

16TH ANNUAL ALMOND RESEARCH CONFERENCE, DECEMBER 6, 1988, SACRAMENTO

Project No. 88-L15 - Field Evaluation of Almond Varieties and Rootstocks

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Objectives: (1) Continue data collections and observations on varieties in the newer Regional Variety Trials and on selected varieties in older plots where additional information is needed. (2) Evaluate varieties for yield efficiency (yield per tree canopy size). (3) Make further cross-pollinations in an effort to identify the fourth compatibility group from Nopareil X Mission progeny and to determine what varieties are in it. (4) Continue collection of yield and tree size data from rootstock plots. Begin determining yield efficiency of various rootstocks used for almond. (5) Complete the summarization and statistical analysis of data associated with this project and begin publication of this information.

Interpretive Summary:

The years 1987 and 1988 were somewhat unique in that after a severely weather-damaged 1986 almond crop, two successive years occurred in which bloom time weather did not limit production (pollination). With back to back large crops, there has been an opportunity to study varietal response to successive large crops. After the heavy 1987 crop some varieties came back with a very reduced bloom density in 1988, especially Sonora and Price, while other varieties came back with a good bloom density. With these heavy crops, kernel (meat) size was also reduced in 1988 in all regional variety trials except the one at San Joaquin Delta College.

Yields in the four regional variety trials (Kern, Butte, San Joaquin and Fresno Counties) were generally quite good in 1988. In many cases, varieties from the younger plots which have not yet reached full bearing produced greater yields in 1988 than in 1987. Even in several of the full bearing plots some varieties produced as much or more in 1988 as in 1987. Information for varieties on which harvest data were taken can be found in tables on the following pages of this report. These data include the number of nuts per tree, kernel weight, percent kernel and yield per tree and per acre for each of the four regional trials. While overall data

are given in these tables, it would probably be more meaningful to compare test varieties with adjacent standards varieties to reduce the variation that occurs in some plots. We plan to do this in the near future.

In the regional variety trial in Kern County, Butte, Nonpareil, Ruby, Sauret #1, and Mono were the highest yielding varieties. Sonora also yielded quite well in this plot and in fact somewhat better than in 1987. Kernel sizes were quite small for many varieties, especially in the older section of this plot, possibly due to an inherent water penetration problem.

In the Butte plot at California State University, Chico, Padre, Nonpareil and Carrion were the highest yielding varieties in the block. A majority of the varieties in this plot yielded at the rate of 2000 kernel (meat) pounds or more per acre.

In the San Joaquin Delta College variety trial at Manteca, Jordanolo, Ne Plus Ultra and Tokyo were the highest yielding varieties while Sauret #1 came up with a short crop in 1988. Merced had 14% Navel Orangeworm damage and 20% total worm damage.

The regional variety plot at California State University, Fresno, was planted in 1981 and the trees are not yet full bearing. Ruby, Heart and LeGrand were the highest yielding varieties in this plot. On the other hand, Yosemite, Planada, Sonora and Grace all produced poorly in 1988. Planada, Yosemite and Sonora produced at least 10% blanks, which may be part of the reason for their low production. Jordanolo had 12% worm damage.

Ne Plus Ultra, Monterey, Sauret #2, Price, Merced and Peerless tended to produce 10% or more double kernels in most plots where they were evaluated. Also producing this many doubles in specific plots were Carmel (Butte plot); Pearl, Valenta, and Dottie Won (San Joaquin plot); and Lodi & Hoover (Fresno plot).

In rootstock plots at Kern and Colusa Counties, trees on almond-peach hybrid rootstocks outproduced trees on peach (Nemaguard or Lovell) and almond rootstocks as they did in 1987. Hybrid rootstocks produce larger trees than either peach or almond stocks and in commercial orchards would probably be spaced at a greater distance, thereby offsetting some of these yield differences. Nevertheless, drought tolerance of the hybrid rootstock is a significant advantage providing other conditions are satisfactory for the use of this stock. In another rootstock plot in western Fresno County, almond, Lovell and Nemaguard rootstocks were compared. In the early years of this orchard the peach stocks significantly out-yielded almond and frequently Nemaguard out-yielded Lovell. However, now in the 14th season almond is yielding as well as the two peach rootstocks.

Additional cross pollinations were made this spring in an effort to further clarify the cross compatibility of various almond varieties. Based on this year's data no new varieties can be added to the compatibility charts. However, this year's studies did confirm some of the previously developed information.

Butte Co. RVT Plot
 California State University, Chico (CSUC)
 Durham, California
 Yield Summary - 1988
 Planted 1976

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt. (gm)	no./oz.	% Kernel	Weight lb/tree	lb/acre
Early blooming varieties							
Neplus Ultra	39	12967	1.27	22	52	36.3	2759
Sonora	21	7700	1.30	22	70	22.1	1682
Mid blooming varieties							
Nonpareil	120	16773	1.12	25	67	41.3	3137
Fritz	30	13554	1.03	28	53	30.7	2330
Solano	22	14790	0.93	31	63	30.3	2300
Price	24	13050	0.94	30	64	26.9	2047
Carmel	22	11018	1.08	26	57	26.1	1986
Late blooming varieties							
Padre	63	20763	0.99	29	55	45.3	3444
Carrion	33	14433	1.25	23	67	39.8	3028
Mission	142	12866	1.04	27	46	29.7	2256
Butte	25	11290	0.97	29	56	24.0	1827

Fresno County RVT Plot
 California State University, Fresno (CSUF)
 Fresno, California
 Yield Summary - 1988
 Planted 1981

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt. (gm)	no./oz.	% Kernel	lb/tree	Weight lb/acre
Early blooming varieties							
NePlus Ultra	80	6904	1.23	23	58	18.9	1436
Jordanola	20	4806	1.07	26	61	11.4	863
Janice	19	4719	1.01	28	61	10.5	800
Peerless	20	3805	0.99	29	35	8.3	631
Sonora	20	2322	1.18	24	70	6.0	459
Mid blooming varieties							
Heart	17	14164	1.26	22	63	39.4	2995
Merced	20	13410	1.20	24	70	35.4	2692
Sauret #1	19	11111	1.16	24	70	28.5	2167
Sorrenti	20	12190	1.00	28	62	26.8	2038
Valenta	20	11662	1.01	28	76	26.0	1974
Sauret #2	20	8180	1.15	25	59	20.7	1573
Elsie	20	8384	1.10	26	62	20.4	1551
Solano	20	6161	1.36	21	88	18.5	1408
Carmel	40	7246	1.10	26	60	17.5	1327
Hoover	20	6618	1.14	25	78	16.6	1264
Monarch	20	7189	1.03	27	52	16.4	1243
Norman	19	8158	0.80	35	72	14.5	1099
Lodi	20	6542	0.95	30	61	13.7	1039
Fritz	19	4286	1.35	21	70	12.8	969
Bonita	20	6252	0.92	31	62	12.7	962
Nonpareil	508	5352	1.08	26	62	12.6	957
Milow	20	7367	0.72	39	74	11.7	889
Jeffries	20	5007	1.05	27	66	11.6	884
DB-OJ	20	5290	0.88	32	49	10.3	780
Price	20	4385	1.03	28	65	9.9	754
Monterey	20	3245	1.26	22	51	9.0	686
Grace	20	2659	1.06	27	60	6.2	472
Late blooming varieties							
LeGrand	17	18931	1.10	26	76	45.8	3483
Ruby	20	13320	1.36	21	78	39.9	3035
Tioga	18	21212	0.72	39	57	33.9	2573
Thompson	17	9623	1.12	25	71	23.8	1809
Padre	20	10960	0.96	30	68	23.2	1763
Tokyo	20	11091	0.89	32	53	21.8	1654
Mission	258	8350	1.10	27	55	20.5	1561
Livingston	20	5325	1.19	24	65	14.0	1062
Butte	20	5428	1.13	25	82	13.5	1029
Mono	20	4216	1.03	28	46	9.6	728
Ripon	19	3332	1.22	23	56	9.0	681
Planada	19	1133	1.40	20	51	3.5	265
Yosemite	20	839	1.13	25	55	2.1	159

Kern County RVT Plot
McFarland, California
Yield Summary - 1988

Variety	No. of trees	No. of nuts/tree	Ave. kernel			Weight	
			wt (gm)	no./oz.	% Kernel	lb/tree	lb/acre
Planted 1974, 1976							
Early blooming varieties							
Sonora	25.5	12400	0.92	31	73	25.1	1907
NePlus Ultra	22.5	8157	1.18	24	61	21.1	1607
Mid blooming varieties							
Nonpareil	71	12141	1.00	28	74	26.8	2036
Jeffries	24.25	13071	0.90	32	68	25.8	1962
Carmel	26	9344	1.05	27	63	21.6	1641
Price	26	7901	0.82	35	64	14.2	1083
Late blooming varieties							
Butte	26	16439	0.83	34	61	30.0	2281
Ruby	23	11824	1.09	26	66	28.4	2159
Fritz	26	12891	0.91	31	56	25.9	1966
Carrion	26	11864	0.97	29	64	25.4	1928
Mission	78	10485	0.96	30	49	22.5	1712
Padre	23	10613	0.76	38	59	17.7	1344
Planted 1981							
Mid blooming varieties							
Nonpareil	42.5	13418	1.03	27	72	30.6	2323
Sauret #1	25.5	13480	0.95	30	71	28.1	2137
Sauret #2	25	10185	1.15	25	60	25.9	1969
Monterey	26	9866	1.04	27	47	22.6	1716
Bonita	26	6958	0.94	30	63	14.4	1091
Monarch	26	4496	1.01	28	54	10.1	764
Late blooming varieties							
Mono	24	11517	1.04	27	56	26.5	2015
Tokyo	25	11616	1.01	28	56	25.8	1962
Mission	104	10422	1.03	28	48	23.9	1815
Livingston	22.5	8961	1.21	24	73	23.8	1811
Yosemite	22.5	6426	1.10	26	58	15.6	1182

San Joaquin County RVT Plot
Delta College
Manteca, California
Yield Summary - 1988

See Corrected Copy

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt (gm)	no./oz	% Kernel	Weight lb/tree	lb/acre
Planted 1978							
Early blooming varieties							
Jordanola	21	11258	1.66	17	72	41.2	3131
NePlus Ultra	25	12441	1.42	20	66	38.9	2960
Peerless	25	8760	1.17	24	49	22.7	1723
Sonora	27	6119	1.42	20	75	19.2	1456
Mid blooming varieties							
Monarch	27	9879	1.03	28	57	22.4	2528 ¹⁷⁰²
Price	27	8667	1.20	24	64	23.0	2512 ¹⁷⁹⁸
Merced	27	7360	1.30	22	71	21.0	2410 ¹⁵⁹⁶
Fritz	26	9486	1.11	26	57	23.1	2364 ¹⁷⁵⁵
Solano	27	7861	1.05	27	72	18.1	2275 ¹³⁷⁶
Nonpareil	364	11346	1.33	21	72	33.3	2168 ²⁵³⁰
Sauret #2	26	10559	1.36	21	65	31.7	1705 ²⁴⁰⁹
Monterey	24	10049	1.49	19	55	33.1	1598 ²⁵¹⁶
Carmel	26	10237	1.26	22	66	28.5	1378 ²¹⁶⁶
Grace	24	6314	1.02	28	67	14.3	1083 ¹⁰⁸⁷
Sauret #1	26	12599	1.12	25	70	31.1	648 ²³⁶⁴
Late blooming varieties							
Tokyo	22	16180	1.09	26	57	39.0	2960
Butte	22	15662	1.05	27	62	36.4	2766
Livingston	23	12689	1.27	22	70	35.6	2709
Le Grand	25	12627	1.17	24	68	32.7	2484
Ruby	54	11024	1.28	22	60	31.2	2368
Mission	113	11969	1.16	25	52	30.6	2322
Padre	20	13975	0.98	29	60	30.3	2304
Mono	21	14341	0.94	30	46	29.7	2259
Thompson	23	10020	1.30	22	76	28.7	2182
Planted 1984							
Mid blooming varieties							
Rosetta	27	5377	1.29	22	51	15.3	1164
Valenta	27	4081	1.18	24	61	10.7	810
Jeffries	27	3143	1.23	23	75	8.5	648
Late blooming varieties							
Aldrich	27	7719	1.12	25	68	19.0	1446
Woods Colony	27	5216	1.36	21	68	15.7	1190
Dottie Won	27	3804	1.14	25	53	9.5	725
Pearl	26	2432	1.18	24	62	6.3	481

San Joaquin County RVT Plot
Delta College
Manteca, California
Yield Summary - 1988

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt (gm)	kernel no./ oz	% Kernel	lb/ tree	Weight lb/ acre
Planted 1978							
Early blooming varieties							
Jordanola	21	11258	1.66	17	72	41.2	3131
NePlus Ultra	25	12441	1.42	20	66	38.9	2960
Peerless	25	8760	1.17	24	49	22.7	1723
Sonora	27	6119	1.42	20	75	19.2	1456
Mid blooming varieties							
Monterey	24	10049	1.49	19	55	33.1	2512
Nonpareil	364	11089	1.33	21	71	32.5	2467
Sauret #2	26	10559	1.36	21	65	31.7	2410
Sauret #1	26	12599	1.12	25	70	31.1	2364
Carmel	26	10237	1.26	22	66	28.5	2168
Fritz	26	9486	1.11	26	57	23.1	1758
Price	27	8667	1.20	24	64	23.0	1745
Monarch	27	9879	1.03	28	57	22.4	1705
Merced	27	7360	1.30	22	71	21.0	1598
Solano	27	7861	1.05	27	72	18.1	1378
Grace	24	6314	1.02	28	67	14.3	1083
Late blooming varieties							
Tokyo	22	16180	1.09	26	57	39.0	2960
Butte	22	15662	1.05	27	62	36.4	2766
Livingston	23	12689	1.27	22	70	35.6	2709
Le Grand	25	12627	1.17	24	68	32.7	2484
Ruby	54	11024	1.28	22	60	31.2	2368
Mission	113	11969	1.16	25	52	30.6	2322
Padre	20	13975	0.98	29	60	30.3	2304
Mono	21	14341	0.94	30	46	29.7	2259
Thompson	23	10020	1.30	22	76	28.7	2182
Planted 1984							
Aldrich	27	7719	1.12	25	68	19.0	1446
Woods Colony	27	5216	1.36	21	68	15.7	1190
Rosetta	27	5377	1.29	22	51	15.3	1164
Valenta	27	4081	1.18	24	61	10.7	810
Dottie Won	27	3804	1.14	25	53	9.5	725
Jeffries	27	3143	1.23	23	75	8.5	648
Pearl	26	2432	1.18	24	62	6.3	481