Almond Board of California
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Project No.: 01-BL-02- Field Evaluation of Almond Varieties

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Objectives

1. Three new Regional Almond Variety Trials were planted in 1993. Bloom, hullsplit, yield and nut quality data will be collected in 2001. 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 2001 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 2 varieties that produced over 4000 lbs/acre, 11 varieties that produced between 3000 and 4000 lbs/acre and 12 varieties that produced over between 2000 and 3000 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. Seven varieties produced over 2000 lbs/acre, 23 produced over 1000 lbs/acre and 3 produced under 1000 lbs/acre in the Delta RAVT in 2001. In the Butte RAVT, 6 varieties produced over 2000 lbs/acre while the rest produced between 1000 and 2000 lbs/acre.

Yokut at the Butte RAVT has been the only variety to show any indication of possible noninfectious bud failure (BF) symptoms, but these symptoms might be due to a virus condition that mimics BF. No other variety in any of the three trials has shown signs of BF.

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 2001 Almond Board Research Conference Proceedings and in a leaflet that was distributed at the 2001 Almond Board Research Conference (2001 Progress Report- Regional Almond Variety Trials).

Results

In the **Kern RAVT**, with 86 trees per acre, Jeanette and Padre both produced over 4000 kernel pounds per acre (Table 1). Carmel, Plateau, Morley, Ruby, selection 2-19E, Butte, Monterey, Aldrich, Fritz, Sano, and Nonpareil all produced over 3000 kernel pounds per acre (Table 1). There were twelve varieties that produced between 2000 and 3000 kernel pounds per acre and seven varieties that produced between 1000 and 2000 kernel pounds per acre. No varieties produced less than 1000 kernel pounds per acre in the Kern RAVT in 2001.

Plateau (34%), Kahl (30%), Donna (16%), Sano (10%), Wood Colony (8%) and Butte (8%), Mission (7%), Livingston (6%), Price (6%) and Aldrich (6%) all had more than 4% double kernels in the 2001 season. Only Kahl (16%) and Price (8%) had any blank kernels while Sonora (6%) was the only variety any kernel gumming. Worm damage was extensive in the Kern RAVT in 2001 with Plateau (40%), Kapareil (34%), Livingston (28%), Johlyn (26%), Jenette (24%), Donna (22%) all having over 20% damage and eleven varieties having from 10 to 20 percent damage and eight more varieties having 6 to 10 percent damage.

In the **Delta RAVT** with 75 trees per acre, Winters (selection 13-1), Butte, Carmel, Plateau, Livingston, Padre and Dottie Won all produced over 2000 kernel pounds per acre (Table 2).

The majority of the varieties produced between 1000 and 2000 kernel pounds per acre while three produced less than 1000 kernel pounds per acre.

Kahl (44%), Aldrich (42%), Donna (38%), Plateau (30%), Livingston (24%), Wood Colony (20%), Fritz (20%), Sano (18%), selection 2-19E (14%), Price (14%), Monterey (12%), Dottie Won (10%), Morley (10%), Rosetta (10%), Butte (8%), Savana (8%), selection 2-43W (8%), Savana (8%), selection 2-43W (8%), Jiml (8%), Carmel (8%), Mission (7%), Ruby (6%) and Chips (6%) all produced 6% or more double kernels in the Delta trial for the 2001 season. Varieties with over six percent or more blank kernels were selection 1-87 (18%), selection 2-43W (14%), Price (12%), Donna (10%), selection 2-19E (8%), Savana (8%), Monterey (8%), selection 25-75 (6%), and Chips (6%)). The only worm damage detected was in Dottie Won (8%). Varieties with six percent or more gum damage were Sonora (8%), Livingston (8%) and selection 1-102W (6%).

The **Butte RAVT** is located near Chico and has 64 trees per acre. In this trial, Winters (selection 13-1), Livingston, Plateau, Carmel, Morley and Rosetta produced more than 2000 kernel pounds per acre in the 2001 season (Table 3). All of the other varieties produced between 1000 and 2000 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 2001 season was double kernels with Kahl producing over 30% and Sano, Plateau and Price producing 20% or more double kernels. Aldrich, selection 25-75, Donna, Wood Colony, Livingston and Carmel all produced 10% or more double kernels while Mission, Monterey, selection 1-87 and Rosetta all had 6% or more double kernels. Kahl (10%), Price (8%), Kapareil (6%) and Donna (6%) were the only varieties to have over 4% blank kernels in this trial. Only Johlyn (8%) and Sonora (6%) had kernels with gum. Winters (14%), Chips (14%), Sonora (8%), Carmel (8%), selection 25-75 (6%) and Wood Colony (6%) had six percent or more worm damage.

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 2001 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. 2001 Yield Summary for the Regional Almond Variety Trial at Paramount Farming Company, Shafter, Kern County. Planted in 1993.					
				Kernel Pounds Per	
Variety	No. of Nuts/Tree	Average Kernel Weight (g)	Shelling Percentage	**Tree**	Acre[1]
Jenette	17985	1.23	77.0	48.6	4177
Padre	19736	1.09	55.3	47.3	4068
Carmel	16206	1.24	62.6	44.4	3819
Plateau	13504	1.43	59.8	42.5	3653
Morley	20131	0.93	49.8	41.1	3531
Ruby	14140	1.30	60.1	40.5	3482
2-19E	16000	1.15	62.1	40.5	3479
Butte	18322	0.98	54.9	39.5	3401
Monterey	13428	1.31	57.3	38.9	3342
Aldrich	15443	1.10	62.9	37.6	3230
Fritz	15753	1.07	54.5	37.2	3199
Sano	10936	1.46	61.8	35.3	3033
Nonpareil	**11773**	**1.36**	**69.8**	**35.1**	**3022**
Price	12199	1.22	65.1	32.8	2819
Kahl	12156	1.14	54.0	30.6	2634
Winters (13-1)	11626	1.12	58.8	28.8	2475
Chip's	11126	1.15	64.6	28.1	2419
Johlyn	9348	1.31	68.4	26.9	2313
Rosetta	7672	1.59	54.8	26.8	2308
Mission	**9831**	**1.24**	**47.9**	**26.7**	**2296**
1-87	11977	1.00	55.9	26.3	2260
Livingston	8835	1.33	69.6	26.0	2233
Wood Colony	8614	1.34	64.6	25.5	2193
25-75	11972	0.95	69.7	25.0	2150
Yokut	8518	1.28	61.4	23.9	2059
Sonora	6707	1.43	76.4	21.2	1822
Savana	8033	1.16	66.0	20.6	1771
1-102W	5791	1.54	66.7	19.6	1685
Donna	6928	1.18	62.3	18.0	1549
2-43W	7089	1.14	60.7	17.7	1526
Kapareil	8507	0.92	67.6	17.3	1486
Jiml	4750	1.55	70.5	16.2	1391

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

Table 2. 2001 Yield Summary for the Regional Almond Variety Trial at San Joaquin Delta College Farm, Manteca, San Joaquin County. Planted in 1993.					
				Kernel Pounds Per	
Variety	No. of Nuts/Tree	Average Kernel Weight (g)	Shelling Percentage	**Tree**	Acre[1]
Winters (13-1)	14643	1.10	65.8	35.6	2671
Butte	13713	1.02	52.0	30.8	2311
Carmel	11220	1.19	58.2	29.4	2206
Plateau	9613	1.39	51.3	29.3	2201
Livingston	10653	1.21	57.3	28.4	2133
Padre	11351	1.13	54.8	28.3	2123
Dottie Won	11914	1.03	53.6	26.9	2019
Jenette	9735	1.20	66.6	25.7	1927
Nonpareil	**8566**	**1.27**	**67.3**	**23.9**	**1794**
Sano	7448	1.43	49.7	23.5	1762
Mission	**9248**	**1.15**	**47.3**	**23.4**	**1754**
Morley	10448	0.99	46.3	22.7	1702
Wood Colony	8020	1.27	52.4	22.4	1677
Yokut	7690	1.32	55.0	22.3	1674
Sonora	7308	1.37	76.6	22.0	1651
Fritz	9272	1.08	53.4	22.0	1648
Rosetta	7036	1.39	50.3	21.5	1611
Monterey	7424	1.28	50.3	20.9	1570
Ruby	7433	1.23	50.6	20.1	1505
Chips	7149	1.24	58.5	19.5	1464
1-102W	5634	1.48	63.2	18.4	1379
Kapareil	9300	0.88	67.5	17.9	1346
Aldrich	7504	1.05	51.0	17.4	1307
Kahl	7383	1.02	41.5	16.6	1246
1-87	8345	0.90	70.5	16.5	1238
Johlyn	5806	1.24	73.7	15.8	1188
Jiml	6317	1.13	60.4	15.7	1179
Donna	5931	1.16	52.7	15.2	1137
Price	6164	1.06	62.3	14.3	1075
2-19E	5437	1.12	58.1	13.4	1008
2-43W	4089	1.14	71.2	10.2	767
25-75	4013	1.03	68.3	9.1	683
Savana	2539	1.28	69.1	7.1	536

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

Table 3. 2001 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]
Winters (13-1)	18880	1.01	53.4	41.8	2677
Livingston	13724	1.18	58.8	35.7	2283
Plateau	12010	1.28	45.8	33.8	2160
Carmel	12994	1.13	52.4	32.3	2070
Morley	15761	0.92	48.2	32.1	2053
Rosetta	10967	1.32	46.9	31.9	2041
Yokut	10919	1.28	58.2	30.7	1964
Nonpareil	**11059**	**1.18**	**63.9**	**28.9**	**1846**
Padre	13326	0.98	52.7	28.6	1833
2-19E	13478	0.96	50.8	28.6	1828
Wood Colony	10948	1.15	51.4	27.8	1781
1-87	13886	0.87	49.5	26.7	1711
Butte	13597	0.89	48.4	26.6	1705
Ruby	10557	1.13	49.3	26.2	1676
Aldrich	11683	1.01	50.1	26.0	1663
Sano	8561	1.29	44.4	24.2	1552
Monterey	8489	1.29	47.5	24.1	1541
Kahl	10076	1.05	42.5	23.3	1491
Chip's	9881	1.07	52.8	23.3	1490
Jiml	9000	1.17	60.4	23.2	1484
Mission	**9879**	**1.07**	**42.8**	**23.2**	**1483**
Price	10874	0.96	53.2	22.9	1469
Johlyn	9607	1.08	65.3	22.8	1457
25-75	11796	0.86	52.8	22.4	1433
Kapareil	10971	0.88	71.1	21.3	1364
Jenette	7263	1.26	62.9	20.2	1290
Sonora	5305	1.56	69.9	18.2	1165
Donna	7226	1.10	51.6	17.5	1118
Savana	7813	1.00	62.3	17.3	1106
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 78 trees per acre.