

Southern California Pomology Research Update

Kirk Larson, UC South Coast R.E.C. - Irvine

- Pomology project website
- Performance of new SD cultivars
- Breeding for disease tolerance/resistance

UC Pomology website

www.plantsciences.ucdavis.edu/ucstrawberry

UC Sheet Research Reports

Research Conference Presentations

Scientific Articles

Event Calendar

Annual Pomology Report

PSAB Annual Report

UC and other Online Resources

Coming soon:

Photo gallery with Pest and Disease Photos

Performance of new cultivars in Southern California, 2006-2010

Benicia (C225)

Mojave (C227)



Strawberry breeding objectives for UC short-day cultivars

Early production

Long, steady fruiting season

Easy to grow (nursery & fruiting field)

Consistently good fruit quality and flavor

Plant architecture that facilitates harvest efficiency

Disease & environmental tolerance



Benicia



Mojave

Three-year average^x yield performance for high-elevation advanced short-day selections compared with Camarosa & Ventana, 2006-09

Dig/plant 9/26-9/30	Yield performance to 6-8								
	Yield perform to 3/1								
	G/plt ^y	Mkt g/plt ^z	Cull (%)	G/plt	Mkt g/plt	Cull (%)	Fruit		
Item							size (g)	app. (1-5)	firm. (1-5)
Benicia	396	378	4.6	2227	1791	21.6	34.4	3.1	3.4
Mojave	507	471	6.0	2176	1888	13.2	36.6	3.8	3.2
				9,792 C/A	8,496 C/A				
Ventana	407	345	15.2	1962	1540	21.5	32.5	3.2	3.4
Camarosa	332	269	19.0	2042	1534	24.9	31.0	2.6	3.4

Grams per plant x 4.5 = number of 12# crates/acre

^x One-year of data for C225 and C226 (2008-09)

^y G/plt = total grams per plant; ^z Mkt g/plt = marketable grams per plant

Three-year average^x yield performance for high-elevation advanced short-day selections compared with Camarosa & Ventana, 2006-09

<i>Dig/plant 10/3-10/6</i>	Yield performance to 6-8								
	Yield perform to 3/1								
		Mkt	Cull		Mkt	Cull	Fruit		
Item	G/plt ^y	g/plt ^z	(%)	G/plt	g/plt	(%)	size (g)	app. (1-5)	firm. (1-5)
Benicia	234	221	5.6	1784	1462	18.1	33.3	3.4	3.5
Mojave	259	244	5.8	1803	1570	12.9	35.8	3.7	3.3
				8,114	7,065				
Ventana	273	245	10.3	1856	1415	23.8	32.1	3.4	3.4
Camarosa	163	119	27.0	1808	1293	28.5	30.9	2.7	3.4

Grams per plant x 4.5 = number of 12# crates/acre

^x Two years of data for C225 and C226 (2007-09)

^y G/plt = total grams per plant; ^z Mkt g/plt = marketable grams per plant

Three-year average^x yield performance for high-elevation advanced short-day selections compared with Camarosa & Ventana, 2006-09

<i>Dig/plant</i> 10/15-10/20	<u>Yield perform to 3/1</u>			<u>Yield performance to 6-8</u>					
							<u>Fruit</u>		
Item	G/plt ^y	Mkt g/plt ^z	Cull (%)	G/plt	Mkt g/plt	Cull (%)	size (g)	app. (1-5)	firm. (1-5)
Benicia	219	201	8.2	1921 8,645	1613 7,260	16.0	33.5	3.4	3.5
Mojave	236	217	8.1	1756	1534	12.6	36.3	3.8	3.2
Ventana	252	230	8.7	1910	1559	18.4	33.1	3.4	3.4
Camarosa	182	145	20.3	1832	1381	24.6	30.9	2.8	3.4

Grams per plant x 4.5 = number of 12# crates/acre

^x Two years of data for C225 and C226 (2007-09)

^y G/plt = total grams per plant; ^z Mkt g/plt = marketable grams per plant

Performance of short-day selections and cultivars in Oxnard, 2008-09

Glen Hasegawa / Steve Imoto - Camarillo Ranch

Item	Crates/acre to 3/1	Crates/acre to 5/16
Benicia	658	5,051
Mojave	997	5,419
Ventana	1,199	5,337
Palomar	1,217	5,701

Standard cultivars planted Oct. 1, new cultivars planted Oct. 8

Performance of new SD cultivars compared w/ Ventana, 2009-10

Item	Yield perform to 3/1			Yield performance to 6-8					
	G/plt ^y	Mkt g/plt ^z	Cull (%)	G/plt	Mkt g/plt	Cull (%)	Fruit		
							size (g)	app. (1-5)	firm. (1-5)
High elevation plants - dig/plant 9/28-10/1									
Benicia	954	801	16.0	1885	1484	21.3	32.2	3.0	3.5
Mojave	809	729	10.0	1743	1446	17.0	33.8	3.7	3.2
Ventana	1237	904	26.9	2133	1530	28.3	29.4	2.8	3.2
High elevation plants - dig/plant 10/15-10/20									
Benicia	696	626	10.1	1841	1641	10.1	33.8	3.2	3.3
Mojave	560	502	10.4	1555	1388	10.7	34.4	3.6	3.2
Ventana	751	595	20.1	2090	1699	18.7	32.5	2.9	3.0
Low elevation plants with leaves on - dig/plant 10/11-10/13									
Mojave	863	789	8.6	1968	1755	10.8	41.7	3.5	3.3

^y G/plt = total grams per plant; ^z Mkt g/plt = marketable grams per plant
 100 grams/plant = 450 crates/acre



6 DRY PINTS

PRODUCE OF U.S.A.

CALIFORNIA



C225



C227

Benicia



**Photos
taken
March 20**

Mojave



Qualitative Performance Evaluations for Short-day Selections: So. Calif.

	Benicia compared with Ventana	Mojave compared with Ventana
Productivity	0	0
Production pattern	0	+
Fruit size	+	+
Firmness	+	0
Appearance	0	+
Flavor	+	+
Postharvest	+	0
Rain - weather tolerance	0	+
Disease tolerance	0	0
Mite tolerance	0	0
Harvest ease	+	+
Cull rate	+	+
Runners (nursery)	+	+

“+”, “0” or “–” indicates performance that is better, equal, or inferior to that of Ventana

Advanced selections: resistance/tolerance to major pathogens

Resistance score (5 = best)

Genotype	Phytophthora	Verticillium	Colletotrichum
Ventana	2.1	2.9	2.7
Benicia	3.5	2.1	2.6
Mojave	2.3	3.8	2.7

Benicia in Southern California

Adapted to early planting, but reduced fruit app. score

**Similar production to Ventana with greater total yield
and lower cull rate**

Larger fruit than Ventana

Consistently excellent flavor

Vigorous plant w/ open structure - harvest efficiency

Cautions:

Fruit may darken during hot periods

Verticillium

Mojave in Southern California

Adapted to very early planting

Earlier fruiting than Ventana with greater total yield

Larger fruit than Ventana with better flavor

Very low cull rate

Consistent fruit shape & color with bright red shine

Open plant structure - harvest efficiency

Cautions:

Not quite as firm as most UC cultivars

Phytophthora cactorum

Developing strawberry cultivars with tolerance to pests and diseases

UCD: *P. cactorum*, *V. dahliae*, *S. macularis*, *T. urticae*

UC SCREC: *C. acutatum*, *M. phaseolina*

Assess tolerance/susceptibility of cultivars & advanced selections to important pests/pathogens

Identify sources of genetic resistance/tolerance, incorporate into breeding lines

C. acutatum genetic screen

Evaluation



Plug
propagation



Infection



Inoculation



C. acutatum genetic screen

Evaluate ~50 cultivars and
advanced selections annually



Moderately tolerant



Highly susceptible



**Macrophomina
plant collapse in
So. California
an increasingly
common problem**



***Macrophomina phaseolina* genetic screen**

U.C. SCREC, Irvine

Tom Gordon, Steve Koike, Lassen Canyon Nursery

Experimental site with *M. phaseolina* only

Fumigate site with MB:Pic (57:43, 350#/A): 5-20-09

Establish Albion frigo plants: 6-09-09

Inoculate Albion plants with *M. phaseolina*: 8-12-09

Incorporate infected plants into soil: 8-31-09

Re-establish beds

Plant 54 cvs & adv selections (HE nursery)

Evaluate germplasm survival

MAC field inoculation

Aug. 11-12, 2009 UC SCREC



Frigo Albion



**Albion plants
2 weeks after
inoculation**

**Widespread
disease
symptoms**





Incorporate
infected
plants



A photograph of a strawberry field. Rows of strawberry plants are spaced out across the field, each covered by a piece of black plastic mulch. Small white labels with black numbers are placed next to many of the plants. The field is bordered by a dirt path on the left and a fence in the background. The plants are green and appear to be in the early stages of growth. The labels have numbers like '54-611', '52-603', and '52-617'.

Control
plots

Late May
2010



Innoculated plots Late May, 2010



Macrophomina

Innoculated and control plots, May 2010





Results for 2009-10

- 5 of 44 advanced selections had survival rates of 65-85%
- None of the 10 cultivars had survival rates $> 40\%$
- Monterey, Portola, S. Andreas and Ventana had survival rates of 35-40%



‘Ecocover’ paper bed mulch



Biodegradable paper mulch



Paper mulch

Biodegradable

Poor heat
Transmission

Durability issues





THANK YOU!