

Southern California Pomology Research Update

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2011 Nursery harvest/establishment update

Performance of new SD cultivar Benicia

Fertility/mulch trial: Benicia, S.Andreas, Palomar

Soil fumigation trials for control of Macrophomina

Breeding for disease tolerance/resistance

2011 Nursery update

Warmer spring weather compared to past 2 years – better survival, establishment

Good summer growth temps, but with significantly less chilling than normal in late summer/early fall

Some nurseries harvested later than usual, and most nurseries appear to have met orders

In some cases, nursery management and/or postharvest handling issues appear to have contributed to weak plants & higher mortality rates

Performance of new cultivars in Southern California, 2006-2010

Benicia
Mojave



Short-day strawberry breeding objectives

Excellent flavor

Consistently high fruit quality

Early production

Long, stable production cycle

Easy to grow (nursery & fruiting field)

Plant architecture that facilitates harvest efficiency

Disease & environmental tolerance



Benicia

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	8,496				
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</i> 10/3-10/6	Yield performance to 6-8								
	Yield perform to 3/1			Fruit					
		Mkt	Cull		Mkt	Cull			
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 new SD cultivars compared w/ Ventana, 2009-10

Item	Yield performance to 6-8								
	Yield perform to 3/1								
		Mkt	Cull		Mkt	Cull	Fruit		
	G/plt ^y	g/plt ^z	(%)	G/plt	g/plt	(%)	size (g)	app. (1-5)	firm. (1-5)
<i>High elevation plants - dig/plant 9/28-10/1</i>									
Benicia	954	801	16.0	1885	1484	21.3	32.2	3.1	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
<i>High elevation plants - dig/plant 10/15-10/20</i>									
Benicia	696	626	10.1	1841	1641	10.1	33.8	3.3	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	3.3
<i>Low elevation plants with leaves on - dig/plant 10/11-10/13</i>									
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

Yield performance for new short day cultivars Benicia and Mojave compared with Camarosa & Ventana, 2010-11

<i>Dig/plant</i> 9-28/10-1	<u>Yield performance to 6-8</u>								
	<u>Yield perform to 3/1</u>			<u>Fruit</u>					
		Mkt	Cull		Mkt	Cull			
Item	G/plt ^y	g/plt ^z	(%)	G/plt	g/plt	(%)	size (g)	app. (1-5)	firm. (1-5)
Benicia	261	220	16.0	1973 8,645	1484 7,260	24.8	31.3	3.2	3.5
Mojave	238	216	9.2	1892	1578	16.6	33.4	3.6	3.1
Ventana	169	149	11.8	2200	1408	36.0	33.1	3.3	3.4
Camarosa	182	145	20.3	1897	1204	36.5	28.5	2.3	3.3

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

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

Timeline for developing a UC cultivar

Evaluate and choose cultivars or selections for use as parents

Yr 1: Crosses - seed - germinate - plant seedlings in field

Yr 2: Evaluate sdls; keep 3% - propagate original stock

Yr 3: 1st clonal trial; evaluate selections w/ LE plants - retain 20-30% - propagate original stock

Yr 4: 2nd clonal trial at LE; also some at HE - propagate original stock & conduct grower trials

Yr 5: Meristem promising selections - propagate original stock & conduct grower trials

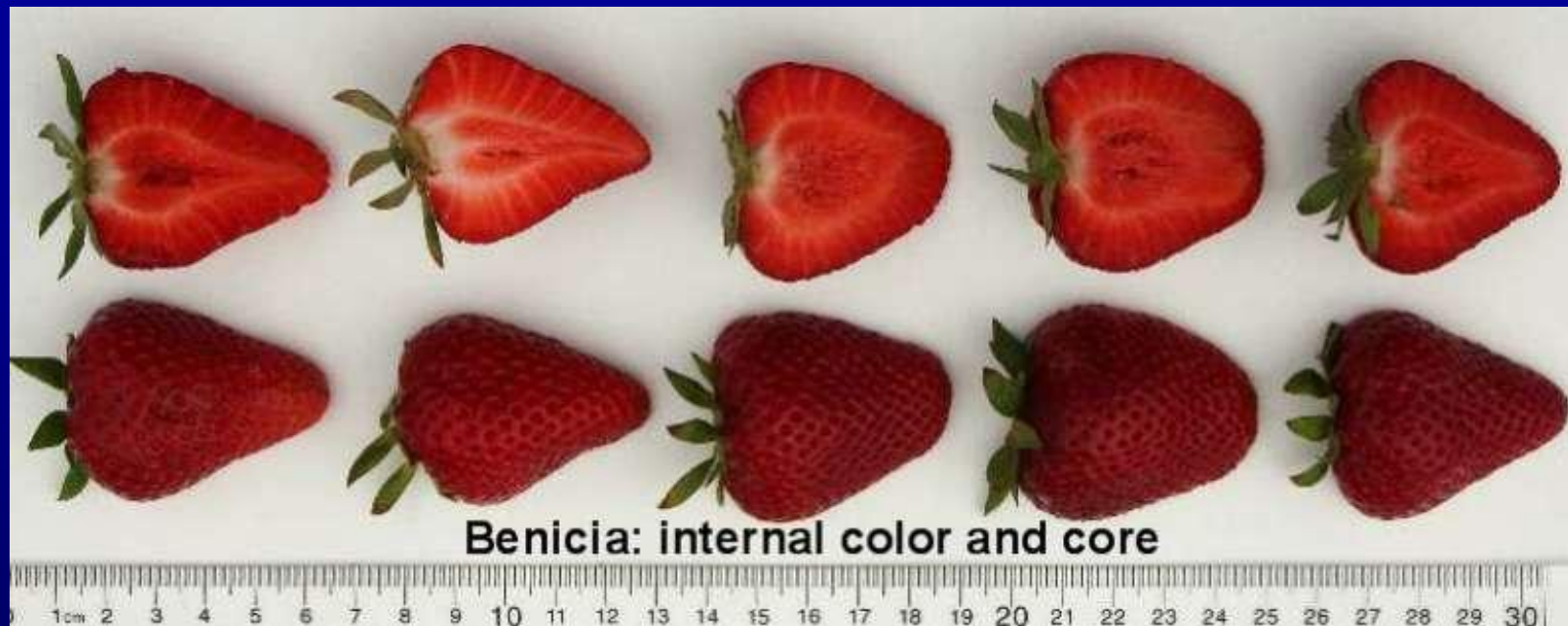
Yr 6: Screenhouse propagation for meristem plants - propagate original stock & conduct grower trials

→ Original stock sequentially propagated for 6 years w/out meristemming

Yr 7: Disease-free plants of new cultivar available to growers



Benicia



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

**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

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**



Plant high-elevation cultivars and selections



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%













THANK YOU!