

2014 High Tunnel Tomato Variety Trials



**Kansas State University
Horticulture Research and Extension Center
Olathe, Kansas**

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www.hightunnels.org



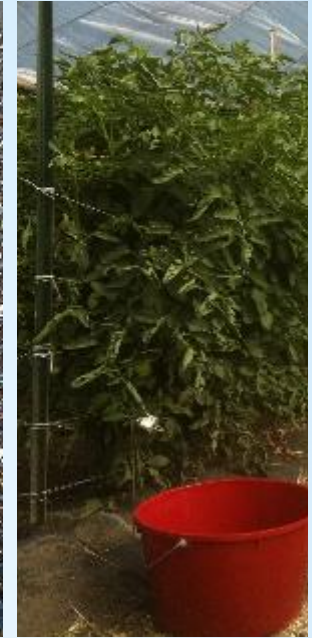
K-STATE

Research and Extension

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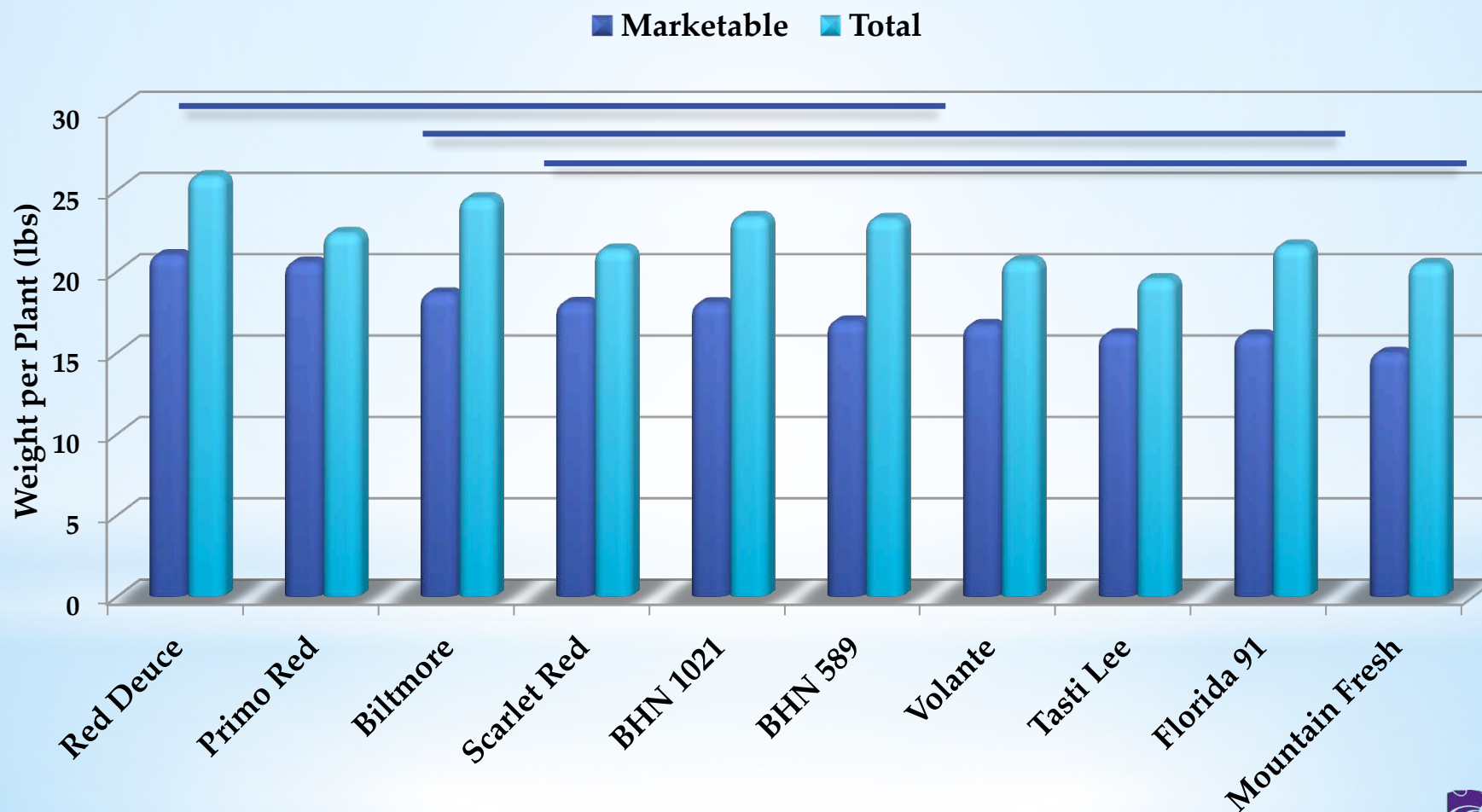
Materials & Methods

- **Planted** in tunnel: April 22nd
- Five plants per plot
- 18" in-row spacing
- Pruned to first fruit hand
- Stake-and-weave
- **Fertilize:**
 - **Preplant:** calcium nitrate and potassium nitrate using equal portions of nitrogen at 75 lbs nitrogen/acre total.
 - **Fertigate:** carried out at a rate of 10lbs nitrogen/acre per application on 15 and 23 July, and 7 August
- **Harvest** from July 9 to October 2
- **IPM:** BT for army and horn worms



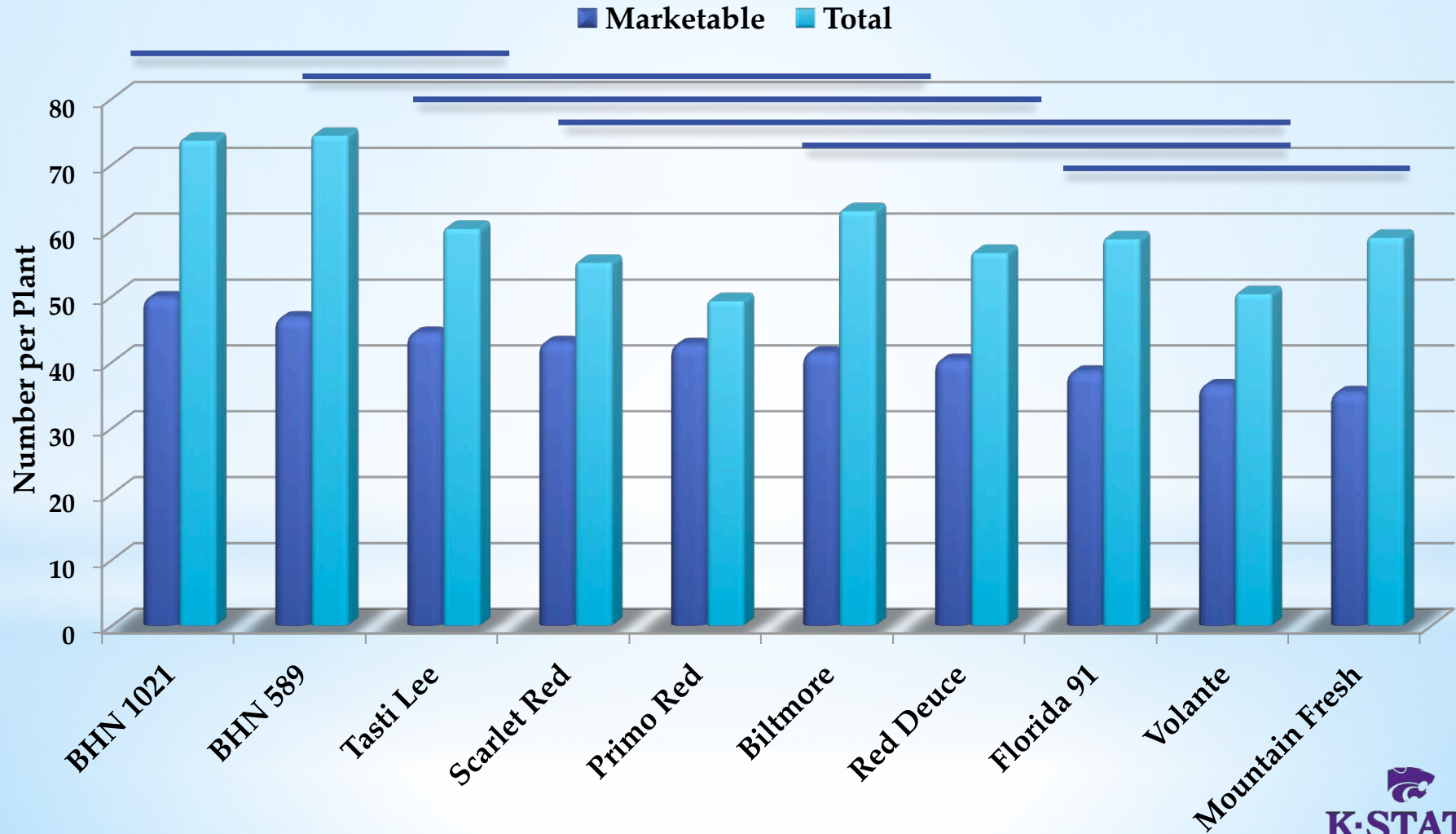
2014 KVGGA High Tunnel Tomato Variety Trial

Marketable & Total Weight per Plant



2014 KVGGA High Tunnel Tomato Variety Trial

Marketable & Total Number per Plant



2014 KVGGA High Tunnel Tomato Variety Trial

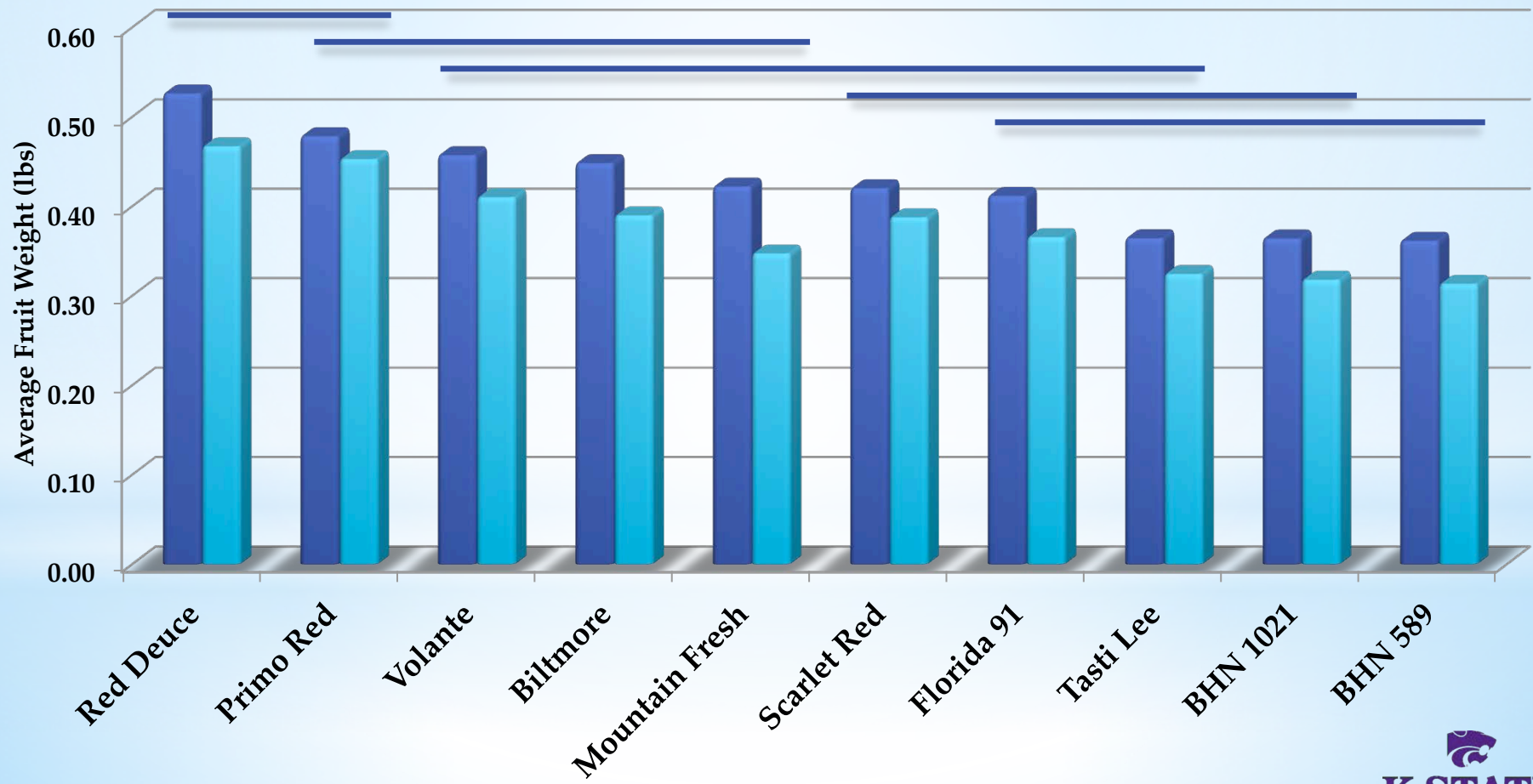
Marketable and total per plant fruit yield of tomato varieties grown in a three season high tunnel in Olathe, Kansas.

Variety	Marketable				Total			
	Number		Wt (lbs)		Number		Wt (lbs)	
Red Deuce	40.3	abcd	21.0	c	56.6	bcd	25.8	d
Primo Red	42.7	cde	20.5	c	49.3	a	22.3	abc
Biltmore	41.4	bcde	18.6	bc	62.9	d	24.5	cd
Scarlet Red	43.0	cde	18.0	abc	55.1	abc	21.3	ab
BHN 1021	49.8	f	18.0	abc	73.6	e	23.3	bcd
BHN 589	46.8	ef	16.9	ab	74.4	e	23.2	bcd
Volante	36.5	ab	16.7	ab	50.3	abc	20.6	ab
Tasti Lee	44.4	def	16.1	ab	60.2	cd	19.5	a
Florida 91	38.5	abc	16.0	ab	58.6	cd	21.5	abc
Mountain Fresh	35.4	a	14.9	a	58.9	cd	20.4	ab
LSD _(0.05)	5.6		3.5		7.3		3.1	

2014 KVGa High Tunnel Tomato Variety Trial

Average Fruit Weight

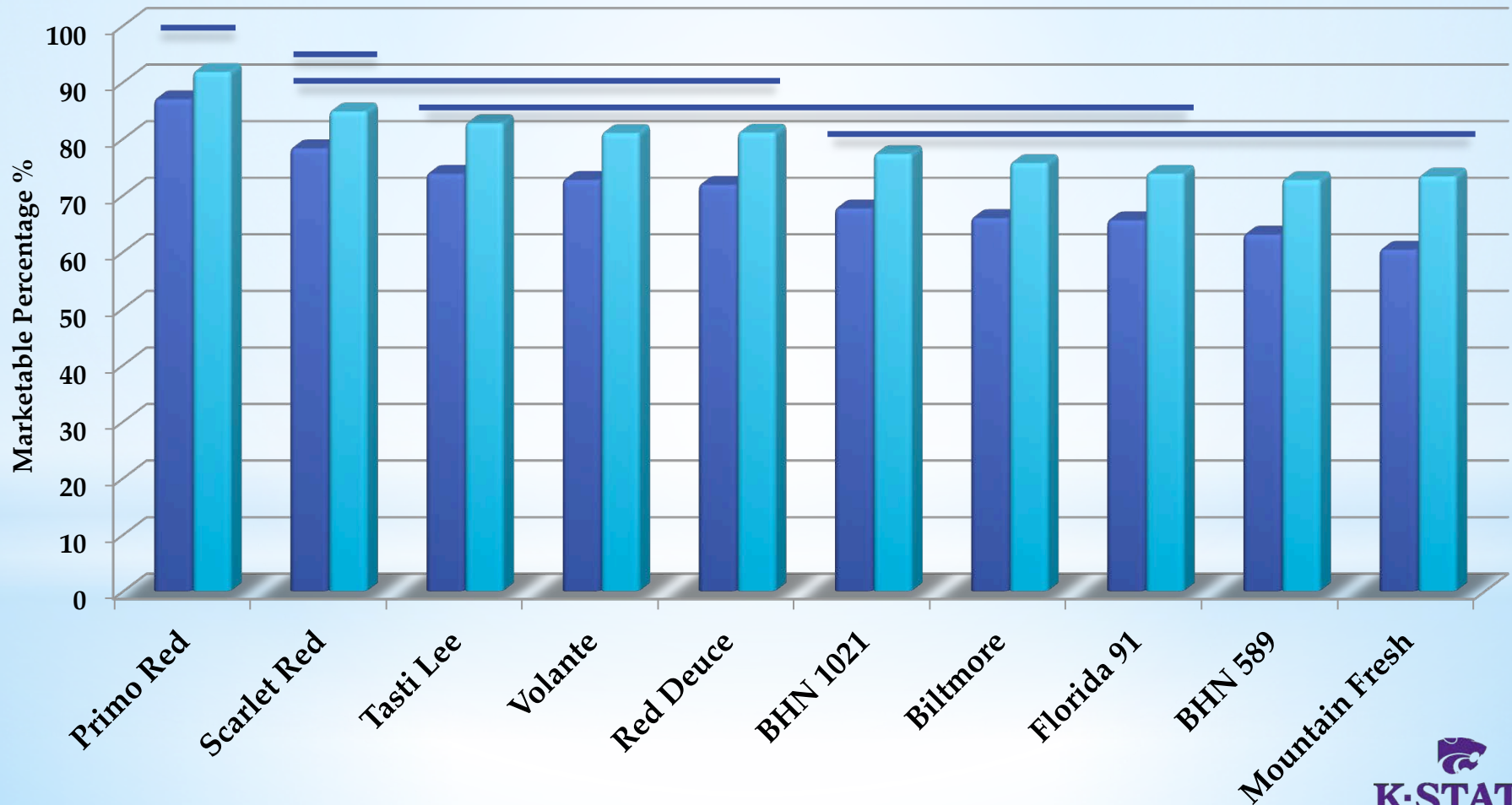
■ Marketable ■ Total



2014 KVGGA High Tunnel Tomato Variety Trial

Marketability Percentage by Weight & Number

■ Number ■ Weight



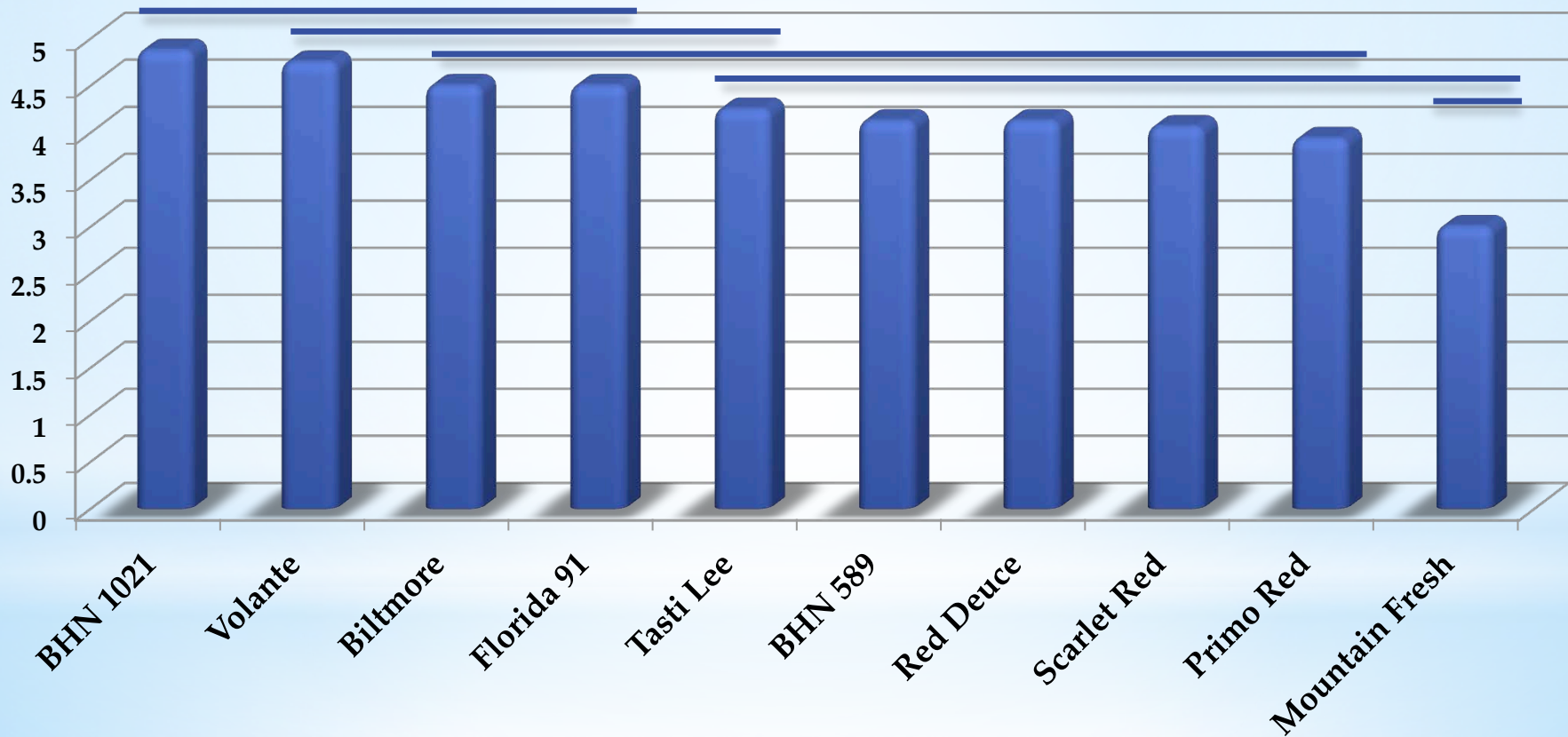
2014 KVGGA High Tunnel Tomato Variety Trial

Mean tomato fruit size (lbs) and marketability of tomato varieties grown in a three season high tunnel in Olathe, Kansas.

Variety	Average Fruit Size (lbs)				Percent Marketability			
	Marketable		Total		Number		Weight	
Red Deuce	0.53	e	0.47	d	71.8	bc	81.0	bcd
Primo Red	0.48	de	0.45	d	86.9	e	91.7	f
Biltmore	0.45	cd	0.39	bc	65.9	ab	75.6	ab
Scarlet Red	0.42	bc	0.39	bc	78.2	cd	84.8	de
BHN 1021	0.36	ab	0.32	a	67.6	ab	77.2	abc
BHN 589	0.36	a	0.31	a	63.0	a	72.6	a
Volante	0.46	cd	0.41	cd	72.7	bc	80.9	bcd
Tasti Lee	0.36	ab	0.32	a	73.7	bc	82.7	cd
Florida 91	0.41	abc	0.37	abc	65.5	ab	73.8	a
Mountain Fresh	0.42	cd	0.35	ab	60.3	a	73.3	a
LSD _(0.05)	0.06		0.06		8.3		6.7	

2014 KVGGA High Tunnel Tomato Variety Trial

Plant Vigor*
Rating 1= Least, 5=Most



**based on visual observations of plant height, biomass, and plant canopy*

2014 KVGGA High Tunnel Tomato Variety Trial

Average Fruit Size by Weight: Harvest Date

— BHN 589
 — BHN 1021
 — Biltmore
 — Florida 91
 — Mountain Fresh
 — Primo Red
 — Red Deuce
 — Scarlet Red
 — Tasti Lee
 — Volante



	Jun-24	Jul-7	Jul-11	Jul-14	Jul-21	Jul-14	Jul-30	Aug-06	Aug-13	Aug-14	Aug-25	Aug-14	Sep-14	Sep-10	Sep-19	Sep-19
BHN 589	0.37	0.52	0.49	0.54	0.51	0.59	0.53	0.45	0.37	0.32	0.19	0.30	0.29	0.27	0.26	0.19
BHN 1021	0.00	0.43	0.44	0.49	0.43	0.60	0.48	0.46	0.40	0.32	0.30	0.28	0.29	0.27	0.40	0.19
Biltmore	0.00	0.53	0.46	0.57	0.57	0.51	0.65	0.60	0.49	0.45	0.58	0.39	0.39	0.42	0.40	0.20
Florida 91	0.00	0.48	0.41	0.38	0.49	0.55	0.61	0.58	0.44	0.46	0.37	0.34	0.35	0.33	0.24	0.19
Mountain Fresh	0.00	0.41	0.44	0.61	0.56	0.42	0.59	0.47	0.41	0.40	0.33	0.27	0.29	0.28	0.29	0.19
Primo Red	0.22	0.47	0.51	0.60	0.52	0.48	0.56	0.56	0.57	0.62	0.36	0.46	0.46	0.43	0.44	0.32
Red Deuce	0.32	0.52	0.60	0.57	0.58	0.66	0.87	0.74	0.52	0.45	0.46	0.46	0.36	0.40	0.39	0.28
Scarlet Red	0.26	0.50	0.46	0.56	0.51	0.46	0.61	0.54	0.45	0.43	0.36	0.28	0.35	0.31	0.33	0.22
Tasti Lee	0.00	0.34	0.34	0.38	0.38	0.49	0.49	0.43	0.39	0.35	0.35	0.34	0.34	0.30	0.31	0.21
Volante	0.28	0.45	0.47	0.63	0.55	0.79	0.68	0.54	0.48	0.38	0.44	0.40	0.39	0.37	0.35	0.22

2014 KVGA High Tunnel Tomato Variety Trial

Variety	TSWV	Fusarium Wilt		Verticillium Wilt (r1)	Root-knot Nematode	TMV	Alternaria Stem Canker	Grey Leaf Spot
		Race 1	Race 2					
BHN589	R	R	R	R	R			
BHN1021	R	R	R	R	R			
Biltmore		R	R	R			R	R
Florida 91		R	R	R			R	R
Mountain Fresh		R	R	R	R			
Primo Red	IR	R	R	R		R		
Red Deuce		R	R	R		R		R
Scarlet Red		R	R	R			R	R
Tasti Lee		R	R	R				
Volante	IR	R	R	R			R	IR

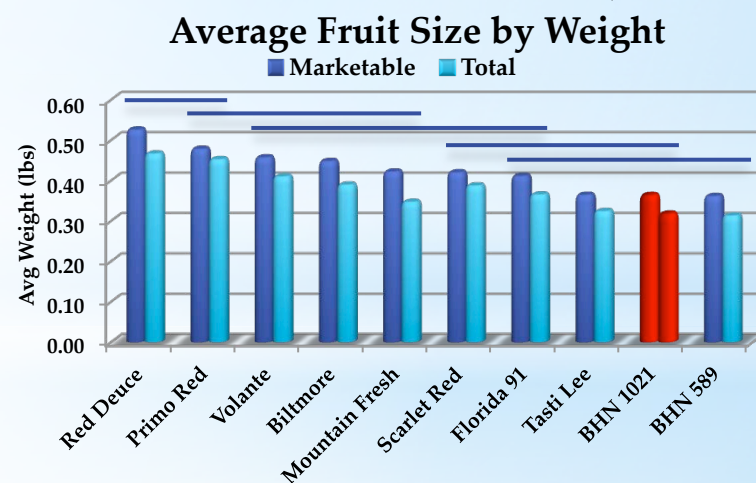
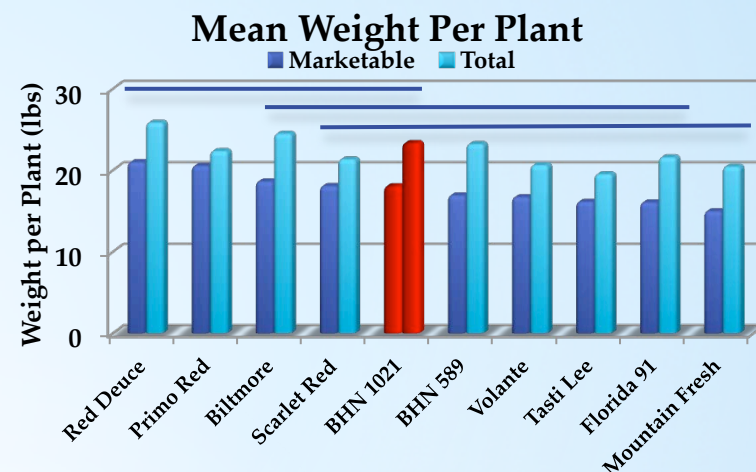
R=Resistant , I=Intermediate Resistance

Resistance information gathered from seed companies

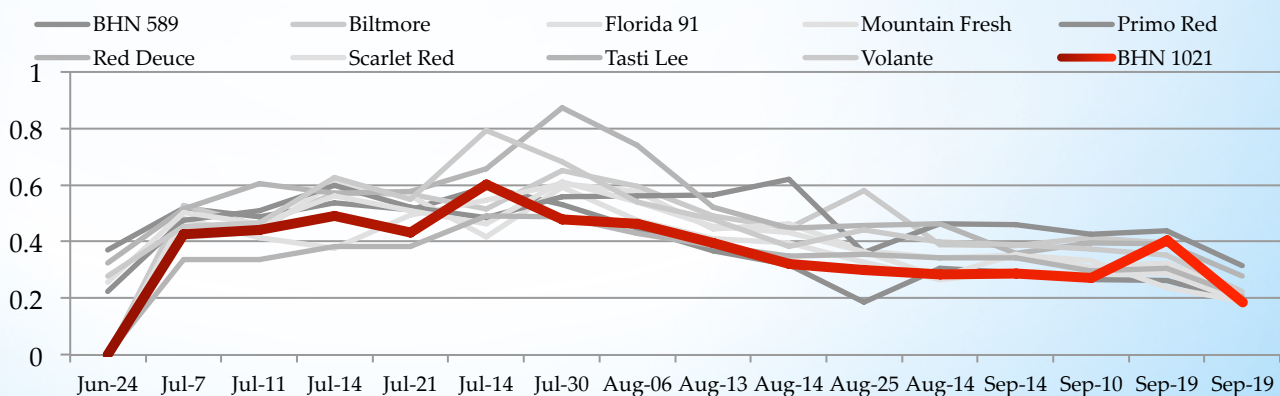
BHN 1021



DAYS: 76
FRUIT SIZE: 10oz.
PLANT TYPE/HEIGHT: 3-4ft
VIGOR: 4.5 out of 5



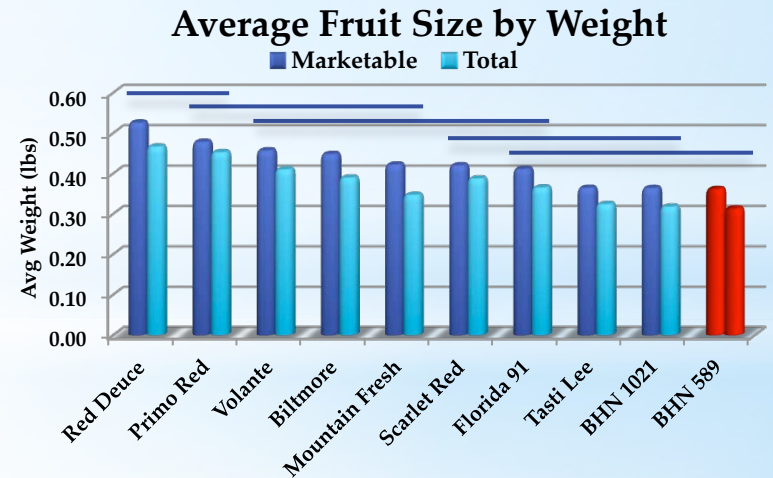
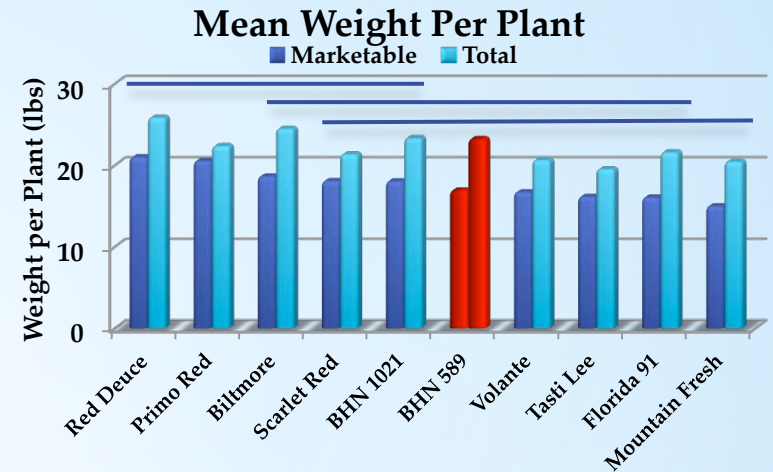
Average Fruit Size by Weight: Harvest Date



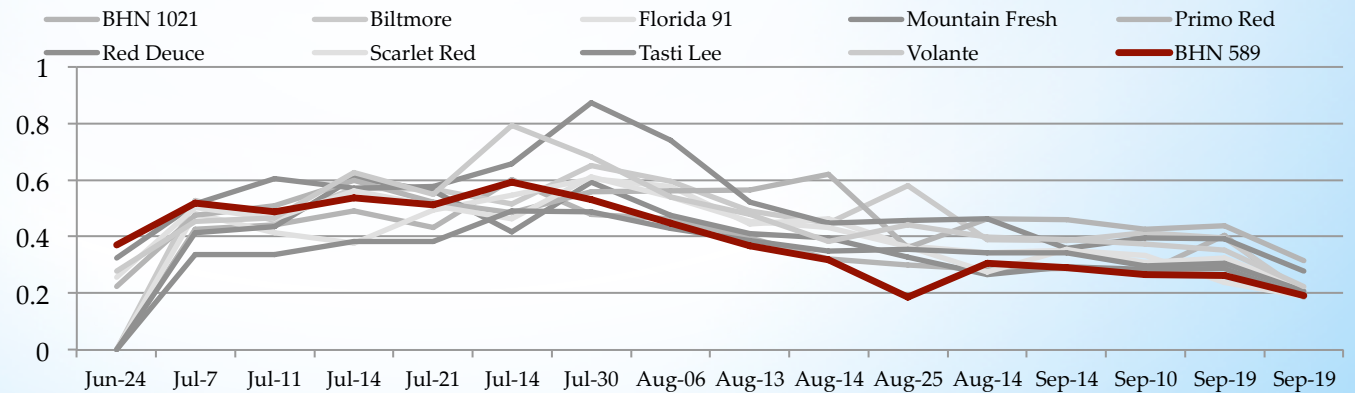
BHN 589



DAYS: 75
FRUIT SIZE: 7oz.
PLANT TYPE/HEIGHT: 3ft
VIGOR: 4.5 out of 5



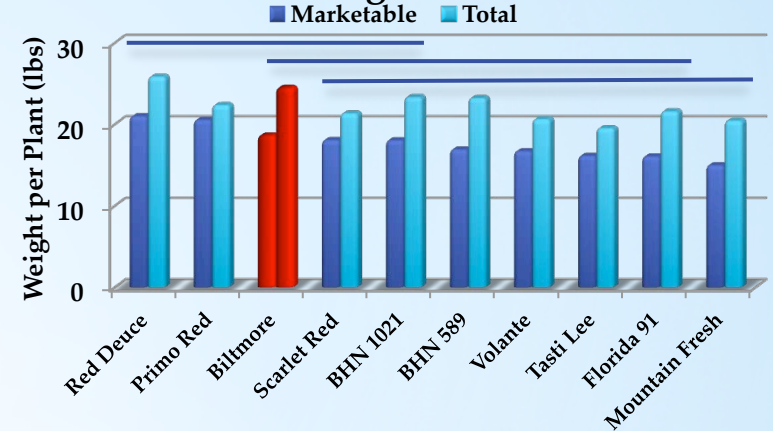
Average Fruit Size by Weight: Harvest Date



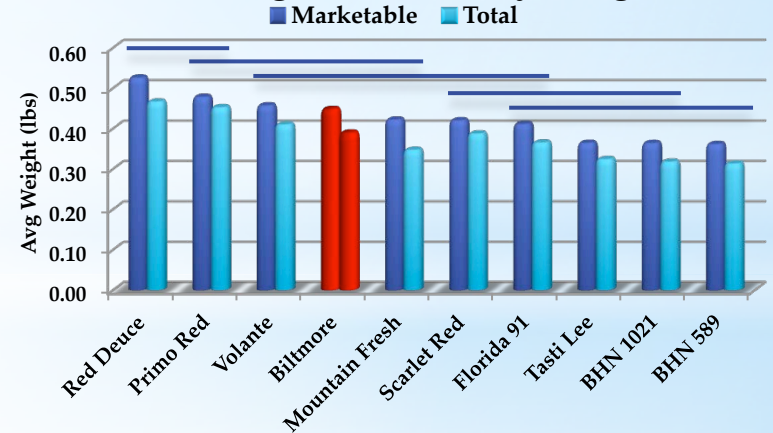
BILTMORE



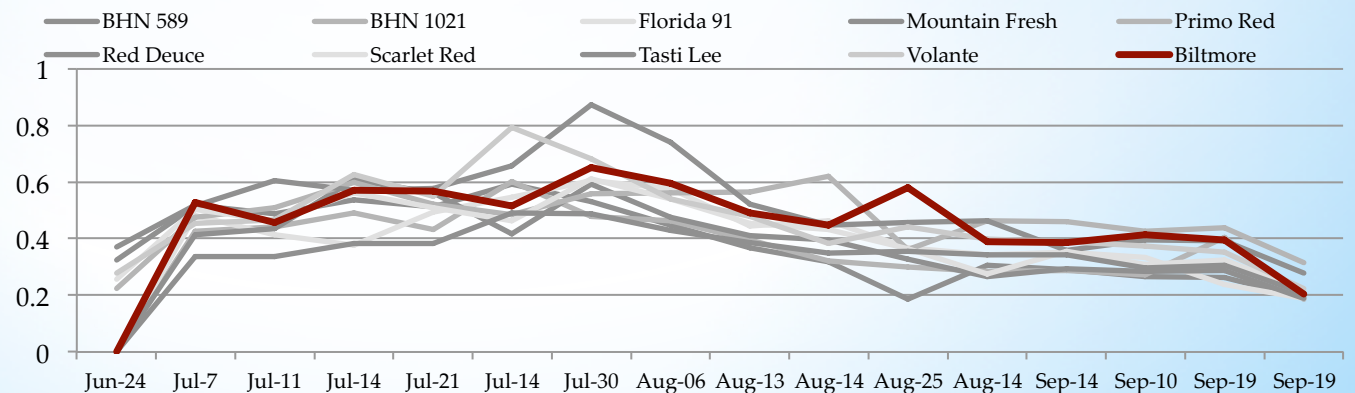
Mean Weight Per Plant



Average Fruit Size by Weight



Average Fruit Size by Weight: Harvest Date

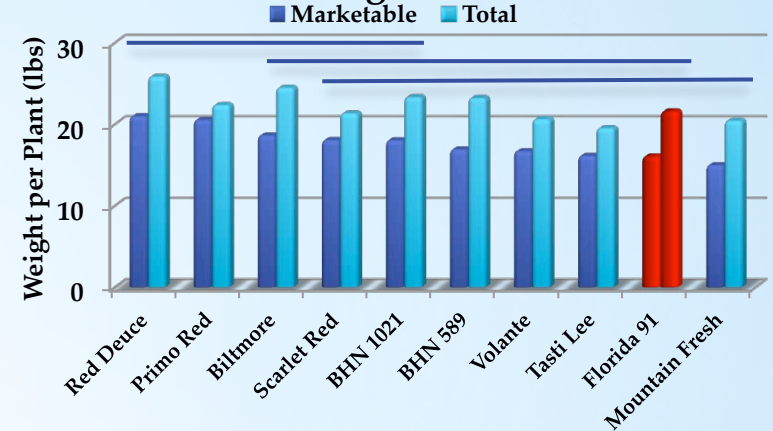


DAYS: 70
FRUIT SIZE: 10oz.
PLANT TYPE/HEIGHT: 2-3ft
VIGOR: 4 out of 5

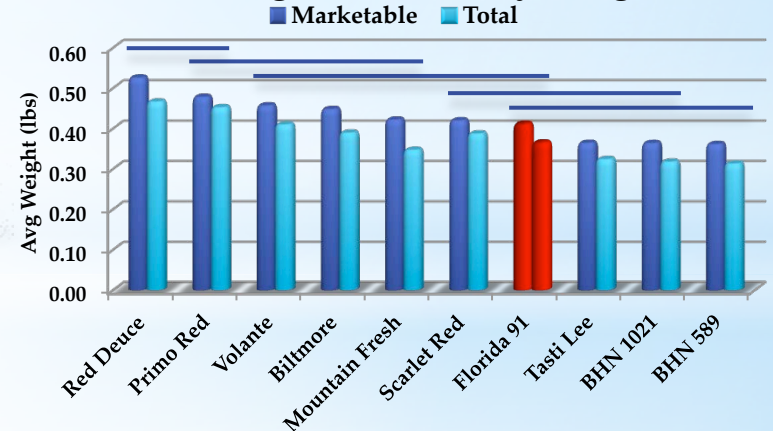
FLORIDA 91



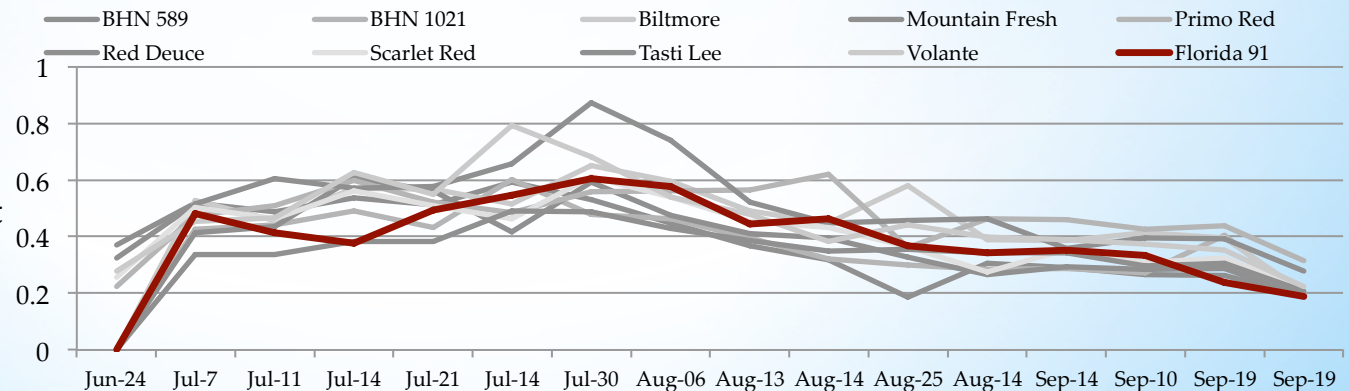
Mean Weight Per Plant



Average Fruit Size by Weight

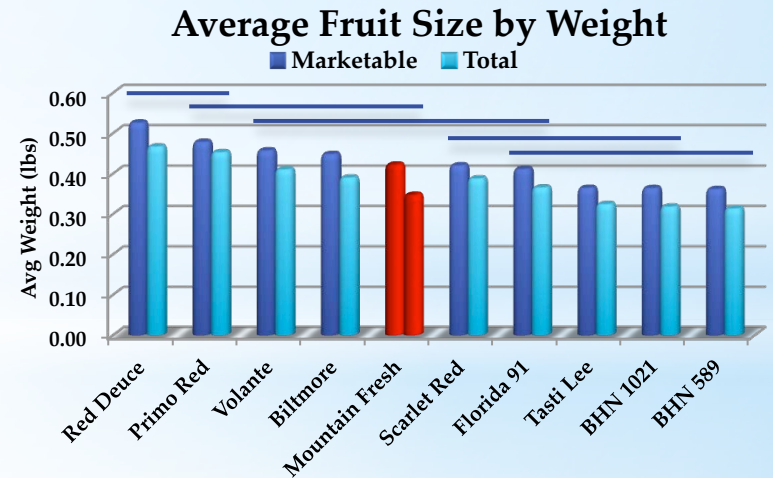
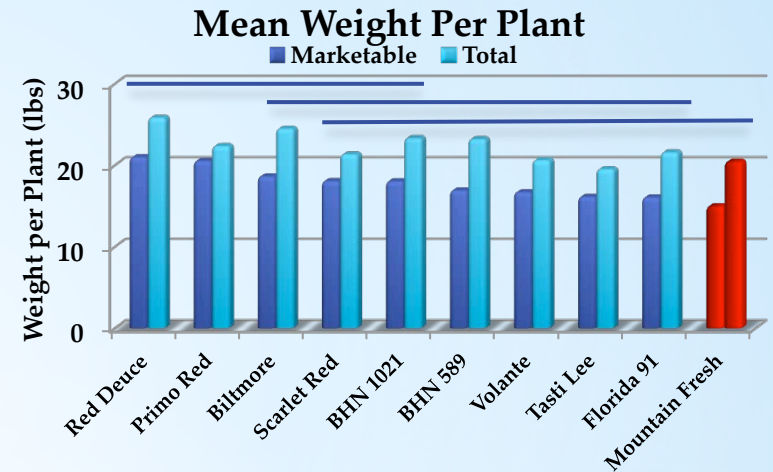


Average Fruit Size by Weight: Harvest Date

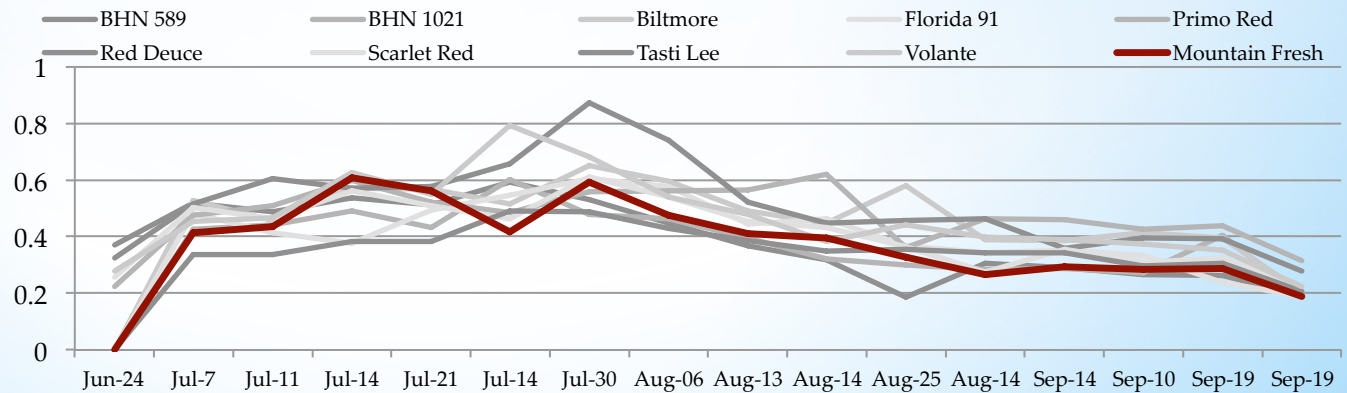


DAYS: 72
FRUIT SIZE: 10oz.
PLANT TYPE/HEIGHT: 2-3ft
VIGOR: 4.5 out of 5

MOUNTAIN FRESH

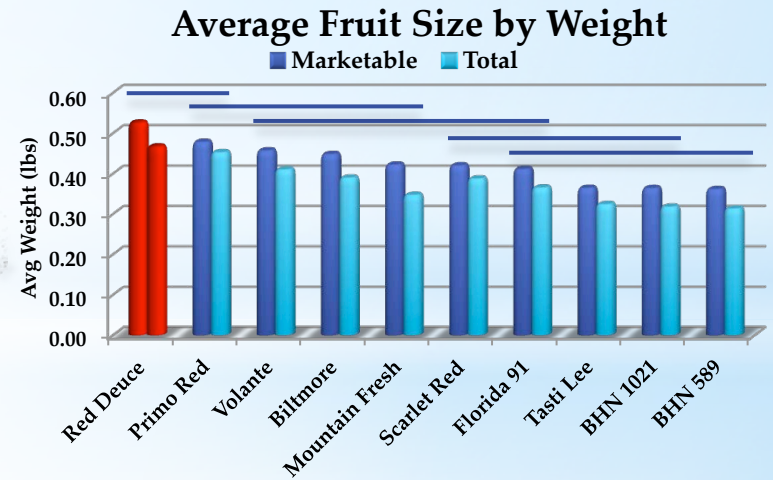
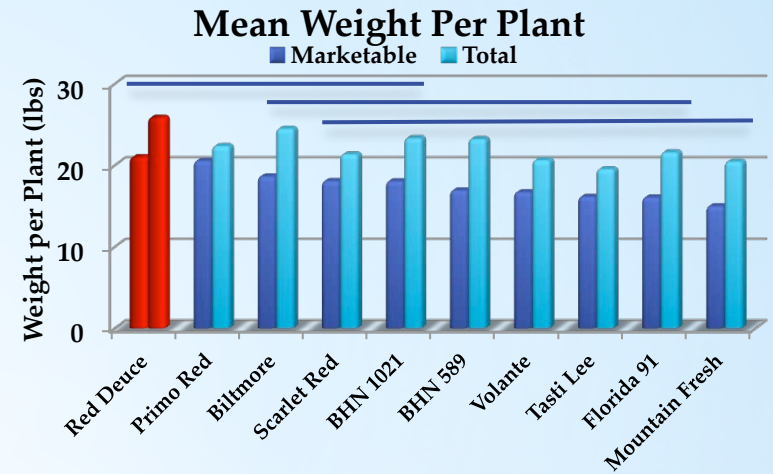


Average Fruit Size by Weight: Harvest Date

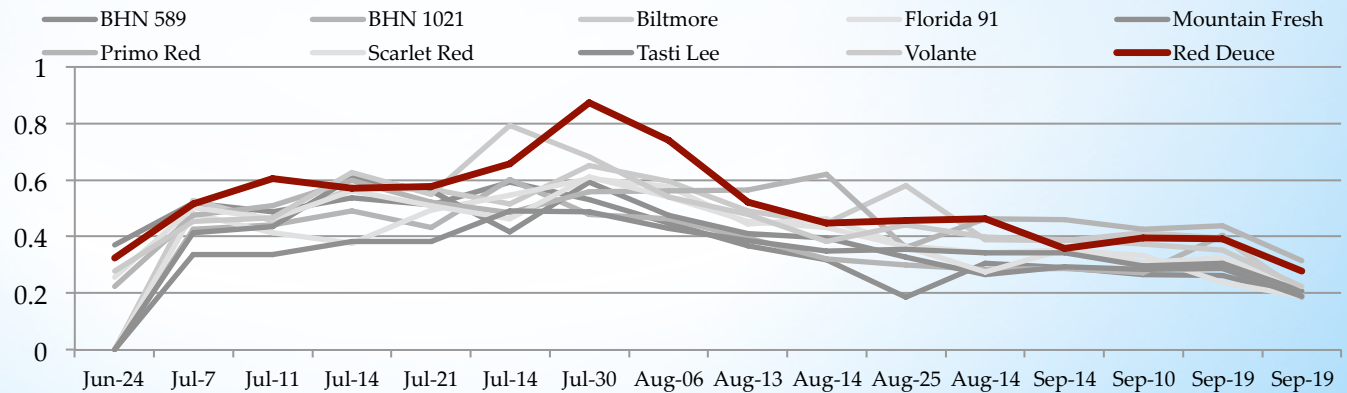


DAYS: 78
FRUIT SIZE: 10-12oz.
PLANT TYPE/HEIGHT: 4ft
VIGOR: 4.25 out of 5
Good Canopy

RED DEUCE



Average Fruit Size by Weight: Harvest Date

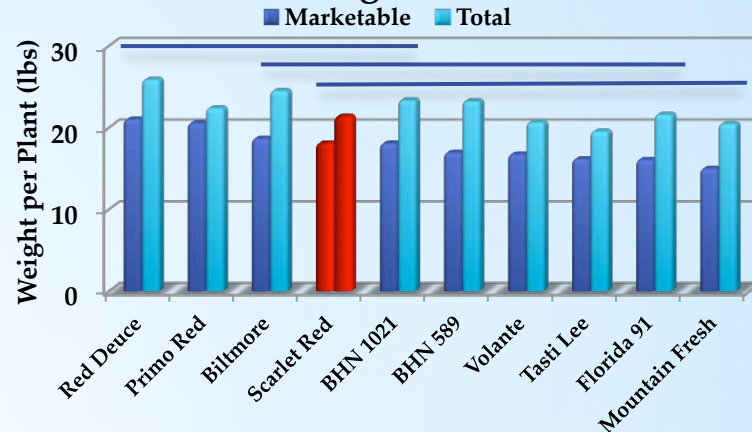


DAYS: 72
FRUIT SIZE: 10oz.
PLANT TYPE/HEIGHT: 2-3ft
VIGOR: 4.25 out of 5

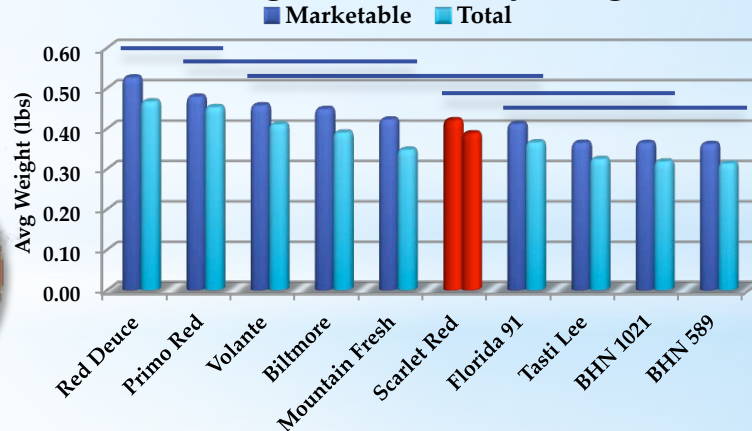
SCARLET RED



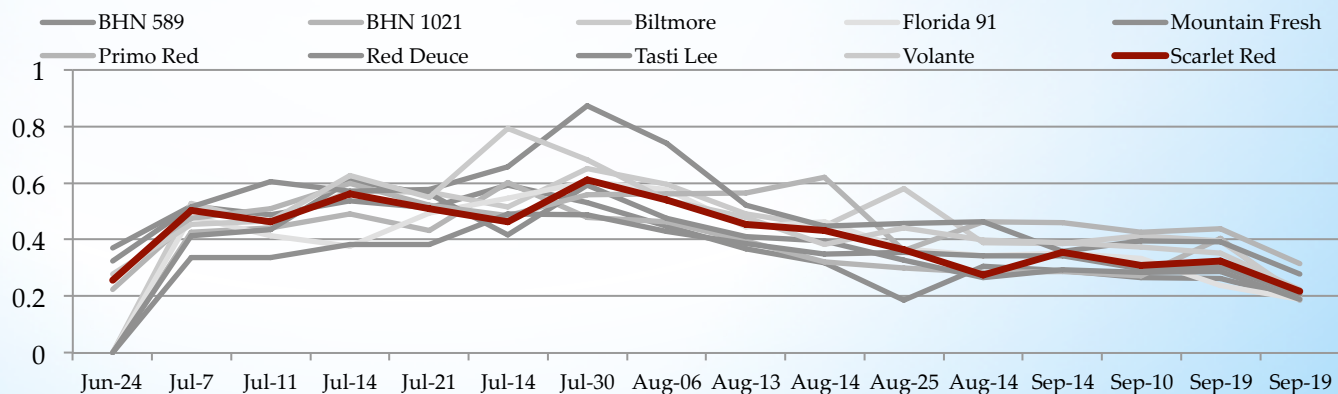
Mean Weight Per Plant



Average Fruit Size by Weight

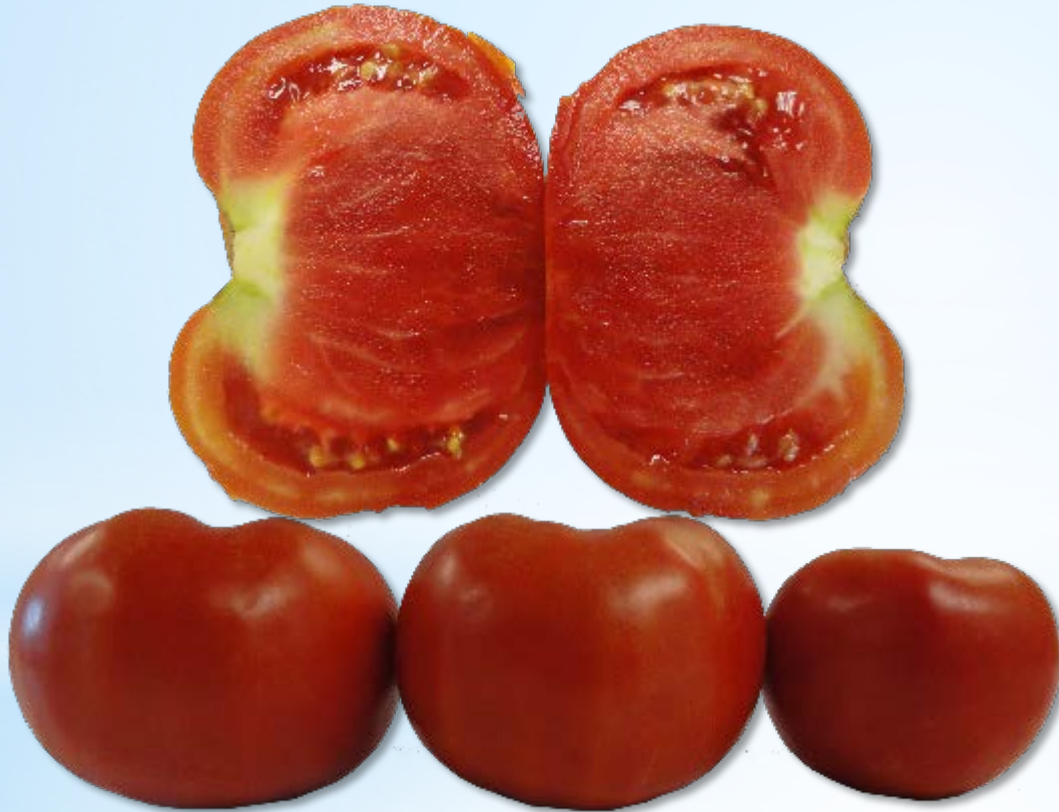


Average Fruit Size by Weight: Harvest Date

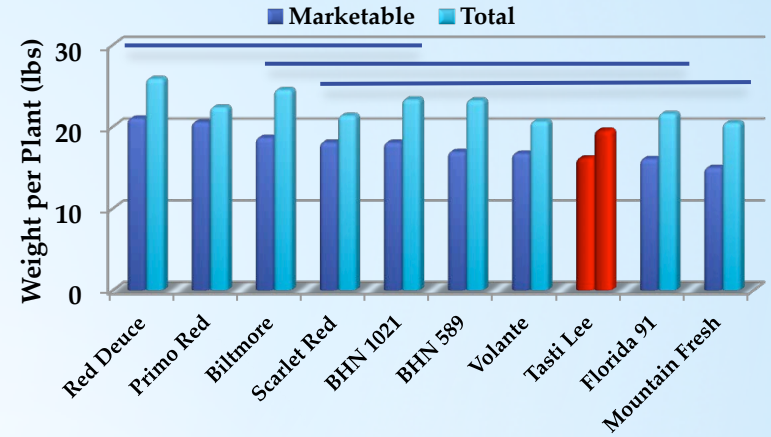


DAYS: 75
FRUIT SIZE: 12oz.
PLANT TYPE/HEIGHT: 4ft
VIGOR: 4 out of 5

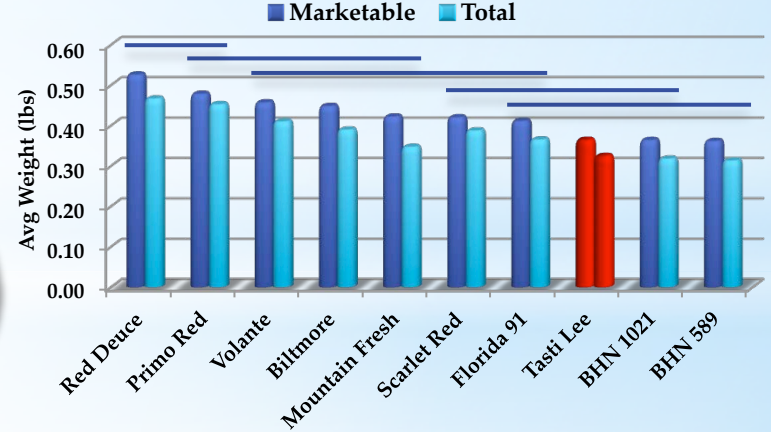
TASTI LEE



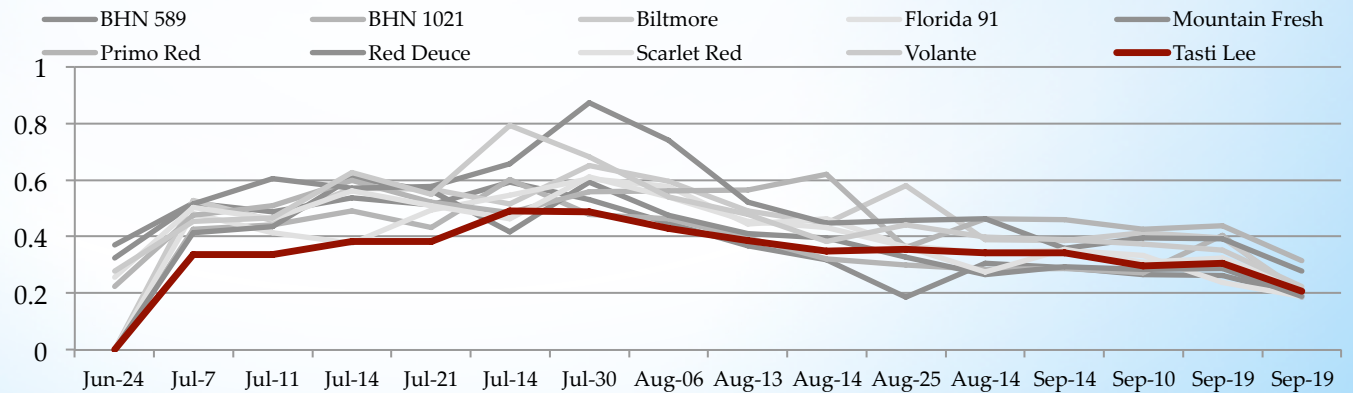
Mean Weight Per Plant



Average Fruit Size by Weight



Average Fruit Size by Weight: Harvest Date



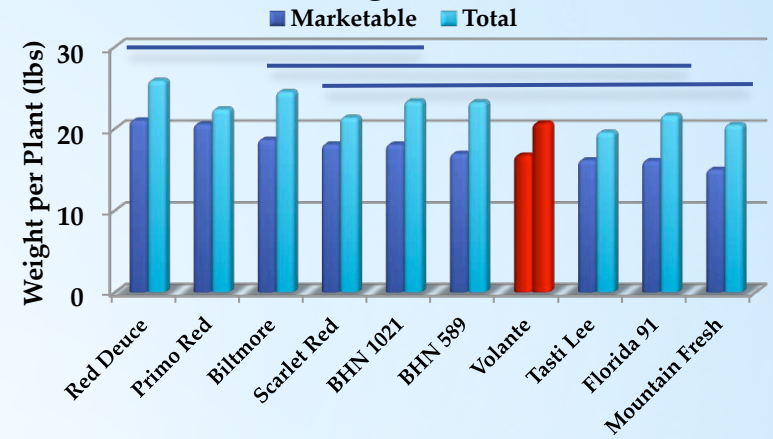
DAYS: 75
FRUIT SIZE: 6-9oz.
PLANT TYPE/HEIGHT:
Good Vigorous Plant
VIGOR: 4.75 out of 5

VOLANTE

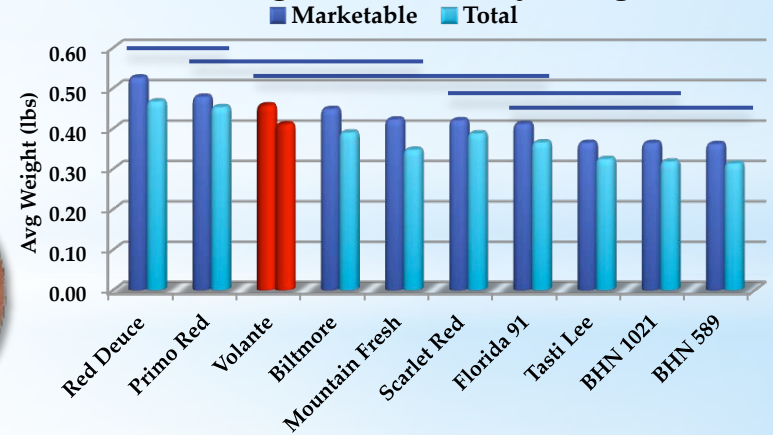


DAYS: 74
FRUIT SIZE: 10oz.
PLANT TYPE/HEIGHT: 2-3 ft.
VIGOR: 4 out of 5

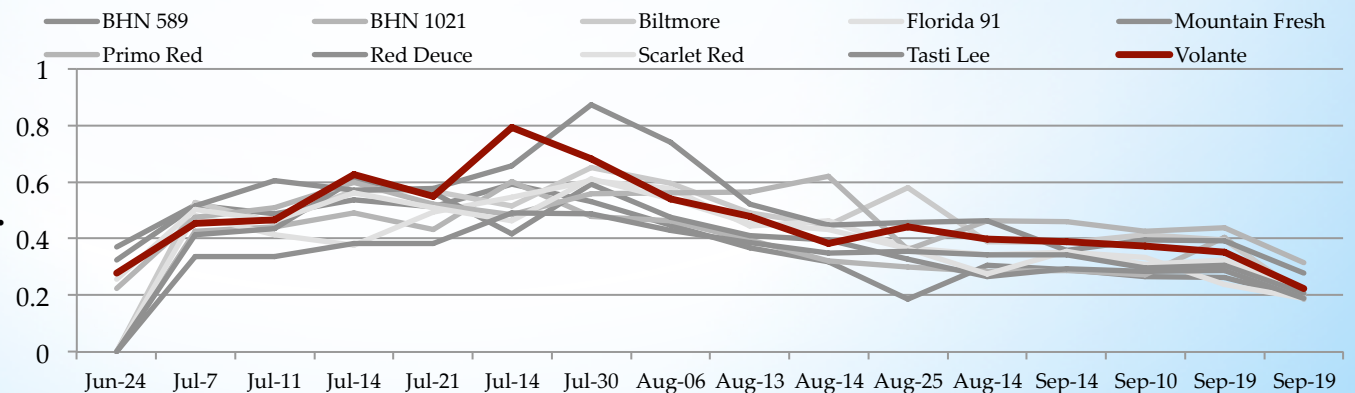
Mean Weight Per Plant



Average Fruit Size by Weight



Average Fruit Size by Weight: Harvest Date



Summary

'Red Deuce' had the highest per plant total and marketable yield, but marketable yield was statistically similar to 'Primo Red', 'Biltmore', 'Scarlet Red', and 'BHN 1021' ($P < 0.05$). 'Red Deuce' had statistically similar yield to 'BHN 1021' and 'BHN 589'. A similar trial was conducted in 2013, and 'Red Deuce' had the highest marketable and total yield. 'Primo Red' was a new entry into the annual variety trials conducted at our location and also performed very well. It was second to 'Red Deuce' in marketable fruit production as well as total and marketable fruit size. Interestingly, the proportion of marketable fruit produced by 'Primo Red' was dramatically increased over the other entries and was 91.7% for marketability by weight as compared to the other varieties, which ranged from 72.6% to 84.8%. The major portion (>60%) of the fruit quality problems seen in this trial were the result of blossom end rot (BER). Although the cull fruit were not graded specifically for this issue, the results seen in this study were most likely the result of a lower incidence of BER.

Several varieties showed good potential for early-season production, which can be advantageous for marketing high-value fruit. In particular, 'Primo Red', 'Volante', and 'BHN 589' showed the highest yields during the early weeks of July (data not shown). 'Mountain Fresh', 'Red Deuce', and 'Biltmore' had the highest yields at peak harvest. 'Biltmore' also showed very strong production in the early part of September, which may be useful for growers looking to cater to late markets. 'BHN 589' is one of the more common semi-determinate varieties grown in high tunnels. In this trial, 'BHN 589' produced more consistently from week-to-week than any of the others. In fact, it had the highest yields early in the season but had the lowest yield at peak harvest (data not shown).

Acknowledgements

- We would like to sincerely thank the following:
 - Kansas Vegetable Growers Association for support of this project.
 - Seeds were donated by Harris Moran, Seedway, and Johnny's Selected Seeds.
 - Technical support provided by Vicente Mascote, Lani Meyer, Molly Fusselman, Mike Ryan, Brian Boutte, Kelly Gude, and Jacob Chapman.
 - We also thank the Olathe Horticulture Research and Extension Center for assistance with this project.

The Variety Trial results are published in the Midwest Vegetable Variety Trial Report