

1986 Annual Report

Project No. 86-L13 - Tree and Crop Research
Field Evaluation of Almond Varieties

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Objectives: (1) obtain and evaluate yield, phenology, field performance, and nut characteristics of varieties in Regional Variety Test (RVT) plots. (2) Continue to obtain data on pollen incompatibility as a guide for varietal planting combinations and to establish genetic relationships. (3) Continue to obtain data on graft incompatibility with Marianna 2624 and the performance of various almond rootstocks. (4) Extend evaluation of varieties to newer selections and recently introduced varieties with the prospect of incorporation these into RVT or other test plots.

Interpretive Summary:

Yield data was obtained from four RVT plots in 1986 (see attached). The adverse weather during bloom reduced yield in most commercial areas of California and also reduced the crop in all of the RVT plots. In general, nuts/tree were reduced 50% or more from previous years. In a number of cases, however, increased average kernel size and weight at least partially offset the reduced number of nuts and gave somewhat higher per tree yields (weight) than might have been expected.

Experiments on testing pollen incompatibility was curtailed because of weather but evidence was obtained to place Yosemite in the Carmel group and Mono in the Thompson group.

Growth and bearing habits of different varieties have been defined as shoot bearing, spur bearing or a combination. The relative proportion of each have been studied in relation to yield potential in different almond varieties in the RVT plots and in seedling populations involving almond, peach, and almond-almond species hybrids. Some of these results have been described in Project 86-KA13. Four basic kinds of growth habit traits are defined, based on location of flower buds as (a) laterally on long shoots, (b) laterally on current season laterals, (c) short lateral spurs and (d) long lateral shoots. Types a, b and d are typically found in peach. Type C is typical of almond but some varieties also produce on a, b or d. Some almond species produce type d. Yield in almond

appears to be closely associated with a combination of shoot and spur type growth. Varieties differ greatly in their tendencies to produce these two types. Earliness of production appears to be related to a tendency for production on long shoots; high yield depends on both but probably more from spurs. Long-term continuation of yield potential appears to depend on maintaining enough vigor and new growth to continually lay down new spurs, rather than continuation of the old spurs.

When crossed with peach to produce F1 and F2 progeny (see Project 86-KA13) breeding material of high yield potential combining peach and almond growth characteristics, high % set, varying almond and peach fruit characters have resulted. Work with Dr. Steve Weinbaum shows presence of high self-fertility in these populations combined with high self-pollination.

Genetic dwarf gene from peach superimposed upon these growth habits in the same population shortened internodes, increased density of flower buds and greatly magnified foliage density. However, in this material their ability to set fruit was reduced as compared to the same nondwarfed material described in the previous paragraph.

Another group of crosses was made between spur producing (Padre, and others) and with shoot producing varieties, on the one hand, and a group of hybrids from almond x Prunus webbii, Prunus argentea and others. High yield potential, spur bearing, seedlings of varying sizes were produced, some combined with good kernel quality. This material should show low BF-potential. Twenty-five new selections have been initially made for possible variety use.

Observations continued on graft incompatibility of different varieties to Marianna 2624 in the Nickels Estate plot. The same incompatibility relationships were shown among different varieties as previously observed. Observations were made in commercial orchards of poor growth of Carmel and some other varieties, considered compatible in tests up to now. This problem was associated with death of large parts of the root system in affected trees which evidently occurred subsequently to the heavy rains in February 1986 which saturated the soil. Some "brown lines" were also observed at the graft union suggesting possible pathogens involvement. It was concluded that the 1986 problem was not related to incompatibility.

Kern RVT Plot
McFarland, California
Yield summary - 1986

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt.		% kernel	Weight	
			gms.	no./oz.		lbs/tree	lbs/acre

Planted 1974							
Early blooming varieties							
Sonora	25	7,047	1.32	21	73	20.5	1,558
Jordanolo	52	5,816	1.48	19	66	18.8	1,425
NePlus Ultra	46	4,994	1.40	20	52	15.4	1,174
Mid blooming varieties							
Fritz	26	10,152	1.11	26	59	24.8	1,884
Norman	18	9,486	1.05	27	71	21.9	1,666
Solano	26	8,059	1.10	26	71	19.5	1,479
Nonpareil	382	6,784	1.25	23	71	18.7	1,417
Milow	26	4,890	0.74	39	71	7.9	602
Robson	25	4,838	1.18	24	58	12.5	953
Price	25	4,335	1.21	23	65	11.6	881
Merced	26	4,072	1.27	22	73	11.4	869
Carmel	26	2,180	1.27	22	65	6.1	463
Late blooming varieties							
Butte	26	9,073	1.08	26	55	21.6	1,641
Ruby	26	8,318	1.18	24	56	21.7	1,647
Carrion	26	7,015	1.30	22	64	20.1	1,530
Padre	20	6,559	1.15	25	55	16.7	1,268
Mission	208	4,970	1.21	24	48	13.3	1,006
Thompson	26	3,665	1.24	23	68	10.1	764
Planted 1976							
Mid blooming varieties							
Nonpareil	99	6,701	1.22	23	65	17.7	1,348
Jeffries	25	5,453	1.17	24	69	14.0	1,066
1-69	26	2,534	1.19	24	72	6.7	506
Planted 1981							
Mid blooming varieties							
3-63	20	5,659	0.81	35	50	10.1	767
Sauret #2	24	4,835	1.22	23	59	13.0	984
Sauret #1	25	4,738	1.13	25	61	11.8	894
Nonpareil	150	3,802	1.15	25	62	9.7	730
Monterey	26	2,348	1.38	21	49	7.2	544
Bonita	26	2,000	0.90	31	51	4.0	302
Monarch	24	1,732	1.21	24	57	4.6	350
Late blooming varieties							
Mono	26	4,810	1.11	26	51	11.7	891
2-43W	24	4,671	1.12	25	63	11.5	875
Tokyo	26	4,664	1.21	23	50	12.4	943
Mission	199	4,147	1.23	23	47	11.2	854
Livingston	20	4,129	1.36	21	63	12.3	939
2-19E	26	3,354	1.02	28	51	7.6	574
Yosemite	25	3,161	1.16	24	57	8.1	616

Butte RVT Plot
 California State University, Chico (CSUS)
 Durham, California
 Yield summary - 1986

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt.		% kernel	Weight	
			gms.	no./oz.		lbs/tree	lbs/acre
Planted 1976							
Early blooming varieties							
Sonora	21	3,582	1.69	17	68	13.3	1,014
NePlus Ultra	39	2,204	1.56	18	60	7.6	577
Mid blooming varieties							
Nonpareil	218	8,034	1.36	21	68	24.0	1,819
Price	24	7,980	1.13	25	72	19.8	1,505
Fritz	30	7,685	1.18	24	49	20.0	1,523
Norman	26	7,539	1.11	26	67	18.5	1,404
Carmel	22	7,505	1.32	21	57	21.9	1,664
Solano	22	7,355	1.21	24	67	19.5	1,486
23-122	26	7,255	1.20	24	52	19.2	1,457
Merced	21	7,067	1.36	20	64	21.3	1,616
Robson	26	5,631	1.40	20	61	17.3	1,318
Late blooming varieties							
Padre	63	10,040	1.16	24	56	25.6	1,947
Mission	177	9,574	1.20	24	45	25.2	1,915
Butte	25	7,819	1.19	24	55	20.5	1,560
Carrion	33	4,526	1.49	19	63	14.9	1,131
Thompson	32	3,896	1.41	20	63	12.1	921
Ripon	31	3,545	1.13	25	48	8.8	668
Planted 1980							
Mid blooming varieties							
3-63	22	7,335	1.02	28	53	16.4	1,248
1-69	24	6,584	1.30	22	66	18.9	1,438
1-46	17	6,035	1.34	21	59	17.8	1,352
Nonpareil	156	5,988	1.34	21	69	17.7	1,348
23.5-16-40b	20	3,822	1.29	22	54	10.8	823
24-5Z	23	3,541	1.26	22	48	9.8	748

San Joaquin Co. RVT Plot
Delta College
Manteca, California
Yield summary - 1986
Planted 1978

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt.		% kernel	Weight	
			gms.	no./oz.		lbs/tree	lbs/acre

Early blooming varieties							
Jordanolo	24	3,761	1.71	17	72	14.2	1,080
Peerless	27	3,354	1.32	21	40	9.8	744
NePlus Ultra	46	2,175	1.52	19	68	7.3	558
Sonora	27	2,003	1.54	18	83	6.8	516
Mid blooming varieties							
Sauret #2	26	5,805	1.74	16	81	22.3	1,692
Sauret #1	26	5,488	1.20	24	70	14.5	1,106
Monterey	24	4,918	1.49	19	57	16.1	1,225
24-5Z	27	4,169	1.17	24	56	10.8	817
1-69	27	3,817	1.34	21	70	11.2	854
Fritz	26	3,590	1.19	24	58	9.4	716
Monarch	27	3,105	1.39	20	59	9.5	724
Carmel	27	3,089	1.52	19	67	10.3	786
Merced	27	2,935	1.34	21	68	8.7	660
Price	27	2,908	1.27	22	69	8.2	619
Solano	27	2,838	1.16	24	66	7.3	552
1-46	26	2,797	1.44	20	45	8.9	672
Nonpareil	471	2,240	1.45	20	69	7.1	540
Grace	23	2,208	1.09	21	64	5.3	402
Late blooming varieties							
Mono	22	10,446	1.08	26	53	24.8	1,888
Yosemite	21	9,962	1.01	28	58	22.2	1,690
Padre	18	9,838	1.05	27	59	22.8	1,731
Livingston	23	9,607	1.14	25	65	24.2	1,838
Ruby	22	8,998	1.14	25	56	22.6	1,719
Ripon	21	8,011	1.09	26	58	19.3	1,464
Planada	10	7,783	1.29	22	54	22.1	1,682
Mission	135	7,045	1.18	24	52	18.3	1,391
Butte	23	6,990	1.11	26	60	17.1	1,299
Le Grand	23	5,551	1.25	23	66	15.3	1,163
Thompson	23	5,294	1.24	23	65	14.5	1,100
Tokyo	22	3,624	1.37	21	54	10.9	829

Fresno County RVT Plot
 California State University, Fresno (CSUF)
 Fresno, California
 Yield summary - 1986
 Planted 1981

Variety	No. of trees	No. of nuts/tree	Ave. kernel wt.		% kernel	Weight	
			gms.	no./oz.		lbs/tree	lbs/acre

Early blooming varieties							
Jordanolo	20	2,095	1.64	17	67	7.6	575
Janice	19	2,035	1.23	23	64	5.5	420
Sonora	20	1,434	1.32	21	76	4.2	317
Peerless	20	1,424	1.44	20	42	4.5	344
NePlus Ultra	80	1,191	1.74	16	61	4.6	346
Mid blooming varieties							
DB-OJ	20	3,724	1.14	25	50	9.4	713
Sauret #2	20	3,206	1.28	22	63	9.1	690
Price	20	3,146	1.09	26	65	7.5	573
DB-OY	20	2,961	1.27	22	58	8.3	631
Solano	20	2,867	1.00	28	68	6.3	480
Carmel	20	2,598	1.25	23	63	7.2	545
Hoover	20	2,450	1.25	23	59	6.8	514
Milow	20	2,433	0.88	32	75	4.7	360
1-46	20	2,331	1.16	24	59	6.0	454
Sorrenti	20	2,323	1.27	22	55	6.5	495
Sauret #1	19	2,295	1.30	21	67	6.6	501
Carmel	20	2,263	1.30	22	62	6.5	492
Monterey	20	2,233	1.48	19	50	7.3	555
Nonpareil	508	2,158	1.25	23	69	5.9	450
1-69	20	2,056	1.19	24	63	5.4	410
Norman	19	1,911	1.09	26	68	4.6	349
Merced	20	1,772	1.18	24	66	4.6	349
Heart	17	1,766	1.54	18	63	6.0	456
Fritz	19	1,765	1.13	25	63	4.4	335
Jeffries	20	1,761	1.20	24	65	4.7	356
23.5-16-40b	20	1,760	1.22	23	54	4.7	361
K16-14	20	1,718	1.11	26	57	4.2	319
Elsie	20	1,692	1.46	19	61	5.4	413
Valenta	20	1,639	1.20	24	50	4.3	328
Monarch	20	1,116	1.22	23	58	3.0	228
Bonita	20	730	1.24	23	64	2.0	152
Grace	20	338	1.00	28	61	0.7	57
Late blooming varieties							
K10-26	20	3,187	1.19	24	56	8.4	636
Padre	20	3,180	1.09	26	62	7.6	581
Livingston	20	3,142	1.22	23	58	8.4	642
Le Grand	37	2,985	1.29	22	63	8.5	646
Mission	261	2,976	1.26	28	48	8.0	605
Ruby	20	2,768	1.25	23	47	7.6	580
Thompson	17	2,677	1.24	23	69	7.3	556
Tioga	18	2,319	0.98	29	60	5.0	381
Butte	20	2,253	1.18	24	54	5.9	446
Ripon	19	2,088	1.11	25	49	5.1	389
Mono	20	1,941	1.07	26	49	4.6	349
Yosemite	20	1,775	1.09	26	52	4.3	324
2-19E	20	1,336	1.20	24	60	3.5	269
Tokyo	20	822	1.37	21	50	2.5	188
2-43W	20	782	1.26	22	63	2.2	165
Planada	19	603	1.39	20	45	1.8	140