Some Highlights From the University of Florida Tomato Breeding Program

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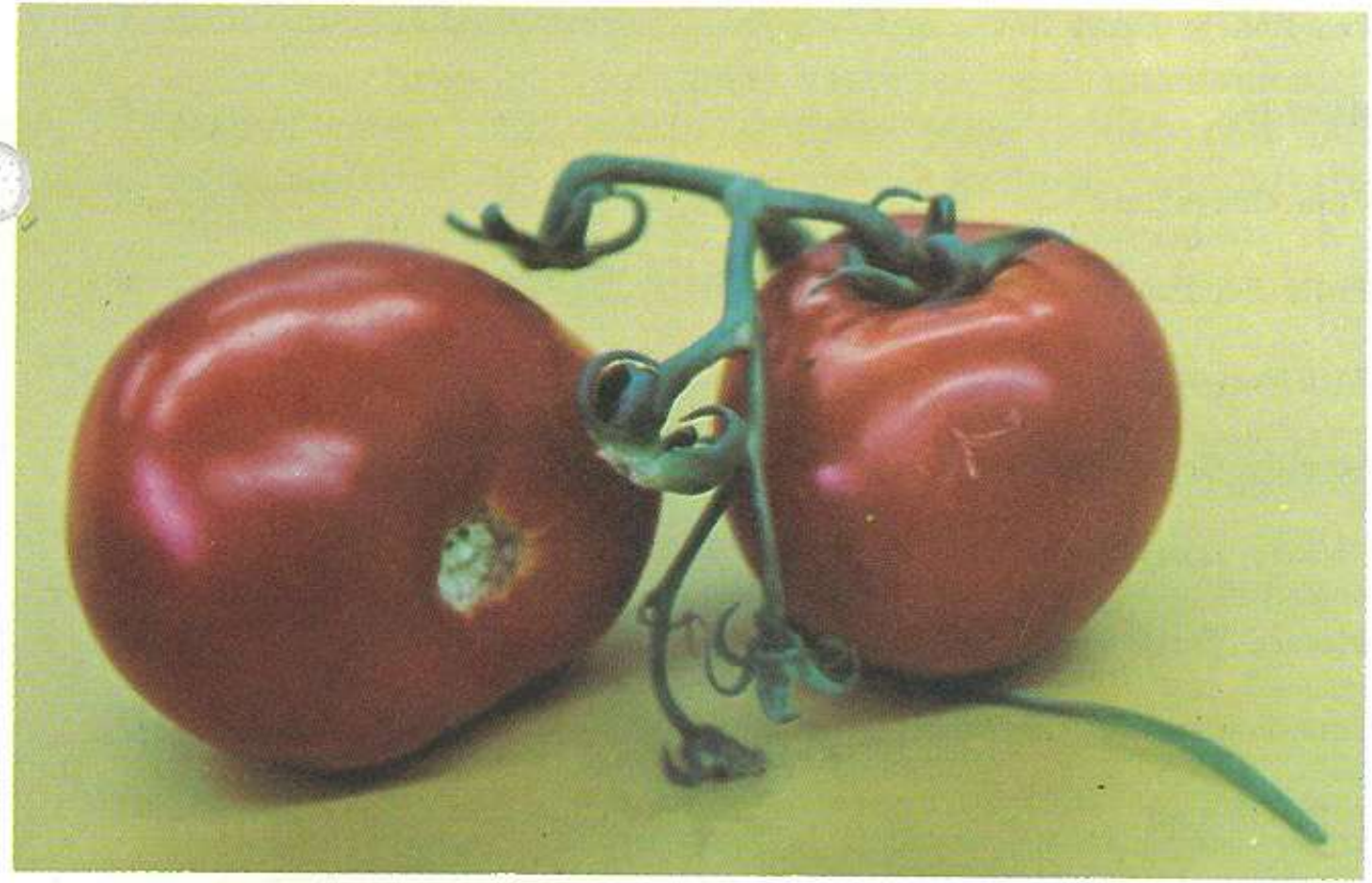



FMC

Jointless Tomato Breeding

- Recessive trait needed in both parents of a hybrid
- Growers (& pickers) prefer jointless varieties for ease of harvest
- However there are few large-fruited jointless varieties because they are not as reliable for marketable yield
- Problems include: off-shapes, rough blossom scars, and cracking


Sanibel
Three standard tomato inbreds/ hybrids
Fla. 8834
Jointed CGH Inbred

Would you have invested?

Microsoft Corporation, 1978

Possible Tomato Releases

- Fla. 8787: Jointless, crimson-good color and flavor, adapted to Dade County
- Fla. 8455: Heat-tolerant hybrid, possible main season potential
- Fla. 8611 and Fla. 8835: Plum fruited inbreds with tolerance to bacterial spot-to be released as breeding lines

Yield trail of crimson hybrids and controls grown at Pine Island Farms, Dade County, Florida. Winter 2009.

Hybrid	Marketable Yield (25 lb box/A)	Fruit Size (g)	Culls (% by wt.)
212	2740 a[z]	198 b	17 ab
Sanibel	2735 a	234 ab	19 ab
Fla. 8787	2416 ab	225 ab	14 b
Tribeca	2129 a-c	203 ab	23 a
Fla. 8786	1876 bc	219 ab	18 ab
Florida 47	1641 c	253 a	18 ab

[z] Mean separation in columns by DMRT at $P \leq 0.05$.

Marketable yield, fruit size, and culls for tomato hybrids grown at Pine Island Farms, Dade County, Florida. Winter 2010.

Hybrid	Marketable yield (25 lb box/A)	Fruit size (g)	Culls (% by wt.)
Fla. 8314	1806 a[z]	144 e	29 d
Fla. 8455	1538 ab	183 ab	32 cd
Tasti-Lee	1529 ab	154 de	33 b-d
Sanibel	1478 ab	175 bc	43 ab
Fla. 8787	1301 ab	187 ab	41 a-c
Florida 47	1267 ab	195 a	41 a-c
Tribeca	1242 b	162 cd	48 a

[z] Mean separation in columns by DMRT at $P \leq 0.05$.

Firmness and color for hybrids grown in Dade County, Winter 2009.

Hybrid	Firmness (mm deformation)	External fruit color		Internal fruit color	
		L*	Hue angle	L*	Hue angle
Sanibel	5.0 a[z]	42.6 a	51.7 a	38.5 ab	51.9 a
Fla. 8786	4.9 a	42.3 ab	48.8 bc	36.3 b	43.5 c
212	4.8 a	41.7 ab	51.2 a	40.1 a	46.2 b
Tribeca	3.8 b	41.3 b	48.1 c	36.3 b	51.6 a
Fla. 8787	3.6 b	42.0 ab	49.9 a-c	37.5 b	44.1 bc
Florida 47	3.5 b	42.6 a	50.8 ab	36.5 b	52.3 a

[z] Mean separation in columns by Duncan Multiple Range Test at $P \leq 0.05$.

Tomato Yield Trial NFREC, Fall 2009

Entry	Source	Marketable Yield (boxes/acre) Extra Large	Marketable Yield (boxes/acre) Total	Marketable (%)	Fruit Size (oz)
Fla. 8733	GCREC	2298 a[z]	3129 a	86.4 a-e	5.8 b-f
Tribeca	GCREC	2004 a-c	2673 ab	87.9 a-d	6.1 b-d
Fla. 8455	GCREC	2072 ab	2460 bc	87.5 a-e	6.8 a
BHN 765	BHN	1706 b-d	2405 b-d	86.1 a-e	6.1 b-d
Mt. Glory	NCS	1619 b-d	2370 b-d	85.8 a-e	6.0 b-e
Solar Fire	Harris Moran	1389 d-f	2286 b-d	89.6 ab	6.1 b-d
Tycoon	Hazera	1699 b-d	2239 b-d	82.1 ef	6.2 bc
Fla. 8555	GCREC	1460 cd	2215 b-d	88.7 ab	5.4 f
Fla. 8690	GCREC	1335 d-f	2169 b-d	89.4 ab	5.8 c-f
Quincy	Seminis	1434 c-f	2040 b-e	92.3 a	5.8 b-f
BHN 602	BHN	1446 c-e	2028 b-e	85.3 b-e	6.1 b-e
Redline	Syngenta	1291 d-f	1990 b-f	88.9 ab	5.9 b-f
Bella Rosa	Sakata	1364 d-f	1936 b-f	85.8 a-e	5.9 b-f
3095	Hazera	1345 d-f	1845 c-f	78.3 fg	6.1 b-e
Security 28	Harris Moran	1375 d-f	1816 c-f	82.5 d-f	6.3 ab
3096	Hazera	1141 d-f	1781 c-f	74.8 g	5.7 d-f
Inbar	Hazera	1087 d-f	1732 c-f	79.8 f	5.7 d-f
Finishline	Syngenta	1178 d-f	1723 c-f	88.2 a-c	5.9 b-e
FL 91	Seminis	1302 d-f	1695 d-f	85.7 a-e	6.0 b-e
Ofri	Hazera	831 f	1383 ef	82.8 c-f	5.5 ef
HMX 8847	Harris Moran	836 ef	1281 f	86.7 a-e	5.9 b-f

Yield of selected tomato hybrids at GCREC , Spring 2010.

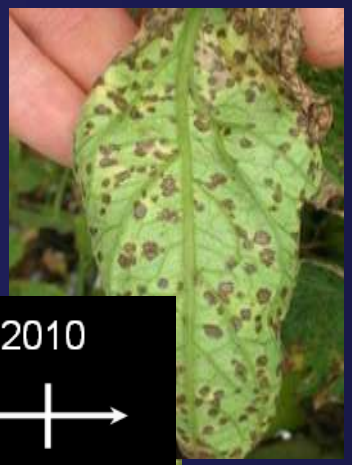
		Marketable Yield		Fruit size	Culls
Hybrid	Rank	Total	5 x 6	(oz.)	(% by wt.)
8801 (HT)[z]	1	2793 a[y]	2156 a	6.53 e	14.3 c
8763 (BST)	2	2773 a	2340 a	6.78 c-e	16.5 bc
8704 (BST)	3	2445 ab	2770 a	8.01 a-c	12.8 c
8802 (HT)	4	2391 ab	2195 a	8.54 ab	23.7 a-c
8712 (BST)	5	2381 ab	2099 a	7.49 b-d	15.5 bc
8455 (HT)	6	2348 ab	1547 ab	9.16 a	31.8 ab
8770	7	2318 ab	2147a	7.81 a-d	21.7 a-c
8717 (HT)	8	2315 ab	1713 ab	6.76 c-e	22.2 a-c
8761 (BST)	9	2285 ab	2164 a	8.75 ab	11.5 c
8760	10	2283 ab	2187 a	8.63 ab	9.5 c
Tasti-Lee	17	2041 ab	1188 b	5.82 e	13.6 c
Florida 47	30	1837 b	1392 b	6.48 de	34.5 a

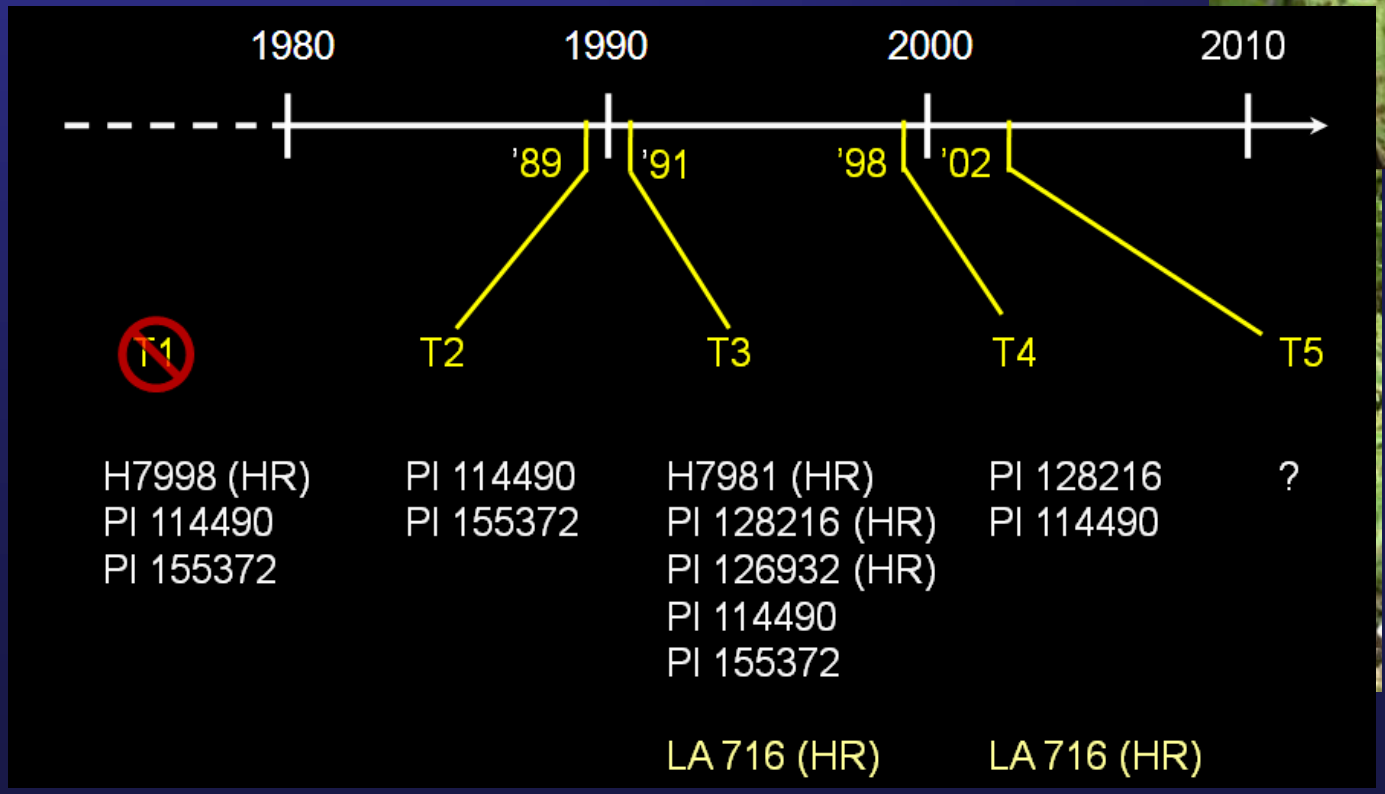
[z] HT = heat tolerant, BST = bacterial spot tolerant

[y] Mean separation in column by Duncan's multiple range test at $P \leq 0.05$.

Bacterial Spot

- Causal agent:
  - *Xanthomonas euvesicatoria* (Race T1)
  - *Xanthomonas vesicatoria* (Race T2)
  - *Xanthomonas perforans* (Races T3, T4, T5)





Yield, fruit size and bacterial spot disease severity for plum tomatoes at GCREC, Spring 2010.

Genotype	Marketable yield (25 lb boxes/A)	Fruit size (g)	Length/width ratio	Culls (% by wt.)	Bacterial spot disease severity[z]
Picus	3048	100.5 a[y]	1.52 a	13.6	6.0a
Fla. 8835	2743	72.0 b	1.38 b	6.1	4.3b
Fla. 8611	2579	59.2 b	1.34 b	5.8	3.5c
	NS			NS	

[z] Rated on the Horsfall-Barratt scale, lower numbers indicate less disease.
[y] Mean separation in columns by Duncan's multiple range test at $P \leq 0.05$.

Fruit firmness and color for plum tomatoes at GCREC, Spring 2010

	Firmness	External fruit color		Internal fruit color	
Genotype	mm deformation	L*	Hue angle	L*	Hue angle
Picus	149.5 c[z]	43.0 a	49.7	42.7 b	53.5 b
Fla. 8835	173.5 b	43.8 a	52.4	48.1 a	58.8 a
Fla. 8611	188.3 a	40.4 b	52.2	46.6 a	60.0 a
			NS		

[z] Mean separation in columns by Duncan's multiple range test at $P \leq 0.05$.

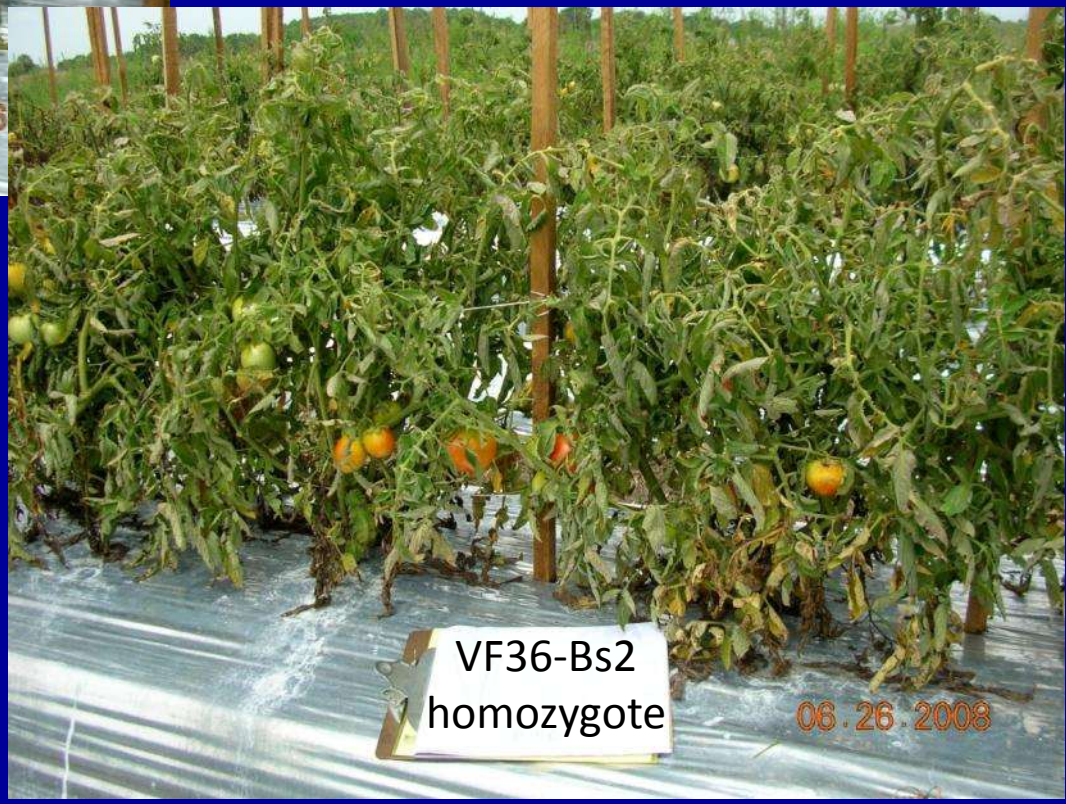
DIFFERENTIALS

RACE	ECW	ECW-10R Bs1	ECW-20R Bs2	ECW-30R Bs3	PI 235047
P0	S	HR	HR	HR	HR
P1	S	S	HR	HR	HR
P2	S	HR	HR	S	S
P3	S	S	HR	S	HR
P4	S	S	S	HR	HR
P5	S	HR	S	S	S
P6	S	S	S	S	HR
P7	S	S	HR	HR	S
P8	S	S	HR	S	S
P9	S	S	S	S	S

SEASON 1 and 2 - Fall 2007 and Spring 2008 Balm, Florida

Genotype	Marketable Yield (kg/plant)	Total Yield (kg/plant)	Fruit Weight (g)	Disease Severity[2]
VF36	0.25 b[1]	0.80 b	133 c	7.4 a
VF36 *Bs2* homozygous	0.96 a	1.78 a	132 c	3.0 d
VF36 *Bs2* hemizygous	1.01 a	1.97 a	138 c	3.0 d
FL 47	1.19 a	1.94 a	176 a	5.6 c
FL 91	1.26 a	1.71 a	180 a	5.6 c
Sebring	1.18 a	1.67 a	170 ab	6.1 b

[1] Means in column width the same letter are not significantly different, $P \leq 0.05$, Duncans multiple range test.
[2] Disease severity based on the Horsfall-Baratt scale.



2008 Field Trial, Balm, FL


VF36 *Bs2* hemizygous

Tomato Yield Trial at Quincy, Florida- Fall 2005

Marketable yield (25 lb. box/A)

hybrid	total	x-large	fruit wt. (oz)	% marketable
Fla.8314	1729 a[2]	1072 ab	5.7 c-e	86.4 ab
Phoenix	1528 ab	1201a	6.6 a	87.6 ab
Solar Fire	1492 a-c	828 a-e	5.5 c-g	83.9 a-c
Quincy	1398 a-d	1142 a	6.7 a	88.9
Talladega	1380 a-e	937 a-c	5.9 b-d	84.7 a-c
Florida 91	1224 a-f	924 a-d	6.1 bc	86.6 ab
Sebring	1130 b-f	695 b-g	5.7 c-e	88.8 a
Florida 47	1103 b-f	566 c-h	5.9 b-d	82.3 a-c
Tasti-Lee	967 c-f	392 f-h	5.0 f-h	80.5 a-c
Fla.7964	962 c-f	548 c-h	5.4 d-g	76.7 bc
Crista	830 ef	524 d-h	5.9 b-d	81.0 a-c
Amelia	777 f	591 c-g	5.9 b-d	73.7 c

Bs-2 Transformation Summary

- VF36 transformed *Bs2* provided resistance to bacterial spot race T4 when homozygous or hemizygous.
- VF36 transformed with *Bs2* had increased yield over 'VF36'.
- Fla. 8000 is being transformed with *Bs2* which will allow for hybrid Fla. 8314 (*Bs2*) to be resistant to bacterial spot races T3 and T4. Meanwhile TYLCV resistance is being added to the other parent.
- Will the market be ready for a GMO tomato?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Summary of survey results from three cities comparing flavor of Tasti-Lee, Tomatoes on the Vine (TOV) and Field Tomatoes. There were over 90 respondents to the survey.

Variety	Excellent	Good	OK	Bad	Terrible
Tasti-Lee	22.2	48.9	21.1	6.7	1.1
TOV	28.1	33.7	22.5	7.9	7.9
Field	14.1	37.0	38.0	10.9	0.0


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J. Scott's Vision for the Florida Tomato Industry of the Future

- Food Service: Mature green tomato varieties, will be jointless, CGH types that will not be staked and harvested by machine
- Supermarket: Vine–ripe tomato varieties of the Tasti-Lee type will be staked and hand harvested

WANTED: Somebody to go back in time with me. This is not a joke. P.O. Box 322, Oakview, CA 93022. You'll get paid after we get back. Must bring your own weapons. Safety not guaranteed. I have only done this once before.


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