Field Evaluation of Almond Varieties

Project No.:	09-HORT2-Lampinen
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Objectives:

The objective of this project is to evaluate performance of pollenizers and Nonpareil clones (including yields) in a replicated field trial in McFarland California. Bloom and maturity data for the 2009 season for the McFarland Variety Trial as well as light interception and yield data

Interpretive Summary:

This report will concentrate on a replicated variety trial of eight varieties and eight Nonpareil clones that was planted in 2004 in Kern County near McFarland. Soils at the site consist of McFarland loam and Wasco sandy loam (both Class I soils). The irrigation system is double line drip. Tree spacing is 20 feet between tree rows and 18 feet between trees for a density of 121 trees per acre. Varieties planted included Chips, Kahl, Kochi, Marcona, Selection 2-19e, Sweetheart and Winters, Nonpareil clones planted include Nonpareil 3-8-2-70, Nonpareil 5, Nonpareil 6, Nonpareil 7, Nonpareil Dr., Nonpareil-J, Nonpareil-Newell and Nonpareil-Nico. There are six replications of each variety and Nonpareil clone with 34 trees per replication. Pollenizer and Nonpareil rows alternate in the orchard.

The objectives of the trial are to evaluate pollenizers and Nonpareil clones in a replicated trial where relative yield performance as well as bloom dates, maturity dates, disease/insect susceptibility, etc. can be assessed.

Weather during bloom was generally good at the McFarland trial site. Bloom was generally advanced by 1-3 days in 2009 compared to in 2008 (**Table 1**). Sweetheart and Marcona were the varieties to reach full bloom the earliest and Kochi and Selection

2-19e were the latest. Bloom overlap was very good in 2009. Hullsplit data for the 2009 season has been misplaced.

In 2009, hullrot was again severe in Kochi (**Table 2**) as it was in 2008. Unlike during the 2008 season, there was little hullrot in the Nonpareil clones in 2009 (**Table 2**). There were no significant differences in hull rot for all other varieties besides Kochi for the 2009 season (**Table 2**).

Yield data for the McFarland trial from the 2006 through 2009 seasons are shown in **Table 3**. Selection 2-19e and the Nonpareil clones have had the highest cumulative yields at the McFarland trial (**Table 4**). Cumulative yields at the end of the 2009 season show that Nonpareil-Nico, Nonpareil-Newell, selection 2-19e, Nonpareil-Driver, and Nonpareil 3-8-2-70 have had significantly higher yields than all of the other varieties (**Table 3**). The top yielding cultivars are producing yields in the range of 4000 kernel pounds per acre which is very high for a 6th leaf orchard. The replication provided in this trial adds much value to the data compared to earlier unreplicated variety trials but it comes at a cost in terms of the time required for maintaining, rating and harvesting the plots.

The automatic lightbar (described in report for Almond Board project titled "Development and Testing of a Mobile Platform for Measuring Canopy Light Interception and Stress in Almond") was used to measure midday canopy light interception in the McFarland trial on July 19-20, 2009. **Table 4** shows the photosythetically active (PAR) interception, yield and yield per unit PAR intercepted by variety for the 2009 season. The productivity per unit canopy light interception tended to be quite high for the size of the tree since our previous data has suggested somewhere around 50 pounds per unit light intercepted is near the normal maximum for almond. This trial produced between 52 and 85 kernel pounds per unit light intercepted. In general, this does not appear to be due to alternate bearing effects since yields for most varieties and Nonpareil sources was also high in the 2008 season (**Table 3**). These yields are high for the age of the orchard as well. **Figure 1** shows average yield by orchard age for all varieties, selections and Nonpareil sources for the Butte, Delta and Kern trials planted in 1993 compared to the McFarland trial planted in 2004. Part of the difference is likely due to the fact that the McFarland trial has a much smaller selection of varieties included.

Acknowledgements

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•	February 2008	March 2008
10 11 12 13 14	15 16 17 18 19 20 21 22 23 24 25 26 27	28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Marcona	F C	
Winters	F	
Sweetheart	F	
Nonpareil-Jones	F	
Nonpareil-7	F	
Nonpareil-Newell	F	
Nonpareil-Driver	F	
Nonpareil-6	F	
Nonpareil-2-70	F	
Chips	F	
Kahl		
Nonpareil-5		
Nonpareil-Nico		F
Kochi		F ////////////////////////////////////
2-19E		F ////////////////////////////////////
	February 2009	March 2009
10 11 12 13 14	15 16 17 18 19 20 21 22 23 24 25 26 27 2	8 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Sweetheart	<u>/////////////////////////////////////</u>	
Marcona	F	
Nopareil-3-8-2-70	F ///	
Nopareil-5	F ///	
Nonpareil-7	F ///	
Nonpareil-Driver	F //	
Nonpareil-Jones	F ///	
Nopareil-Newell	F ///	
Nonpareil-6		
Nonpareil-Nico		
Kahl		
Winters		
Cnips		
Kochi		
2 10E		

Table 1. Bloom data for the McFarland Trial for the 2008 and 2009 season. Crosshatched area indicates period from onset of bloom to 100% petal fall.

Table 2. Hullrot strikes per tree for the 2009 season at the McFarland trial. Letters indicate significant difference at the 5% level of significance

2000 Han for Suffice, a cc			
Kochi	122	b	
Sweetheart	18	а	
Marcona	18	а	
Winters	16	а	
2-19E	11	а	
Chips	8	а	
Nonpareil-Newell	5	а	
Nonpareil-5	5	а	
Nonpareil-7	4	а	
Nonpareil-J	4	а	
Nonpareil-DR	4	а	
Nonpareil 3-8-2-70	3	а	
Nonpareil-Nico	2	а	
Nonpareil-6	1	а	
Kahl	1	а	

2009 Hull rot strikes/tree

Table 3. Yield, number of nuts, average kernel weight, shelling percentage and kernel pound per acre yield for the 2006 through 2009 seasons. Data for each year is sorted by cumulative yield.

2006						Cumulative
			Shelling	Kernel po	ounds per	kernel
Variety	No. of nuts/tree	Average kernel wt (g)	percentage	Tree	Acre	lbs/acre
2-19e	6852 a	0.94 g	53.0 d	14.2 a	1718 a	1718 a
Winters	6648 a	0.87 h	53.4 d	12.7 a	1540 a	1540 a
Marcona	3611 bcd	1.31 a	<u>30.7</u> f	10.4 b	1258 b	1258 b
Nonpareil-Ni	4246 b	1.U9 cde	67.2 a	10.2 b	1232 bc	1232 bc
Nonpareil-5	3/13 bcd	1.12 bcd	67.9 a	9.1 bcd	1110 bcd	1110 bcd
Nonpareil-D	3867 bc	1.U7 det	b3.4 abc	9.1 bcd	1103 bcd	1103 bcd
Nonpareil-3-8-2-70	3848 bc	1.U/ cde	64.6 ab	9.1 bcd	1101 bcd	1101 bcd
Nonpareil-Ne	3815 bc	1.07 cde	67.7 a	9.0 bcd	1086 bcd	1086 bcd
Nonpareil-6	3886 bcd	1.12 bc	67.Ua	8.9 bcd	10/5 bcd	10/5 bcd
Nonpareil-J	3717 bcd	1.08 cde	64.0 abc	8.8 bcd	1066 bcd	1066 bcd
Chips	3623 bcd	1.02 f	53.8 d	8.1 bcde	985 bode	985 bcde
Kochi	3134 cd	1.16 b	59.9 c	8.0 cdet	965 cdet	965 cdet
Nonpareil-/	3288 bcd	1.08 cde	65.1 a	7.8 det	940 det	940 det
Kahl	3139 cd	1.06 ef	47.8 e	7.3 def	889 def	889 def
Sweetheart	2777 d	0.95 g	67.8 a	5.8 f	588 f	588 f
2007						Cumulative
			Shelling	Kernelpo	ounds per	kernel
Variety	No. of nuts/tree	Average kernel wt (g)	percentage	Tree	Acre	lbs/acre
2-19e	13149 a	0.78 e	54.3 d	22.8 a	2756 a	4474 a
Winters	11972 ab	0.83 de	60.2 b	21.8 ab	2634 ab	4173 a
Nonpareil-Newell	10659 bc	0.90 bc	67.3 a	20.9 abc	2536 abc	3626 b
Nonpareil-Nico	9260 cde	0.92 bc	66.0 a	18.8 abcde	2279 abcde	3511 b
Nonpareil-Driver	9793 cd	0.91 bc	65.6 a	19.6 abcd	2370 abcd	3474 b
Nonpareil-3-8-2-70	9340 cde	0.92 bc	66.3 a	18.9 abcde	2291 abcde	3393 b
Nonpareil-5	8905 cdef	0.95 b	67.0 a	18.6 abcde	2251 bcde	3323 bc
Marcona	6938 fg	1.08 a	29.8 f	16.5 defg	1995 defg	3252 bcd
Kahl	9594 cd	0.91 bc	47.6 e	19.3 abcd	2332 abcd	3222 bcd
Nonpareil-J	9137 cde	0.89 bcd	65.5 a	17.8 bcde	2152 bcdef	3218 bcd
Nonpareil-6	8396 def	0.94 b	67.1 a	17.4 def	2103 def	3178 bcd
Nonpareil-7	9517 cd	0.92 bc	67.9 a	19.3 abcd	2332 abcd	3140 bcd
Chips	7681 defg	0.87 cd	54.4 d	14.7 efg	1780 efg	2766 bcd
Kochi	6006 g	1.08 a	59.4 bc	14.3 fg	1729 fg	2694 de
Sweetheart	6767 fg	0.89 bcd	66.6 a	13.1 g	1588 g	2165 е
0000						
2008						Cumulative
2008			Shelling	Kernel po	ounds per	Cumulative kernel
2008 Variety	No. of nuts/tree	Average kernel wt (g)	Shelling percentage	Kernel po Tree	ounds per Acre	Cumulative kernel Ibs/acre
2008 Variety 2-19e	No. of nuts/tree	Average kernel wt (g) 0.93 g	Shelling percentage 54.3 d	Kernel po Tree 27.5 cd	ounds per Acre 3321 cd	Cumulative kernel Ibs/acre 7795 a
2008 Variety 2-19e Nonpareil-Nico	No. of nuts/tree 13472 a 13879 a	Average kernel wt (g) 0.93 g 1.10 cd	Shelling percentage 54.3 d 66.0 a	Kernel po Tree 27.5 cd 33.5 a	oundsper Acre 3321 cd 4056 a	Cumulative kernel Ibs/acre 7795 a 7567 ab
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell	No. of nuts/tree 13472 a 13879 a 11916 bcd	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de	Shelling percentage 54.3 d 66.0 a 67.3 a	Kernel po Tree 27.5 cd 33.5 a 28.6 cd	Acre 3321 cd 4056 a 3456 cd	Cumulative kernel Ibs/acre 7795 a 7567 ab 7110 bc
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 66.3 a	Kernel po Tree 27.5 cd 33.5 a 28.6 cd 30.7 b	Acre 3321 cd 4056 a 3456 cd 3714 b	Cumulative kernel Ibs/acre 7795 a 7567 ab 7110 bc 7106 bc
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-Joriver	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a	Kernel po Tree 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de	Shelling percentage 54.3 d 66.0 a a 67.3 a a 66.3 a a 65.6 a a 67.0 a a	Kernel po Tree 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 30.5 b	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b	Cumulative kernel 1bs/acre 7795 a 7567 ab 7100 bc 7106 bc 7085 bc 7001 bc
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-Driver Nonpareil-5 Winters	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.02 de	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.0 a 67.0 a	Kernel production 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 21.4 cb	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg	Cumulative kernel Ibs/acre 7795 a 7567 ab 7106 bc 7106 bc 7086 bc 7086 bc 7001 bc 6843 c
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 40707 c	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.02 de 1.06 de	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.2 b 67.4 b 67.5 a	Kernel po Tree 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.5	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab	Cumulative kernel Ibs/acre 7795 a 7567 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-6 Nonpareil-1	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 44974 /	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.06 de 1.16 c	Shelling percentage 54.3 d 66.0 a a 67.3 a a 65.6 a a 67.0 a a 67.9 a a 67.1 a a	Kernel pc 27.5 cd 33.5 a 28.6 29.8 bc 30.5 b 29.8 20.5 b 22.1 31.1 ab 27.3 27.3 cd	Acre 3321 cd 4056 a 3456 cd 3611 bc 3622 b 2670 fg 3763 ab 3300 cd	Cumulative kernel 1bs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c 64478 cd
2008 Variety 2-19e Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-4	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 40772 d	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.08 de 1.02 1.06 1.16 c 1.17 cd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 60.2 b 67.9 a 67.1 a 65.5 a 47.0 a	Kernel po 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 27.3 cd 26.6 de 20.6 fd	Acre 3321 cd 4056 a 3456 cd 3714 b 3692 b 2670 fg 3763 ab 3300 cd 3224 de 3723 cf	Cumulative kernel 1bs/acre 7795 a 7567 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-5 Nonpareil-6 Nonpareil-6 Nonpareil-J Kahl Chine	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.08 de 1.08 de 1.09 de 1.08 de 1.09 cd 1.09 cd 1.06 de 1.16 c 1.09 cde 0.96 fg 0.96 fg	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.9 a 67.1 a 65.5 a 47.6 e	Kernel pc 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.6 cf	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 c	Cumulative kernel 1bs/acre 7795 a 7567 ab 7110 bc 7106 bc 7085 bc 7001 bc 6802 c 6478 cd 6442 cd 5954 de 5954 de
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-5 Nonpareil-6 Nonpareil-6 Nonpareil-1 Kahl Chips	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.02	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.2 b 67.3 a 65.5 a 67.1 a 65.5 a 47.6 e 54.4 d 66.5 a	Kernel pc 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2952 -f	Cumulative kernel Ibs/acre 7795 a 7567 ab 7100 bc 7065 bc 7001 bc 6843 c 6822 c 6478 cd 6442 cd 5954 de 5722 e
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-Driver Nonpareil-5 Winters Nonpareil-7 Nonpareil-6 Nonpareil-J Kahl Chips Sweetheart Moreaec	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 de 11071 de 11072 de 11465 cd 13149 ab 4701 f	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.16 c 1.09 cde 0.93 g	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.9 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a	Kernel program 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 ef	Acre 3321 cd 4056 a 3456 cd 3611 bc 3611 bc 3672 b 2670 fg 3300 cd 3224 de 2956 ef 2893 ef 17.4 cf	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6842 c 6442 cd 5954 de 5722 e 5059 f 5059 f
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-6 Nonpareil-J Kahl Chips Sweetheart Marcona	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 1283 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11405 cd 13149 ab 4721 f	Average kernel wt (g) 0.93 g 1.09 cd 1.09 de 1.17 cd 1.08 de 1.02 1.06 1.09 cde 1.16 c 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.0 a 67.0 a 67.0 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f	Kernel program 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h	Acre 3321 cd 4056 a 34566 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6842 cd 6954 de 5954 de 5059 f 5001 f 5002 f
2008 Variety 2-19e Nonpareil-Nicco Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-6 Nonpareil-J Kahl Chips Sweetheart Marcona Kochi	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11071 d 11465 cd 13149 ab 4721 f 5882 f	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.08 de 1.09 de 1.01 cd 1.02 de 1.06 de 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.2 b 67.9 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc	Kernel po 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h	Acre 3321 cd 4056 a 34456 cd 3611 bc 3692 b 2670 fg 3763 ab 3300 3224 de 2733 fg 29656 ef 2893 ef 1748 h 2002 h	Cumulative kernel 1bs/acre 7795 a 7567 ab 7110 bc 7106 bc 7085 bc 7001 bc 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-Oriver Nonpareil-5 Winters Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-J Kahl Chips Sweetheart Marcona Kochi	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.08 de 1.08 de 1.09 cd 1.08 de 1.09 cde 1.06 de 1.16 c 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.0 a 67.1 a 67.5 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc	Kernel po 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3700 cd 3224 de 2733 fg 2893 ef 2893 ef 1748 h 2002 h	Cumulative kernel Ibs/acre 7795 a 7567 ab 7110 bc 7106 bc 7085 bc 7001 bc 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-1 Kahl Chips Sweetheart Marcona Kochi 2009	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 110717 de 11071 de 11071 de 110720 de 11465 cd 13149 ab 4721 f 5882 f	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.06 de 1.16 c 1.09 cde 1.18 g 1.09 cde 1.18 g 1.19 cde 1.16 c 1.39 rg 1.39 a 1.28 b	Shelling percentage 54.3 d 66.0 a a 67.3 a a 65.6 a a 67.0 a a 67.9 a 67.1 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc	Kernel pr 27.5 cd 33.5 a 28.6 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 27.3 cd 26.6 de 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h	Acre 3321 cd 4056 a 3456 cd 3611 bc 3611 bc 3672 b 2670 fg 3700 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c 6478 cd 65564 de 5722 e 5059 f 5001 f 4996 f Cumulative
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-6 Nonpareil-4 Nonpareil-5 Sweetheart Marcona Kochi 2009	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 1283 ab 9872 e 13250 ab 10707 de 11071 d 10770 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f	Average kernel wt (g) 0.93 g 1.09 de 1.09 de 1.07 de 1.08 de 1.02 1.06 1.09 cde 1.06 de 1.09 cde 0.96 fg 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.0 a b 67.9 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.8 fg 24.4 ef 23.9 ef 14.4 h 16.5 h	Acre 3321 cd 4056 a 34566 cd 3714 b 3611 bc 3672 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 5954 d 5722 e 5059 f 5001 f 4996 f Cumulative kernel
2008 Variety 2-19e Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-5 Sweetheart Marcona Kochi 2009 Variety	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.08 de 1.09 de 1.017 cd 1.06 de 1.08 de 1.09 cde 1.06 de 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.0 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage	Kernel po 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel po Kernel po	Acre 3321 cd 4056 a 34456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 1748 h 2002 h winds per Acre	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6802 c 6802 c 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-Oriver Nonpareil-Oriver Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-7 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cd 1.09 s 9 1.39 1.39 a 1.28 b 2 2 1.05 bcd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.1 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab	Kernel po 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel po Tree 32.9 a	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2893 ef 1748 h 2002 h winds per Acre 3977 a	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7001 bc 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11417 a
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-2-70 Nonpareil-Oriver Nonpareil-S Winters Nonpareil-S Nonpareil-S Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Nico	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cde 1.06 de 1.16 c 0.936 fg 0.97 fg 0.82 g 1.39 a 1.28 b 4.28 b 1.05 bcd	Shelling percentage 54.3 d 66.0 a 66.3 a 65.6 a 67.0 a 60.2 b 67.9 a 67.1 a a 65.5 a 47.6 47.6 e 54.4 d 66.6 a 29.8 29.5 bc 9.5 bc 9.5 bc 74.8 ab 74.8 ab	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h 16.5 h Kernel pc Tree 32.9 a 33.1 a	Acre 3321 cd 4056 a 3456 cd 3611 bc 3611 bc 3672 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h winds per a 3977 a 4004 a	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6842 c 6842 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-J Winters Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-4 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Newell 2-19e	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cd 1.09 cde 1.06 de 1.09 cde 1.16 c 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 1.03 bcd 0.84 f	Shelling percentage 54.3 d 66.0 a 66.3 a 65.6 a 67.9 a 67.9 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 c	Acre 3321 cd 4056 a 3456 cd 3456 cd 3456 cd 3611 bc 3632 b 3611 bc 3632 b 3632 b 3632 b 3703 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h ounds per Acre 3977 a 4004 a 3285 c	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7005 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11417 a 11145 ab
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-7 Nonpareil-1 Z009 Variety Nonpareil-Newell 2-19e Nonpareil-Driver	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13280 ab 10707 de 11071 d 10707 de 11071 d 10707 de 1149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13856 ab	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.07 de 1.08 de 1.02 1.06 1.09 cde 1.06 de 1.07 de 1.08 de 1.09 cde 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 1.03 bcd 0.84 f 1.08 ab	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.0 a 67.1 a 67.5 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f 75.8 a	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 c 32.9 a 33.1 a	Acre 3321 cd 4056 a 3456 cd 3714 b 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 1748 h 2002 h 2002 h counds per Acre 3977 a 4004 a 3285 c 3977 a	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6842 cd 6442 cd 6442 cd 6442 cd 6554 de 5722 e 5059 f 5001 f 4996 f 5001 f 4996 f Cumulative kernel Ibs/acre 11417 a 11145 ab 11060 ab
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-Oriver Nonpareil-Oriver Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-7 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-Oriver Nonpareil-3-8-2-70	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 110707 de 110720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13856 ab 13756 ab	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 de 1.07 de 1.08 de 1.09 cd 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b 0.95 bcd 1.03 bcd 0.84 f 1.08 ab 1.04 bcd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 67.0 a 67.1 a 67.1 a a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc 97.4 ab 65.6 f 74.8 ab 65.6 f 74.8 ab 74.6 ab	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 27.1 c 32.9 a 31.4 ab	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3670 fg 3700 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h ounds per Acre 3977 a 3285 c 3977 a 3798 ab	Cumulative kernel lbs/acre 7795 a 7667 ab 7110 bc 7006 bc 7006 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel lbs/acre 11147 a 11145 ab 11080 ab
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-2-70 Nonpareil-S Winters Nonpareil-S Winters Nonpareil-7 Nonpareil-3 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-S-2-70 Nonpareil-5	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13766 ab 13766 ab 12070 bcd	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cde 1.16 c 0.93 fg 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b 1.05 bcd 1.03 bcd 1.04 bcd 1.05 bcd 1.03 bcd 0.84 f 1.08 ab 1.04 bcd	Shelling percentage 54.3 d 66.0 a 66.3 a 65.6 a 67.0 a 67.1 a 67.1 a 65.5 67.1 a 65.6 74.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 74.8 ab 65.6 f 75.8 a 74.6 ab	Kernel prime 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pr Tree 32.9 a 33.1 a 27.1 c 32.9 a 33.1.4 ab 28.7 bc	Acre 3321 cd 3321 cd 3321 cd 3321 cd 3456 cd 3456 cd 3456 cd 3714 b 3611 bc 3670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h winds per - Acre - 3977 a 4004 a 3285 c 39778 ab 3476 bc	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7085 bc 7086 bc 7087 ab 6842 cd 6478 cd 6472 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab 11080 ab 11062 ab 10905 abc 10494 bcd
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-S Winters Nonpareil-7 Nonpareil-7 Nonpareil-3 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Newell 2-19e Nonpareil-Newell 2-19e Nonpareil-S-70 Nonpareil-5 Nonpareil-5	No. of nuts/tree 13472 a 13879 a 11916 bcd 12606 bcd 12729 abc 1283 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13866 ab 13756 ab 13051 ab	Average kernel wt (g) 0.93 g 1.09 cd 1.09 de 1.07 de 1.08 de 1.09 cd 1.09 cd 1.09 cd 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 1.05 bcd 1.03 bcd 1.04 bcd 1.08 ab 1.08 ab	Shelling percentage 54.3 d 66.0 a 67.3 a 65.6 a 67.0 a 67.0 a 67.0 a 67.1 a 67.1 a 67.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f 75.8 a 74.6 ab 74.2 ab 72.6 abc	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.8 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 c 32.9 a 31.4 ab 28.7 bc 29.5 bc	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3672 b 3673 ab 3300 cd 3224 de 27763 ab 3300 cd 3224 de 27956 ef 2893 ef 1748 h 2002 h 9977 a 3977 a 30285 c 39777 a 3285 c 3977 a 3285 c 3977 a 37978 ab 3476 bc 3571 bc	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6802 c 6478 cd 6478 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab 11080 ab 11082 ab 10905 abc 10393 bcd
2008 Variety 2-19e Nonpareil-Newell Nonpareil-Newell Nonpareil-3-8-2-70 Nonpareil-5 Winters Nonpareil-7 Nonpareil-7 Nonpareil-6 Nonpareil-7 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Newell 2-19e Nonpareil-1-Newell 2-19e Nonpareil-5 Nonpareil-7 Nonpareil-7 Nonpareil-7	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13280 ab 10707 de 11071 d 10707 de 11071 d 10720 de 11495 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13856 ab 13766 ab 13766 ab 13051 ab	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.07 de 1.08 de 1.02 1.06 1.09 cde 1.06 de 1.16 c 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 1.03 bcd 1.04 bcd 1.08 ab 1.04 bcd 1.08 ab 1.03 bcd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 60.2 b 67.9 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f 75.8 a 74.6 ab 74.2 ab	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 27.3 cd Stress and	Acre 3321 cd 4056 a 3456 cd 3714 b 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 1748 h 2002 h 2002 ch 4004 a 3285 c 3977 a 4004 a 3285 c 3977 a 3798 ab 3476 bc 3571 bc 3661 abc	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7001 bc 6843 c 6842 cd 6954 de 5954 de 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab 11080 ab 11080 ab 11080 ab 10393 bcd 1039 cd
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-Oriver Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-7 Nonpareil-Nico Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-Oriver Nonpareil-5 Nonpareil-5 Nonpareil-7 Nonpareil-6 Nonpareil-7	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 110707 de 110720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13856 ab 13756 ab 13051 ab 13805 ab 12803 abc	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cd 1.08 de 1.09 cd 1.09 de 1.07 de 1.08 de 1.09 cde 1.09 cde 1.09 cde 1.09 cde 0.90 fg 0.97 fg 0.82 g 1.39 a 1.28 b 0 bcd 1.03 bcd 1.04 bcd 1.03 bcd 1.04 bcd	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.1 a 67.1 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 74.8 ab 65.6 f 75.8 a 74.6 ab 74.2 ab 72.6 abc 71.2 cd 71.6 bcd	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 c 32.9 a 31.4 ab 28.7 bc 29.5 bc 30.3 abc 29.0 bc	Acre 3321 cd 4056 a 3456 cd 3714 b 3611 bc 3612 b 2670 fg 3733 ab 3300 cd 224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h 9002 cd 977 a 3977 a 3078 ab 3476 bc 3571 bc 3611 abc	Cumulative kernel lbs/acre 7795 a 7567 ab 7110 bc 7106 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel lbs/acre 11417 a 11145 ab 11080 ab 11080 ab 10905 abc
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-2-70 Nonpareil-Driver Nonpareil-S Winters Nonpareil-7 Nonpareil-3 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-3-8-2-70 Nonpareil-3 Nonpareil-3 Nonpareil-5 Nonpareil-6 Nonpareil-6	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13756 ab 12070 bcd 13051 ab 13505 ab 12803 abc 9434 ef	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cde 1.06 de 1.16 c 0.93 fg 0.97 fg 0.82 g 1.39 a 1.28 b 1.05 bcd 1.03 bcd 1.04 bcd 1.05 bcd 1.03 bcd 1.04 bcd 1.03 bcd 1.04 bcd 1.05 bcd	Shelling percentage 54.3 d 66.0 a 66.3 a 65.6 a 67.0 a 67.1 a 67.1 a a 65.5 a 47.6 47.6 e 54.4 d 66.6 a 29.8 29.8 f 59.5 bc Shelling percentage 74.7 ab 74.8 ab 65.6 f 75.8 a 74.2 74.6 ab 74.2 74.6 ab 74.2 74.6 ab 74.2	Kernel prime 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pr Tree 32.9 a 33.1 a 27.1 c 32.9 a 33.1 a 27.1 c 32.9 a 31.4 ab 28.7 bc 29.5 bc 30.3 abc 29.0 bc 20.0 bc	Acre 3321 cd 3321 cd 3321 cd 3321 cd 3321 cd 3456 cd 3456 cd 3714 b 3611 bc 3611 bc 3612 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h ounds per h 977 a 4004 a 3285 c 39778 ab 3476 bc 3571 bc 3661 abc 3513 bc 3613 bc	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7085 bc 7086 bc 7087 ab 7106 bc 7085 bc 6843 c 6802 c 6478 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab 11080 ab 11062 ab 10393 bcd 10393 bcd 99555 de 9258 ef
2008 Variety 2-19e Nonpareii-Newell Nonpareii-Newell Nonpareii-S-8-2-70 Nonpareii-Driver Nonpareii-S Winters Nonpareii-7 Nonpareii-7 Nonpareii-3 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareii-Newell 2-19e Nonpareii-Newell 2-19e Nonpareii-Driver Nonpareii-5 Nonpareii-3	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 1283 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13866 ab 13756 ab 13051 ab 13505 ab 12070 bcd 13051 ab 13505 ab 12803 abc 9434 ef 11035 cde	Average kernel wt (g) 0.93 g 1.09 cd 1.09 de 1.07 de 1.08 de 1.09 cd 1.06 de 1.07 de 1.08 de 1.09 cde 1.16 c 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 1.03 bcd 1.04 bcd 1.05 bcd 1.08 ab 1.08 ab 1.03 bcd 1.04 bcd 1.02 bcd 0.96 bcde	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.0 a 67.0 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f 75.8 a 74.6 ab 72.6 abc 71.2 cd 71.4 bcd 61.6 g 59.1 g	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 22.8 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Kernel pc Tree 32.9 a 33.1 a 27.1 c 32.9 a 31.4 ab 28.7 bc 30.3 abc 29.0 bc 30.3 abc 29.0 bc 20.0 e 21.1 de	Acre 3321 cd 3321 cd 3321 cd 3321 cd 3321 cd 3456 cd 3456 cd 3714 b 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2736 ef 2893 ef 1748 h 2002 h 0002 h 0004 a 3285 c 3977 a 30977 a 3798 ab 3476 bc 3571 bc 3661 abc 3513 bc 2415 e 2559 de	Cumulative kernel Ibs/acre 7795 a 7667 ab 7110 bc 7106 bc 7085 bc 7095 a 6802 c 6478 cd 6478 cd 6478 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel Ibs/acre 11145 ab 11080 ab 11082 ab 10905 abc 10439 cd 9955 de 9258 ef 8513 fg
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-Newell Nonpareil-Oriver Nonpareil-5 Winters Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-7 Nonpareil-Nico Nonpareil-Nico Nonpareil-Nico Nonpareil-10river Nonpareil-3-8-2-70 Nonpareil-5 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-5 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-5 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-5 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-5 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-7	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13856 ab 13756 ab 13756 ab 13651 ab 13505 ab 12803 abc 9434 ef 11035 cde 9771 ef	Average kernel wt (g) 0.93 g 1.00 cd 1.09 de 1.07 de 1.08 de 1.09 cd 1.07 de 1.08 de 1.09 cde 1.06 de 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b Verage kernel wt (g) 1.05 bcd 1.03 bcd 1.03 bcd 1.04 bcd 1.08 ab 1.03 bcd 1.04 bcd 1.05 bcd 1.04 bcd 0.96 bcde 0.97 ef	Shelling percentage 54.3 d 66.0 a 67.3 a 66.3 a 65.6 a 67.0 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc Shelling percentage 74.7 ab 65.6 f 74.8 ab 65.6 f 74.6 ab 74.6 ab 74.2 ab 74.6 ab 71.2 cd 71.6 bcd 61.6 g 95.9 1 95.8 g	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h Cree 32.9.a 33.1 a 27.1 c 32.9 a 31.4 ab 28.7 bc 30.3 abc 29.0 29.0 bc 20.0 e 21.1 de 20.0 e	Acre 3321 cd 4056 a 3456 cd 3611 bc 3692 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 1748 h 2002 h 2002 ch 4004 a 3285 c 3977 a 4004 a a 3285 c 3977 a 3285 c 3977 a 3285 c 3977 a 3285 c 3573 bc 3561 abc 3513 bc 2415 e 2559 de 2422 e	Cumulative kernel lbs/acre 7795 a 7567 ab 7110 bc 7106 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel lbs/acre 11417 a 11145 ab 11062 ab 11062 ab 11062 ab 11095 bc 10494 bcd 1039 bcd 10139 cd 9955 de 9258 ef 8513 fg 8144 gh
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-Driver Nonpareil-5 Winters Nonpareil-7 Nonpareil-6 Nonpareil-J Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-Driver Nonpareil-5 Nonpareil-5 Nonpareil-5 Nonpareil-6 Nonpareil-6 Nonpareil-7 Nonpareil-6 Nonpareil-4 Nonpareil-5 Nonpareil-5 Nonpareil-7 Nonpareil-5 Nonpareil-7 Nonpareil-5 Nonpareil-5 Nonpareil-5 Nonpareil-7 Nonpareil-5 Nonpareil-7 Nonpareil-5 Nonpareil-7	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 110707 de 11071 de 10720 de 11465 cd 13149 ab 4721 f 5882 f 0 No. of nuts/tree 13773 ab 14513 a 14706 a 13866 ab 13756 ab 132070 bcd 13051 ab 13205 ab 12803 abc 9434 ef 11035 cde 9771 ef 12798 abc	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cd 1.08 de 1.09 cde 1.16 c 0.906 fg 0.97 fg 0.82 g 1.39 a 1.28 b 0 b 0.95 bcd 1.03 bcd 1.04 bcd 1.03 bcd 1.04 bcd 1.05 bcd 1.04 bcd 0.96 bcd	Shelling percentage 54.3 d 66.0 a 67.3 a 65.6 a 67.0 a 67.1 a 65.5 a 47.6 e 54.4 d 66.6 a 29.8 f 59.5 bc 95.5 bc 974.8 ab 65.6 f 75.8 a 74.7 ab 74.8 ab 72.6 abc 71.2 cd 71.6 bcd 61.6 g 59.1 g 58.6 g 73.3 abc	Kernel pc 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 de 26.6 de 22.6 fg 24.4 ef 23.9 ef 14.4 h h 6.5 29.9 a 33.1 a 27.1 c 32.9 a 33.1 a 27.1 c 32.9 a 33.1 a 27.7 bc 32.9 a 33.1 a 27.7 cd bc 32.9 a 33.1 a 27.7 bc 32.9 a 31.4 ab 28.7 29.5 bc 30.3 abc 29.0 bc 29.0 bc 20.0 e 21.1 de 20.0 e 21.1 de 20.0 e 24.0 d	Acre 3321 cd 3321 cd 3321 cd 3321 cd 3456 cd 3456 cd 3714 b 3611 bc 3611 bc 3612 b 2670 fg 3763 ab 3300 cd 224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h omds per	Cumulative kernel lbs/acre 7795 a 7567 ab 7110 bc 7006 bc 7005 bc 7001 bc 6843 c 6802 c 6478 cd 6442 cd 5954 de 5722 e 5059 f 5001 f 4996 f Cumulative kernel lbs/acre 11417 a 11145 ab 11060 ab 11062 ab 10905 abc 10494 bcd 10393 bcd 10393 bcd 10395 de 9258 ef 8513 fg 81144 gh
2008 Variety 2-19e Nonpareil-Nico Nonpareil-Newell Nonpareil-S-8-2-70 Nonpareil-S-8-2-70 Nonpareil-S- Winters Nonpareil-7 Nonpareil-3 Kahl Chips Sweetheart Marcona Kochi 2009 Variety Nonpareil-Nico Nonpareil-Newell 2-19e Nonpareil-S-82-70 Nonpareil-3-8-2-70 Nonpareil-3-8-2-70 Nonpareil-3-8-2-70 Nonpareil-3-8-2-70 Nonpareil-3-8-2-70 Nonpareil-5 Nonpareil-6 Nonpareil-6 Nonpareil-5 Sweetheart Kahl Chips Sweetheart Marcona	No. of nuts/tree 13472 a 13879 a 11916 bcd 12506 bcd 12729 abc 12883 ab 9872 e 13250 ab 10707 de 11071 d 10720 de 11465 cd 13149 ab 4721 f 5882 f No. of nuts/tree 13773 ab 14513 a 14706 a 13766 ab 13766 ab 13766 ab 13756 ab 12070 bcd 13051 ab 13605 ab 12803 abc 9434 ef 11035 cde 9771 ef 12798 abc 8977 fg	Average kernel wt (g) 0.93 g 1.10 cd 1.09 de 1.17 cd 1.07 de 1.08 de 1.09 cd 1.08 de 1.09 cde 1.06 de 1.07 de 1.08 de 1.09 cde 0.96 fg 0.97 fg 0.82 g 1.39 a 1.28 b 1.05 bcd 1.03 bcd 1.04 bcd 1.03 bcd 1.04 bcd 1.03 bcd 1.04 bcd 0.96 bcd 1.03 bcd 1.04 bcd 0.96 bcd 0.96 bcd	Shelling percentage 54.3 d 66.0 a 66.3 a 65.6 a 67.0 a 67.1 a 67.1 a a 65.5 a 47.6 47.6 e 54.4 d 66.6 a 29.8 29.5 bc 95.5 bc 95.5 bc 97.4.8 ab 65.6 f 75.8 a 74.6 ab 74.2 ab 74.2 ab 72.6 abc 71.2 71.6 bcd 61.6 g 99.1 g 58.6 g 73.3 abc 32.5	Kernel pr 27.5 cd 33.5 a 28.6 cd 30.7 b 29.8 bc 30.7 b 29.8 bc 30.5 b 29.8 bc 30.5 b 22.1 fg 31.1 ab 27.3 cd 26.6 22.6 fg 24.4 ef 23.9 ef 14.4 h 16.5 h - - Kernel pr Tree 32.9 a 33.1 a - 27.1 c - - 32.9 a 31.4 ab - - 29.5 bc - - 29.5 bc - - 20.0 bc - - 20.0 bc - - 20.0 bc - - 20.0 c - - 20.0	Acre 3321 cd 3321 cd 3321 cd 3321 cd 3456 cd 3456 cd 3611 bc 3611 bc 3611 bc 3612 b 2670 fg 3763 ab 3300 cd 3224 de 2733 fg 2956 ef 2893 ef 1748 h 2002 h winds per - Acre - 3977 <a< td=""> - 4004<a< td=""> - 3285 c 3977 a - 30476 bc 3571 bc 3613 bc 3571 bc 3613 bc 3513 bc 2415 e 2906 d</a<></a<>	Cumulative kernel lbs/acre 7795 a 7667 ab 7110 bc 7006 bc 7006 bc 7008 bc 6843 c 6802 c 6478 cd 6442 cd 6442 cd 65954 de 5722 e 5059 f 5001 f 4996 f 5055 f 6001 f 4996 f Cumulative kernel lbs/acre 11417 a 11145 ab 11080 ab 11062 ab 11080 ab 11062 ab 110393 bcd 10393 bcd 10395 de 9258 ef 8513 fg 81444 gh 7965 gh

Table 4. Midday canopy light interception, yield and yield per unit light intercepted by variety for 2009. Letters indicate significant difference at the 5% level of significance

Variety	Midday canopy PAR interception (%)	Yield (kernel pounds/acre)	Yield per unit PAR intercepted
Nonpareil-J	57.1 a	3512.8 bc	63.4 cd
Nonpareil- 38270	54.1 a	3798.5 a	71.8 bc
Nonpareil- Newell	53.9 a	4004.2 a	72.8 abc
Nonpareil- Nico	53.3 a	3850.7 a	69.3 bc
Nonpareil- 6	52.9 a	3660.6 bc	68.9 bc
Nonpareil- 5	52.5 a	3476.2 bc	72.0 bc
Nonpareil- DR	51.5 a	3976.6 a	76.1 abc
Sweetheart	50.7 a	2906.4 d	69.6 bc
Selection 2-19E	45.7 bc	3284.8 c	71.6 bc
Chips	44.0 c	2558.7 de	55.9 d
Kochi	43.5 c	2259.0 e	52.6 d
Winters	35.9 d	2415.1 e	63.9 cd
Kahl	33.4 d	2558.7 de	85.2 a
Marcona	33.0 d	2561.9 de	77.7 ab



Figure 1. Average yield for all varieties, selections and Nonpareil sources by orchard age for 1993 regional variety trials as well as the McFarland variety trial that was planted in 2004.