Almond Board of California
Annual Report
May 2003

Project No.: 02-BL-02- Field Evaluation of Almond Varieties

Project Leader: Bruce Lampinen, Dept. of Pomology, UC Davis

Cooperating Personnel: T. Gradziel, S. Metcalf, M. Thorpe and W. Micke (UCD), J. Connell (Butte County), P. Verdegaal (San Joaquin County), M. Viveros (Kern County), J. Floyd (CSU, Chico), J. Burkhard and L. Sheffield (S.J. Delta College), and Paramount Farming Company (Kern County).

Objectives

1. Three new Regional Almond Variety Trials were planted in 1993. Bloom, hullsplit, yield and nut quality data will be collected in 2002. Trees will also be observed and evaluated for growth, pest and disease susceptibility, and noninfectious bud failure symptoms.
2. Summarize and analyze data associated with this project and publish and otherwise disseminate this information as appropriate, including publishing a leaflet reporting the 2002 results from these three trials.

Abstract

Three new Regional Almond Variety Trials (RAVTs) were planted in 1993 at Paramount Farming Company near Shafter in Kern County (Kern), San Joaquin Delta College farm near Manteca in San Joaquin County (Delta) and at California State University at Chico farm in Butte County (Butte). The Kern trial again had the highest overall yields this year with 5 varieties that produced over 4000 lbs/acre, 16 varieties that produced between 3000 and 4000 kernel lbs/acre and 8 varieties that produced between 2000 and 3000 kernel lbs/acre. Although this trial has more trees per acre (86) than the Butte (64) or Delta (75) trials, the trees should have filled in such that the effect of tree spacing on yields should have been largely eliminated by this point in the trials. Thirteen varieties produced over 2000 kernel lbs/acre, 18 produced over 1000 kernel lbs/acre and 2 produced under 1000 kernel lbs/acre in the Delta RAVT in 2002. In the Butte RAVT, only Chip's produced over 3000 kernel lbs/acre while 12 varieties produced over 2000 kernel lbs/acre while the rest produced between 1000 and 2000 kernel lbs/acre except selection 2-19e which produced only 964 kernel pounds/acre.

Until the 2002 season, only Yokut at the CSU-Chico trial had shown indications of possible noninfectious bud failure (BF) symptoms, and these symptoms might be due to a virus condition that mimics BF. However, in the spring of 2002, minor bud failure was

observed on the tops of 14% of the Carmel trees in the Kern trial and 12% of the Carmel trees in the Butte trial. This followed a warm 2001 May-June period that was extremely conducive to bud failure. To date, no bud failure has been observed on the Carmel trees at the Delta College trial.

Experimental Procedure

Three RAVT's were planted in 1993 at Paramount Farming Company in Kern County (Kern), San Joaquin Delta College farm in San Joaquin County (Delta) and at California State University Chico Farm in Butte County (Butte)

During bloom, data was collected on the standard and test cultivars by walking the plots on a regular basis (approximately every other day) to assess timing and intensity of bloom. During hullsplit, the plots were walked on a regular basis (approximately weekly) to record the beginning and end of the hullsplit period. Since some trees were lost due to disease, wind damage etc., a tree count was made at each site during summer to allow for the adjustment of yield values for number of trees present that season.

Because of the variability in maturity dates, three to four harvests were required at each location. At harvest, total tree weights were obtained by weighing all nuts from each plot using harvest trailers fitted with load cells and/or drive up load cells. Random sub-samples (approximately 5-8 lbs from each plot) were taken as the nuts left the harvester. These sub-samples were then counted to assess number of nuts per pound. Then approximately 100 nuts were taken from this sub-sample to be dried and used for analysis of kernel weights, insect damage, defects, etc. Trees were observed over the season and any indication of disease symptoms, insect problems or non-infectious bud failure were noted.

More details about these trials can be found in the 2002 Almond Board Research Conference Proceedings and in a leaflet that was distributed at the 2002 Almond Board Research Conference (2002 Progress Report- Regional Almond Variety Trials).

Results

The **Butte RAVT** is located near Chico and has 64 trees per acre. In this trial, there were 13 varieties that produced over 2000 kernel pounds per acre in the 2002 season (Table 1). All of the other varieties produced between 1000 and 2000 kernel pounds per acre except selection 2-19E which produced 964 kernel pounds per acre. Two Selections were removed from the Butte RAVT in 2001. Selection 1-102W was removed since it had lost about half of the trees and was extremely susceptible to anthracnose. Selection 2-43W was removed because it had not proved to be very productive and was not going to be released. In place of the two removed selections, Avalon (Burchell Nursery), Durango (Fowler Nursery) and Kochi (Sierra Gold Nursery) were planted, as well as Carmel as a standard for comparison.

The predominant kernel defect for the Butte RAVT in the 2002 season was double kernels with Plateau, Kahl and Price producing over 30% and Wood Colony producing 20% double kernels. Butte, Sano and selection 2-19e produced 10% or more double kernels while

Livingston, Donna and Aldrich all had 6% or more double kernels. Morley (12%), Price (8%), Kapareil (6%) and Sonora (6%) were the only varieties to have over 4% blank kernels in this trial. Only Kahl (6%) and Rosetta (6%) had kernels with gum. Winters (8%) was the only variety with six percent or more worm damage.

In the **Delta RAVT** with 75 trees per acre, there were 13 varieties with that produced over 2000 kernel pounds per acre (Table 2). Eighteen varieties or selections produced between 1000 and 2000 kernel pounds per acre while two produced less than 1000 kernel pounds per acre.

Donna (32%), Kahl (24%), Price (24%), Wood Colony (20%), Dottie Won (14%), Monterey (14%), Aldrich (12%), Jiml (12%), Butte (10%), Sano (8%), selection 2-19e (8%), Savana (6%), selection 25-75 (6%), Plateau (6%) and Livingston (6%) all produced 6% or more double kernels in the Delta trial for the 2002 season. Varieties with six percent or more blank kernels were Kahl (16%), Donna (14%), Monterey (12%), Price (10%), Savana (10%), selection 2-43w (10%), Aldrich (8%), Butte (8%), Jiml (6%) and Morley (6%). Varieties with six percent or more gum damage were selection 1-102w (20%), Savana (16%) and Winters (6%) There were also 4 varieties or selections with 20% or more twin kernels (Price, Sonora, Carmel and Jenette), 2 with 10% or more twin kernels (Jiml and selection 1-87) and 6 with 6% or more twin kernels (Nonpareil, selection 2-19e, selection 25-75, Livingston, Wood Colony and Mission).

In the **Kern RAVT**, with 86 trees per acre, Aldrich, Padre, Jiml, Ruby and Butte produced over 4000 kernel pounds per acre (Table 3). There were 16 varieties or selections that produced produced over 3000 kernel pounds per acre (Table 1). There were 10 varieties or selections that produced between 2000 and 3000 kernel pounds per acre and two varieties that produced between 1000 and 2000 kernel pounds per acre. Only Sano produced less than 1000 kernel pounds per acre in the Kern RAVT in 2002.

Plateau (32%), Sano (12%), selection 25-75 (10%), Jiml (10%), Kahl (10%), Price (6%), Wood Colony (6%) and Johlyn (6%) all had more than 4% double kernels in the 2002 season. Only Morley (6%) had any blank kernels while no varieties or selections had any kernel gumming. There were eleven varieties or selections with 6% or more worm damage in the Kern RAVT in 2002.

Dissemination of Information

The information from this project was made available to growers by presentations at the Almond Board Research Conference and other meetings. A booklet detailing the 2003 results was published and distributed at the Almond Board Research Conference, other meetings, and through the Almond Board and Cooperative Extension Offices. Similar booklets have been published and distributed for previous years.

Table 1. 2002 Yield Summary for the Regional Almond Variety Trial at California State University at Chico Farm, Butte County. Planted in 1993					
				Kernel Pounds Per	
Variety	No. of Nuts/Tree	Average Kernel Weight (g)	Shelling Percentage	Tree	Acre[1]
Chip's	16495	1.37	69.7	49.9	3195
Aldrich	23382	0.89	54.8	45.6	2920
Nonpareil	**16266**	**1.13**	**65.7**	**40.4**	**2587**
Winters (13-1)	19982	0.88	45.2	38.7	2479
Jiml	14805	1.14	59.4	37.0	2371
Plateau	14195	1.18	46.9	36.9	2361
Livingston	15875	1.05	57.9	36.7	2350
Carmel	15557	1.06	50.7	36.3	2320
Wood Colony	14895	1.10	54.3	36.2	2318
Mission	**16208**	**1.01**	**45.7**	**36.0**	**2304**
Johlyn	13061	1.11	68.7	31.8	2036
Monterey	11534	1.25	46.5	31.8	2032
Butte	15233	0.93	47.5	31.3	2001
Jenette	12128	1.13	68.1	30.3	1939
Padre	16212	0.84	49.8	30.1	1929
Sano	10529	1.29	53.8	30.0	1918
Ruby	12439	1.06	50.9	29.0	1859
25-75	16564	0.79	52.9	28.7	1835
1-87x	15035	0.85	58.0	28.2	1802
Morley	12788	0.97	48.3	27.2	1741
Yokut	9743	1.18	50.3	25.3	1621
Sonora	8172	1.30	69.1	23.4	1498
Rosetta	7783	1.32	46.6	22.7	1451
Donna	9745	0.94	52.0	20.2	1294
Kahl	8802	1.03	36.4	20.0	1280
Price	9366	0.94	49.9	19.4	1244
Savana	7541	1.10	51.8	18.3	1169
Kapareil	8872	0.87	70.0	17.1	1093
2-19E	6910	0.99	43.7	15.1	964
2-43W	Selection was removed from the Butte RAVT				
1-102W	Selection was removed from the Butte RAVT				

[1]Based on a spacing that gives 64 trees per acre.

Table 2. 2002 Yield Summary for the Regional Almond Variety Trial at San Joaquin Delta College Farm, Manteca, San Joaquin County. Planted in 1993.

Variety	No. of Nuts/Tree	Average Kernel Weight (g)	Shelling Percentage	Kernel Pounds Per	
				Tree	Acre[1]
Padre	16945	1.07	59.1	39.9	2995
Livingston	15772	1.10	62.2	38.1	2856
Carmel	13763	1.19	62.3	36.0	2697
Fritz	15076	1.06	60.4	35.3	2645
Plateau	12192	1.30	59.8	35.0	2626
Monterey	11559	1.32	61.0	33.5	2513
Butte	15375	0.97	56.3	32.8	2459
Ruby	12067	1.22	60.6	32.4	2432
Jiml	11093	1.26	58.1	30.8	2313
Dottie Won	14221	0.98	52.9	30.7	2302
Chips	11795	1.18	60.6	30.7	2299
Mission	**12072**	**1.11**	**50.9**	**29.4**	**2203**
Nonpareil	**9630**	**1.32**	**69.4**	**27.9**	**2093**
Winters (13-1)	10137	1.15	59.9	25.6	1922
Johlyn	9159	1.20	71.3	24.3	1822
Yokut	8531	1.29	58.3	24.2	1812
1-87	11660	0.93	60.9	23.8	1787
25-75	10365	1.04	65.9	23.8	1784
Jenette	8458	1.28	68.2	23.8	1783
Kahl	9986	1.08	50.2	23.7	1778
Aldrich	9539	1.09	61.5	23.0	1724
Morley	9511	1.06	51.4	22.3	1672
Sano	6677	1.44	57.0	21.2	1590
Wood Colony	6888	1.39	66.3	21.1	1579
Donna	8447	1.09	53.0	20.2	1515
Sonora	6470	1.42	76.9	20.2	1514
Price	8611	1.00	66.1	19.0	1422
2-43W	6349	1.27	53.8	17.8	1334
2-19E	6519	1.16	54.8	16.6	1245
1-102W	4742	1.54	67.1	16.1	1209
Rosetta	4508	1.45	50.8	14.4	1083
Kapareil	4838	0.98	61.2	10.4	783
Savana	1061	1.40	70.6	3.3	245

[1]Based on a spacing that gives 75 trees per acre.

Table 3. 2002 Yield Summary for the Regional Almond Variety Trial at Paramount Farming Company, Shafter, Kern County. Planted in 1993					
Variety	No. of Nuts/Tree	Average Kernel Weight (g)	Shelling Percentage	Kernel Pounds Per Tree	Kernel Pounds Per Acre[1]
Aldrich	28551	0.85	63.6	53.2	4576
Padre	29495	0.82	56.5	53.0	4559
Jiml	21429	1.06	61.8	49.8	4287
Ruby	19423	1.12	58.0	47.8	4113
Butte	25837	0.84	56.9	47.7	4101
2-43W	22326	0.94	64.7	46.1	3967
1-102W	16480	1.27	68.2	46.0	3958
Sonora	19638	1.06	71.4	45.7	3928
1-87	25394	0.78	62.9	43.6	3752
Morley	22337	0.88	50.2	43.1	3706
Price	23543	0.83	63.1	42.8	3684
Livingston	18157	1.06	61.0	42.6	3660
Nonpareil	**17311**	**1.07**	**70.5**	**40.7**	**3504**
Rosetta	15724	1.17	48.6	40.4	3473
Johlyn	15795	1.15	69.3	40.1	3453
Fritz	20471	0.89	56.4	40.1	3451
Carmel	17451	1.03	59.8	39.5	3398
Monterey	14933	1.16	55.0	38.3	3293
Wood Colony	16038	1.07	66.9	37.7	3245
Mission	**18203**	**0.83**	**47.2**	**36.8**	**3161**
Yokut	14538	1.14	57.1	36.6	3150
Chip's	15842	0.97	66.3	33.8	2905
Kahl	15231	1.00	51.5	33.4	2874
Jenette	13966	1.08	60.2	33.3	2862
Plateau	12953	1.15	51.2	32.9	2827
Winters (13-1)	16538	0.89	63.6	32.4	2788
2-19E	12746	1.01	56.6	28.3	2434
25-75	12043	0.90	62.7	23.8	2044
Kapareil	13927	0.76	72.6	23.4	2010
Donna	7819	1.04	64.4	17.9	1540
Savana	7056	1.08	61.9	16.8	1449
Sano	3364	1.55	58.4	11.5	990

[1]Based on a spacing that gives 86 trees per acre.