

# NASGA 2018

## *Strawberry Variety Evaluation Trials*

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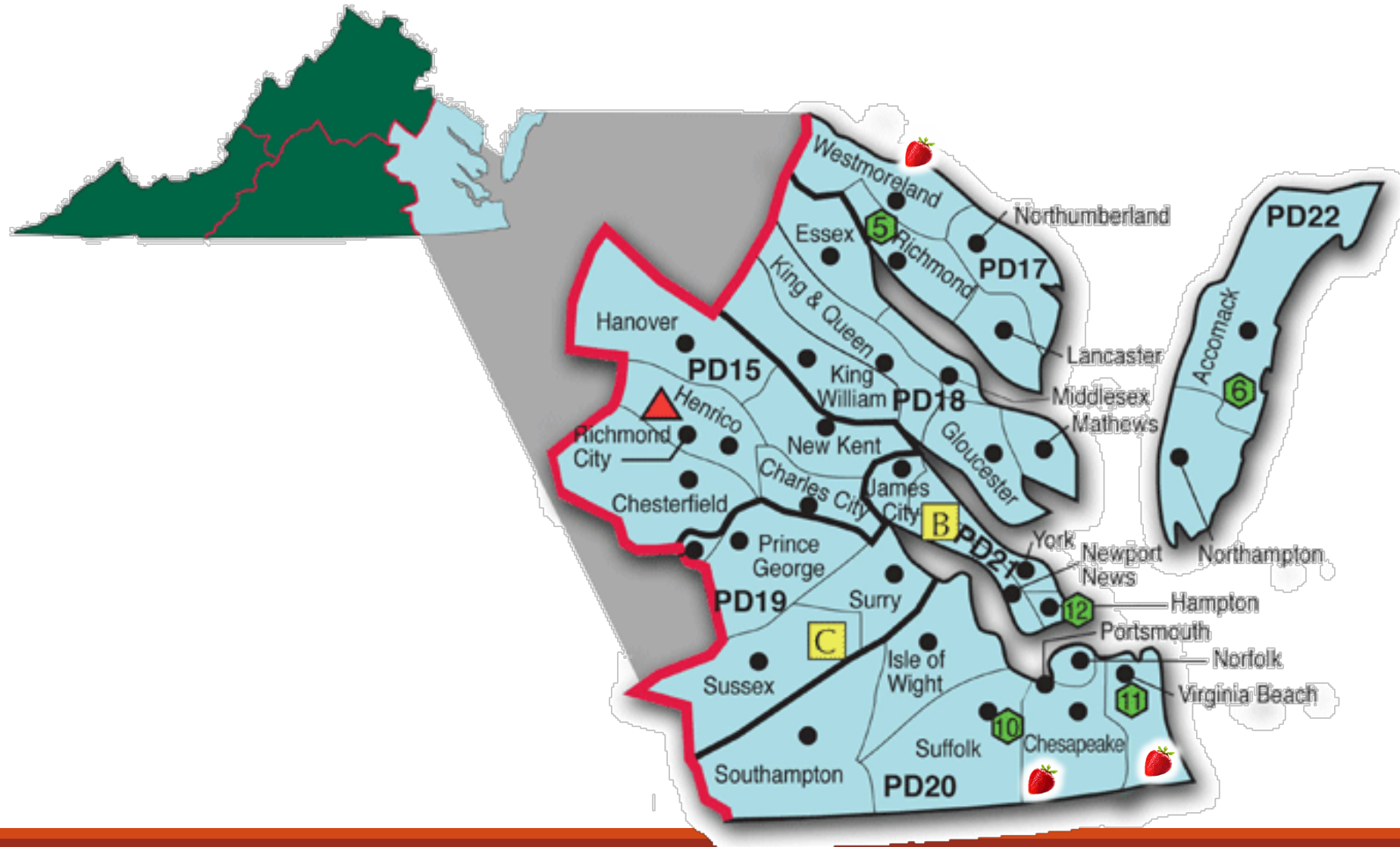
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**HAMPTON ROADS AREC**

**VIRGINIA COOPERATIVE EXTENSION**

# 2013-14 growing season

## Southeast District



## Varieties evaluated in the 2013-14 growing season

Variety	Type	Where from?
1. Albion	Day neutral	UC Varieties
2. Benicia	June-bearing	
3. Camarosa	June-bearing	
4. Camino Real	June-bearing	
5. Chandler	June-bearing	
6. San Andreas	Day neutral	

Variety	Type	Where from?
7. Strawberry Festival	June-bearing	U. Florida
8. Florida Radiance		U. Florida (2008)
9. Sweet Charlie		U. Florida
10. Winterstar		U. Florida (2011)
11. Treasure		Florida, Private Breeder Peggy Chang, Naples
12. Flavorfest		USDA Beltsville, MD

	Flanagan Farms City of Virginia Beach	Lilley Farms City of Chesapeake	Westmoreland Farms Westmoreland County
Experiment design	RCBD	RCBD	RCBD
Replications	3	3	3
Plot orientation	East-West	East-West	East-West
Plant count/rep.	All cultivars-30; Flavorfest - 20 plants	All cultivars- 20; Flavorfest -15 plants	20 plants in most varieties
Fumigation	August 31 with Pic-Chlor 60 at 120 lbs/A	Sept. 1 with Telone C-35	No fumigation. Devrinol was applied over the bed prior to planting
Tarp	VIF 1.25 mil.	1.25 mil. embossed std. black plastic	1.25 mil. embossed std. black plastic
Plant spacing	16 inch	12 inch	14 inch
Planting date	29 Sept. 2013	3 Oct. 2013	27 Sept. 2013
Site history	Prior year, the site had squash planted in it	No rotation, strawberries planted yearly.	Prior to planting strawberries, soybean was planted at the site as per rotation plan
			

# Summary from 2013-14 season

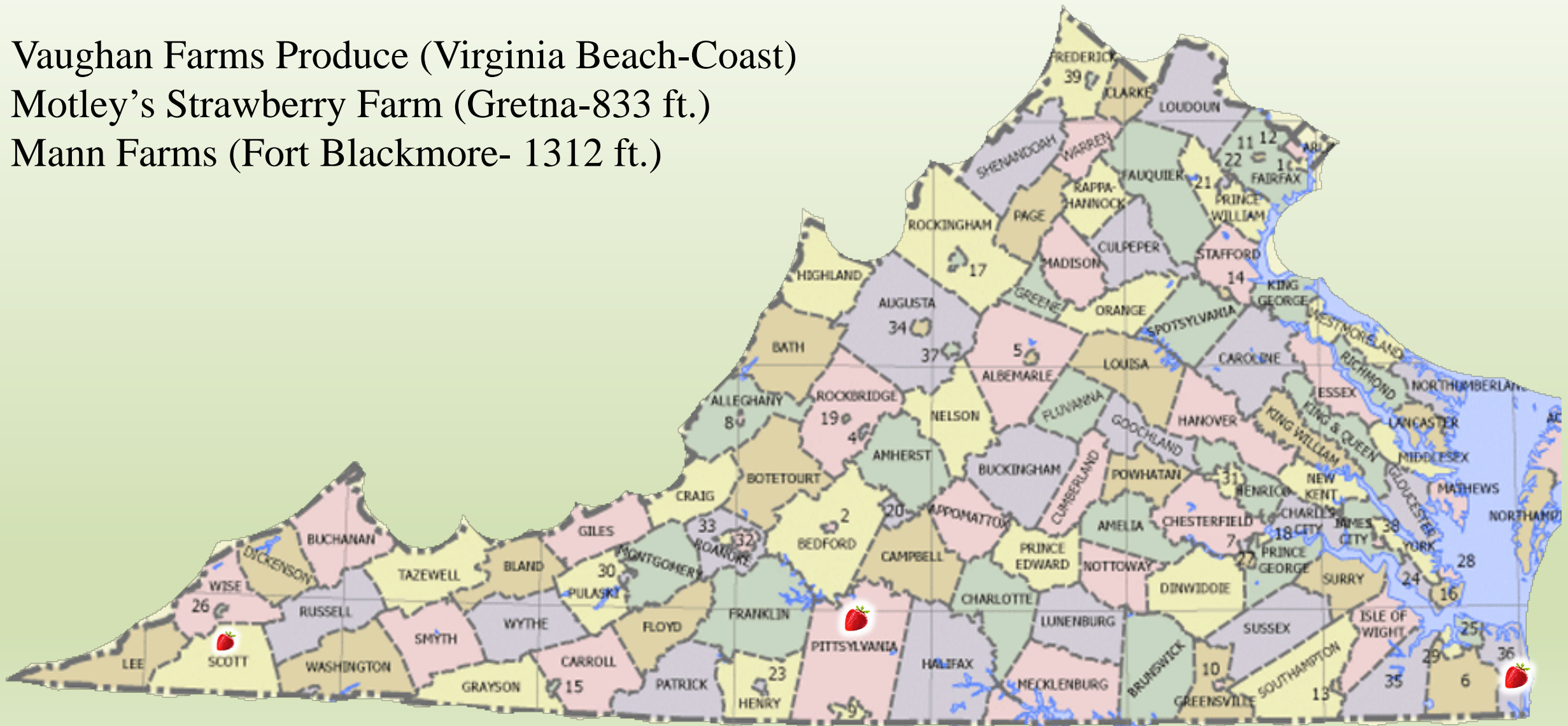
- Camino Real, Chandler, Camarosa, and Benicia were the top yielding cultivars. Camino Real yield was consistently the best at all three locations.
- Camino Real and Benicia had larger fruits than Chandler, Camarosa, and Sweet Charlie.
- Sweet Charlie and Flavorfest were amongst the sweetest berries, but Sweet Charlie yielded high only at single location. Flavorfest may be a good alternative cultivar to Sweet Charlie in terms of sweetness.
- Both Benicia and Camino Real were less sweet compared to Chandler and Camarosa.

# Participating farms 2016-17 season:

Vaughan Farms Produce (Virginia Beach-Coast)

Motley's Strawberry Farm (Gretna-833 ft.)

Mann Farms (Fort Blackmore- 1312 ft.)



# Varieties evaluated in 2016-17 growing season:

Variety	Year of Release	Location
1. 8-8-6	Unreleased	Rutgers U.
2. 09-2-1	Unreleased	Rutgers U.
3. Benicia	2010	U. California
4. Cabrillo	2010	U. California
5. Camarosa	1992	U. California
6. Camino Real	2001	U. California
7. Chandler	1983	U. California
8. Flavorfest	2012	USDA Beltsville, MD

Variety	Year of Release	Location
9. Merced	2014	U. California
10. NCS 10-038	Unreleased	North Carolina State U.
11. NCS 10-156	Unreleased	North Carolina State U.
12. Ruby June	2014	Lassen Canyon Nursery
13. Lucia	2014	Lassen Canyon Nursery
14. Rutgers Scarlet	2015	Rutgers U.
15. Sweet Charlie	1992	U. Florida

# Nursery supply source

Chandler, Camarosa, Sweet Charlie, Flavorfest, Camino Real, and Benicia --  
→ McNitt Growers, Carbondale, IL.

Ruby June, Lucia, Cabrillo, and Merced → Carther Plants, Ontario, Canada.

NCS-038 and NCS-156 advanced selections → NC State University.

09-2-1, 8-8-6, and Rutgers Scarlet → Rutgers University. The Rutgers plant material was evaluated only at Vaughan Farms due to its late procurement.

No.	Variety	Marketable Yield (7 Apr 17 through 13 Jun 17)	Letter Group
		lbs/plant	LSD, alpha = 0.05
1	NCS-038	1.2	A
2	Benicia	0.9	B
3	Chandler	0.9	B
4	Camino Real	0.8	BC
5	NCS-156	0.7	BCD
6	Merced	0.6	CDE
7	Ruby June	0.6	DE
8	Rutgers 8-8-6	0.5	DE
9	Rutgers Scarlet	0.5	DE
10	Camarosa	0.5	DE
11	Flavorfest	0.5	DE
12	Cabrillo	0.4	EF
13	Sweet Charlie	0.3	FG
14	Lucia	0.2	FG
15	Rutgers 9-2-1	0.2	G

### Vaughan Farms, Virginia Beach, VA

NCS-038 had highest and superior yield over Chandler.

Benicia, Camino Real, NCS-156 yielded comparable to Chandler.

Ruby June, Flavorfest, Rutgers Scarlet, 8-8-6, yields were less than Chandler, but comparable to Camarosa.

Lowest yield: Sweet Charlie, Lucia, Rutgers 9-2-1.

No.	Variety	Total Yield (7 Apr 17 through 13 Jun 17)	Letter Group
		lbs/plant	LSD, alpha = 0.05
1	NCS-038	1.7	A
2	Benicia	1.5	AB
3	Chandler	1.4	B
4	Camino Real	1.3	BC
5	NCS-156	1.2	BC
6	Merced	1.0	CD
7	Flavorfest	1.0	CD
8	Rutgers Scarlet	1.0	CD
9	Rutgers 8-8-6	1.0	CD
10	Ruby June	0.9	D
11	Camarosa	0.9	D
12	Cabrillo	0.9	D
13	Lucia	0.7	DE
14	Sweet Charlie	0.5	E
15	Rutgers 09-2-1	0.4	E

### Vaughan Farms, Virginia Beach, VA

Highest and superior yield over Chandler: NCS-038.

Benicia, Camino Real, NCS-156 yielded comparable to Chandler.

Ruby June, Flavorfest yields were less than Chandler but comparable to Camarosa.

Lowest yield: Sweet Charlie, Lucia, Rutgers 9-2-1.

No.	Variety	Total Soluble Solids	Letter Group
		°Brix	LSD, alpha = 0.05
1	RS 9-2-1	9.4	A
2	Lucia	8.7	B
3	RS-886	8.5	BC
4	Rutgers Scarlet	8.4	BC
5	Sweet Charlie	8.0	CD
6	NCS-156	7.8	DE
7	Ruby June	7.7	DE
8	Camarosa	7.5	DE
9	Flavorfest	7.4	EF
10	Merced	7.4	EF
11	Chandler	7.2	EF
12	NCS-038	6.9	FG
13	Cabrillo	6.6	GH
14	Camino Real	6.3	GH
15	Benicia	6.1	H

### Vaughan Farms, Virginia Beach, VA

Rutgers Selection 9-2-1, Lucia, are both sweeter than Sweet Charlie

Rutgers 8-8-6, Rutgers Scarlet, NCS-156, Ruby June, Camarosa comparable to Sweet Charlie

TSS in Merced, Flavorfest, NCS-38, Camarosa, Ruby June, were comparable to Chandler

Benicia, Camino Real, Cabrillo had the lowest TSS.

No.	Variety	Fruit Size	Letter Group
		g/fruit	LSD, alpha = 0.05
1	Benicia	25.4	A
2	Cabrillo	23.3	AB
3	Lucia	21.3	BC
4	Merced	20.7	BCD
5	NCS-038	20.0	CDE
6	Camino Real	19.5	CDEF
7	Camarosa	19.3	CDEF
8	Ruby June	18.3	DEFG
9	Flavorfest	17.2	EFGH
10	Rutgers Scarlet	16.8	FGH
11	Rutgers 09-2-1	16.3	GHI
12	NCS-156	16.3	GHI
13	Chandler	16.1	GHI
14	Rutgers 8-8-6	14.6	HI
15	Sweet Charlie	13.8	I

### Vaughan Farms, Virginia Beach, VA

Benicia and Cabrillo had larger fruits than Camarosa.

Sweet Charlie had the smallest fruit size not different from Rutgers 8-8-6, Chandler, NCS-156, and Rutgers 9-2-1.

No.	Variety	Firmness (kg)	Letter Group
1	Cabrillo	0.29	A
2	Camarosa	0.27	AB
3	Lucia	0.24	BC
4	Rutgers 09-2-1	0.24	BC
5	Merced	0.23	BCD
6	Camino Real	0.22	CD
7	Benicia	0.22	CD
8	NCS-038	0.21	CDE
9	Ruby June	0.21	CDE
10	NCS-156	0.20	CDE
11	Sweet Charlie	0.19	DEF
12	Rutgers 8-8-6	0.19	DEF
13	Rutgers Scarlet	0.18	EF
14	Flavorfest	0.16	EF
15	Chandler	0.15	F

### Vaughan Farms, Virginia Beach, VA

Most firm: Cabrillo and Camarosa

Least firm: Chandler, not significantly different from Flavorfest and Rutgers Scarlet.

No.	Variety	Marketable Yield (7 Apr 17 through 13 Jun 17)	Letter Group
		lbs/plant	LSD, alpha = 0.05
1	NCS-038	3.2	A
2	Chandler	2.8	AB
3	NCS-156	2.5	B
4	Benicia	2.5	B
5	Camino Real	2.4	BC
6	Camarosa	2.0	CD
7	Flavorfest	2.0	CD
8	Sweet Charlie	1.9	CD
9	Ruby June	1.8	DE
10	Merced	1.7	DE
11	Lucia	1.6	DE
12	Cabrillo	1.3	E

### Mann Farms, Fort Blackmore, VA

NCS-038 had the highest yield comparable to Chandler.

Benicia, Camino Real, NCS-156 yielded comparable to Chandler.

Flavorfest, Sweet Charlie, Ruby June yields were comparable to Camarosa.

Producing significantly less than both industry standards: Cabrillo

No.	Variety	Total Yield (7 Apr 17 through 13 Jun 17)	Letter Group
		lbs/plant	LSD, alpha = 0.05
1	NCS-038	3.3	A
2	Chandler	2.9	AB
3	NCS-156	2.7	BC
4	Benicia	2.7	BC
5	Camino Real	2.5	BCD
6	Camarosa	2.3	CDE
7	Flavorfest	2.0	DEF
8	Sweet Charlie	1.9	EF
9	Ruby June	1.9	EF
10	Merced	1.7	FG
11	Lucia	1.6	FG
12	Cabrillo	1.4	G

### Mann Farms, Fort Blackmore, VA

Highest yielding: NCS-038, Chandler.

NCS-156, Benicia, Camino Real yielded comparable to Chandler and Camarosa.

Other varieties that yielded comparable to Camarosa: Flavorfest, Sweet Charlie, Ruby June.

Cabrillo yielded less than the industry standards.

No.	Variety	Fruit Size	Letter Group
		g/fruit	LSD, alpha = 0.05
1	Cabrillo	21.1	A
2	Ruby June	20.3	AB
3	Camino Real	20.3	AB
4	NCS-038	19.8	ABC
5	Merced	19.7	ABC
6	Benicia	18.9	ABCD
7	FlavorFest	18	ABCD
8	Camarosa	18	ABCD
9	Chandler	17.3	BCD
10	Lucia	17	CD
11	NCS-156	16.2	D
12	Sweet Charlie	15.9	D

### Mann Farms, Fort Blackmore, VA

Cabrillo- largest mean fruit size, only variety to have significantly larger fruit than Chandler.

Sweet Charlie had the smallest fruit size, but still comparable to both industry standards.

## Grower take on most liked and most disliked variety

N= 10

Taste test done:

31 May 2017 (towards the  
end of season).

Variety	Liked	Disliked
8-8-6	—	—
09-2-1	3	0
Benicia	0	4
Cabrillo	1	1
Camarosa	2	0
Camino Real	1	1
Chandler	3	0
Flavorfest	2	1
Lucia	1	1
Merced	0	3
NCS-038	0	2
NCS-156	1	2
Ruby June	1	1
Rutgers Scarlet	0	3
Sweet Charlie	1	1



# Cabrillo

- Day-neutral (ever-bearing) variety, released in 2010.
- Moderate to high plant vigor with an open canopy.
- Moderately susceptible to powdery mildew, anthracnose, Verticillium wilt, Phytophthora crown rot, and common leaf spot.
- Fruit is large, firmer.
- Good for fresh market, processing, and home gardens.



# Chandler

- UC Davis cultivar released in 1983.
- June bearing.
- Adaptable to eastern U.S. including matted row production.
- Susceptible to diseases.
- Fruit size is medium to large, with medium firmness.
- Good for pick your own farms.
- Most reliable yielding variety for the upper piedmont, foothills, and coastal plains in Virginia and North Carolina.

# Camarosa

- Moderate to high plant vigor.
- Good disease profile except susceptible to Verticillium wilt (*Verticillium dahliae*).
- Fruit is large and firm, and holds well in the rains. Suitable for shipping and local market consumption.
- Fruit tastes best when it is picked darker in color, past the glossy bright red stage.

# Camino Real

- Compact growth habit.
- Resistant to Verticillium (*Verticillium dahliae*) and Phytophthora (*Phytophthora cactorum*). Relatively resistant to Anthracnose crown rot (*Colletotrichum acutatum*).
- Attractive, mostly symmetrical conic fruit.
- ‘Camino Real’ has good flavor and is suitable for fresh market and processing.
- Darker color (internal and external) compared to ‘Camarosa’.



# NCS 10-038

- North Carolina germplasm. Selected in 2010.
- Late Season – Short day variety.
- Moderate plant vigor and have an open canopy
- Possible ‘Chandler’ replacement. Fruit is more firm, higher yielding and a more uniform season production.



# NCS 10-156

- North Carolina variety. Selected in 2010
- Early Season – Short day variety.
- Possible replacement for ‘Sweet Charlie’.
- Good size fruit with glossy red exterior and uniform conical shape.
- Good for local markets and home gardens.



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# Ruby June

- Lassen Canyon variety. Released in 2014.
- Plants have moderate to high vigor.
- High disease tolerance especially against Fusarium wilt
- Fruit is large and good firmness and taste.



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# Acknowledgements

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## On-Farm Cooperators

- Vaughan Farms.
- Mann Farms.
- Motley's Strawberry Farms.

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- Allen Straw
- Kevin Motley
- Jillian Rajevich
- Sanghamitra Das
- Zachary Landis
- Ethan Murdock
- Ashley Sibley

# What variety should I consider as a grower?

- If you're a grower who has a pick-your-own operation, unless you have a misshapen, discolored, or mushy looking fruit, a strawberry fruit should be saleable.
- Flavor is an important trait. If you have pretty berries that lack flavor, then you will sell some berries, but if your area has competitors, the customer will shop around.
- If you don't pick all your fruits, the yield numbers don't mean a whole lot!
- Consider trialing a new variety or two at your own farm in smaller plots each season.
- Having a mix of varieties at a farm level is a good idea.