

2014 High Tunnel Bell Pepper Variety Trials



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

*Kimberly Oxley, Research Associate
Cary Rivard, Extension Specialist*

www.hightunnels.org



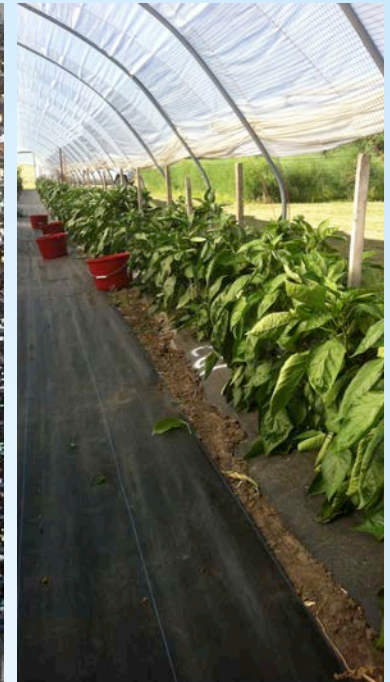
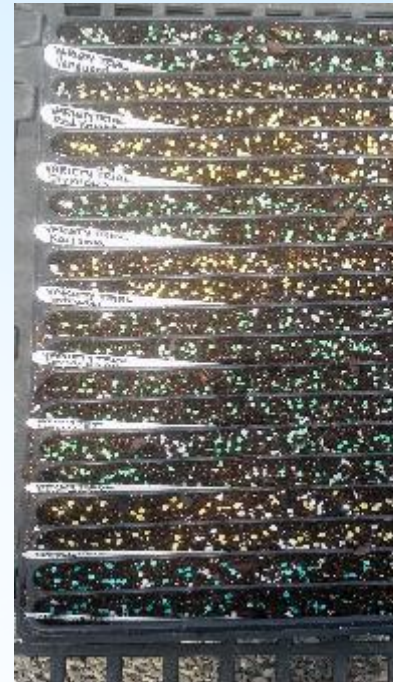
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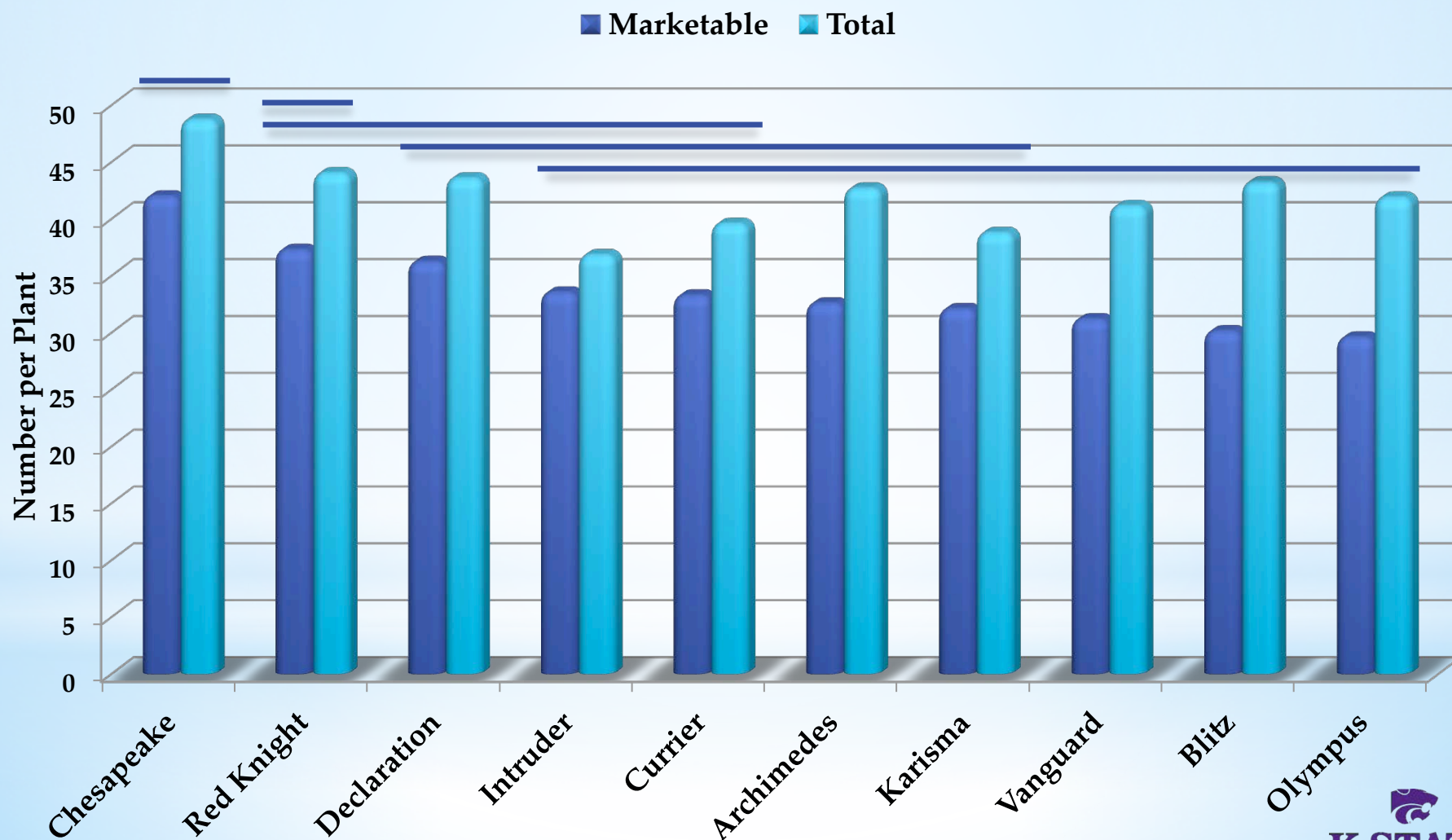
Materials & Methods

- **Planted** in tunnel: May 9th
- Five plants per plot
- 18" in-row spacing
- 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 worms



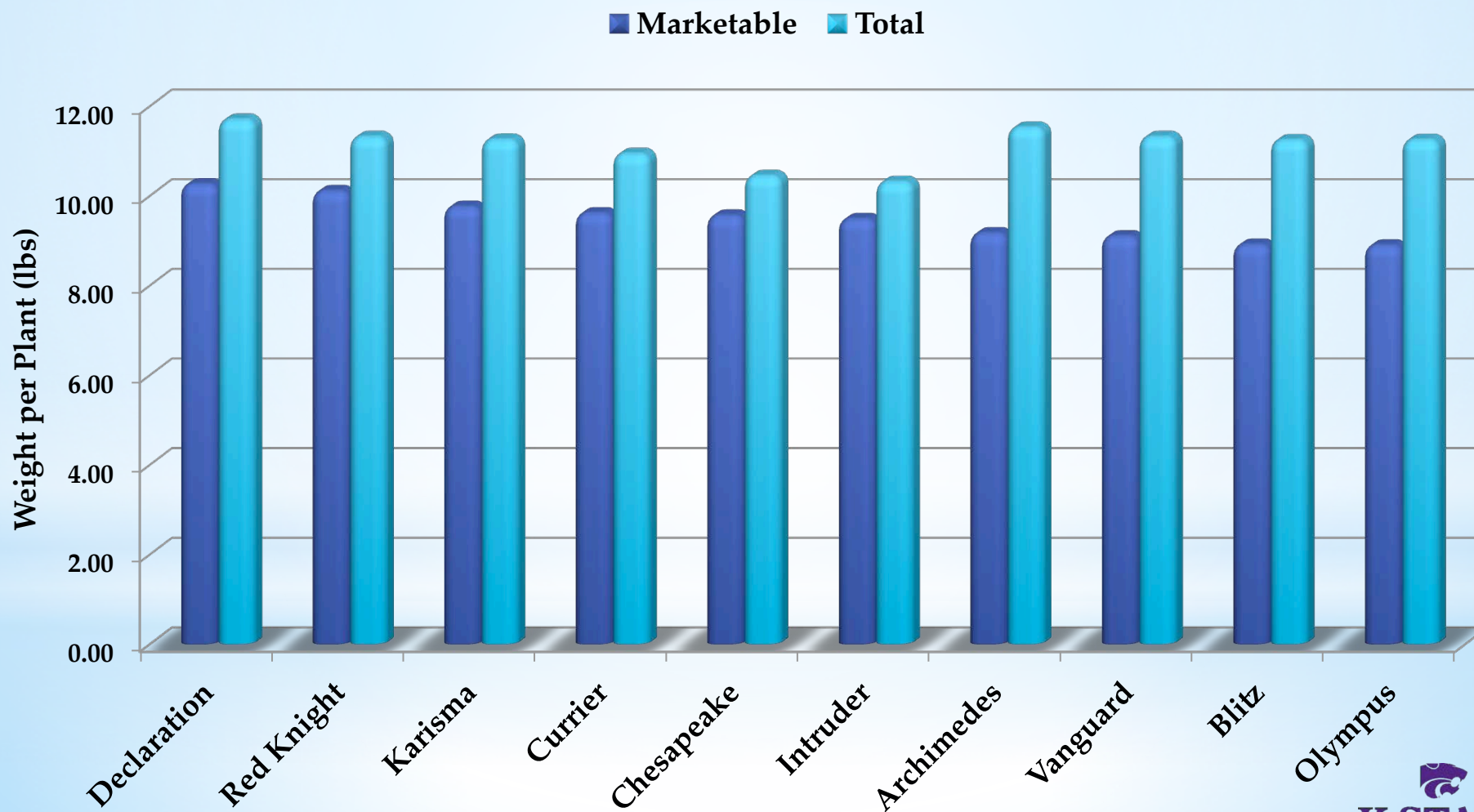
2014 KVGA High Tunnel Pepper Variety Trial

Marketable & Total Number per Plant



2014 KVGA High Tunnel Pepper Variety Trial

Marketable & Total Weight per Plant



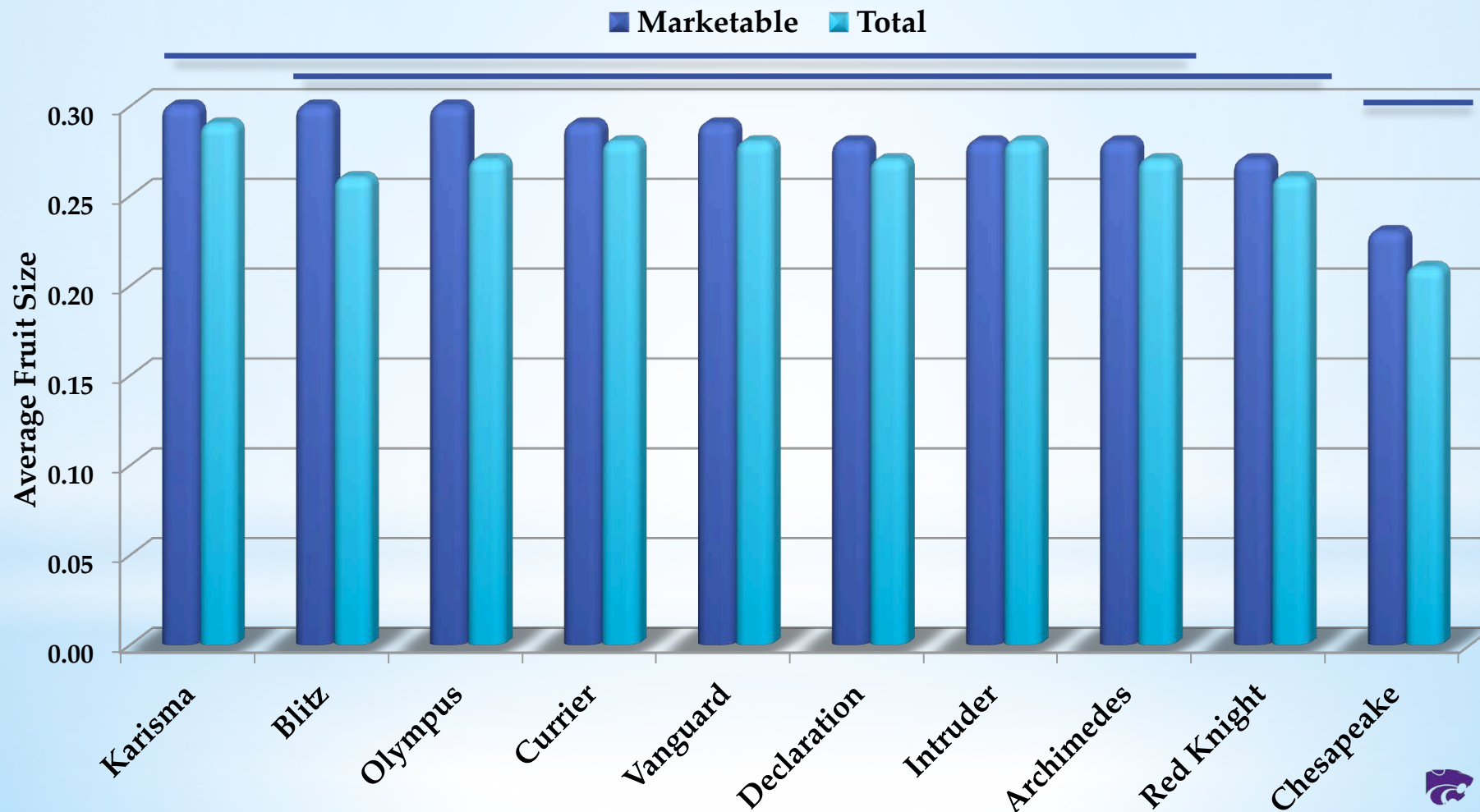
2014 KVGA High Tunnel Pepper Variety Trial

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

Variety	Marketable		Total	
	Number	Wt (lbs)	Number	Wt (lbs)
Chesapeake	42.0 e	9.55	48.7 c	10.44
Red Knight	37.3 cd	10.10	44.0 bc	11.31
Declaration	36.2 bc	10.25	43.6 bc	11.69
Intruder	33.5 abc	9.47	36.8 a	10.30
Currier F1 Hybrid	33.3 abc	9.60	39.6 ab	10.93
Archimedes	32.6 ab	9.16	42.7 b	11.52
Karisma	32.1 ab	9.75	38.8 ab	11.25
Vanguard	31.2 a	9.09	41.1 ab	11.31
Blitz	30.1 a	8.90	43.2 b	11.23
Olympus	29.6 a	8.89	41.9 ab	11.24
LSD _(0.05)	4.7	NS	5.5	NS

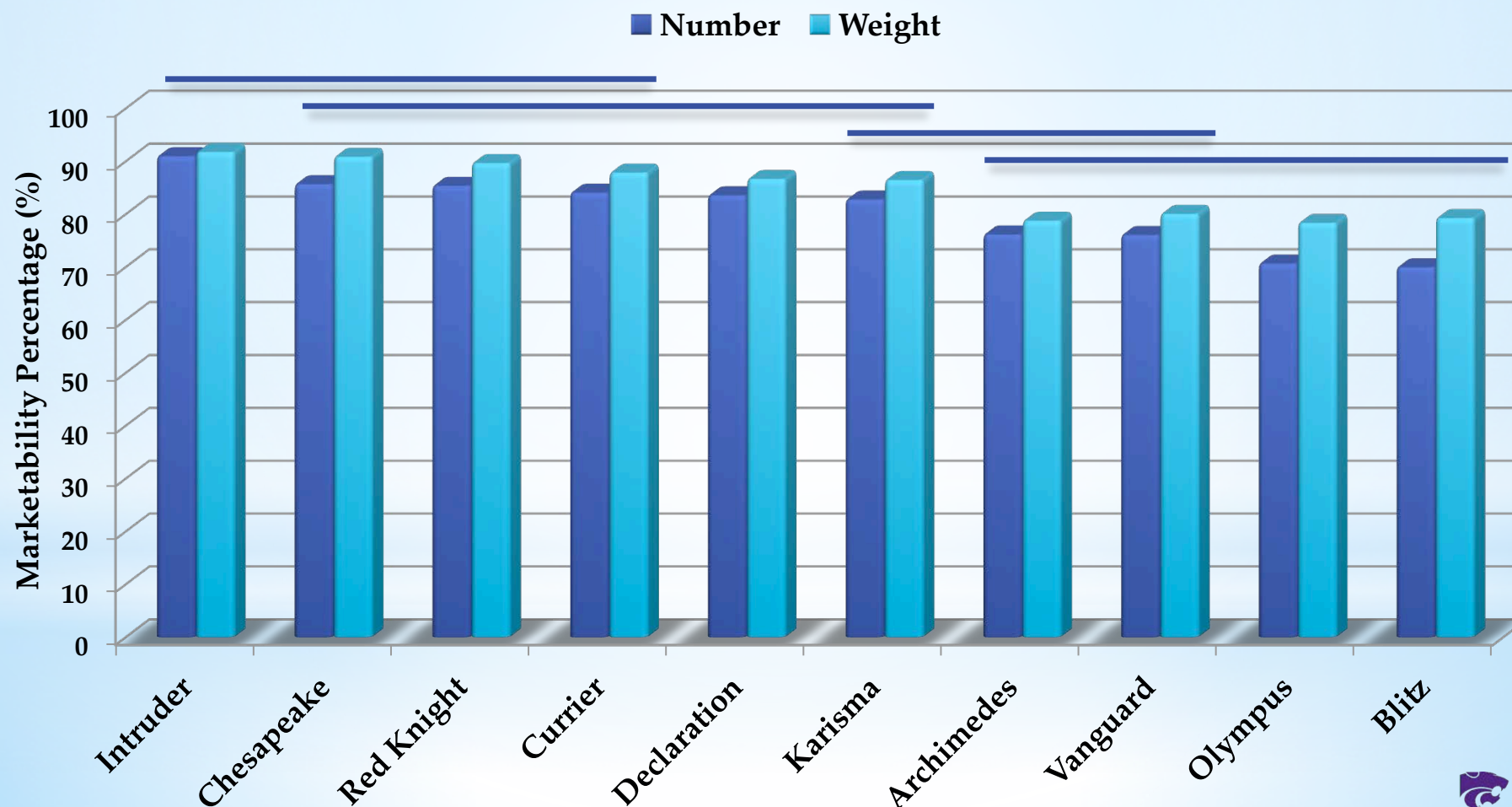
2014 KVGA High Tunnel Pepper Variety Trial

Average Fruit Size Marketable & Total (lbs)



2014 KVGA High Tunnel Pepper Variety Trial

Fruit Marketability Percentage



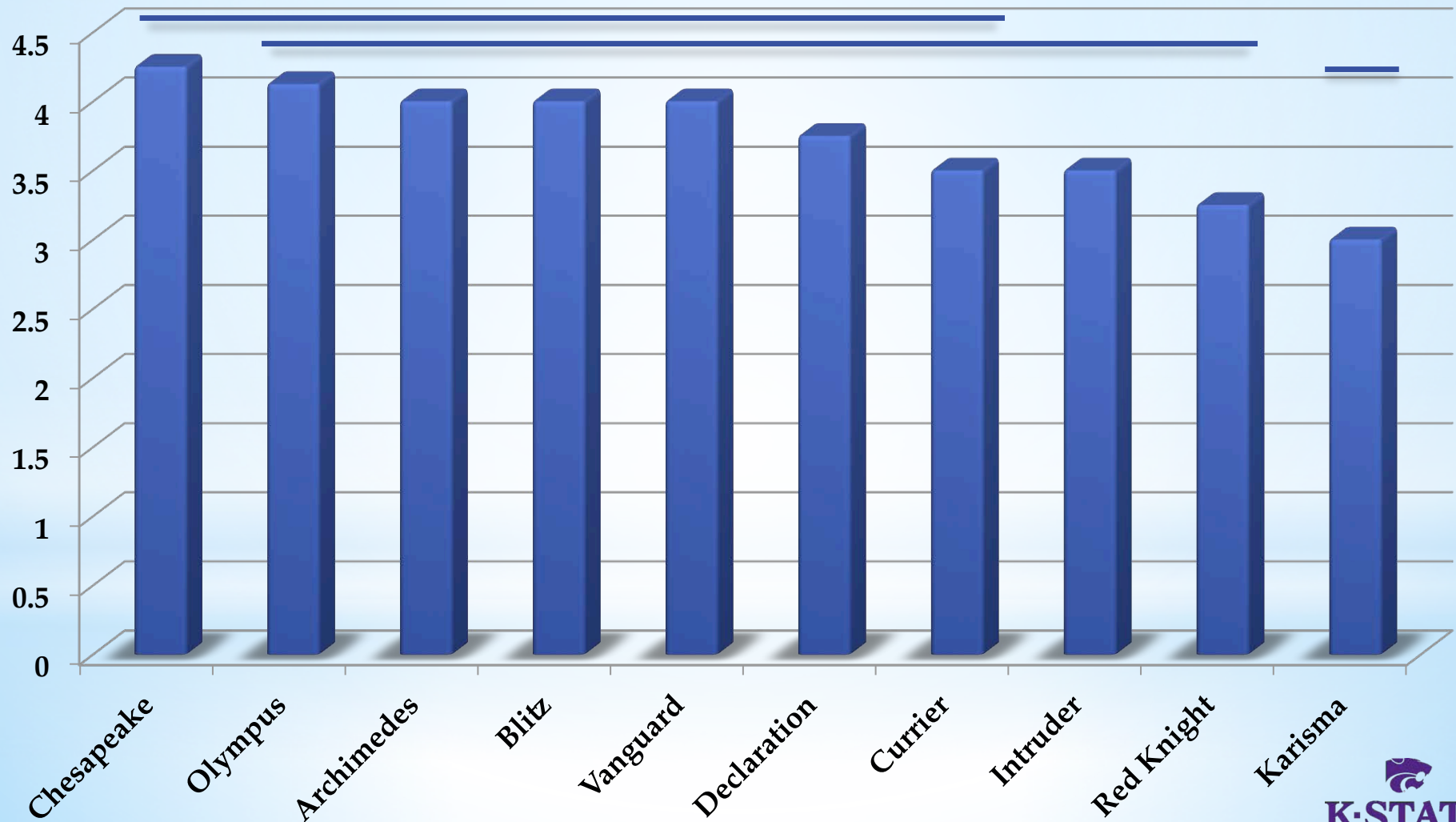
2014 KVGA High Tunnel Pepper Variety Trial

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

Variety	Average Fruit Size (lbs)		Percent Marketability	
	Marketable	Total	Number	Weight
Chesapeake	0.23 a	0.21 a	85.6 cd	90.8 b
Red Knight	0.27 b	0.26 b	85.3 cd	89.6 b
Declaration	0.28 bc	0.27 bc	83.5 c	86.6 b
Intruder	0.28 bc	0.28 bc	90.9 d	91.7 b
Currier F1 Hybrid	0.29 bc	0.28 bc	84.0 cd	87.8 b
Archimedes	0.28 bc	0.27 bc	76.1 ab	78.7 a
Karisma	0.30 c	0.29 c	82.7 bc	86.4 b
Vanguard	0.29 bc	0.28 bc	76.0 ab	80.0 a
Blitz	0.30 bc	0.26 b	69.9 a	79.2 a
Olympus	0.30 bc	0.27 bc	70.6 a	78.3 a
LSD _(0.05)	0.03	0.03	7.3	5.9

2014 KVGA High Tunnel Pepper Variety Trial

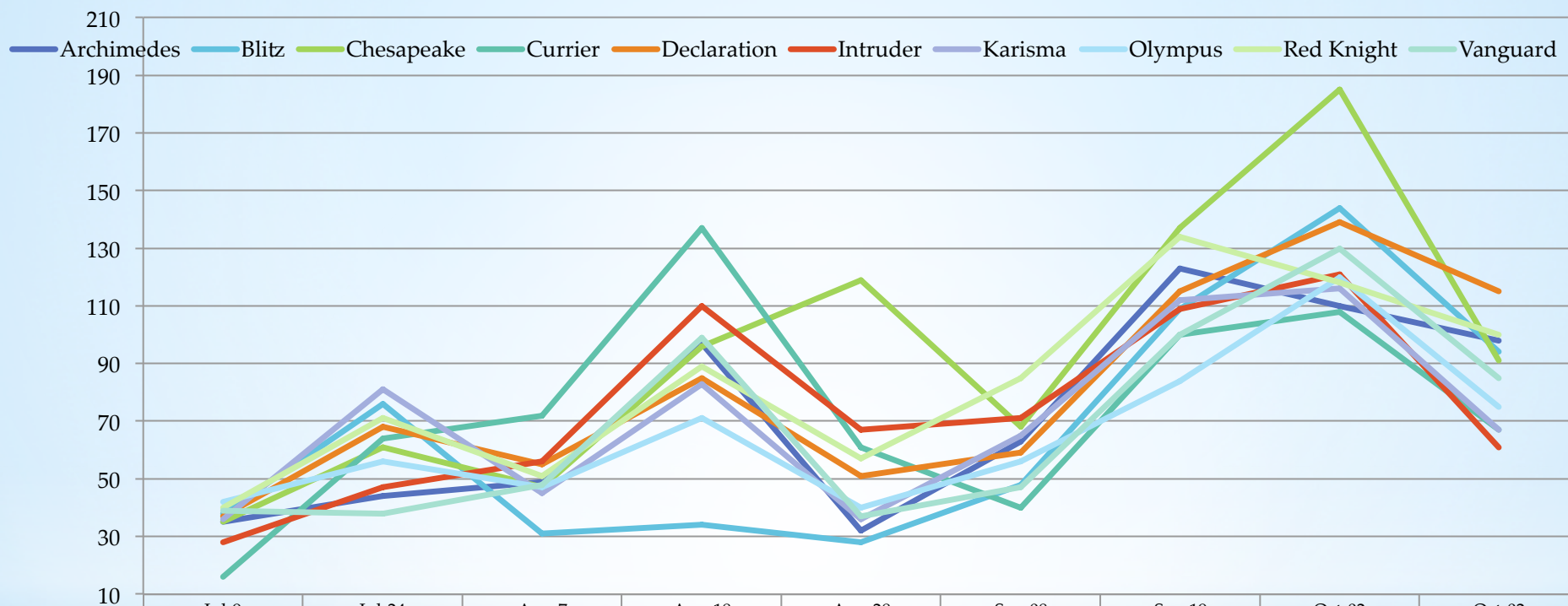
Plant Vigor



*Values below the same horizontal line are not statistically different ($\alpha=0.05$)

2014 KVGA High Tunnel Pepper Variety Trial

Average Fruit Size by Weight: Harvest Date



	Jul-9	Jul-24	Aug-7	Aug-18	Aug-28	Sep-08	Sep-19	Oct-02	Oct-02
Archimedes	35	44	49	97	32	63	123	110	98
Blitz	38	76	31	34	28	48	109	144	94
Chesapeake	35	61	47	96	119	68	137	185	91
Currier	16	64	72	137	61	40	100	108	67
Declaration	37	68	55	85	51	59	115	139	115
Intruder	28	47	56	110	67	71	109	121	61
Karisma	36	81	45	83	36	65	112	116	67
Olympus	42	56	47	71	40	56	84	120	75
Red Knight	40	71	51	89	57	85	134	118	100
Vanguard	39	38	48	99	37	47	100	130	85



2014 KVGA High Tunnel Pepper Variety Trial

Variety	BLS					Phytophthora	TMV	PVY	CMV	TSWV	TEV	PMV
	1	2	3	4	5							
Archimedes	R	R	R			IR		R				
Blitz	R	R	R	R	R		R				IR	
Chesapeake							R			IR		
Currier	R	R	R			IR	R	R	IR			R
Declaration	R	R	R		R	IR			IR	R		
Intruder	R	R	R			IR	R				R	
Karisma	R	R	R				R	R	IR			R
Olympus	R	R	R				R	R	IR			
Red Knight	R	R	R				R	IR				
Vanguard	R	R	R	R	R	IR			IR			

R=Resistant , I=Intermediate Resistance, N=None

Resistance information gathered from seed companies



ARCHIMEDES

DAYS: 76

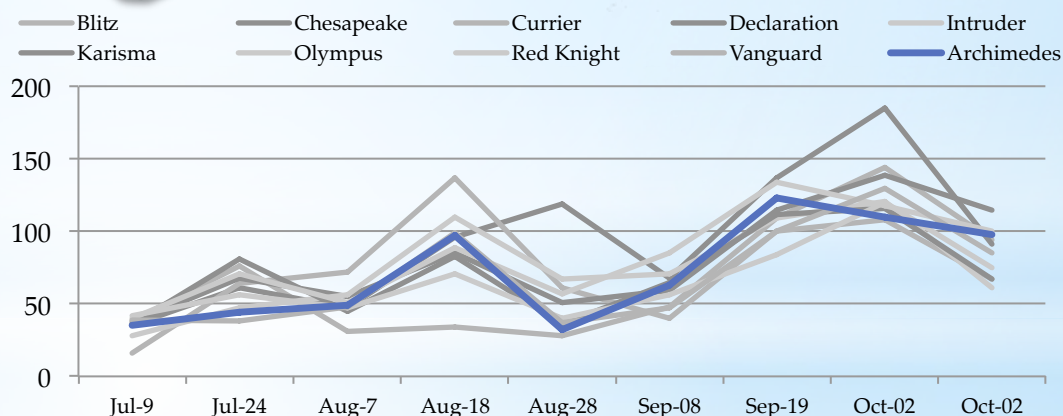
FRUIT SIZE: 4 3/4" x 4 1/2"

PLANT TYPE: Medium large, good canopy

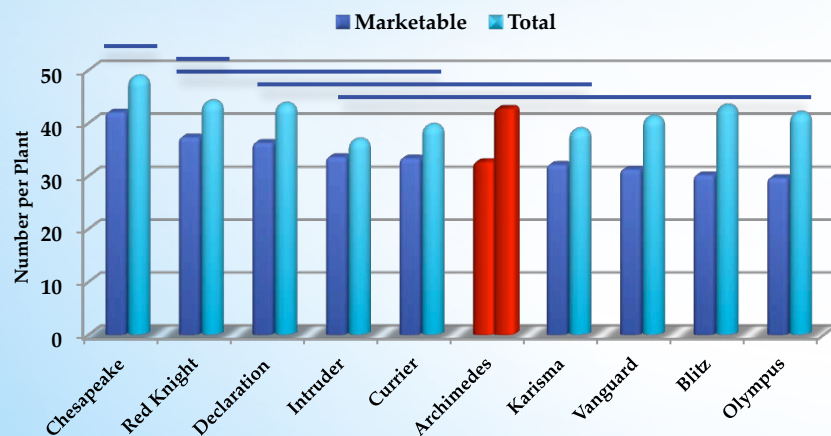
VIGOR: 4 out of 5

LOBES: 4

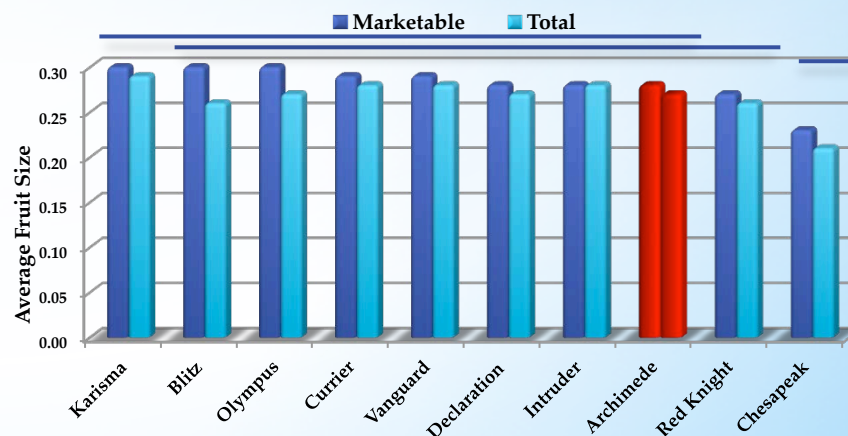
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





BLITZ

DAYS: Mid-early

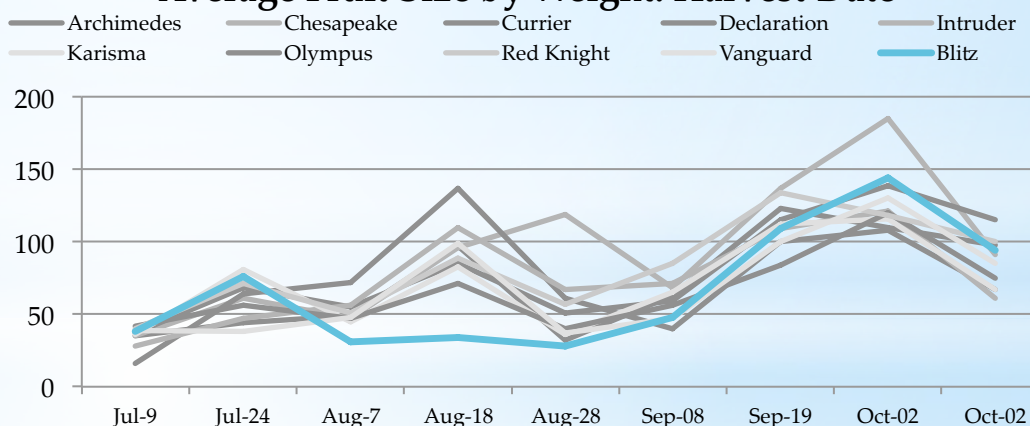
FRUIT SIZE: 4" x 4 1/2"

PLANT TYPE: Medium large, good canopy

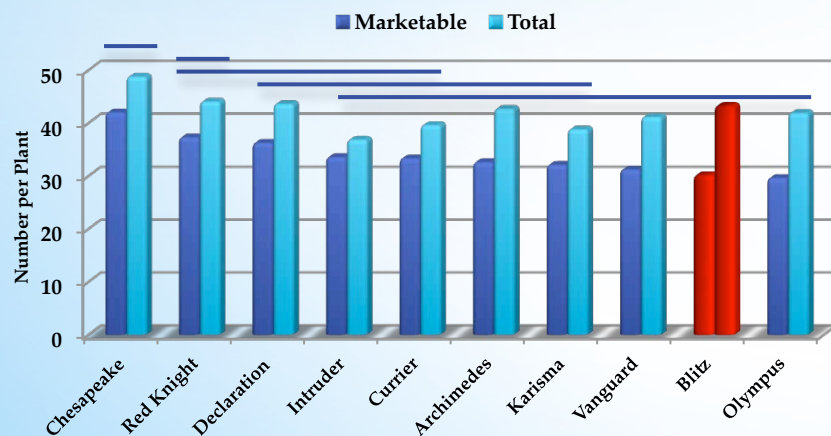
VIGOR: 4 out of 5

LOBES: 4

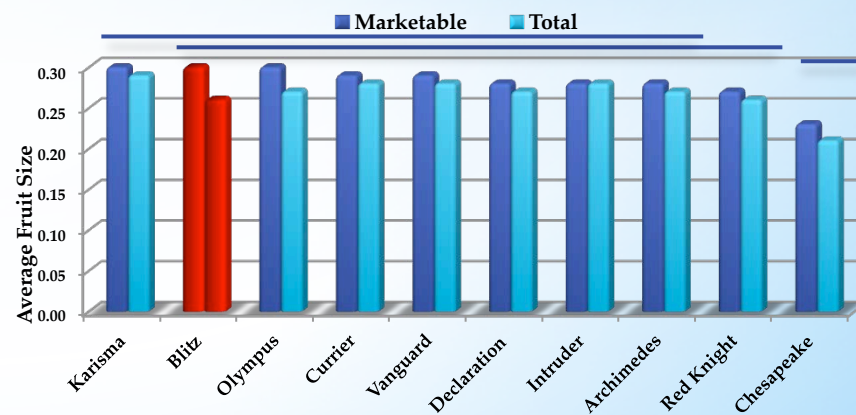
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





CHESAPEAKE

DAYS: 72

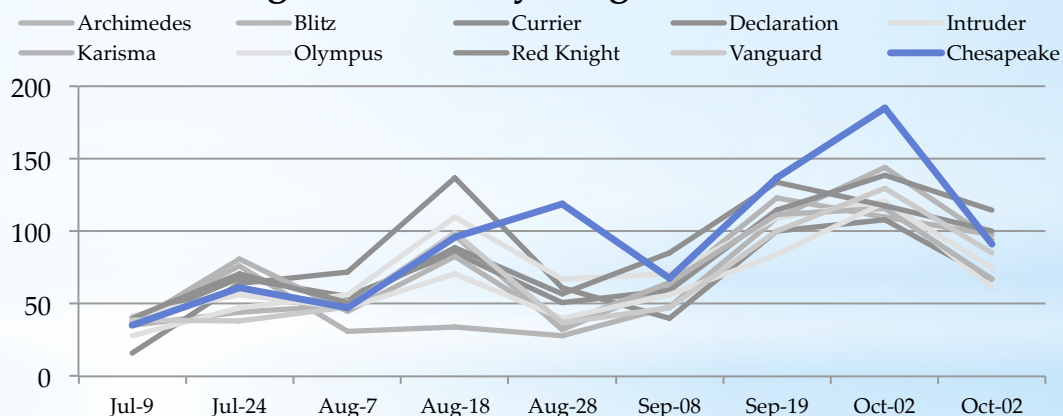
FRUIT SIZE: 4" x 4 3/4 "

PLANT TYPE: Large, vigorous canopy

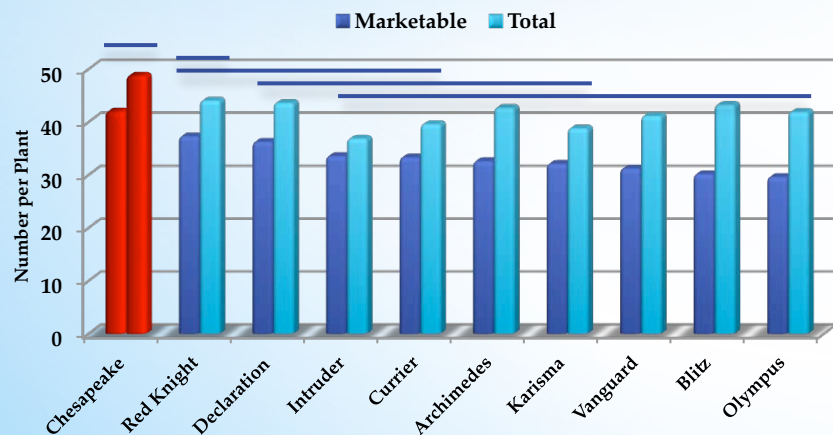
VIGOR: 4.25 out of 5

LOBES: 4

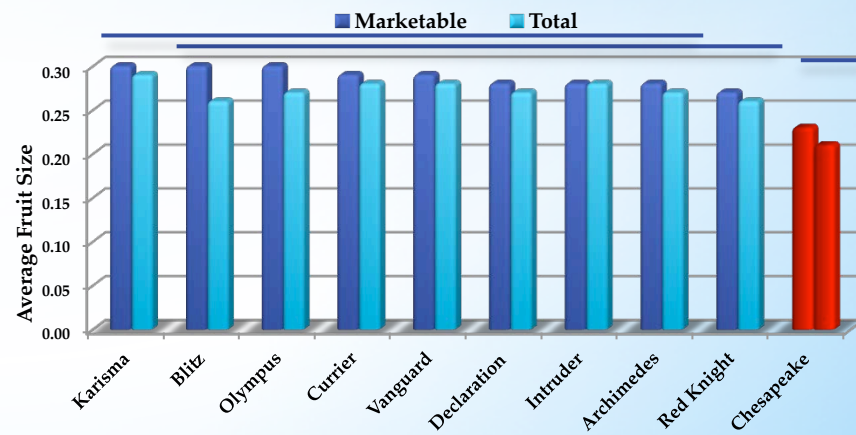
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





CURRIER F1

DAYS: 73

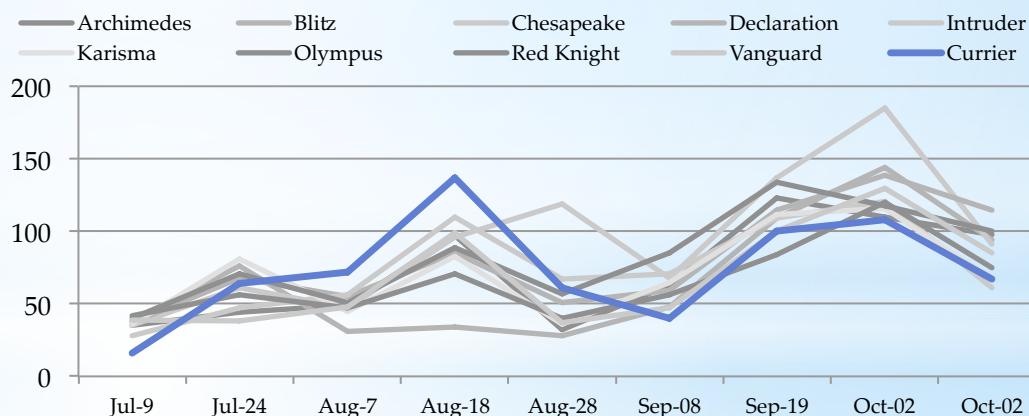
FRUIT SIZE: 4" x 4 1/2"

PLANT TYPE: Medium large canopy

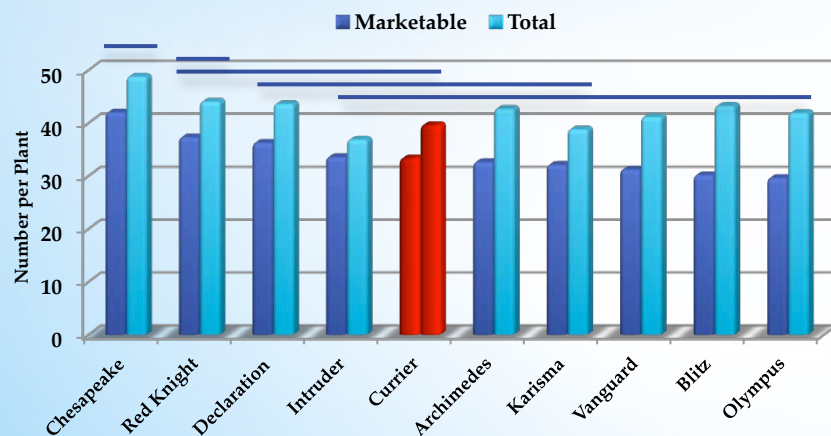
VIGOR: 3.5 out of 5

LOBES: 4

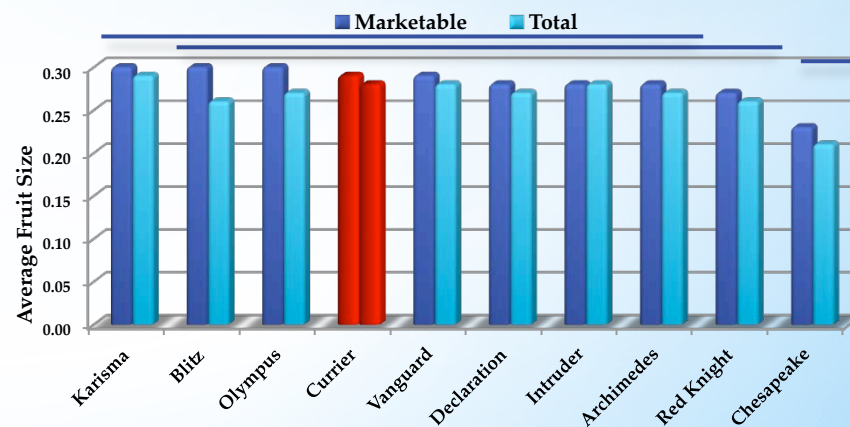
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant

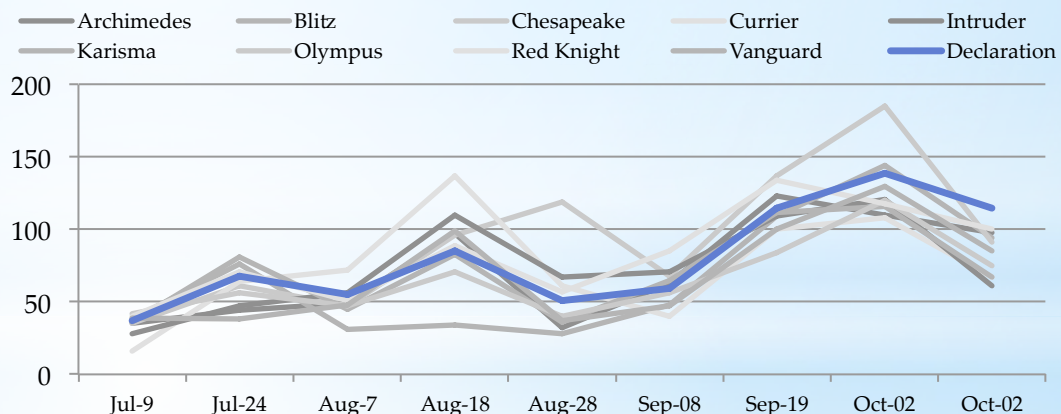


Average Fruit Size by Weight





Average Fruit Size by Weight: Harvest Date



DECLARATION

DAYS: 70

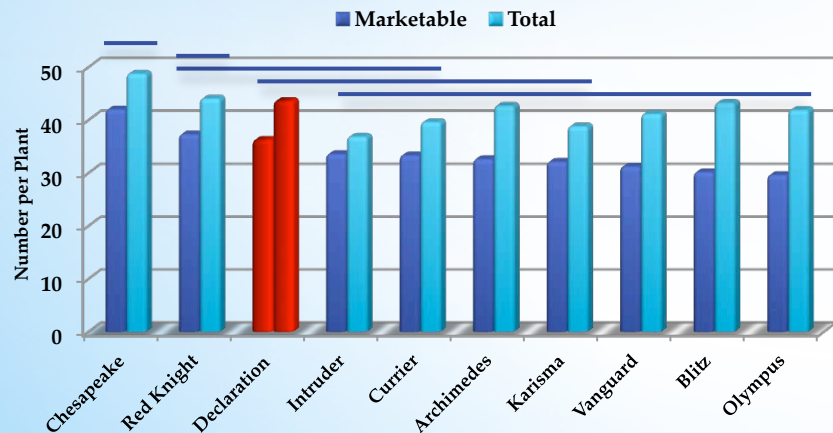
FRUIT SIZE:

PLANT TYPE: tall plants that provide excellent leaf coverage and a continuous set

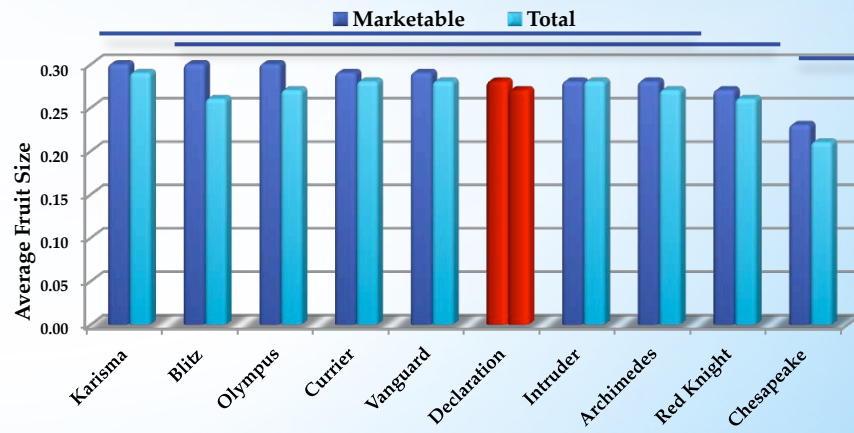
VIGOR: 3.75 out of 5

LOBES: 4

Marketable & Total Number per Plant



Average Fruit Size by Weight





INTRUDER

DAYS: 75

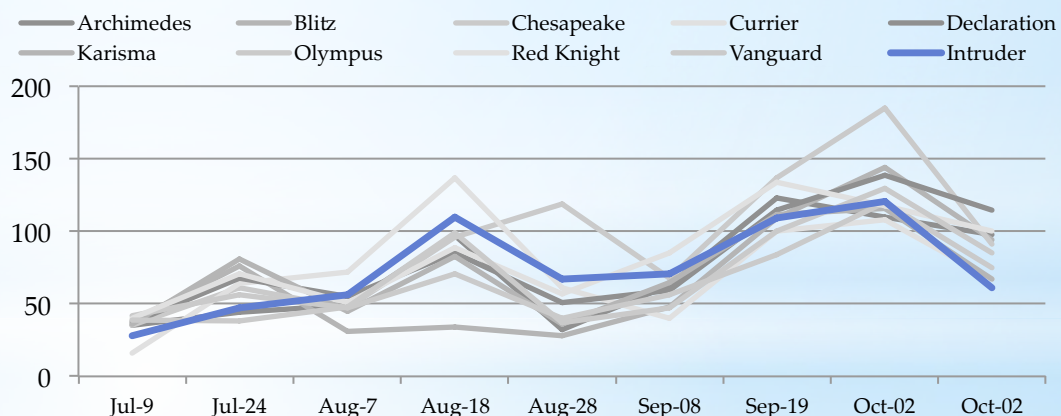
FRUIT SIZE:

PLANT TYPE: medium-sized canopy

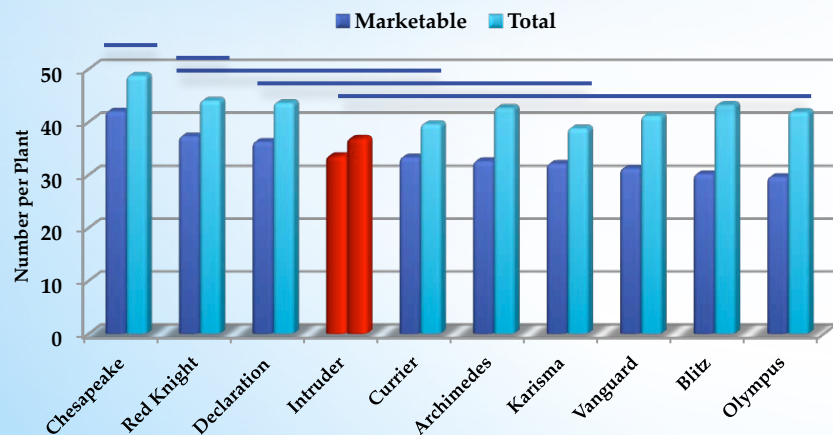
VIGOR: 3.5 out of 5

LOBES: 4

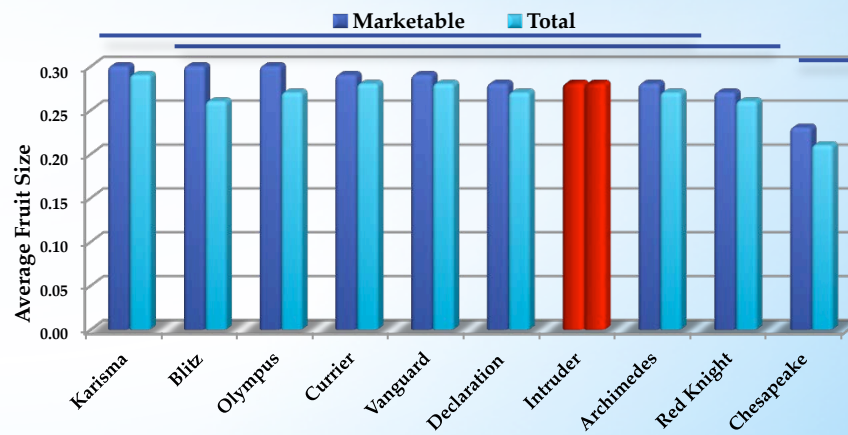
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





KARISMA

DAYS: 75

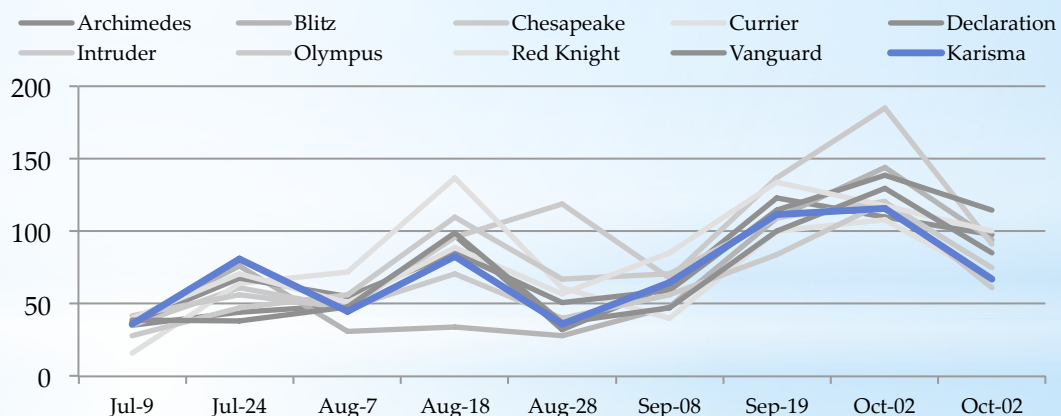
FRUIT SIZE: 4 1/2" x 4"

PLANT TYPE: large-sized canopy

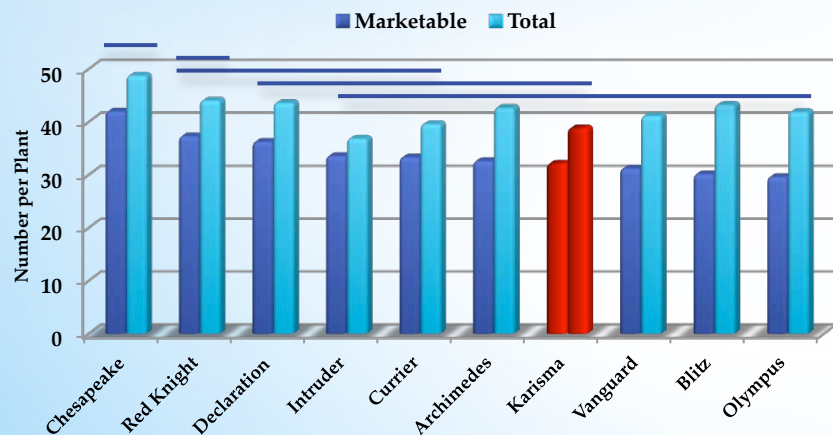
VIGOR: 3 out of 5

LOBES: 4

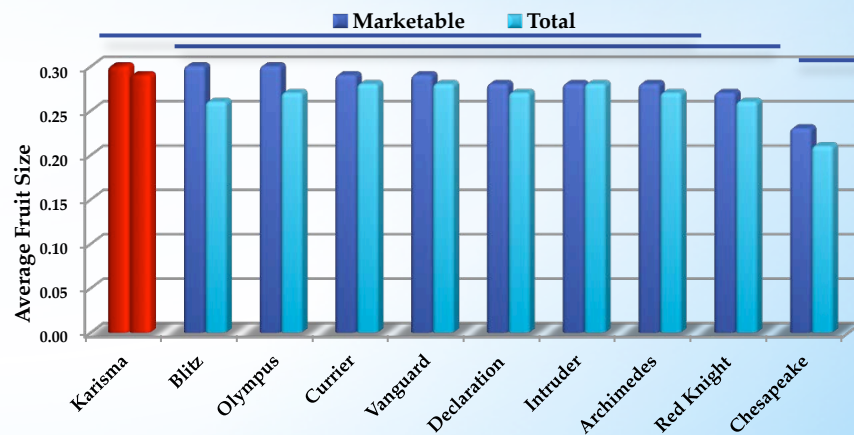
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





OLYMPUS

DAYS: 65

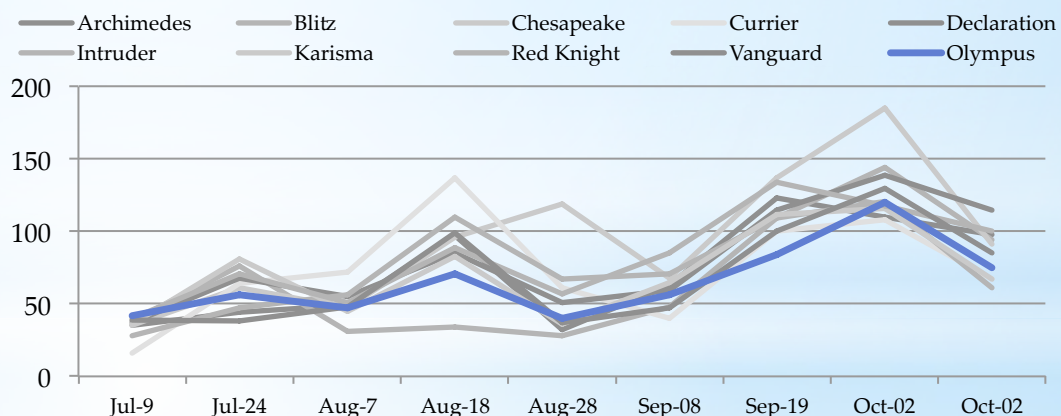
FRUIT SIZE:

PLANT TYPE: medium sized

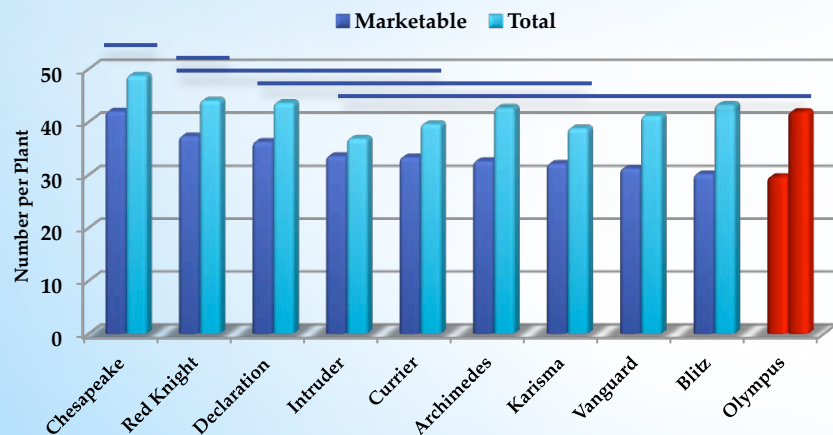
VIGOR: 4.25 out of 5

LOBES: 4

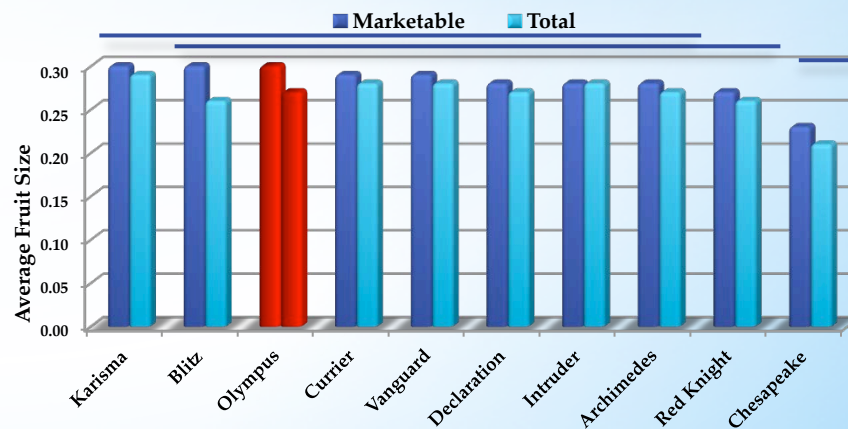
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





RED KNIGHT

DAYS: 64

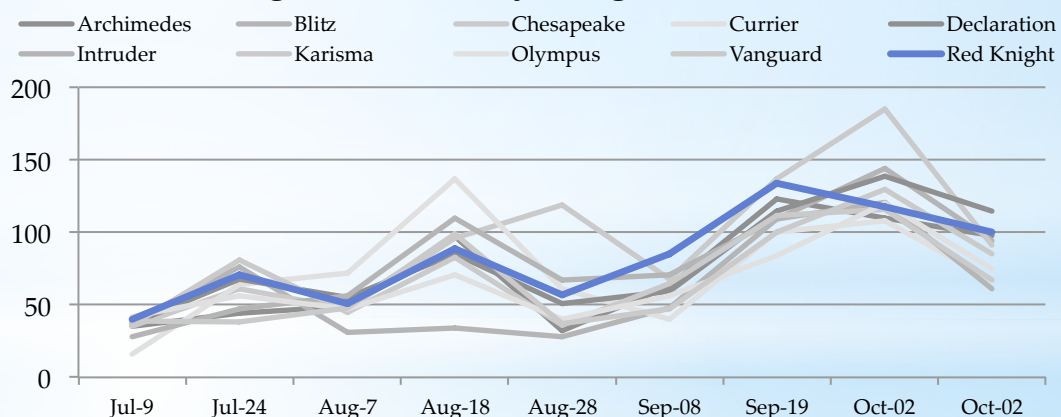
FRUIT SIZE: 4½" x 4½"

PLANT TYPE: compact sturdy

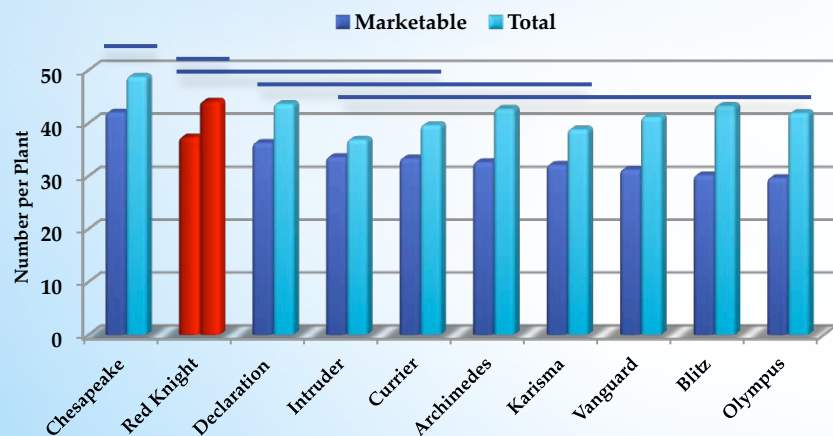
VIGOR: 3.25 out of 5

LOBES: 4

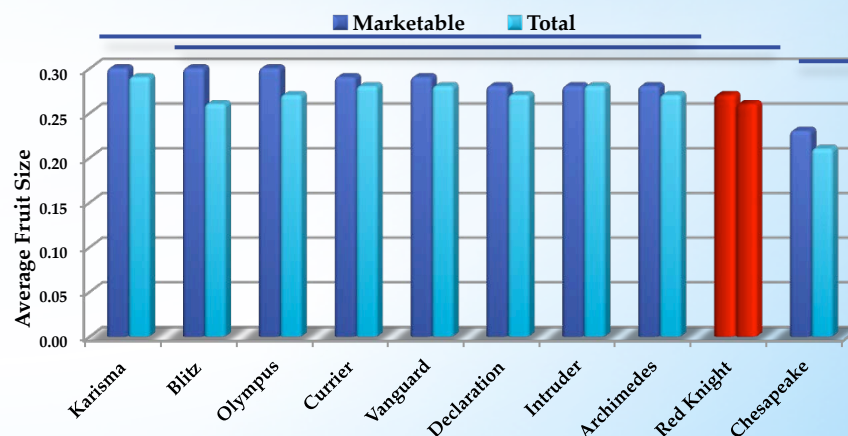
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight





VANGUARD

DAYS: 73

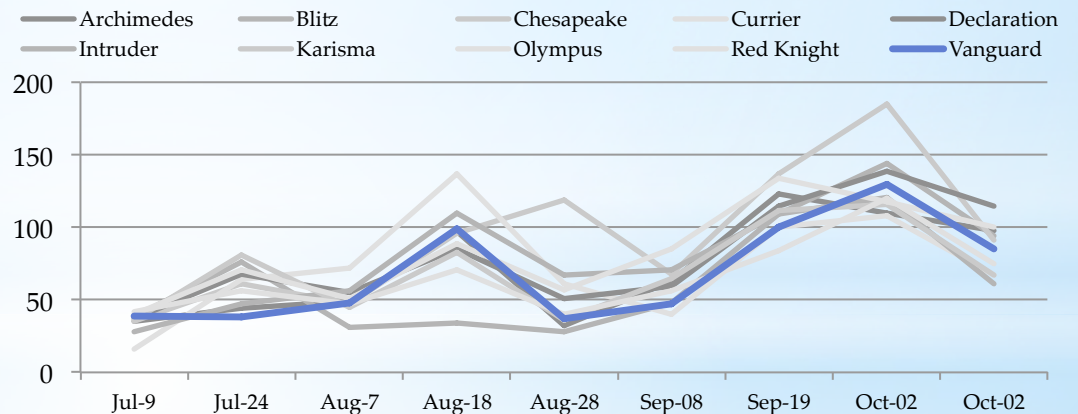
FRUIT SIZE: 4½" x 4½"

PLANT TYPE: medium tall

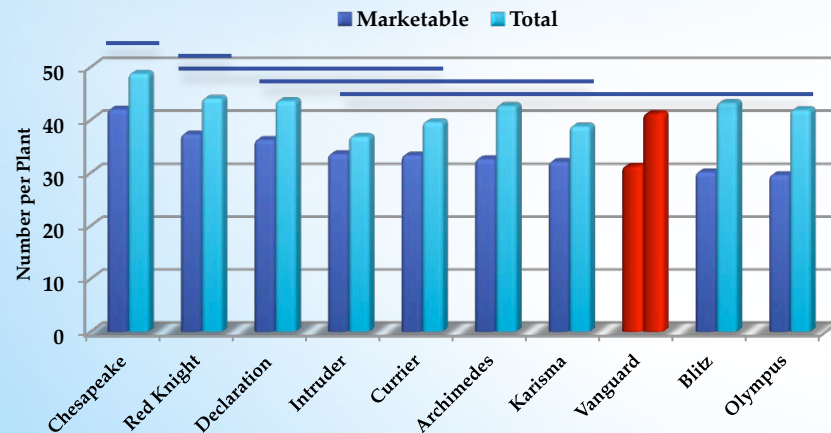
VIGOR: 4.25 out of 5

LOBES: 4

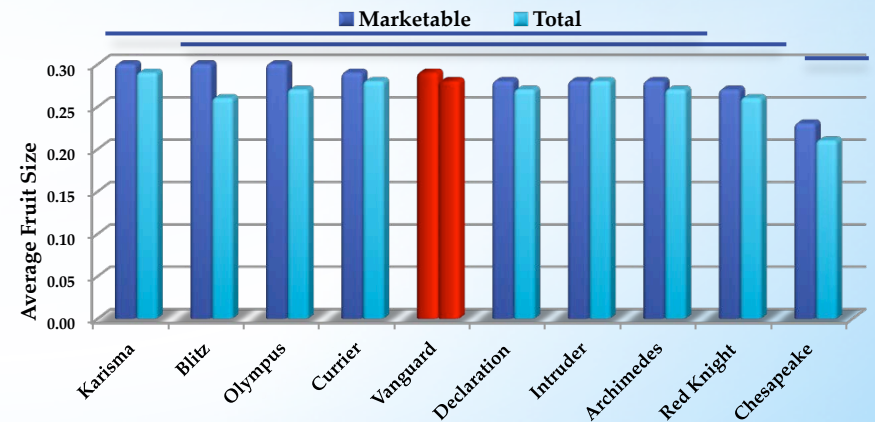
Average Fruit Size by Weight: Harvest Date



Marketable & Total Number per Plant



Average Fruit Size by Weight



Summary

In our trial, there were no statistically significant differences between any of the varieties in regards to marketable and total yield as measured by fruit weight. However, there were some differences observed in fruit number ($P < 0.05$). 'Chesapeake' had the highest marketable and total fruit number per plant. Marketable fruit number of 'Chesapeake' was statistically similar to 'Red Knight' and 'Declaration', but was higher than the other varieties that were tested ($P < 0.05$). 'Karisma' had the highest average marketable fruit size, but was statistically similar to 'Olympus', 'Blitz', 'Vanguard', and 'Currier F1'. 'Chesapeake' had a particularly low average marketable fruit size and was statistically lower than all the other varieties. In 2013, 'Karisma', 'Vanguard' and 'Olympus' had the highest average fruit size in a similar trial. Depending on how important average fruit size is to the market, this data can be interpreted differently. If smaller fruit are accepted/preferred for market, 'Chesapeake' may be an ideal variety as peppers are typically sold per piece at retail markets. However, if larger fruit are preferred, 'Declaration' or 'Currier F1' may be more valuable as they maintain good fruit size and have higher yield (weight) than many of the other varieties tested. Similar to 2013, 'Intruder' had the highest percent marketability although 'Chesapeake' and 'Red Knight' were statistically similar. A large portion ($> 80\%$) of the fruit quality problems seen in this trial was 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.

Total weekly fruit yield was plotted in order to summarize early vs. mid- and late-season production (data not shown). In contrast to the 2013 trial, several varieties showed excellent production early and mid-season, whereas in 2013 the majority of the yield came in September. Three varieties showed high potential for early-season production, which can be advantageous for marketing high-value fruit. In particular, 'Karisma', 'Blitz', and 'Declaration' showed the highest yields during July (data not shown). At the peak of the season, 'Currier F1', 'Intruder', 'Vanguard', and 'Archimedes' had the highest production and were dramatically higher than the other varieties tested. During the peak harvest, and throughout the month of August, 'Blitz' had very poor production. 'Red Knight', 'Chesapeake', and 'Archimedes' had the highest yields late in the season (data not shown).

Acknowledgements

- We would like to sincerely thank the following:
 - The 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