Developing Machine-Harvestable Fresh Market Tomatoes;

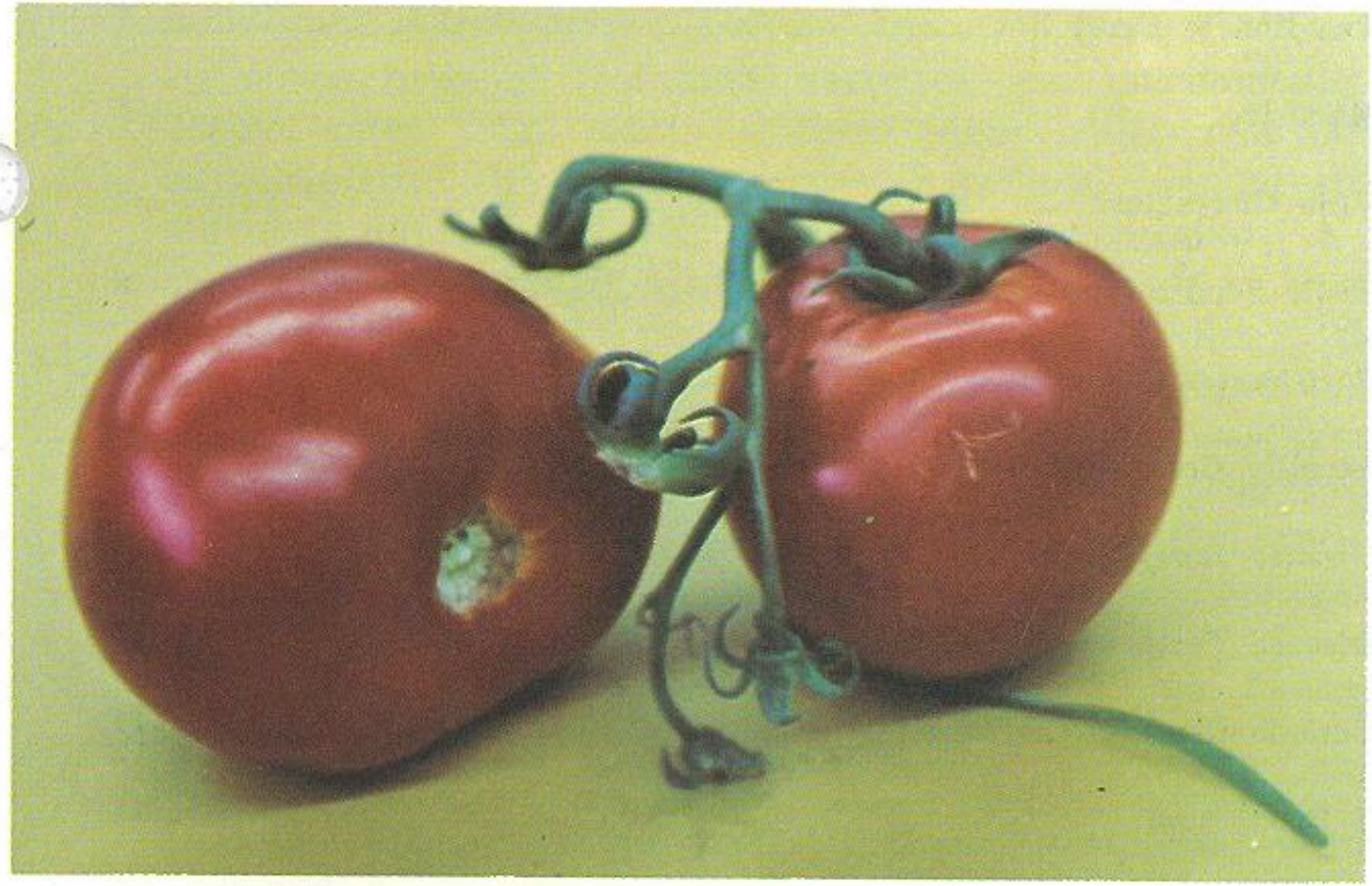
and other Highlights from the UF Breeding Program

S.F. Hutton, J.W. Scott, B.M. Santos
813-633-4137
sfhutton@ufl.edu

UF UNIVERSITY of FLORIDA

FLORIDA MH-1

florida's first machine harvest fresh market tomato




0102-1

Comparison of once-over harvest yields of compact growth habit (CGH) tomato inbreds grown at GCREC, Balm, spring 2012[z].

Genotype	Total (25 lb box/A)	XL (25 lb box/A)
Fla. 8916	2514 a	1076 a
Fla. 8607	2296 ab	750 b
Fla. 8834	2139 bc	274 c
Fla. 8107	2008 bc	658 b
Fla. 8914	1965 c	362 c

[z] Split-plot design with varying nitrogen rates as main plot; 10 plants per plot at 1-ft spacing; mean separation by LSD

Once-over harvest yield of compact growth habit (CGH) tomato inbreds compared to 'Florida 47' on a grower farm, winter 2013[z].

Genotype	25 lb box/acre	25 lb box/bin
Florida 47	490	33.26
Fla. 8916	1359	32.36
Fla. 8916a	1476	30.76
Fla. 8916b	1482	31.87
Fla. 8915	900	25.72
Fla. 8914	490	24.50
Fla. 8834	660	33.00

[z] 8916, 8916a, 8916b grown on 0.31 A, other CGH lines grown on 0.1 A, Florida 47 grown on 11.25A.

Spring 2013…

058.3


0392-1


0399-2


0399-2

2014-2015 Specialty Crop Block Grant

Main Objectives:

1 – Improve jointless, CGH germplasm

2 – Determine best cultural practices

3 – Assess labor efficiency of mechanical harvest

4 – Evaluate feasibility/profitability of adopting CGH varieties and mechanical harvesting

2014-2015 Specialty Crop Block Grant

Main Objectives:

1 – Improve jointless, CGH germplasm

2 – Determine best cultural practices

3 – Assess labor efficiency of mechanical harvest

4 – Evaluate feasibility/profitability of adopting CGH varieties and mechanical harvesting

2014-2015 Specialty Crop Block Grant

Breeding Objectives:

- Develop improved parents and hybrids
- Integrate key traits
  - TYLCV, FCR, TSWV resistances
  - Heat-tolerance
  - Graywall resistance

Program Highlights

Short term goals:

- Improved inbreds and hybrids
  - Yield, size, % marketable, firm, etc.
  - With key resistances (TYLCV, FCR, TSWV)
  - Heat tolerance

Long term goals:

  - Bacterial spot and bacterial wilt resistance
  - TYLCV gene discovery and characterization
  - Graywall resistance
  - Whitefly resistance
  - Compact growth habit, jointless-pedicel

Program Highlights

Short term goals:

- Improved inbreds and hybrids
  - Yield, size, % marketable, firm, etc.
  - With key resistances (TYLCV, FCR, TSWV)
  - Heat tolerance

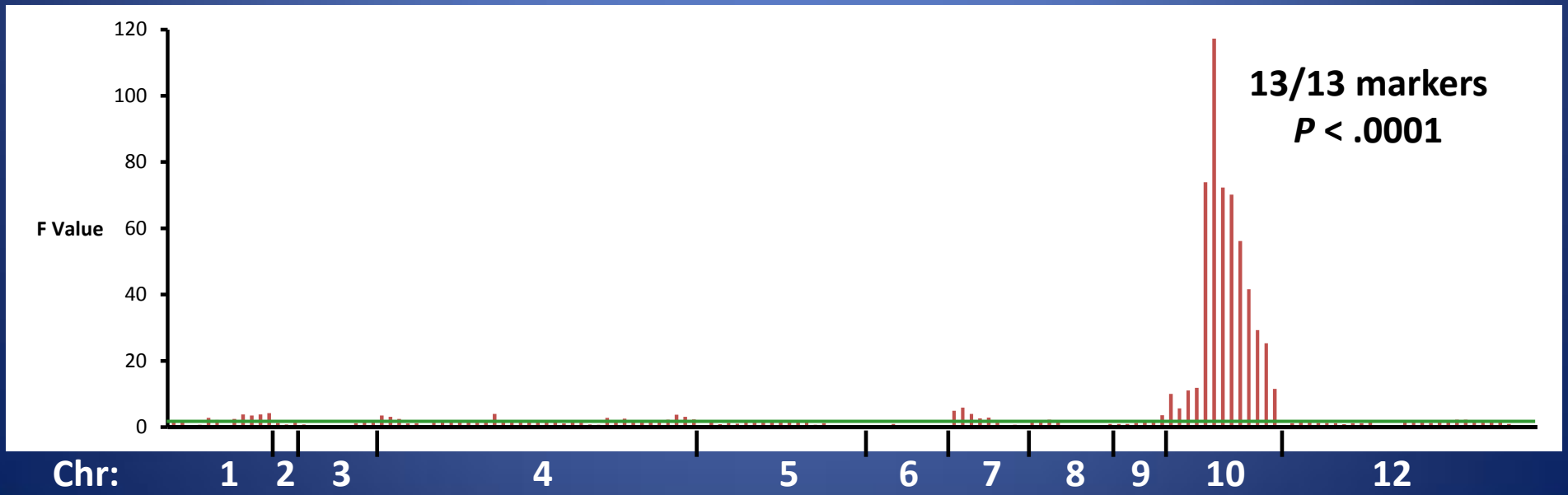
Long term goals:

  - Bacterial spot and bacterial wilt resistance
  - TYLCV gene discovery and characterization
  - Graywall resistance
  - Whitefly resistance
  - Compact growth habit, jointless-pedicel

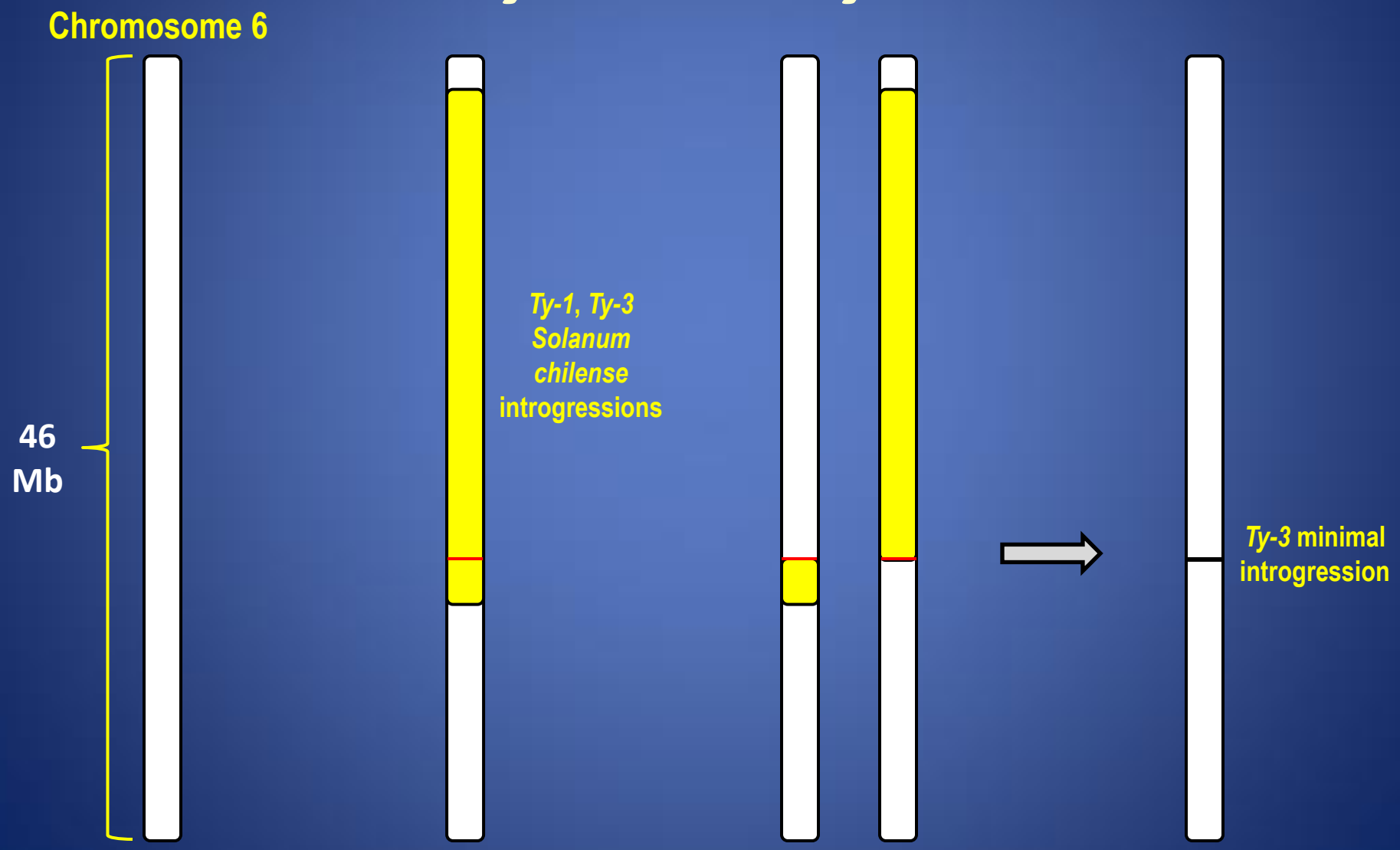
Ty-6 Mapping

- Genotyping through SolCAP Community Project
- Subset of 384 SNPs optimized for processing and fresh market
- 158 polymorphic SNPs for (7776 x 8383) population


F_1
Fla. 8383
Fla. 7776


13/13 markers
P < .0001
F Value
120
100
80
60
40
20
0
Chr:
1
2
3
4
5
6
7
8
9
10
12

Ty-1 and *Ty-3*


Chromosome 6
46 Mb
Ty-1, *Ty-3* *Solanum chilense* introgressions
Ty-3 minimal introgression

Marketable yield, extra-large yield, fruit size and culls for tomato inbreds and control hybrids in spring 2013 at GCREC

	Marketable yield (25 lb. box/A)		Fruit size	Culls
Entry	Total	Extra-large	(oz.)	(% by wt.)
8872B	1904 a[z]	1648 a	8.1 a	31 bc
7781	1884 a	482 d	4.9 f	27 c
E228 bwt	1777 a	825 b-d	5.9 c-e	22 c
E249 TSWV	1743 a	981 b-d	6.2 cd	25 c
8869	1700 a	924 b-d	6.1 cd	37 a-c
Solar Fire	1639 ab	608 cd	5.3 ef	30 bc
8921 (sister)	1611 ab	642 cd	5.6 de	33 a-c
8923B	1513 ab	1308 ab	7.9 a	32 a-c
8925	1472 ab	1116 bc	7.0b	35 a-c
Sanibel	1366 ab	981 b-d	6.5 bc	44 ab
Sebring	1057 b	664 cd	6.2 cd	45 ab
Florida 47	1028 b	544 d	5.7 de	48 a

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

Marketable yield, extra-large yield, fruit size and culls for tomato inbreds and control hybrids in spring 2013 at GCREC

	Marketable yield (25 lb. box/A)		Fruit size	Culls
Entry	Total	Extra-large	(oz.)	(% by wt.)
8872B	1904 a[z]	1648 a	8.1 a	31 bc
7781	1884 a	482 d	4.9 f	27 c
E228 bwt	1777 a	825 b-d	5.9 c-e	22 c
E249 TSWV	1743 a	981 b-d	6.2 cd	25 c
8869	1700 a	924 b-d	6.1 cd	37 a-c
Solar Fire	1639 ab	608 cd	5.3 ef	30 bc
8921 (sister)	1611 ab	642 cd	5.6 de	33 a-c
8923B	1513 ab	1308 ab	7.9 a	32 a-c
8925	1472 ab	1116 bc	7.0b	35 a-c
Sanibel	1366 ab	981 b-d	6.5 bc	44 ab
Sebring	1057 b	664 cd	6.2 cd	45 ab
Florida 47	1028 b	544 d	5.7 de	48 a

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

Total marketable yield, extra-large marketable yield, fruit size and culls for tomato hybrids in spring 2013 at GCREC.

	Marketable yield (25 lb. box/A)		Fruit size	Culls
Entry	Total	Extra-large	(oz.)	(% by wt.)
8904	2524 a[z]	1673 a	6.6 a	14 e
8314 Ty1	2493 a	913 e-h	5.2 cd	19 de
8884	2388 ab	1609 ab	6.5 ab	18 de
Tasti-Lee Sw7	2307 a-c	783 f-h	5.1 cd	20 de
8905 BWT	2238 a-d	1403 a-c	6.0 a-c	13 e
Phoenix	2206 a-d	1304 b-d	6.2 a-c	20 de
E126	2159 a-e	1150 c-e	5.7 a-d	28 a-d
8897 Ty1	2152 a-e	893 e-h	5.4 b-d	20 de
E126 Ty1, Frl	2148 a-e	950 d-h	5.5 a-d	18 de
8897	2075 a-e	995 d-f	5.5 a-d	25 b-e
Tasti-Lee	1820 b-f	739 g-h	5.3 b-d	21 de
Tasti-Lee Ty1	1687 c-f	343 i	4.8 d	22 c-e
Solar Fire	1658 d-f	675 hi	5.4 b-d	30 a-d
8314	1652 d-f	770 f-h	5.5 a-d	38 a
Florida 47	1548 e-g	965 d-g	6.1 a-c	34 a-c
Tygress	1426 fg	873 e-h	5.8 a-c	37 ab
Sebring	986 g	632 hi	6.2 a-c	40 a

z Mean separation in columns by Duncan's multiple range test at $P < 0.05$.

Thanks!