

Variety Evaluation of Compact Growth Habit Tomatoes with Jointless Pedicels in a Modified Bed Configuration

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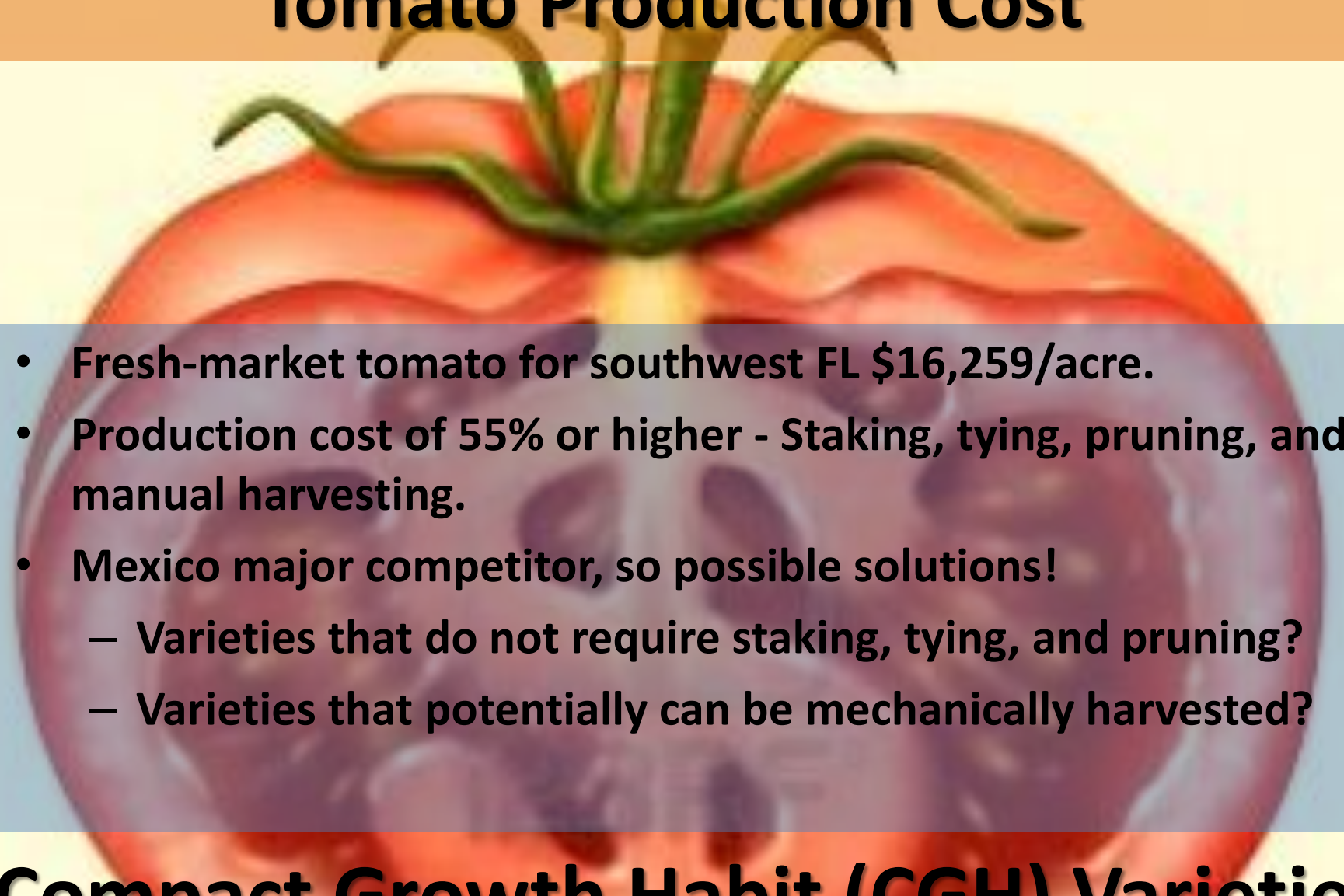
**UNIVERSITY OF
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Florida Tomato Production – Staked Upright Varieties



- Raised beds
- Polyethylene mulch
- Staking, tying, and pruning
- Manual harvest – mature-green

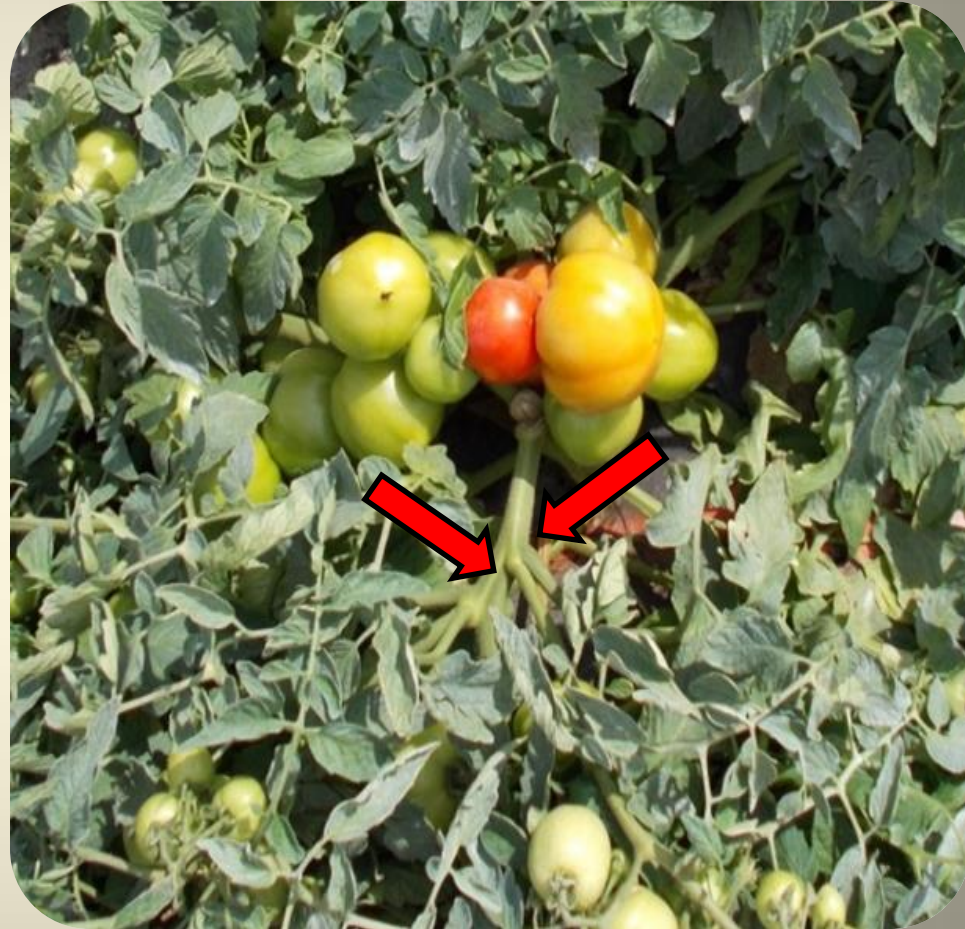
Tomato Production Cost

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- Fresh-market tomato for southwest FL \$16,259/acre.
 - Production cost of 55% or higher - Staking, tying, pruning, and manual harvesting.
 - Mexico major competitor, so possible solutions!
 - Varieties that do not require staking, tying, and pruning?
 - Varieties that potentially can be mechanically harvested?

Compact Growth Habit (CGH) Varieties

CGH Tomatoes

- Determinate plants
- Shortened internodes and increased side branching
 - brachytic (*br*) gene
- Upright or prostrate growth
 - undefined genes



Credits: Aline Coelho Frasca

CGH and Staked Upright



New Tomato Production System

- **Harvest**
 - Manual or potentially mechanical
 - 1 or 2 harvests – crop from the field earlier
- **Bed configuration**
 - Increased slope for improved drainage
- **Plant population**
 - Higher plant density

Objective

The objective of this study was to evaluate CGH tomato breeding lines on yield and postharvest quality

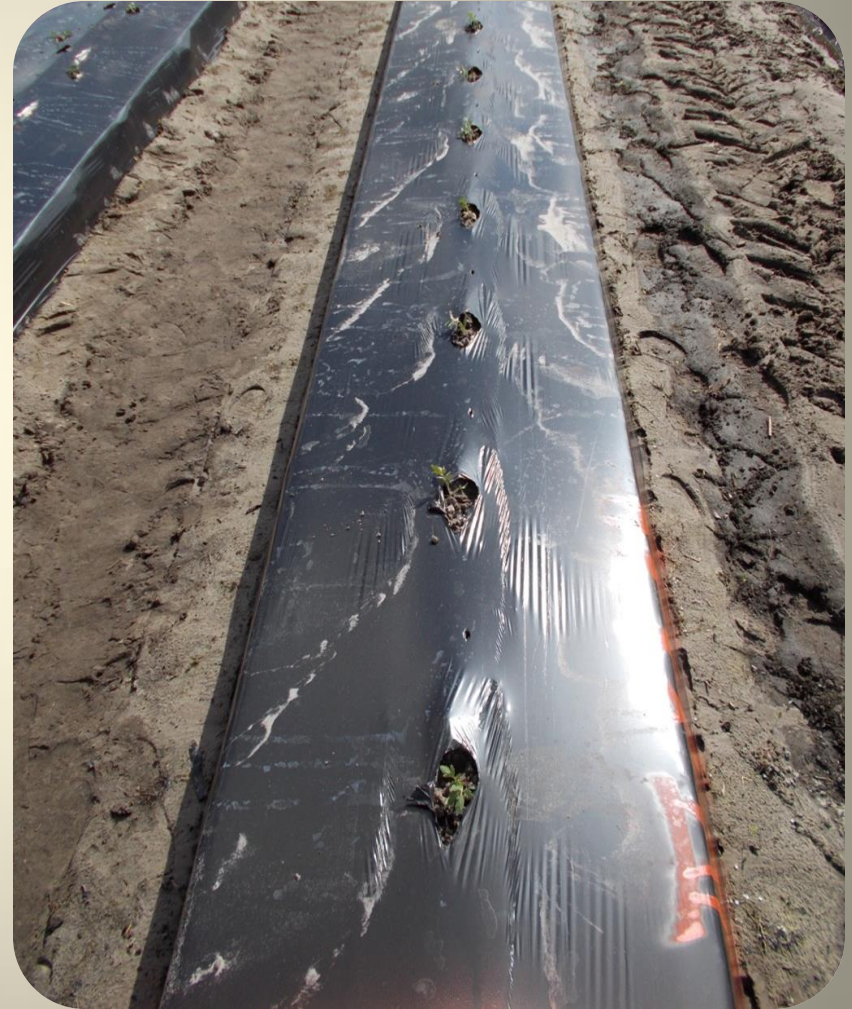
Materials and Methods

Six CGH breeding lines from UF – Tomato Breeding Program

<i>Tomato breeding line</i>	<i>Growth habit</i>	<i>Fruit shape</i>	<i>Jointless (j2) gene</i>	<i>Light green shoulders (u) gene</i>
8914	Upright	Flat round	Present	Present
8915	Upright	Flat round	Present	Present
8916	Prostrate	Flat round	Present	Present
8916a	Prostrate	Flat round	Present	Present
8916b	Prostrate	Flat round	Present	Present
8834	Prostrate	Flat round	Present	Present

Experimental Design

- Study conducted in Immokalee, FL
- During spring 2013 (5.7 inches of rainfall)
- Complete randomized block design with 4 replications
- Plant spacing: 24 inches
- Plant population: 3,630 plants/acre.



Bed Modified Configuration (10% steeper slope)

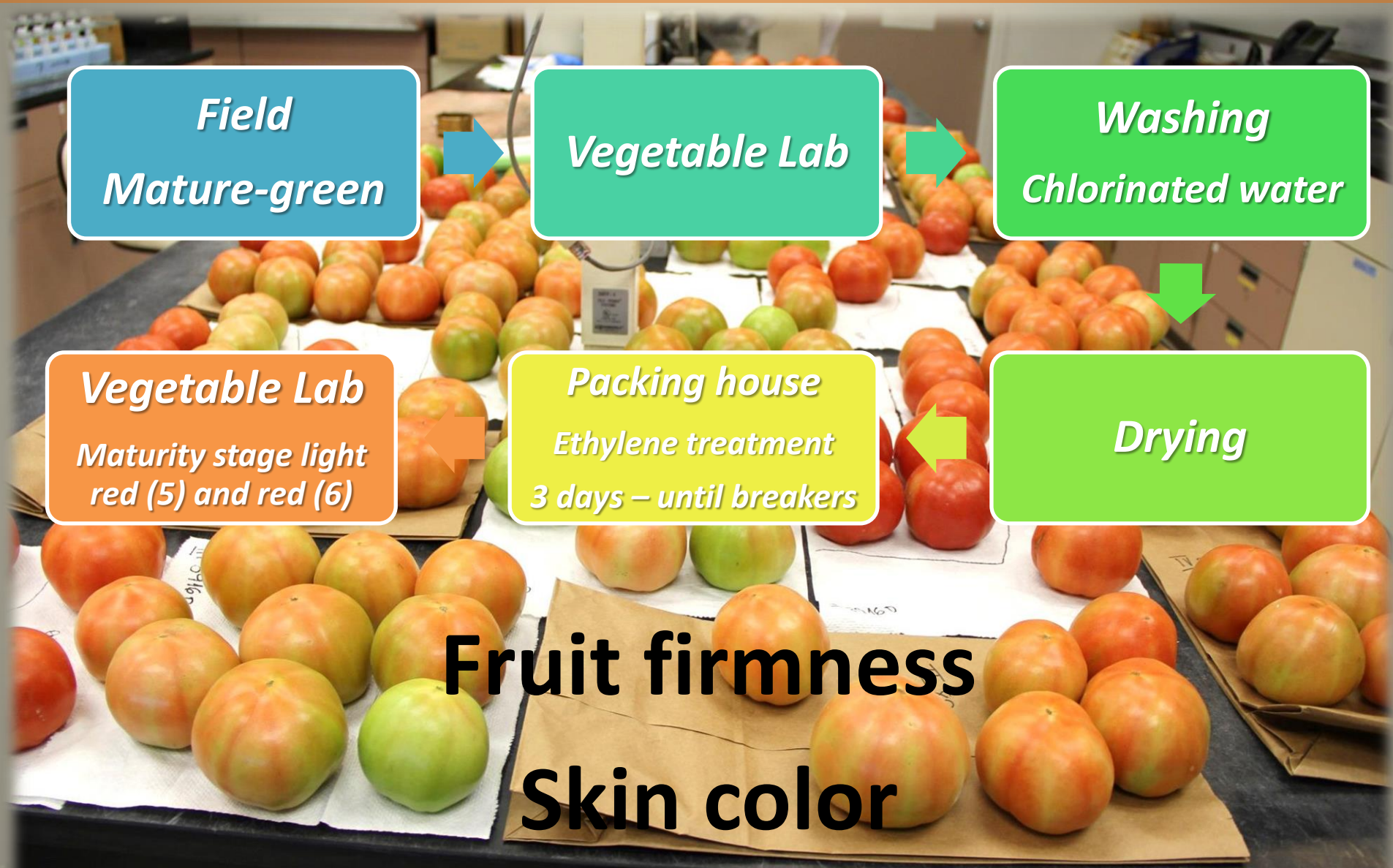


Harvest and Data Collection

- Two harvests at mature-green stage.
- Marketable yield sizes
 - USDA grades and standards
- Unmarketable categories
 - Sunscald, off-shape, and other defects (scratching and gray wall)



Postharvest Evaluation



Statistical Analysis

- Analysis of Variance (ANOVA)
- Mean separation
 - Duncan's multiple range test
 - 95% confidence level (*P-value*)

Results

First harvest

Breeding lines	Extra large	Large	Medium	Total	Culls
	Yield (boxes/acre)				
8914	152d	237b	146bc	535c	153
8915	375c	360a	290a	1,025a	284
8916	599a	270b	153bc	1,022a	200
8916a	419bc	232b	152bc	803b	292
8916b	483b	206bc	191b	879b	179
8834	186d	162c	115c	463c	172
P-value	0.0001	0.0003	0.0002	0.0001	0.12
Significance	***	***	***	***	NS

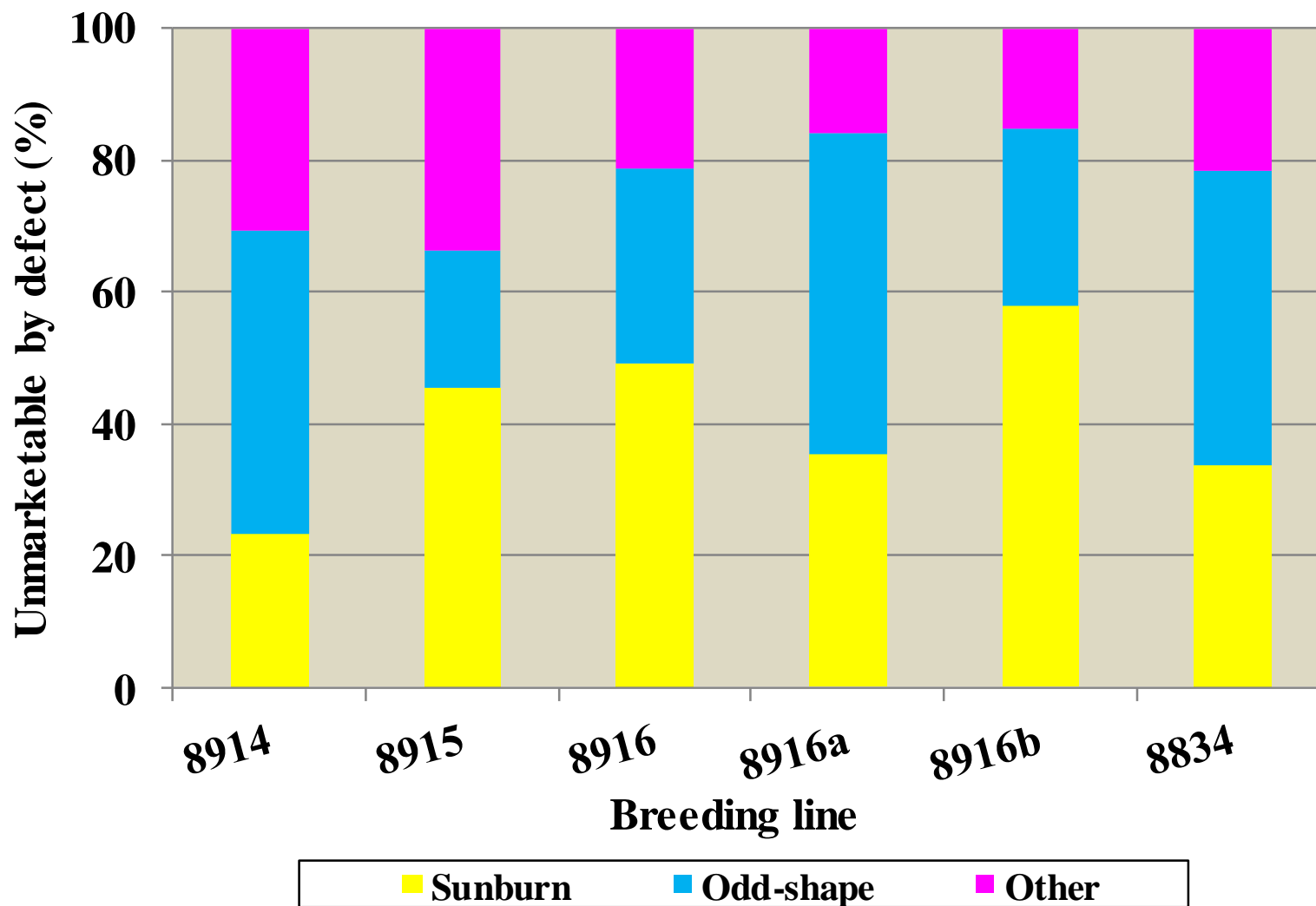
Second Harvest

Breeding lines	Extra large	Large	Medium	Total	Culls
	Yield (boxes/acre)				
8914	41bc	197b	635a	873a	212b
8915	35bc	183bc	602a	821a	384a
8916	59b	137cd	443b	639b	319ab
8916a	99a	254a	439b	792a	402a
8916b	45bc	92de	358b	494bc	272ab
8834	16c	48e	328b	392c	224b
P-value	0.0009	0.0001	0.0001	0.0001	0.002
Significance	***	***	***	***	**

Total Season Harvest

Breeding lines	Extra large	Large	Medium	Total	Culls
	Yield (boxes/acre)				
8914	193d	434b	781a	1,409cd	366b
8915	410c	543a	892a	1,846a	668a
8916	658a	407b	596b	1,661ab	519ab
8916a	518b	486ab	591b	1,595bc	694a
8916b	526b	298c	549bc	1,373d	439b
8834	202d	210c	443c	855e	396b
P-value	0.0001	0.0001	0.0001	0.0001	0.009
Significance	***	***	***	***	**

Fruit Defects – Total Season Harvest



Postharvest Evaluation

Breeding lines	Firmness Deformation (mm)	Skin color (1-6 scale)
8914	2.11	5.94
8915	2.19	6.00
8916	2.35	5.88
8916a	2.61	5.81
8916b	2.74	6.00
8834	2.95	5.94
<i>P-value</i>	0.31	0.29
<i>Significance</i>	NS	NS

How was the Yield of the CGH Tomato?

CGH breeding line NC 13G-1

(Kemble, 1993)

- Single-row planting (24 inches)
- Yield in boxes/acre
(**vine-ripe** tomatoes):

First 3 harvests: 1,314

Total of 6 harvests: 2,267

UF/TBP CGH breeding lines

(Present study)

- Single-row planting (24 inches)
- Yield in boxes/acre
(**mature-green** tomatoes):

First harvest: 1,025

Total of 2 harvests: 1,846

How was the Yield of the CGH Tomato?

Staked upright variety HM 8849

(Ozores-Hampton, unpublished data)

- Single-row planting (24 inches)
- Yield in boxes/acre

(**mature-green** tomatoes):

First marketable harvest: 994

Second marketable harvest: 639

Total marketable (3): 1,634

Extra-large fruit (3): 1,255

UF/TBP CGH breeding lines

(Present study)

- Single-row planting (24 inches)
- Yield in boxes/acre

(**mature-green** tomatoes):

First marketable harvest: 1,025

Second marketable harvest: 873

Total marketable: 1,846

Extra-large fruit: 658

8914



8915



8916



8916a



8916b



8834



Conclusions

- **CGH 8816 and 8815 tomatoes may be a viable option based on yield and quality. However, 8816 produced the highest extra-large fruits.**
- **CGH tomatoes production cost can potentially be lower than staked upright varieties with no staking, tying, and pruning. Also, may require lower fertilizer inputs.**
- **Second year of data is needed to advance 2 or more lines.**

Acknowledgements

- **TBP providing the breeding lines**
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