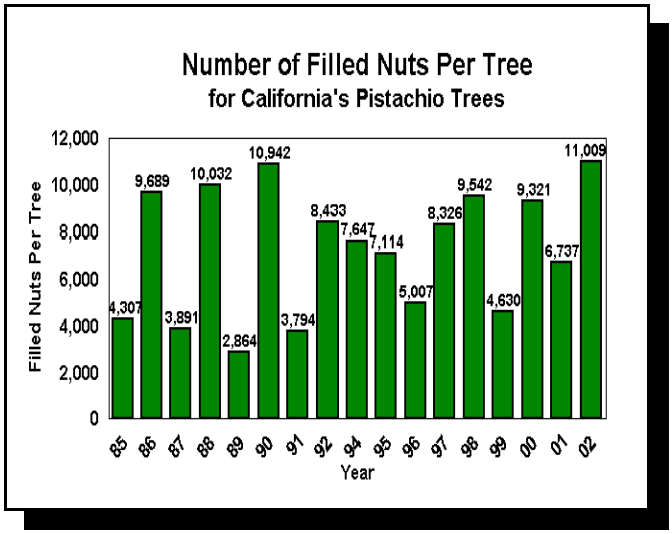
BEARING AND POLLINATOR TREES

The percentage of female trees in California's bearing pistachio orchards (94.0%) increased slightly from last year (92.6%).



FILLED NUTS AND NUTS PER CLUSTER

The number of filled nuts per tree increased dramatically from 6,737 in 2001 to 11,009 in 2002. The average number of nuts per cluster (13.8 nuts per cluster) and percent of nuts filled (71.9%) also increased when compared to 2001, but not as substantially.



IN-HULL AND KERNEL MEASUREMENTS

The in-hull weight per nut including blanks (2.65 grams) and in-hull cross-suture measurements (14.46 millimeters) decreased by 7.6 and 7.2 percent, respectively, compared to 2001. In addition, the weight per kernel (0.889 grams), kernel suture (10.16 millimeters), kernel cross-suture (9.35 millimeters) and kernel length (16.34 millimeters) measurements decreased by 13 percent, 3 percent, 6 percent and 2 percent, respectively, compared to 2001.

PISTACHIO OBJECTIVE MEASUREMENT SURVEY DATA, 1990-2001 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 and 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	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
	2001	246	751	93.8	4.3	12.7	68.5	6,543	2.97	3.22	15.31	1.045	10.50	9.93	16.58
	2002	250	1,167	94.9	4.2	13.9	69.1	11,233	2.72	2.94	14.72	0.903	10.27	9.50	16.36
Kings	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
	2001	54	1,159	97.9	1.8	10.0	69.5	8,062	2.87	3.13	16.39	0.993	10.81	10.19	17.00
	2002	60	1,048	95.5	2.6	16.5	71.7	12,375	2.64	2.85	14.47	0.868	10.13	9.47	16.39
Madera	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
	2001	158	570	88.6	8.3	12.6	71.3	5,137	2.89	3.12	15.34	1.046	10.11	9.73	16.30
	2002	132	1,039	91.8	6.6	14.1	73.7	10,861	2.59	2.55	13.88	0.850	9.79	8.90	15.90
Merced	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	83.9	12,890	2.60	2.86	14.91	0.868	10.22	9.24	15.63
	2001	30	722	88.7	6.3	11.2	67.6	5,455	2.70	3.16	15.86	1.032	10.32	10.90	16.76
	2002	31	1,010	90.8	5.8	14.5	74.8	10,937	2.35	2.60	15.92	0.849	10.17	9.05	16.13
Tulare	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
	2001	63	1,284	93.6	4.3	9.9	71.7	9,112	2.70	2.90	16.21	0.901	10.53	9.65	16.54
	2002	62	1,109	93.1	4.4	11.7	76.0	9,844	2.58	2.76	14.16	0.890	10.35	9.45	16.67
State	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
	2001	632	805	92.6	5.2	12.0	70.0	6,737	2.87	3.13	15.59	1.020	10.52	9.99	16.71
	2002	623	1,108	94.0	4.7	13.8	71.9	11,009	2.65	2.80	14.46	0.889	10.16	9.35	16.34

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.

PISTACHIO OBJECTIVE MEASUREMENT SURVEY DATA, 2002

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	50	1,762	93.0	4.7	12.3	68.6	14,886	2.68	2.92	14.73	0.829	9.93	9.24	15.74
Kerman/ Pioneer Gold I	184	1,019	95.5	3.9	14.7	68.7	10,301	2.75	2.96	14.74	0.938	10.43	9.63	16.64
Kerman/ Pioneer Gold II	3	1,134	95.0	5.0	14.5	71.6	11,799	2.77	2.88	14.23	0.859	10.18	9.00	16.36
TOTAL	250	1,167	94.9	4.2	13.9	69.1	11,233	2.72	2.94	14.72	0.903	10.27	9.50	16.30
KINGS														
Kerman/ Atlantica	12	1,577	95.0	1.3	16.6	72.9	19,042	2.65	2.86	14.57	0.859	10.14	9.51	16.38
Kerman/ Pioneer Gold I	43	1,000	95.5	3.0	15.8	72.3	11,401	2.64	2.85	14.45	0.874	10.15	9.47	16.41
Kerman/ Pioneer Gold II	2	1,012	100.0	0.0	10.9	41.6	4,582	2.17	2.37	13.54	0.769	10.02	9.16	15.77
TOTAL	60	1,048	95.5	2.6	16.5	71.7	12,375	2.64	2.85	14.47	0.868	10.13	9.47	16.39
MADERA														
Kerman/ Atlantica	91	1,111	90.1	7.7	14.3	74.5	11,803	2.55	2.48	13.79	0.838	9.84	8.89	15.93
Kerman/ Pioneer Gold I	37	793	95.3	4.7	14.6	70.3	8,115	2.68	2.74	14.17	0.859	9.48	8.83	15.67
Kerman/ Pioneer Gold II	2	2,074	100.0	0.0	11.6	78.7	18,988	2.93	2.96	14.02	1.021	10.09	9.07	16.32
TOTAL	132	1,039	91.8	6.6	14.1	73.7	10,861	2.59	2.55	13.88	0.850	9.79	8.90	15.90
MERCED														
Kerman/ Atlantica	30	994	90.5	6.0	14.7	75.0	10,979	2.37	2.61	15.92	0.851	10.16	9.05	16.14
Kerman/ Pioneer Gold I	1	1,333	100.0	0.0	10.6	68.2	9,660	1.89	2.27	16.06	0.790	10.32	9.10	15.86
Kerman/ Pioneer Gold II	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	31	1,010	90.8	5.8	14.5	74.8	10,937	2.35	2.60	15.92	0.849	10.17	9.05	16.13
TULARE														
Kerman/ Atlantica	13	1,146	86.2	3.5	12.9	70.8	10,449	2.61	2.74	14.31	0.855	10.26	9.48	16.48
Kerman/ Pioneer Gold I	45	1,134	94.9	4.8	11.5	77.5	10,115	2.57	2.78	14.13	0.900	10.38	9.46	16.73
Kerman/ Pioneer Gold II	2	1,156	100.0	0.0	8.9	83.3	8,581	2.43	2.63	13.69	0.840	10.56	9.18	16.42
TOTAL	62	1,109	93.1	4.4	11.7	76.0	9,844	2.58	2.76	14.16	0.890	10.35	9.45	16.67
STATE														
Kerman/ Atlantica	210	1,297	91.0	6.1	13.7	72.6	12,940	2.58	2.69	14.43	0.846	10.02	9.14	16.07
Kerman/ Pioneer Gold I	378	984	95.5	4.0	14.4	71.2	10,071	2.70	2.88	14.51	0.919	10.26	9.52	16.53
Kerman/ Pioneer Gold II	14	1,396	97.5	2.5	9.9	73.7	10,192	2.63	2.73	13.92	0.902	10.42	9.16	16.60
TOTAL	623	1,108	94.0	4.7	13.8	71.9	11,009	2.65	2.80	14.46	0.889	10.16	9.35	16.34

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.

CALIFORNIA PISTACHIO ACREAGE, PRODUCTION, PRICE AND VALUE, 1980-2002

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	133.0	163,590
2000	74,600	21,700	96,300	190,000	53,000	243,000	3,260	98.0	238,140
2001	78,000	21,000	99,000	127,000	34,000	161,000	2,060	99.0	159,530
2002	83,000	N/A	N/A	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 2003.

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