2004

Progress Report

REGIONAL ALMOND VARIETY TRIALS

Planted in 1993

University of California

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REGIONAL ALMOND VARIETY TRIALS

Planted in 1993

Bruce D. Lampinen, Joseph H. Connell, Paul Verdegaal, Mario Viveros, Samuel G. Metcalf, Valerie C. Gamble, Mary Ann Thorpe, Thomas M. Gradziel and Warren C. Micke.[1]

Background

Regional Almond Variety Trials (RAVTs) were designed to evaluate newer varieties in a semi-commercial (20 to 40 trees per variety) manner and to compare them to standard varieties such as Nonpareil, Mission and currently accepted pollenizers.

Previous RAVTs were established between 1974 and 1981 in Kern, Colusa, Butte, San Joaquin and Fresno Counties. These trials were planted over several years and had trees of different ages and variety combinations. Thus, the data from these earlier trials were not directly comparable and at this point data collection has ended.

1993 Trials

This leaflet presents data collected in 2004 from the three RAVT trials established in 1993. These trials are located in Butte County at the California State University at Chico farm (CSU-Chico), in San Joaquin County at the San Joaquin Delta College farm (Delta College) near Manteca and in Kern County at a Paramount Farming Company orchard (Kern) located south of Shafter and just off of 7th Standard road. Signs are in place at all locations to identify each variety.

To be comparable, these three new trials were all planted in the same year and with essentially the same variety composition. Thus, any differences in varietal performance among various regions should become evident. The only differences in variety composition among the trials were that Fritz was not included at the CSU-Chico trial (it was in the previous trial at this location) and Dottie Won was added to the Delta College plot. Some trees were planted/replanted after 1993. A few trees of several varieties were not available in 1993, especially for the Delta College trial. Vandalism and a tornado destroyed a few trees at CSU-Chico and normal replanting has occurred at all locations.

Varieties were planted on peach rootstock; Lovell for those at CSU-Chico and Nemaguard for trees in the Delta College and Kern plots. One exception, Kapareil, was planted on both peach and peach-almond hybrid rootstocks at all locations, but data is not always included in this publication for the trees on peach-almond hybrid.

The Kern plot is planted on a Milham sandy loam soil and is irrigated with a drip system (it was

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irrigated with micro-sprinklers prior to 1999). The trial at CSU-Chico is on a Vina loam soil and is irrigated with solid-set sprinklers. The Delta College trial is on a Delhi loamy sand soil and is flood irrigated. Probably as a result of the coarse textured soil and flood irrigation, the trees in the Delta trial are generally somewhat smaller than those in the other two RAVTs. In the Delta College trial there appears to be a sandier area in the middle of the orchard where trees are more subject to periodic moisture stress. In 2004, a microsprinkler irrigation system was installed at the Delta trial.

Varieties Included

Standard varieties are planted 1:1 with new varieties; Nonpareil for the early-mid blooming varieties and Mission for the late blooming varieties to ensure adequate pollination. In the Kern and Delta College trials, varieties are planted as a full row of 29 to 38 trees. The rows at CSU-Chico are longer so each row has three different variety sections, with 21 to 25 trees per section. In addition to Nonpareil and Mission, a plot of each of seven "new standard" varieties (other varieties commonly planted today) has been included. These new standard varieties are Butte, Carmel, Fritz (not at CSU-Chico), Monterey, Padre, Price and Sonora.

2004.04-BL-02.Lampinen.Field Evaluation of Almond Varieties

The varieties being tested in these trials are Aldrich, Chips, Donna, Dottie Won (Delta College only), Kahl, Kapareil, Jenette, Jiml, Johlyn, Livingston, Morley, Plateau, Rosetta, Ruby, Sano, Savana, Wood Colony and Yokut. While several of these varieties are not new to the almond industry, they had not been adequately tested in the uniform RAVT concept. In addition, six numbered selections from a University of California at Davis almond breeding program were included in these trials. These are 1-87, 1-102W, 2-19E, 2-43W, 13-1 (Winters) and 25-75.

Selection 1-102w and selection 2-43w were removed from the Butte trial in 2001 since their potential was deemed to be limited under the conditions in this trial. In 2002, high density half rows of Kochi, Durango, Avalon and Carmel (as a standard) were planted in place of the removed selections. These varieties were harvested for the first time in 2004. Starting in 2004, selection 25-75, Aldrich, Monterey, Morley, Padre, Plateau, and Savana were not harvested at the Butte trial since the tree loss in these rows was extensive enough to make yield data unreliable.

Kapareil on peach almond hybrid rootstock was removed from the Delta trial in 2001 due to poor productivity and the row was replanted with Avalon in the spring of 2002. Selection 25-75 and Savana were removed from the Delta trial in 2002 due to poor productivity. Kochi and Nonpareil were planted in place of Selection 25-75 in the spring of 2003 at the Delta trial.

2004 Data and Observations

This 2004 report includes information on bloom time, hullsplit/harvest time, yields, shelling percentage (percent kernel) and kernel defects. In addition previous years and accumulated yield data are given. Some information on disease susceptibility is also included.

Bloom time weather was variable this spring. At the CSU-Chico trial, 30 of the 54 good bee hours (temperatures greater than 59°F and wind less than 10 mph and no rain) occurred after Butte full bloom. At the Delta trial, there were good conditions for bee activity on days spread throughout the bloom period. At the Kern trial, weather at the beginning of bloom was overcast and variable but conditions improved as bloom progressed. Early bloom was on older wood but later bloom was on younger, more productive wood and this

was where most of the crop was produced.

For the second year in a row, overall average yields for all varieties was down at all three trials averaging an 11% decrease at the CSU-Chico trial, 2% at the Delta trial, and 20% at the Kern trial (Fig. 1).

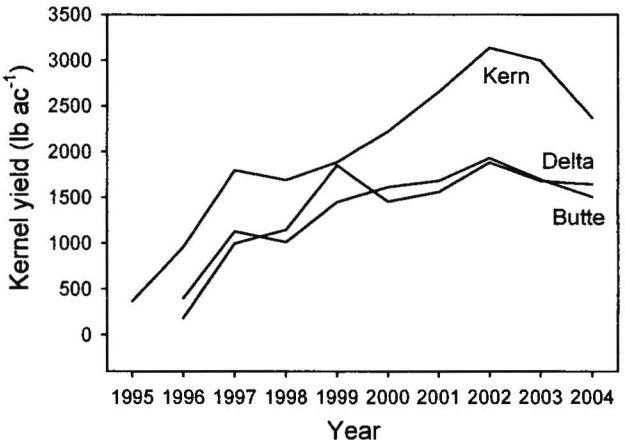


Fig. 1. Average annual yield for all varieties and selections combined at each trial.

In 2004, the CSU-Chico, Delta and Kern trials had 15, 17 and 19 varieties, respectively, with 6% or more kernel doubles (for details see Kernel Defects, page 23-24). The CSU-Chico, Delta and Kern had 0, 4 and 1 variety, respectively, with 6% or more twin kernels. The CSU-Chico, Delta and Kern trials had 3, 7 and 8 varieties, respectively, with 6% or more blank kernels in 2004. The Kern trial had the most worm damage with 21 varieties having 6% or higher worm damage. The CSU-Chico trial had 9 and Delta only had 4 varieties with 6% or higher worm damage in 2004.

Over the last nine years, Kahl, Sano and Plateau have had the most double kernels. Kahl and Donna have had six percent or more blank kernels in at least one of the trials each year. Kapareil has had six percent or more worm damage every year in at least one trial.

Considerable splitting (breakage) and loss of scaffold limbs, and some entire trees, has occurred in both the CSU-Chico and Delta College trials. The exact cause of this splitting is uncertain, but it may be a result of the wide tree spacing and tree damage from a 1995 tornado at the CSU-Chico trial and the prevailing wind, heavy crops and lack of sufficient tree tying at the Delta College plot. In addition, at the CSU-Chico trial, considerable shaker damage has occurred. Loss of scaffold limbs and trees has been taken into account in calculating per acre yields. Even without the above conditions, scaffold splitting may be a problem for the Aldrich variety with its upright growth habit and narrow crotch angles. Thus, this variety will require special care in tree training.

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. In 2003, bud failure was again observed at the Butte and Kern sites but it was not significantly worse than in 2002. In 2004, minor bud failure was observed on the tops of 5% of the Carmel trees in the CSU-Chico trial. No bud failure was observed on the Carmel trees at the Kern trial in 2004. To date, no bud failure has been observed on the Carmel trees at the Delta College trial, although in 2004, a few trees had slight symptoms that could have been the beginning stages of bud failure.

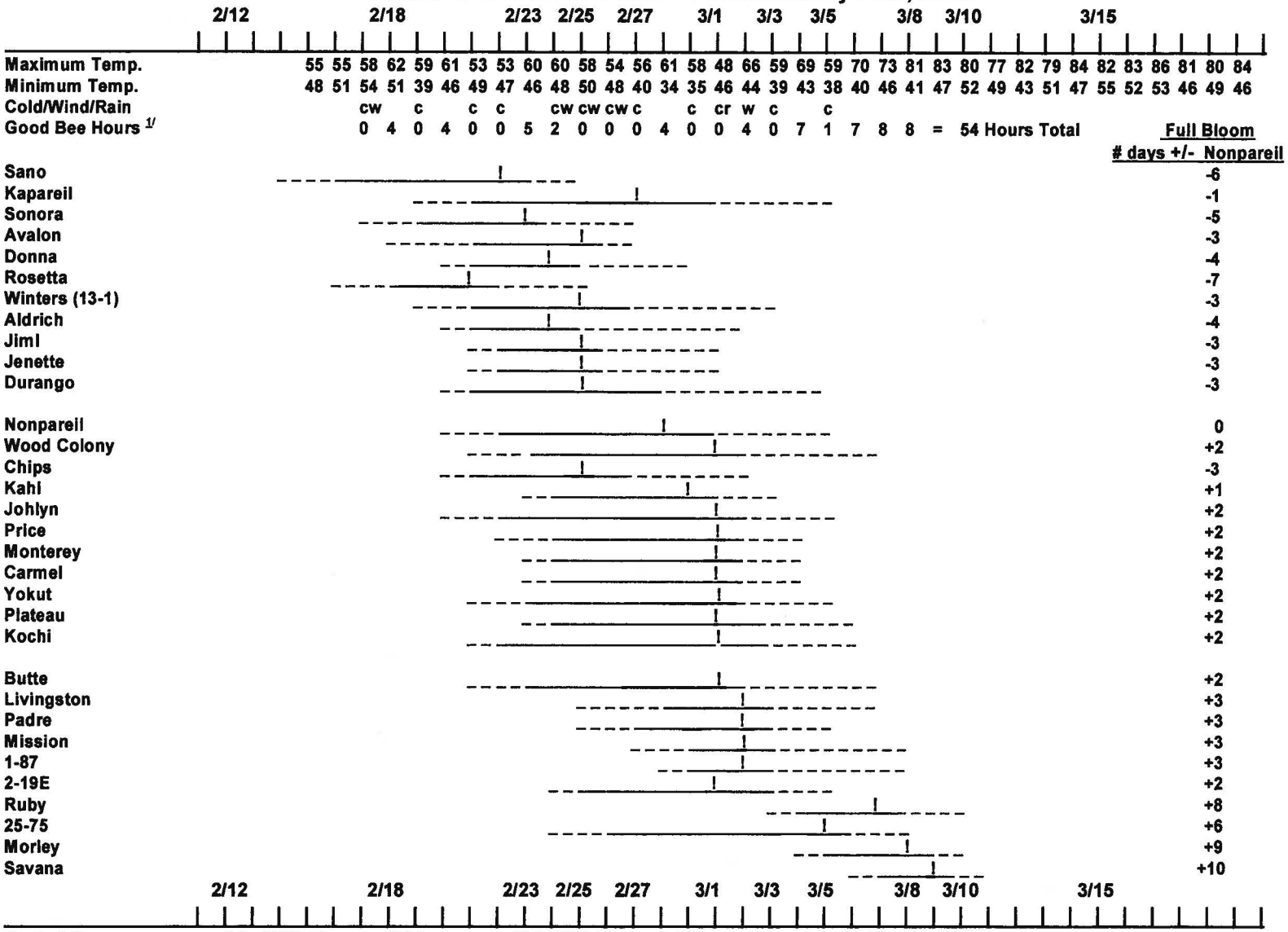
Selection 13-1 was released several years ago with the name 'Winters'. It has shown good production (particularly at the CSU-Chico trial) and should be a good pollenizer for Nonpareil. However, the high susceptibility of Winters to diseases (especially *Alternaria* and *Anthracnose*) and worm damage continues to be a concern.

Acknowledgements

The authors wish to thank the Almond Board of California for helping with tree purchase and for continued support of this project. The following nurseries supplied trees at reduced cost for these trials: Bright's Nursery, Burchell Nursery, Dave Wilson Nursery, Fowler Nursery, Sierra Gold Nurseries and Spoto Nursery. We particularly want to express our appreciation and thanks to the staffs of California State University at Chico, San Joaquin Delta College and Paramount Farming Company for excellent cooperation in managing and maintaining these trials. The assistance of Cooperative Extension field assistants in Kern, Butte and San Joaquin Counties and field personnel of the University of California Pomology Department is gratefully acknowledged.

ALMOND REGIONAL VARIETY TRIAL - 2004 BLOOM

Planted in 1993 at the California State University Farm, Chico



Dashed line encompasses 1 to 100% bloom, solid line covers 10 to 90% bloom, full bloom date marked with a ! = 80% bloom.

1/ Good Bee Hours = total daylight hours between 1% bloom on Sonora and 100% bloom on Mission when temperatures are ≥ 59 F, wind ≤ 10 mph, and no rain. This is a cooperative project between The Almond Board of California, CSU-Chico, and University of California Cooperative Extension.

Prepared by: Joseph H. Connell and Megan Brown, U.C. Farm Advisor and Intern, Butte County, October 15, 2004.

Full Bloom Timing -- Almond Regional Variety Trial, CSU Chico.

	# Days before or after Nonpareil Full Bloom 1/									
Variety	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**Average**
Sonora	-8	-6	-9	-5	-7	-8	-1	-7	-5	-6.2
Sano	-12	-4	-4	-3	-7	-3	-3	-6	-6	-5.3
Kapareil	-11	-2	-5	-3	-7	-3	-2	-8	-1	-4.7
Rosetta	-4	-4	-5	-2	-7	-7	-4	-4	-7	-4.9
Avalon									-3	
Durango									-3	
Winters (13-1)	-4	-6	-6	-2	-4	-3	0	-2	-3	-3.3
Donna	-6	-4	-2	-4	-4	-3	-1	-2	-4	-3.3
Aldrich	-3	0	0	1	-5	-2	-1	-1	-4	-1.7
Chips	0	-2	-1	-1	-2	-2	0	0	-3	-1.2
Jenette	-1	3	4	2	-5	-5	-2	-2	-3	-1.0
Jiml	-2	0	1	3	-3	-1	0	-2	-3	-0.8
Nonpareil	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Price	2	0	3	1	-1	-1	-1	0	2	0.6
Yokut	2	-2	4	2	0	0	2	1	2	1.2
Carmel	2	1	6	2	0	-1	0	1	2	1.4
Kahl	0	1	5	3	1	2	0	-1	1	1.3
Wood Colony	0	-1	7	2	2	0	0	1	2	1.4
Johlyn	1	6	3	4	0	2	0	-1	2	1.9
Monterey	2	0	6	4	0	2	0	1	2	1.9
Plateau	0	0	8	4	4	1	2	3	2	2.7
Kochi									2	
Butte	3	6	8	6	4	0	3	4	2	4.0
2-19E	3	6	5	5	4	3	2	7	2	4.1
2-43W	1	0	9	5	7	---	---	---	---	4.4
Padre	4	8	9	6	4	0	3	7	3	4.9
1-102W	4	6	8	3	6	---	---	---	---	5.4
1-87	4	11	8	5	4	5	3	5	3	5.3
Livingston	4	4	7	10	7	4	3	6	3	5.3
Mission	4	8	10	6	6	5	4	6	3	5.8
Ruby	6	11	17	10	10	6	5	13	8	9.6
25-75	11	13	10	12	15	9	9	15	6	11.1
Morley	6	11	19	18	16	12	10	13	9	12.7
Savana	11	17	20	18	17	12	16	20	10	15.7
Good Bee Hours 2/	77	74	43	37	24	42	61	61	54	

1/ Full bloom as defined here equals the day when 80% of the flowers are open.

2/ Good bee hours = total daylight hours between 1% bloom on Sonora and 100% bloom on Mission when temperatures are ≥ 59 F, wind ≤ 10 mph, and no rain.

Bloom Conditions

1996 - Cold, rainy & windy prior to Nonpareil full bloom, excellent weather from then on.

1997 - A low chilling year, cool during entire blooming period but generally good weather.

1998 - Cold, rainy & windy through much of bloom, a few good days for Butte through Mission bloom.

1999 - Cold throughout bloom, 1 good day each at Sonora & Carmel full bloom, 3 good days for last 10% of late varieties

2000 - Cold, windy & rainy throughout bloom, 3 ok days around Sonora full bloom, 1 good day after Butte full bloom.

2001 - Cold, windy & rainy throughout bloom, 3 good days Winters-Nonpareil full bloom, 2 good days-last 10% of late varieties.

2002 - Early bloom was cold, good weather from 10% Nonpareil bloom through Mission bloom. 3 windy days during peak Mission bloom.

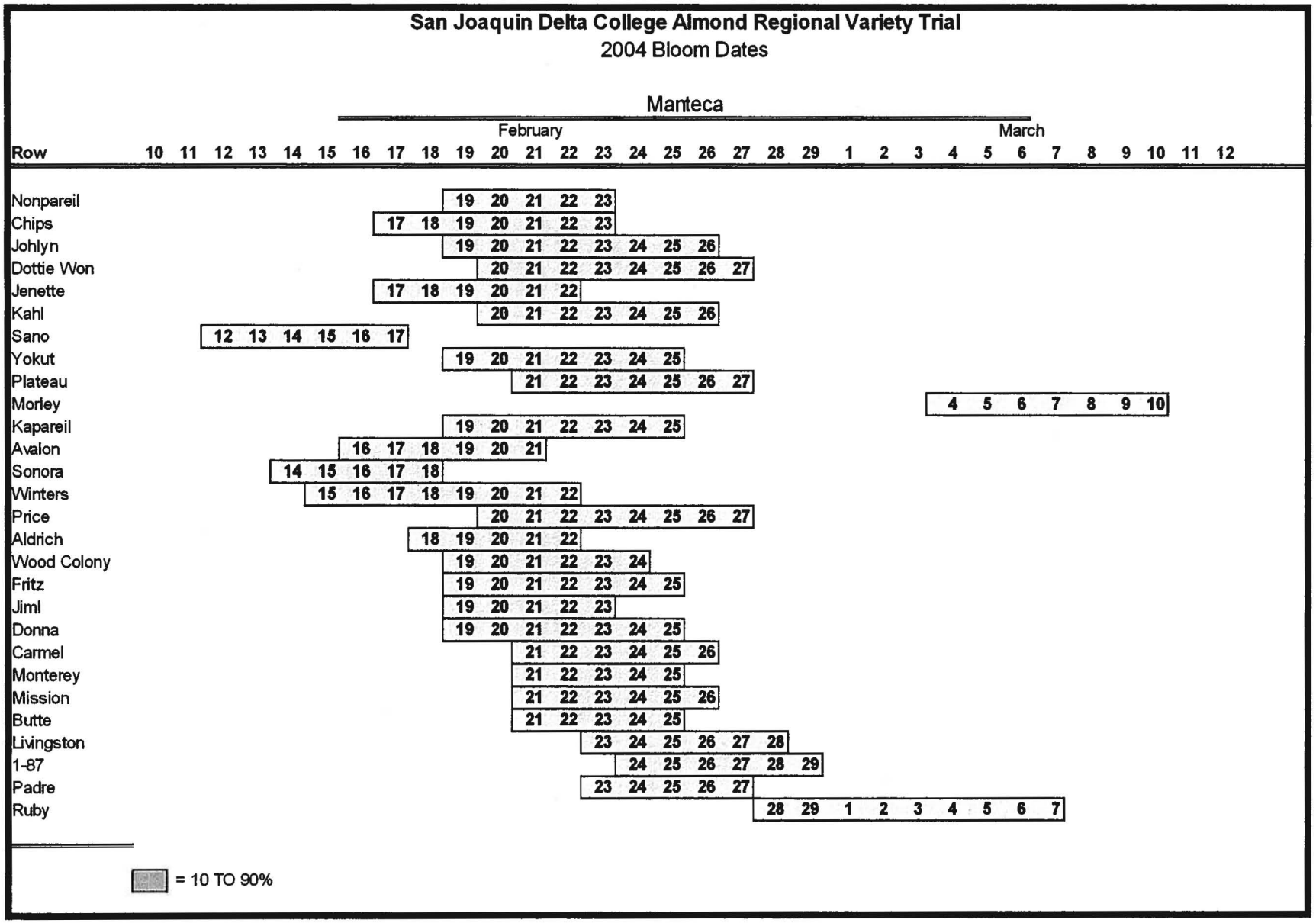
2003 - Cool to cold & windy through much of bloom, warmer late in bloom with 25 of the 61 bee hours occurring after Buttes full bloom.

2004 - Cold & windy through much of bloom, warmer late in bloom with 30 of the 54 bee hours occurring after Mission full bloom.

Bloom Density* -- CSU Chico, Regional Variety Trial

Variety	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sonora	4	2	5	4	4	3	5	3	3
Sano	4	4	3	4	4	4	4	5	5
Kapareil	5	5	5	5	5	5	5	5	5
Rosetta	3	4	2	3	4	4	3	5	5
Winters	5	4	3	4	4	3	2	5	3
Donna	3	3	3	4	3	3	4	2	3
Aldrich	4	5	3	5	5	4	5	5	5
Chips	3	4	4	4	4	3	3	4	4
Jenette	4	5	3	5	5	4	5	3	5
Jiml	2	3	2	2	3	3	4	1	5
Nonpareil	4	4	3	4	3	3	3	2	3
Price	1	1	4	2	4	3	3	3	4
Yokut	1	3	1	2	1	4	2	4	2
Carmel	3	3	3	5	3	4	3	5	3
Kahl	2	3	2	3	2	4	3	5	2
Wood Colony	4	3	3	3	3	4	4	3	4
Johlyn	4	4	1	4	3	3	3	2	2
Monterey	4	4	2	3	3	2	4	2	3
Plateau	2	3	3	3	4	3	3	1	4
Butte	4	4	3	4	4	4	4	4	4
2-19E	3	3	2	5	2	5	2	5	2
2-43W	4	3	2	3	4	---	---	---	---
Padre	3	3	4	5	4	5	5	5	5
1-102W	4	4	4	4	4	---	---	---	---
1-87	3	3	3	3	3	4	3	3	3
Livingston	3	4	3	4	4	4	4	3	3
Mission	3	3	3	3	4	4	4	4	3
Ruby	3	3	3	3	4	3	4	4	3
25-75	2	3	3	3	4	3	3	3	3
Morley	3	3	3	3	4	4	4	4	4
Savana	4	3	3	3	2	3	2	3	2
Avalon	Young trees planted spring 2001								4
Carmel	"								3
Durango	"								4
Kochi	"								3

* The density of bloom is rated annually for each variety on a subjective scale of 1 to 5 with a rating of 5 being the heaviest bloom. Consistency of bloom from one year to the next and tendencies toward alternate bloom/bearing may be indicated by these ratings. Consistently heavy bloom may also indicate consistently light cropping (see Kapareil).


San Joaquin Delta College Almond Regional Variety Trial
2004 Bloom Dates
Manteca
February
March
Row
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 1 2 3 4 5 6 7 8 9 10 11 12
Nonpareil 19 20 21 22 23
Chips 17 18 19 20 21 22 23
Johlyn 19 20 21 22 23 24 25 26
Dottie Won 20 21 22 23 24 25 26 27
Jenette 17 18 19 20 21 22
Kahl 20 21 22 23 24 25 26
Sano 12 13 14 15 16 17
Yokut 19 20 21 22 23 24 25
Plateau 21 22 23 24 25 26 27
Morley 4 5 6 7 8 9 10
Kapareil 19 20 21 22 23 24 25
Avalon 16 17 18 19 20 21
Sonora 14 15 16 17 18
Winters 15 16 17 18 19 20 21 22
Price 20 21 22 23 24 25 26 27
Aldrich 18 19 20 21 22
Wood Colony 19 20 21 22 23 24
Fritz 19 20 21 22 23 24 25
Jiml 19 20 21 22 23
Donna 19 20 21 22 23 24 25
Carmel 21 22 23 24 25 26
Monterey 21 22 23 24 25
Mission 21 22 23 24 25 26
Butte 21 22 23 24 25
Livingston 23 24 25 26 27 28
1-87 24 25 26 27 28 29
Padre 23 24 25 26 27
Ruby 28 29 1 2 3 4 5 6 7
= 10 TO 90%

SAN JOAQUIN DELTA COLLEGE
REGIONAL ALMOND VARIETY TRIAL
2004 RAINFALL
MANTECA

February	Rain (inches)	Air Temperature Max	Air Temperature Min	Wind > 5 mph	March	Rain (inches)	Air Temperature Max	Air Temperature Min	Wind > 5 mph
1	0	54.4	37.2	5.4	1	0.51	56.6	45.7	5.6
2	0.71	56.0	46.2	7.2	2	0	66.7	42.3	6.7
3	0.08	52.6	44.4	5.6	3	0	60.3	35.4	
4	0	56.9	41.7		4	0	66.8	39.6	6.6
5	0.04	58.8	32.0		5	0	69.5	41.9	
6	0	61.1	39.3	5.9	6	0	66.8	45.1	
7	0	59.1	35.8	5.7	7	0	73.3	41.0	
8	0	56.6	35.3		8	0	78.9	42.6	
9	0	62.9	30.8		9	0	78.7	45.9	
10	0	61.0	30.3		10	0	80.4	51.8	6.4
11	0	63.5	29.1		11	0	77.6	41.6	
12	0	66.0	30.8		12	0	77.7	44.7	
13	0	60.9	36.4		13	0	79.5	42.5	
14	0	64.6	33.4		14	0	78.9	45.0	
15	0	66.0	40.6		15	0	81.0	49.5	5.3
16	0.63	60.1	50.5	9.8	16	0	80.5	45.2	
17	0.20	68.8	32.0	7.4	17	0	82.3	42.9	
18	0.55	62.0	47.5	8.0	18	0	85.1	46.4	
19	0	59.3	43.0	4.7	19	0	80.8	45.6	
20	0	56.8	47.1		20	0	83.4	42.2	
21	0.04	58.2	48.8		21	0	79.0	51.0	
22	0.08	57.8	48.5		22	0	75.9	48.2	6.2
23	0	61.9	43.4		23	0	71.3	50.3	7.7
24	0.08	62.6	49.1	5.0	24	0	71.9	49.0	7.1
25	0.71	57.9	48.8	12.1	25	0.08	63.9	42.7	
26	0.35	59.4	40.8	6.1	26	0.04	62.7	36.8	5.7
27	0.04	58.1	40.8		27	0	67.6	43.7	5.4
28	0	60.4	38.0	5.5	28	0	75.5	42.1	
29	0	60.2	34.3		29	0	84.2	46.8	
					30	0	62.8	47.6	7.2
					31	0	68.6	46.1	6.3

Rainfall subtotal for:

January	1.58"
February	3.51
March	0.63
TOTAL	5.72"

Shaded dates = Bloom period

EFFECTIVE BLOOM PERIOD
Kern RVT - Paramount Farming Company

Early Blooming Varieties			
	Bloom Period		
	Beginning	**Full**	**End**
Sano	2-12-04	2-20-04	3-01-04
Kapareil	2-11-04	2-23-04	3-07-04
Rosetta	2-14-04	2-21-04	3-01-04
Sonora	2-17-04	2-23-04	3-01-04
13-1	2-11-04	2-23-04	3-09-04

Mid-Season Blooming Varieties			
	Bloom Period		
	Beginning	**Full**	**End**
Nonpareil	2-18-04	2-26-04	3-01-04
Price	2-18-04	2-23-04	2-28-04
Jenette	2-18-04	2-24-04	3-04-04
Yokut	2-16-04	2-23-04	3-08-04
Johlyn	2-17-04	2-25-04	3-09-04
Plateau	2-19-04	3-01-04	3-01-04
Chips	2-18-04	2-26-04	3-07-04
Kahl	2-17-04	2-23-04	3-04-04
Fritz	2-18-04	2-25-04	3-04-04
Monterey	2-21-04	3-01-04	3-10-04
Aldrich	2-19-04	2-23-04	3-07-04
Wood Colony	2-21-04	2-26-04	3-03-04
1-102W	2-23-04	2-23-04	3-15-04
Jim1	2-18-04	2-25-04	3-08-04
Donna	2-18-04	2-23-04	3-03-04
Carmel	2-21-04	3-01-04	3-10-04
2-19E	2-21-04	3-01-04	3-13-04
2-43W	2-21-04	3-01-04	3-13-04

Late Season Blooming Varieties			
	Bloom Period		
	Beginning	**Full**	**End**
Butte	2-24-04	3-01-04	3-11-04
Livingston	2-23-04	3-03-04	3-15-04
Padre	2-26-04	3-04-04	3-13-04
1-87	2-26-04	3-02-04	3-13-04
25-75	2-23-04	3-02-04	3-15-04
Mission	2-26-04	3-04-04	3-15-04
Ruby	2-27-04	3-11-04	3-17-04
Morley	2-26-04	3-01-04	3-13-04
Savana	3-02-04	3-11-04	3-19-04

Bloom Observations:

Good Blooming Varieties: Padre, Mission, 1-87, Butte

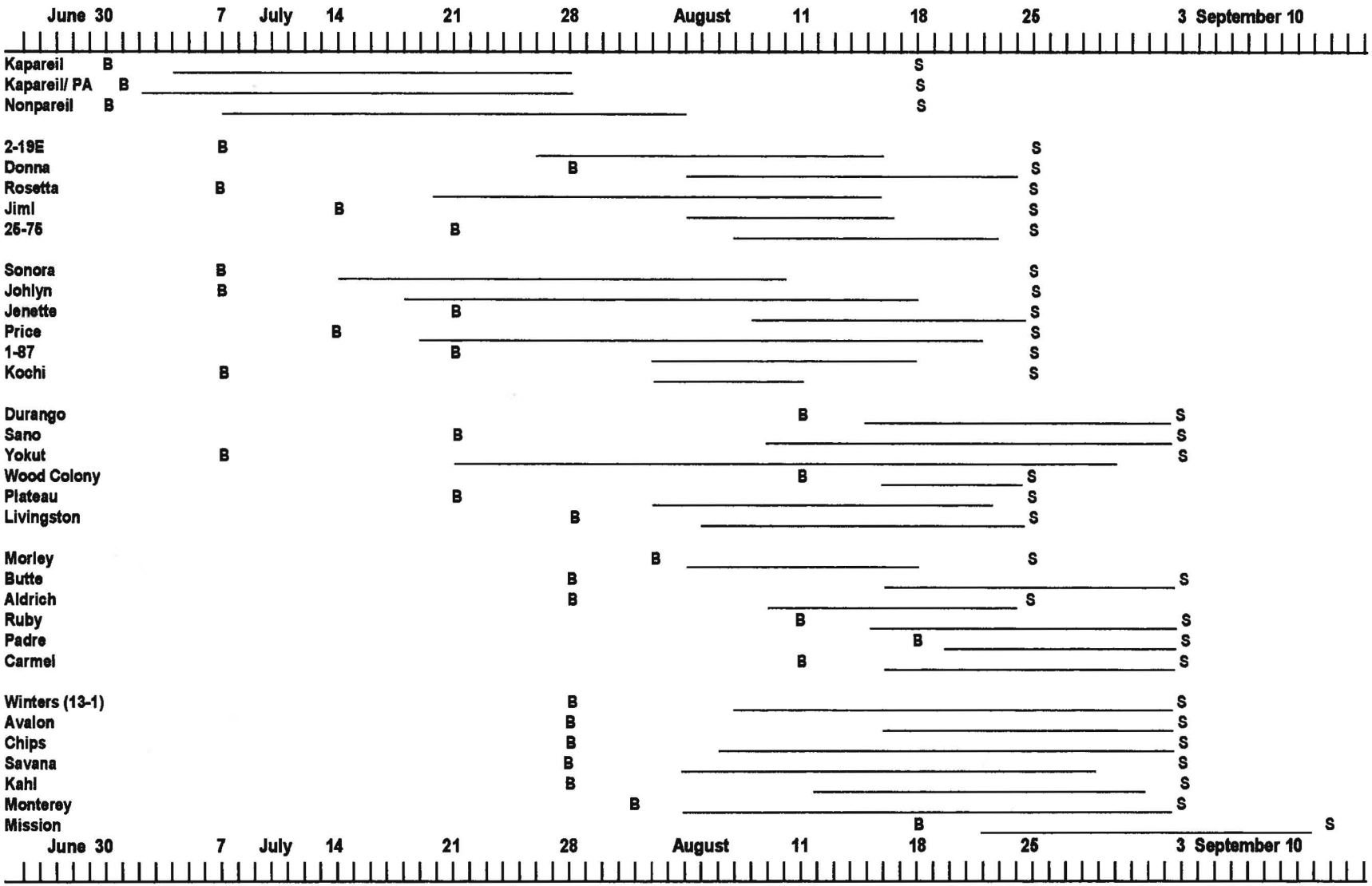
Average Blooming Varieties: Nonpareil, Livingston, 1-102W, Chips, Kahl, Yokut, Price, Aldrich, Wood Colony, Fritz, Jiml, Ruby

Poor Blooming Varieties: 2-19E, 25-75, Kapareil, Donna, Carmel, Johlyn, Jenette, Sano, Plateau, 2-43W, Sonora, Rosetta, 13-1, Monterey

Chilling Hours: 655

ALMOND REGIONAL VARIETY TRIAL - 2004 HARVEST MATURITY

Planted in 1993 at the California State University Farm, Chico



Solid line=1 to 100% hullsplit. B--denotes blank nuts beginning to split. S--indicates when the variety was shaken to the ground, 4 harvests this year. Kochi, Durango and Avalon are young trees in their 4th growing season. This is a cooperative project between the Almond Board of California, CSU-Chico, and University of California Cooperative Extension. Prepared by: Joseph H. Connell, U.C. Farm Advisor and Megan Brown, Butte County CE Intern. 9/22/04.

Almond Regional Variety Trial
2004 Hull Split Dates
Manteca

Variety	Date 10%	90%
Kapareil	4-Jul	14-Jul
Nonpareil	16-Jul	21-Jul
Johlyn	20-Jul	27-Jul
Jenette	26-Jul	10-Aug
Price	26-Jul	3-Aug
Jiml	26-Jul	1-Aug
Wood Colony	29-Jul	13-Aug
Sonora	30-Jul	3-Aug
Donna	30-Jul	9-Aug
Morley	3-Aug	10-Aug
Aldrich	3-Aug	21-Aug
1-87	3-Aug	15-Aug
Yokut	4-Aug	22-Aug
Livingston	4-Aug	12-Aug
Rosetta	5-Aug	11-Aug
Plateau	7-Aug	20-Aug
Chips	10-Aug	20-Aug
Winters	10-Aug	22-Aug
Kahl	10-Aug	23-Aug
Avalon	10-Aug	29-Aug
Sano	12-Aug	24-Aug
Padre	13-Aug	21-Aug
Carmel	16-Aug	25-Aug
Ruby	20-Aug	31-Aug
Butte	20-Aug	30-Aug
Fritz	22-Aug	31-Aug
Monterey	25-Aug	5-Sep
Mission	25-Aug	31-Aug

HULLSPLIT PERIOD

RAVT - Paramount Farming Company (Kern Co.)

EARLY - SEASON		
	Hullsplit Period	
	Beginning*	End**
Kapareil	6-30-04	8-02-04
Nonpareil	7-05-04	8-05-04
2-19E	7-18-04	8-20-04
Sonora	7-16-04	8-28-04
Rosetta	7-14-04	8-20-04
2-43W	7-26-04	8-26-04
1-102W	7-16-04	8-20-04
Donna	7-18-04	8-20-04
Aldrich	8-05-04	8-31-04
Jiml	7-14-04	8-28-04
Jenette	8-02-04	8-31-04
Johlyn	7-28-04	8-26-04

MID - SEASON		
	Hullsplit Period	
	Beginning*	End**
25-75	7-26-04	8-26-04
13-1	8-05-04	9-12-04
1-87	7-28-04	8-20-04
Price	7-23-04	8-20-04
Plateau	7-25-04	8-31-04
Chips	7-30-04	8-31-04
Savana	7-26-04	8-26-04
Morley	7-30-04	8-30-04
Wood Colony	7-28-04	8-30-04

MID to LATE SEASON		
	Hullsplit Period	
	Beginning*	End**
Sano	7-30-04	9-06-04
Yokut	7-23-04	8-31-04
Padre	8-05-04	9-08-04
Butte	8-09-04	9-14-04
Livingston	8-07-04	8-30-04
Kahl	8-09-04	9-15-04
Carmel	8-09-04	9-12-04
Ruby	8-09-04	9-15-04

LATE - SEASON		
	Hullsplit Period	
	Beginning*	End**
Mission	8-21-04	9-17-04
Monterey	8-07-04	9-17-04
Fritz	8-20-04	9-27-04

*Beginning means one to five percent of hullsplit.

**End means 100% hullsplit.

Varieties with some nut drop: Kahl, Butte and Yokut.

Varieties with excessive nut drop: Price, Fritz, Aldrich, Carmel and Monterey.

NOTE: The length of the hullsplit period depended on crop load. Varieties that had a big crop took longer to complete hullsplit than varieties with a light crop.

2004 Yield Summary for the Regional Almond Variety Trial at California State University at Chico Farm, Butte County. Planted in 1993

Variety	No. of nuts/tree	Average kernel weight (g)	Shelling percentage	Kernel pounds per	
				Tree	Acre[1]
Carmel	18089	1.11	53.0	44.2	2830
Winters (13-1)	16637	1.03	53.5	37.9	2425
Livingston	13092	1.09	51.7	31.5	2015
Chip's	13082	1.07	52.1	30.9	1977
Jenette	12736	1.09	60.4	30.7	1964
Mission	**13072**	**1.05**	**40.8**	**30.3**	**1938**
Nonpareil	**11782**	**1.14**	**61.9**	**29.6**	**1897**
Butte	14009	0.92	41.4	28.4	1817
Sano	9594	1.32	50.8	27.8	1780
Donna	12204	0.99	53.2	26.7	1707
Jiml	10866	1.10	64.5	26.3	1682
Kapareil/PA	13401	0.88	68.4	26.1	1670
Wood Colony	10548	1.12	45.9	26.0	1665
Ruby	10442	1.11	49.4	25.6	1640
Rosetta	8565	1.33	48.3	25.0	1601
Yokut	8921	1.24	52.7	24.4	1559
Johlyn	9415	1.13	72.3	23.3	1494
2-19E	8727	0.95	43.9	18.3	1171
Kahl	7930	1.04	38.7	18.1	1160
1-87	9028	0.80	45.4	16.0	1023
Sonora	4931	1.37	71.1	14.9	952
Price	5927	0.89	56.5	11.6	745
Durango	3052	1.27	49.0	8.5	545
Avalon	1563	1.16	53.7	4.0	256
Kochi	679	1.24	[2]	1.9	119
Aldrich	Not harvested at the Butte RAVT[3]				
Monterey	Not harvested at the Butte RAVT[3]				
Morley	Not harvested at the Butte RAVT[3]				
Padre	Not harvested at the Butte RAVT[3]				
Plateau	Not harvested at the Butte RAVT[3]				
Savana	Not harvested at the Butte RAVT[3]				
25-75	Not harvested at the Butte RAVT[3]				
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.
[2]The shelling percentage is unavailable for this variety.
[3]Selections were not harvested due to large numbers of missing trees.

2004 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]
Plateau	12858	1.29	55.4	36.6	2749
Padre	14733	0.96	56.3	31.2	2337
Jenette	10406	1.30	75.3	29.7	2228
Yokut	9590	1.35	60.7	28.5	2135
Ruby	10132	1.26	61.1	28.1	2109
Kahl	7955	1.57	67.2	27.4	2058
Carmel	9423	1.28	62.0	26.6	1993
Livingston	10253	1.15	59.1	25.9	1941
Mission	**9326**	**1.13**	**45.1**	**23.3**	**1746**
Morley	10489	1.00	41.1	23.2	1740
Rosetta	7662	1.34	53.6	22.6	1699
Dottie Won	9213	1.11	50.3	22.5	1686
Chips	8262	1.18	55.9	21.5	1613
Butte	11898	0.81	42.0	21.3	1596
Monterey	6816	1.42	50.6	21.3	1594
Fritz	8498	1.08	55.0	20.3	1519
Sano	6482	1.41	61.5	20.1	1506
1-87	9148	0.94	56.1	19.0	1427
Nonpareil	**6382**	**1.33**	**67.9**	**18.7**	**1403**
Sonora	5669	1.47	75.9	18.4	1377
Price	8036	1.02	59.0	18.1	1354
Johlyn	6189	1.27	74.2	17.3	1297
Winters (13-1)	5996	1.29	72.4	17.0	1274
Jiml	5923	1.29	64.7	16.9	1264
Donna	7054	1.08	48.7	16.8	1261
Wood Colony	4750	1.48	67.6	15.4	1158
Aldrich	5905	1.14	59.6	14.9	1116
Kapareil	5264	0.96	64.5	11.1	831
KapareilPA	Removed from the San Joaquin RAVT				
Savana	Removed from the San Joaquin RAVT				
1-102W	Removed from the San Joaquin RAVT				
2-19E	Removed from the San Joaquin RAVT				
2-43W	Removed from the San Joaquin RAVT				
25-75	Removed from the San Joaquin RAVT				

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

2004 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	Acre[1]
Padre	29187	0.80	57.6	51.6	4434
Rosetta	13700	1.25	57.8	37.6	3234
Aldrich	17596	0.95	59.8	36.9	3173
Johlyn	13965	1.15	68.1	35.3	3037
Ruby	15202	1.05	48.3	35.1	3018
Nonpareil	**13934**	**1.10**	**67.2**	**33.6**	**2890**
Butte	17506	0.87	49.5	33.4	2872
Morley	16946	0.89	48.1	33.3	2863
Mission	**16083**	**0.93**	**42.5**	**32.9**	**2832**
Fritz	16374	0.91	55.8	32.8	2822
Carmel	13286	1.10	58.9	32.3	2778
Jenette	12827	1.14	63.0	32.2	2765
Price	15466	0.91	61.6	30.9	2660
1-102W	10238	1.36	66.1	30.7	2641
Jiml	11662	1.09	63.3	27.9	2403
Yokut	11038	1.15	59.4	27.9	2396
Kahl	12590	1.00	47.3	27.7	2385
Monterey	10995	1.14	58.2	27.7	2383
Wood Colony	10706	1.15	55.5	27.1	2328
Winters (13-1)	12694	0.97	59.2	27.1	2328
1-87	14822	0.82	50.4	26.8	2302
Plateau	10173	1.17	46.8	26.3	2262
Livingston	9586	1.20	65.1	25.3	2179
25-75	13440	0.82	46.4	24.3	2088
2-43W	9799	1.09	59.7	23.4	2016
Chip's	10112	1.01	58.9	22.5	1935
Sano	6845	1.39	54.2	20.9	1797
2-19E	7377	1.07	48.4	17.3	1490
Donna	7976	0.88	45.9	15.5	1336
Savana	5422	1.14	59.0	13.6	1173
Kapareil/PA	6480	0.92	67.2	13.1	1124
Sonora	4836	1.20	70.8	12.8	1099
Kapareil	6706	0.84	68.5	12.4	1070

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

Annual Yield Summary (1996-2004) and Accumulative Yield (1996-2004) for the Regional Variety Trial at California State University at Chico Farm, Butte County. Planted in 1993.

Variety	Yield (kernel pounds/acre[1])									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	Accum.
Winters (13-1)	425	2076	784	2736	2446	2677	2479	3333	2425	19381
Carmel	741	1240	1260	1700	1934	2070	2320	2330	2830	16425
Nonpareil	**494**	**1427**	**1127**	**1952**	**1762**	**1846**	**2587**	**2000**	**1897**	**15092**
Livingston	425	1449	1275	1765	1607	2283	2350	1795	2015	14964
Plateau	360	1215	2367	2007	1943	2160	2361	1675	.	14089
Ruby	448	1208	1315	1823	1828	1676	1859	2002	1640	13798
Butte	443	1169	1549	1404	1509	1705	2001	2064	1817	13661
Chip's	344	817	1188	1030	1434	1490	3195	2063	1977	13538
Mission	**383**	**941**	**890**	**1018**	**1616**	**1483**	**2304**	**2409**	**1938**	**12983**
Wood Colony	724	978	951	1464	1695	1781	2318	1387	1665	12963
Johlyn	537	1047	1046	1870	1595	1457	2036	1864	1494	12947
Sano	372	1036	1020	1558	2128	1552	1918	1514	1780	12878
Rosetta	248	1039	840	1422	1727	2041	1451	2015	1601	12384
Aldrich	275	1813	1005	1388	1494	1663	2920	1545	.	12104
Jenette	279	868	672	1407	1932	1290	1939	1670	1964	12021
Monterey	749	1535	1531	1410	2279	1541	2032	816	.	11894
Jiml	262	873	738	1633	1948	1484	2371	720	1682	11711
Yokut	359	765	896	1204	1126	1964	1621	1700	1559	11193
Morley	219	1102	1189	1364	1846	2053	1741	1661	.	11176
1-87	190	1295	1074	1340	1454	1711	1802	1038	1023	10927
Sonora	732	494	1152	1262	1510	1165	1498	1726	952	10490
Kahl	208	672	1070	1301	1034	1491	1280	2096	1160	10313
Padre	541	1013	832	1258	1402	1833	1929	1466	.	10274
2-19E	276	1299	454	1345	906	1828	964	2023	1171	10266
Price	538	931	990	1230	1066	1469	1244	1602	745	9814
Donna	582	913	712	1003	1255	1118	1294	957	1707	9541
25-75	308	668	815	1103	1910	1433	1835	722	.	8794
Kapareil	68	1129	280	941	1029	1364	1093	1237	1294	8435
Savana	451	1079	815	992	958	1106	1169	1717	.	8287
2-43W	309	1615	1081	1527	1740	.	.	.	.	6272
1-102W	144	1266	436	1481	1926	.	.	.	.	5253
Durango	.	.	.	.	.	.	.	.	545	545
Avalon	.	.	.	.	.	.	.	.	256	256
Kochi	.	.	.	.	.	.	.	.	119	119

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

Annual Yield Summary (1996-2004) and Accumulative Yield (1996-2004) for the Regional Variety Trial at San Joaquin Delta College Farm, Manteca, San Joaquin County. Planted in 1993.

Variety	Yield (Kernel pounds per acre[1])									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	Accum.
Butte	328	1631	2075	2641	2243	2311	2459	2865	1596	18148
Carmel	114	2111	1893	2695	2538	2206	2697	1861	1993	18106
Plateau	[2]	1198	2301	2511	1968	2201	2626	2106	2749	17660
Ruby	419	1274	1890	1985	2518	1505	2432	2494	2109	16626
Padre	221	579	1502	1340	2784	2123	2995	2374	2337	16255
Livingston	73	683	1572	2779	1736	2133	2856	2214	1941	15986
Dottie Won	100	1287	1757	1667	2133	2019	2302	2291	1686	15243
Fritz	134	1692	1539	2086	2024	1648	2645	1819	1519	15106
Monterey	153	1315	1660	2006	1718	1570	2513	2558	1594	15086
Jenette	226	1313	1530	2579	1667	1927	1783	1713	2228	14966
Chips	420	920	1798	2134	1828	1464	2299	2243	1613	14719
Yokut	251	1288	1882	1956	2060	1674	1812	1318	2135	14377
Mission	**219**	**813**	**1332**	**1780**	**2001**	**1754**	**2203**	**1887**	**1746**	**13736**
Nonpareil	**115**	**1165**	**918**	**2252**	**1333**	**1794**	**2093**	**2028**	**1403**	**13102**
Sano	[2]	1213	995	2299	2205	1762	1590	1506	1506	13076
Wood Colony	211	1131	1168	2176	1543	1677	1579	1908	1158	12551
Kahl	[2]	757	1320	1836	1605	1246	1778	1462	2058	12063
Winters (13-1)	[2]	1591	192	2223	392	2671	1922	1446	1274	11711
1-87	79	486	1207	1601	1296	1238	1787	1582	1427	10703
Rosetta	[2]	1323	600	1745	1487	1611	1083	1105	1699	10652
Jiml	[2]	534	744	2509	1098	1179	2313	927	1264	10567
Sonora	123	[2]	965	2407	1194	1651	1514	1234	1377	10465
Morley	[2]	559	576	1401	842	1702	1672	1721	1740	10213
Donna	169	1000	990	1394	1153	1137	1515	1539	1261	10158
Aldrich	34	937	636	2169	902	1307	1724	1329	1116	10153
Johlyn	[2]	634	997	1510	1246	1188	1822	1356	1297	10049
Price	[2]	947	573	1731	932	1075	1422	1327	1354	9361
1-102W	217	457	892	939	519	1379	1209	970	.	6583
2-19E	[2]	503	507	1010	903	1008	1245	1405	.	6581
Kapareil	[2]	361	183	1200	485	1346	783	851	831	6040
2-43W	[2]	[2]	776	1198	632	767	1334	1177	.	5885
Savana	[2]	[2]	184	750	109	536	245	1116	.	2939

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

[2] Because of poor production in 1996 and poor production and a harvesting error in 1997, some varieties were not harvested in these years. Thus, cumulative yields for these varieties should be somewhat higher than what is shown in the table.

Annual Yield Summary (1995-2004) and Accumulative Yield (1995-2004) for the Regional Variety Trial at Paramount Farming Company, Shafter, Kern County. Planted in 1993.

Variety	Yield (kernel pounds/acre[1])										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Accum.
Padre	802	1624	1624	1883	2416	2841	4068	4559	4079	4434	28330
Ruby	664	1406	2413	2180	2550	3164	3482	4113	3964	3018	26954
Jenette	294	952	3085	1574	2692	2810	4177	2862	3638	2765	24850
Butte	377	1364	2400	2353	1670	1178	3401	4101	4443	2872	24159
Plateau	282	1340	2525	2419	2239	3197	3653	2827	2977	2262	23721
2-19E	341	963	2347	1944	2496	2646	3479	2434	4890	1490	23030
Monterey	591	1141	2184	1914	2194	2429	3342	3293	2886	2383	22356
Aldrich	422	459	2230	1295	2936	1410	3230	4576	2491	3173	22222
Fritz	[2]	1261	1706	2234	1700	2805	3199	3451	3000	2822	22178
Nonpareil	**259**	**782**	**2428**	**1963**	**2560**	**2216**	**3022**	**3504**	**2523**	**2890**	**22147**
Livingston	323	760	1972	1749	3054	1608	2233	3660	4396	2179	21933
Carmel	634	1260	1944	1427	1359	2534	3819	3398	2651	2778	21805
Mission	**545**	**1353**	**1949**	**1816**	**1716**	**2285**	**2296**	**3161**	**3516**	**2832**	**21469**
Yokut	382	1316	1519	1835	2023	3184	2059	3150	3118	2396	20982
Kahl	383	1319	1852	1683	1926	2696	2634	2874	3115	2385	20867
Johlyn	291	1221	2195	1936	1287	2084	2313	3453	2900	3037	20716
Morley	176	372	1091	1871	1516	1742	3531	3706	3787	2863	20656
Sano	291	1209	1345	1754	2446	3702	3033	990	3983	1797	20550
Rosetta	93	481	2164	1123	2308	1808	2308	3473	3216	3234	20207
Price	297	746	1118	1772	1235	2997	2819	3684	2282	2660	19610
Chip's	401	882	1417	2004	1709	3106	2419	2905	2798	1935	19575
Winters (13-1)	599	1224	2076	2152	1643	2073	2475	2788	1927	2328	19285
1-102W	304	464	2143	1742	1755	661	1685	3958	3785	2641	19138
1-87	228	607	1598	1594	2171	1008	2260	3752	3543	2302	19063
2-43W	477	1028	2056	1794	1516	1254	1526	3967	2683	2016	18316
Jiml	107	626	1565	1887	1631	2039	1391	4287	2137	2403	18073
Sonora	337	843	1315	1120	2218	3181	1822	3928	2056	1099	17920
Wood Colony	559	1136	1545	1024	760	1923	2193	3245	3068	2328	17781
25-75	167	808	1184	1138	1298	2072	2150	2044	1833	2088	14782
Donna	324	935	766	955	1069	2281	1549	1540	2218	1336	12973
Savana	418	697	1008	1271	656	1480	1771	1449	1961	1173	11885
Kapareil	41	110	733	670	1576	618	1486	2010	1520	1097	9861

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

[2]Yield data for Fritz was lost in 1995 due to a harvesting error. Thus the accumulative yield should be somewhat higher than what is shown in this table.

KERNEL DEFECTS OBSERVED IN 2004

Significant defects noted in the 2004 harvest nut samples of the three RAVTs are outlined below. The trees were in their twelfth growing season. Defects listed may only become important if they continue to show in the same varieties over several years as the trees mature.

	Trial		
Varieties with defect	**CSU-Chico**	**Delta College**	**Kern**
6% or more double kernels:	Wood Colony (32%) Butte (32%) Mission (23%) Kahl (22%) Livingston (18%) Durango (16%) Sano (12%) Price (12%) Donna (12%) 1-87 (12%) Ruby (8%) Yokut (6%) Jenette (6%) Avalon (6%) Rosetta (6%)	Kahl (32%) Plateau (28%) Donna (26%) Price (24%) Monterey (24%) Dottie Won (22%) Livingston (18%) Sano (14%) Mission (14%) Jiml (12%) Aldrich (12%) Fritz (12%) Wood Colony (10%) Morley (8%) Chips (6%) Ruby (6%) Padre (6%)	Plateau (38%) 25-75 (36%) Donna (26%) Mission (20%) Wood Colony (16%) Sano (16%) Kahl (16%) Price (14%) Ruby (14%) Butte (12%) Morley (12%) Carmel (12%) Aldrich (10%) Livingston (10%) Savana (10%) Chips (6%) 2-19E (6%) 2-43W (6%) Fritz (6%)
6% or more twin kernels (two kernels within the same pellicle):	(none)	Price (12%) 1-87 (12%) Jiml (10%) Carmel (10%)	Jiml (6%)
6% or more blank kernels:	Kochi (36%) Kahl (8%) Price (6%)	Kahl (10%) Plateau (10%) Ruby (8%) Monterey (8%) Fritz (8%) Jiml (6%) Kapareil (6%)	Donna (12%) Price (12%) Chips (8%) Morley (8%) Plateau (6%) 2-43W (6%) Kahl (6%) Fritz (6%)

Varieties with defect	CSU-Chico	Delta College	Kern
6% or more kernels with gum:	Winters (8%) Yokut (6%) Johlyn (6%)	Kapareil (8%) Winters (8%) Wood Colony (8%) Johlyn (6%)	(none)
6% or more worm damage:	Sano (18%) Livingston (16%) Chips (16%) Winters (14%) Kochi (12%) Kapareil/PA (10%) Yokut (8%) 2-19e (6%)	Jiml (10%) Donna (8%) Johlyn (6%) Dottie Won (6%)	Kapareil (38%) Kapareil/PA (30%) Chips (20%) Plateau (18%) Sonora (18%) Savana (16%) 2-43W (14%) 2-19E (12%) Livingston (8%) Rosetta (8%) Monterey (8%) Jenette (8%) Nonpareil (8%) Jiml (6%) 25-75 (6%) Donna (6%) Wood Colony (6%) Sano (6%) Carmel (6%) Aldrich (6%) Johlyn (6%)

ALTERNARIA LEAFSPOT 2004

RAVT - Paramount Farming Company (Kern Co.)

Variety	Infestation in 100 Leaf Samples (9-24-04)	Infestation of Leaves Per 30 Sec. Counts (8-31-04)	Percent of Defoliation (8-31-04)
2-19E	0	127	10
Jiml	0	96	15
Donna	32	85	0
Kahl	0	66	10
Monterey	3	53	5
Morley	0	50	40
Savana	2	49	40
Yokut	5	49	5
Winters (13-1)	0	47	30
Carmel	0	47	30
Butte	6	45	0
Johlyn	6	45	5
2-43W	3	39	40
Sonora	5	36	5
Sano	0	35	40
Nonpareil	**0**	**33**	**0**
Mission	**3**	**33**	**0**
Livingston	16	31	0
Plateau	3	29	10
Ruby	0	28	0
Price	0	26	10
Wood Colony	0	26	5
1-102W	0	16	0
25-75	0	16	5
Fritz	0	16	0
Aldrich	4	14	0
Jenette	2	13	0
Rosetta	0	10	0
Kapareil	0	4	0
1-87	8	0	0
Chips	3	0	0
Padre	0	0	0

HULL ROT 2004

RAVT - Paramount Farming Company (Kern Co.)

Variety	No. Strikes / Tree*
Johlyn	767
Kapareil	657
Jiml	498
Nonpareil	**446**
1-102W	427
Sonora	382
2-43W	233
Donna	225
Jenette	193
Winters (13-1)	182
25-75	177
1-87	150
2-19E	110
Chips	72
Savana	62
Rosetta	61
Sano	43
Plateau	43
Price	36
Wood Colony	30
Livingston	26
Aldrich	0
Kahl	0
Butte	0
Yokut	0
Ruby	0
Padre	0
Morley	0
Fritz	0
Mission	**0**
Monterey	0
Carmel	0

* Data taken on 8-31-04