Annual Southern California Strawberry Field Day

U.C. South Coast R.E.C.
7601 Irvine Blvd., Irvine

March 13, 2007

Kirk Larson, Pomologist and CE Specialist
(kdlarson@ucdavis.edu)

Douglas Shaw, Professor and Geneticist

U.C. Davis Dept. of Plant Sciences

Performance of summer-planted day-neutral selection C224 at the University of California South Coast Research and Extension Center, Irvine in 2005-2006

Kirk D. Larson, Pomologist/Specialist, South Coast R.E.C., Irvine, CA
Douglas V. Shaw, Professor, Plant Sciences Department, Univ. of California, Davis, CA

Highlights: In two years of field trials in Irvine, summer plantings (using cold-stored plants) of day-neutral selection C224 have produced high yields of quality fruit with excellent flavor and good firmness from September-December.

Puntos claves: La selección avanzada C224, de tipo de floración día neutral, se ha comportada muy bien en plantaciones de verano (usando plantas congeladas) en ensayos experimentales en Irvine durante los últimos dos años. Con plantación de verano, esta selección produce fruta de alta calidad en el periodo septiembre - diciembre, con sabor excelente, buena firmeza, buen color interno y externo, y buena calidad poscosecha. La planta de C224 es vigorosa y muy productiva; es resistente a *Phytophthora cactorum* pero moderadamente sensible a *Verticillium dahliae*, *Colletotrichum acutatum*, and *Sphaerotheca macularis*.

The day-neutral selection designated C224 (previously, Cal. 1.206-5) has performed well in summer plantings in Irvine in 2005 and 2006, producing high yields of high-quality fruit during the fall (September-December) fruiting season (Table 1). In both trial years, experimental plant material was propagated at a low elevation nursery near Winters, CA, and cold-stored plants were planted on June 28. In 2005, we also established a planting on July 20, which also produced high yields with excellent fruit quality (Table 2). For all trials, we used white-on-black, full-bed mulch and fruit was harvested 2x-weekly from September through December.

Yield of C224 was nearly 6-fold greater than that of Albion, with larger fruit size and better fruit appearance, and with comparable fruit firmness and a low cull rate (Table 1). Fruit of summer-planted C224 is medium-large and round/long conic in shape, although some fruit may be flat-conic or wedge-shaped. Achenes are slightly recessed, resulting in a smooth and shiny fruit surface. The fruit has a relatively small cavity, with light red external and internal color tending to reddish-orange in late-season. Subjectively, fruit flavor is excellent and fruit texture is very pleasing.

Cold-stored plants of summer-planted C224 are vigorous and large in size. Plants of C224 are resistant to *Phytophthora cactorum* but moderately susceptible to *Verticillium dahliae* and *Colletotrichum acutatum.* Leaves and fruit are moderately susceptible to powdery mildew (*Sphaerotheca macularis*)..

Oxnard is the main region in which day-neutral cultivars are summer-planted for fall fruit production, and ambient summer temperatures in Oxnard are typically 10° F cooler than Irvine. In 2007, experimental plantings of C224 will be established using a range of planting dates in both Oxnard and Irvine to determine the effect of planting date and production environment on productivity, production pattern and fruit quality.

Performance of short-day cultivar Palomar at the South Coast R.E.C. (Irvine), Santa Maria, and Watsonville Strawberry Research Facility in 2004-2006

Douglas V. Shaw, Professor, Plant Sciences Department, University of California, Davis, CA
Kirk D. Larson, Pomologist, South Coast Research and Extension Center, Irvine, CA
Daren Gee, DB Specialties Farms, Santa Maria

Highlights: the new short-day cultivar Palomar shows exceptional promise in field evaluations throughout California.

Puntos claves: La nueva variedad de tipo floración día corto Palomar se ha comportada muy bien en ensayos de campo a través el estado durante los últimos dos años. Esta selección produce fruta de alta calidad, con sabor excelente, buena firmeza, buen color interno y externo, y excelente calidad poscosecha. Es muy productiva en toda región. Plantada el 1° de octubre en el sur de California, Palomar es mucho más precoz que Ventana. La planta de Palomar es pequeña, característica que facilita la cosecha de fruta, pero es sensible a *Phytophthora cactorum* y cáliz seca. La Universidad de California ha entregado esta variedad a viveros Californianos para propagación comercial en primavera del 2007.

The short-day cultivar Palomar (previously, C221 and Cal. 00.259-2) has performed well in trials conducted in the three major production regions of California during the past two years and is scheduled for release to California nurseries for commercial propagation in spring of 2007.

For all trials, plant material was propagated at a high elevation nursery in Macdoel, CA. For the Irvine trials, plants were harvested on September 27 and planted on October 1, while planting stock for Santa Maria and Watsonville were harvested on October 15 and planted October 23. The harvest season differed depending on trial location, with harvest through May at Irvine, to August 4 at Santa Maria, and to August 20 in Watsonville.

In 2004-05 and 2005-06, Palomar produced similar early yield to Ventana at all locations, and exceeded seasonal yield for Ventana at Santa Maria (Table 3). This selection had substantially lower cull rates and/or higher appearance scores than Ventana in all trial locations. Fruit size for Palomar was similar to that of Ventana. Importantly, firmness, and the subjective evaluations of flavor and post-harvest fruit quality were excellent for this selection. In Irvine in 2005-06, Palomar had 26% greater early-season yield than Ventana at Irvine, albeit with less total yield, but greater fruit size and firmness. Preliminary results of 2006-07 field trials in Irvine indicate that Palomar produced 78% greater yield than Ventana (995 and 558 crates/acre for Palomar and Ventana, respectively) as of January 18, 2007, with higher fruit appearance scores and a lower cull rate.

An additional feature of Palomar is that plant size is substantially smaller than that of Ventana, a factor that will permit increased planting density and facilitate harvest efficiency. However, with less vegetative vigor and a marked tendency to fruit heavily early in the season, growers in southern California may need to consider management practices that encourage plant vegetative growth, such as the use of clear polyethylene mulch and careful soil moisture and fertility management.

One caution regarding this variety is the tendency to produce fruit with a dry calyx, most typically during the early part of the fruiting season. The extent of this problem varies with production site and year, and appears to be a physiological problem rather than a disease issue. At the present time, we do not have a solution for this problem. Another caution is that Palomar is susceptible to *Phytophthora cactorum* root and crown rot, and preventative treatments similar to that required for growing Diamante should be used.

Table 1. Performance of summer - planted C224 and Albion planted June 28 at the U.C. South Coast REC (Irvine) in 2005 and 2006.

	Number of 12# Crates/Acre					Cull	Fruit Size	Fruit App	Fruit Firm
Item	Sept	Oct	Nov	Dec	Total	%	(g)	(1-5)	(1-5)
Albion	91	97	311	309	819	16	25.4	3.0	3.6
C224	482	1,643	1,670	1,004	4,784	15	29.8	3.3	3.5

Cold-stored plants; white-on-black full-bed mulch
4-row bed, 24,500 plants/acre

Table 2. Performance of summer-planted C224 planted July 20, 2005 U.C. South Coast REC (Irvine).

	Number of 12# Crates/Acre				Cull	Fruit Size	Fruit App.	Fruit Firm
Sept	Oct	Nov	Dec	Total	%	(g)	(1-5)	(1-5)
-	347	1,431	1,256	3,038	11	33.5	3.3	3.8

Cold-stored plants; white-on-black full-bed mulch
4-row bed, 24,500 plants/acre

Table 3. Performance of Ventana and C221 evaluated at the Watsonville Research Facility, Sta Maria, and So. Coast REC, Irvine, averaged for 2004-06.

Location	Item	Early Yield[1] C/A	Yield C/A	Cull Rate (%)	App. Score (5=best)	Fruit Size (g/fruit)	Fruit Firmness
Irvine	Ventana	1,417	5,729	28.6	3.6	33.3	3.6
(Oct 1)	Palomar	1,514	4,976	26.1	3.8	34.8	3.8
Sta Maria	Ventana	1,206	4,878	29.1	---	---	---
(Oct 23)	Palomar	1,137	5,006	20.9	---	---	---
Watsonville	Ventana	1,917	6,970	---	3.4	30.6	8.8
(Oct 23)	Palomar	1,668	6,316	---	3.7	30.2	10.2

[1] Early yield calculated to March 1, April 10, and May 1 for Irvine, Santa Maria, and Watsonville respectively

Table 4. Performance of Palomar and Camarosa, Irvine 2006.

Item	# 12-pound crates/acre Feb 1	April 1	June 1	Gr./ fruit	App. (1-5)	Firm (1-5)
Palomar	1013	3492	6728	36.0	3.7	3.8
Camarosa	725	3506	6923	33.8	2.8	3.6

Macdoel plants dug 9-28, planted 10-1-05; 24,500 plants/acre

Table 5. Three-year performance of Palomar and Ventana, Irvine, 2004-2006.

Item	No. 12# C/A to Mar 1	June 1	Cull %	Gr./ fruit	App. (1-5)	Firm (1-5)
Ventana	1417	5729	28.6	33.3	3.6	3.6
Palomar	1514	4976	26.1	34.8	3.8	3.8

Macdoel plants dug 9-28, planted 10-1; 24,500 plants/acre

Table 6. Early season yield performance: Palomar vs. Ventana, Irvine 2007.

Item	No. 12# C/A Jan 18, 2007	Gr./ fruit	App. (1-5)	Firm (1-5)
Ventana	977	36.1	3.7	3.8
Palomar	558	32.2	4.0	4.0

Macdoel plants dug 9-27, planted 10-1-06; 24,500 plants/acre

Table 7. Performance of Palomar with 3 bed mulch treatments, Irvine 2006.

Mulch trt.	# 12-pound crates/acre Feb 1	April 1	June 1	Gr./ fruit	App. (1-5)	Firm (1-5)
Black (B)	432	2044	4654	34.4	3.8	3.6
C top/B side	422	2173	5148	34.9	3.8	3.6
Clear (C)	475	2329	5743	35.2	3.7	3.5

Macdoel plants dug 10-16, planted 10-20-05; 4-row bed with 24,500 plants/acre

Table 8. Yield performance to February 28 for Palomar, Camarosa & Ventana treated with Phosgard®, Irvine 2007.

Item	Phos-gard®	12# C/A	Gr./ fruit	App. (1-5)	Firm (1-5)
Camarosa	-	999	34.4	2.9	3.8
	+	1356	34.0	2.8	3.9
Ventana	-	991	32.4	3.6	3.8
	+	1029	35.4	3.6	3.9
Palomar	-	1407	32.2	4.0	4.0
	+	1563	32.3	4.0	3.9

Macdoel plants dug 9-27, planted 10-1-06; 24,500 plants/acre

- \- indicates no Phosgard® treatment
- \+ indicates preplant Phosgard® dip, plus monthly drip applications

Table 9. Yield performance to Feb. 28 for Palomar & Camarosa using clear or black mulch & two N-fertility management programs* - Irvine, 2007.

Item	Mulch	N fertility*	12# C/A	Gr./ fruit	App. (1-5)	Firm (1-5)
Camarosa	black	preplant	1284	32.6	2.9	3.8
		preplant +	1082	33.2	2.8	3.8
	clear	preplant	1277	33.4	2.8	3.8
		preplant +	1138	33.1	2.9	3.8
Palomar	black	preplant	1312	29.8	4.0	4.0
		preplant +	1286	29.5	4.0	4.0
	clear	preplant	1541	31.7	4.0	4.0
		preplant +	1627	32.1	4.0	4.0

Macdoel plants dug 9-27 and planted 10-1-06; 24,500 plants/acre
*N fertility trts: preplant = 200 #/A Controlled Release Nitrogen (CRN)
preplant + = 200 #/A CRN + 50 #/A drip-applied N

Table 10. Yield performance to Feb. 28 for Palomar & Camarosa using clear or black mulch & two N-fertility management programs* - Irvine, 2007.

Item	Mulch	N fertility*	12# C/A	Gr./ fruit	App. (1-5)	Firm (1-5)
Camarosa	black	preplant	717	31.1	2.8	3.7
		preplant +	810	31.4	3.1	3.8
	clear	preplant	926	32.6	3.1	3.8
		preplant +	880	31.8	3.1	3.7
Palomar	black	preplant	932	28.5	3.8	4.0
		preplant +	919	28.3	3.9	4.0
	clear	preplant	1226	31.2	4.1	3.9
		preplant +	1149	30.9	4.0	4.0

Macdoel plants dug 9-27 and planted 10-1-06; 24,500 plants/acre
*N fertility trts: preplant = 200 #/A Controlled Release Nitrogen (CRN)
preplant + = 200 #/A CRN + 50 #/A drip-applied N

Table 11. Yield performance to Feb. 28 for Palomar & Camarosa using clear or black mulch & two N-fertility management programs* - Irvine, 2007.

Item	Mulch	N fertility*	12# C/A	Gr./ fruit	App. (1-5)	Firm (1-5)
Camarosa	black	preplant	463	29.1	3.4	3.7
		preplant +	483	28.4	3.2	3.7
	clear	preplant	606	30.1	3.2	3.6
		preplant +	651	28.9	3.2	3.8
Palomar	black	preplant	646	27.3	3.9	4.0
		preplant +	747	27.1	3.9	4.0
	clear	preplant	861	30.4	3.9	4.0
		preplant +	910	30.5	4.0	4.0

Macdoel plants dug 9-27 and planted 10-1-06; 24,500 plants/acre

*N fertility trts: preplant = 200 #/A Controlled Release Nitrogen (CRN)

preplant + = 200 #/A CRN + 50 #/A drip-applied N