

Development and Commercialization of New Citrus Scion Cultivars from the University of Florida-CREC



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Valencia
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- ” Team members**
 - ” Fred Gmitter, Jude Grosser, and Bill Castle**
 - ” 20-25 staff, students, post-docs**
 - ” 30+years of breeding, genetics, and field trials**
- ” Sweet oranges for fresh and processed**
- ” Fresh fruit cultivars**
- ” Approaches to commercialization**



Brief Outline

“New sweet oranges to improve fresh and OJ quality

“New seedless and easy to peel mandarins

“New consumer friendly grapefruit types: No GJE

“New product forms, to renew consumer excitement and retain interest in fresh citrus

“Rootstocks that overcome stresses and improve quantity and quality of citrus products

“Disease resistance, or extinction!”



Citrus Genetic Improvement Needs

- “ Florida cultivars**
 - “ Hamlin: early maturity (November-January), high yields, poor color and juice quality**
 - “ Midsweet: fills midseason gap between Hamlin and Valencia (January –March); productive, seeded, modest quality**
 - “ Valencia: the premium standard for quality, matures March through June**
- “ Our program goal has been to release new selections to fill gaps and improve quality throughout the season**



Sweet Oranges



Valquarius™



Valenfresh™



EV 1 and EV 2



OLL-8 on UFR-2 (4 years)

- “ Florida cultivars**
 - “ Seeded mandarins, not so easy to peel or to eat**
 - “ Navel oranges, poor color and flavor in Florida**
 - “ Grapefruit, the Grapefruit Juice Effect**
- “ Our program goal has been to release new selections that exceed consumer demands and expectations**
- “ Other new opportunities**



Fresh Fruit Cultivars

- “ **More than 15,000 hybrids in the field**
- “ **HIGH PRIORITY: Evaluations and selection on a biweekly basis**
- “ **Appearance, flavor, peelability, seed content, and post-harvest**
- “ **Elite selections shared with industry for commercial perspective**
- “ **Trial blocks at UF and with grower cooperators**

Evaluation and Selection

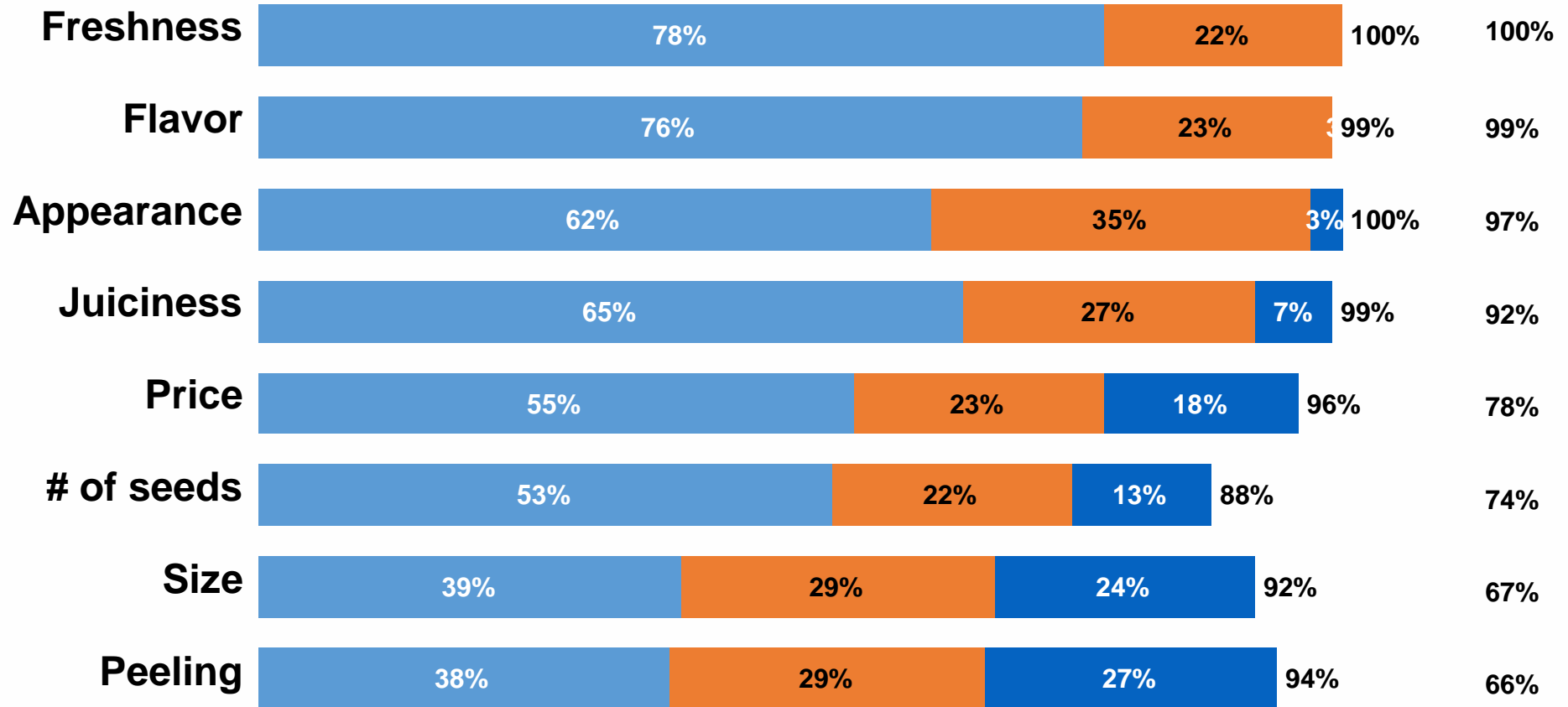
Consumer-Relevant Fruit Characteristics



- **Flavor and aroma of fresh fruit:** mandarins, oranges, grapefruit
- **Color:** mandarins, oranges, grapefruit
- **Health benefits:** mandarins, oranges, grapefruit
- **Seedlessness:** fresh citrus fruit
- **Health concerns:** the Grapefruit Juice Effect
- **Convenience:** ease of peeling, segment integrity
- **Novelty:** unique appearance, new combinations of flavors/colors/aromas

Importance of Fresh Citrus Fruit Attributes in Purchase Decisions

Top2
Box



■ Extremely ■ Very ■ Somewhat

Base: Adults (n=101)



Summary Impressions of Mandarins

	Sample					
	486 Dancy (n=101) %	411 (n=34**) %	965 (n=101) %	392 New (n=101) %	254 Minneola (n=101) %	109 Clementine (n=101) %
Base: Adults						
If this mandarin was available in your grocery store, how likely are you to buy it?						
Extremely likely	19	38	25	20	21	19
Very likely	31	29	31	29	21	22
Somewhat likely	26	18	28	28	33	33
Not very likely	14	6	9	9	18	13
Not at all likely	8	6	7	14	6	13
Don't know	3	3	1	1	2	1
Which one statement best describes how you might use this new variety of mandarin in your household?						
Would totally replace other orange varieties you buy	10	27	16	12	13	12
Would sometimes replace other orange varieties you buy	29	24	31	25	31	28
Would be use in addition to other orange varieties you buy	40	29	41	43	37	34
Be something that you would not buy at all	22	21	13	21	20	27

Sample 965 =Sugar Belle® 'LB8-9'

The overall “winner” and ranked first on the following attributes:

- Overall appearance (7.8 on a 9-point scale)
- Overall flavor (7.0 on a 9-point scale)
- Just right color of fruit and fruit flesh
- Acidity (73% just right)
- Size of fruit (82% just right)
- Likely to buy (56% extremely/very likely)

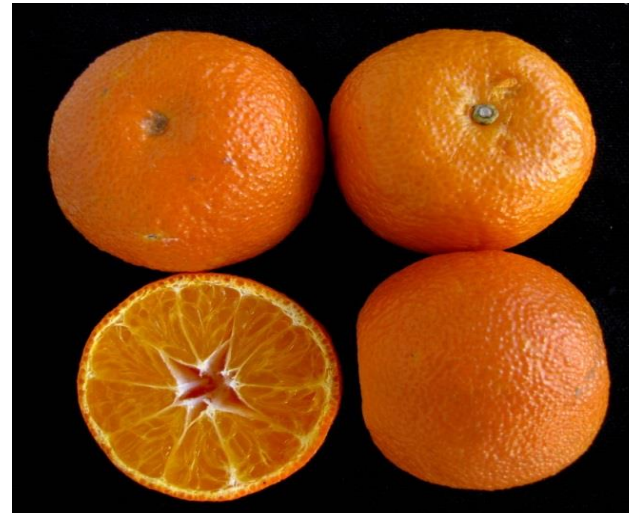


The HLB Tolerance of LB8-9; Sugar Belle®



C4-15-19

- “ Early Maturing (Oct . Nov)
Seedless Tangerine
- “ Clementine size
- “ Good ext & int color
- “ Peelable, improves with storage
- “ Sweet, 14-17 brix
- “ Trees healthy so far, in infected block



UF 950

- “ Easy to peel
- “ Seedless
- “ Clementine size
- “ Convenient to eat
- “ Crisp texture
- “ Better color and flavor than Clementine
- “ Dec maturity; ratio 13-16
- “ Alternaria resistant



UF Citrus Selection 914

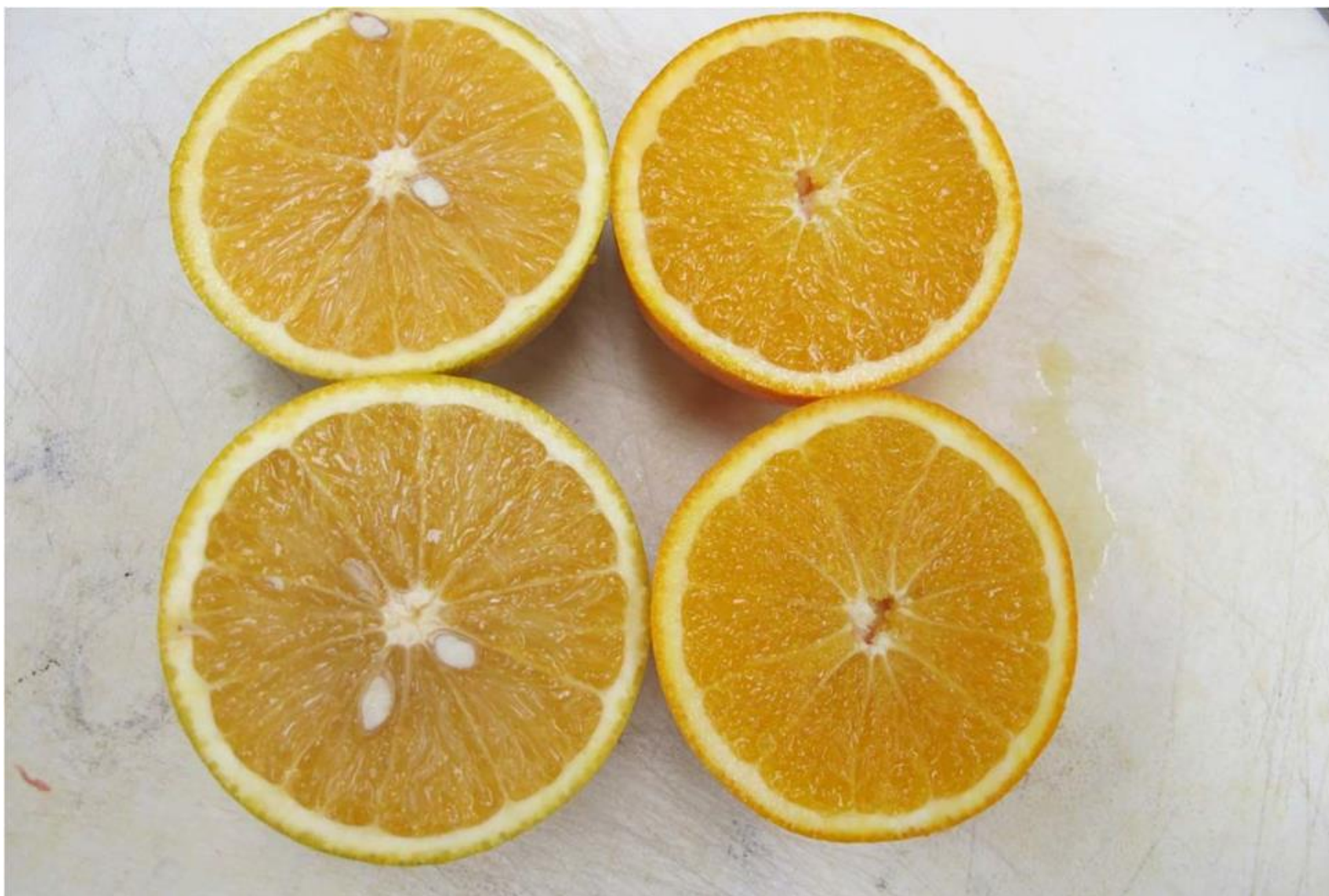


- ” Uniform large fruit (avg. 680 g); harvest from October through early April
- ” External red blush; uniform internal color
- ” Very similar to grapefruit in aroma and flavor attributes
- ” Very low amounts of furanocoumarins
- ” Sweeter and less acidic than ordinary grapefruit
 - . 914 Brix/acid=9.9/0.99= 10
 - . Ruby Red Brix/acid=9.2/1.21= 7.6

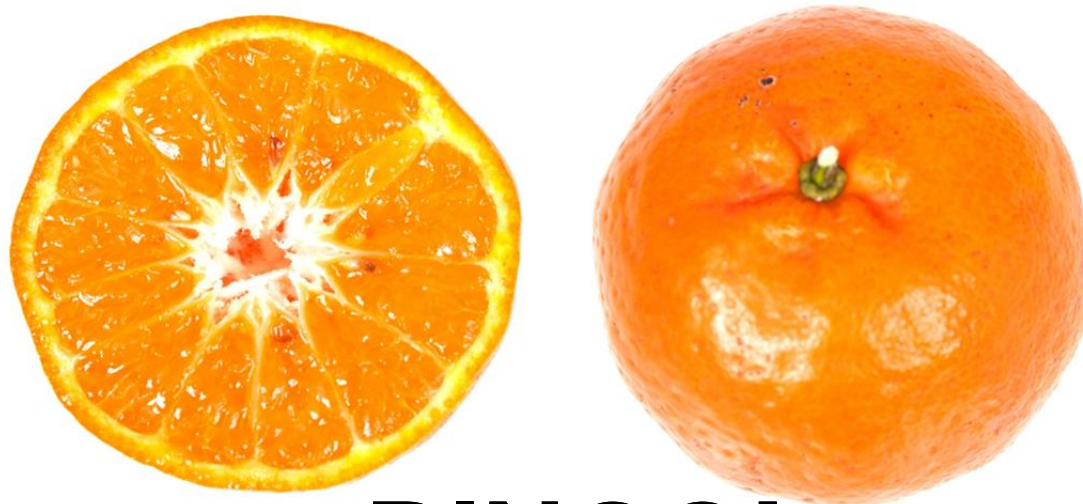
UF 914 Unique Characteristics



FL Glenn Navel (l) vs. RBB 7-34 (r)



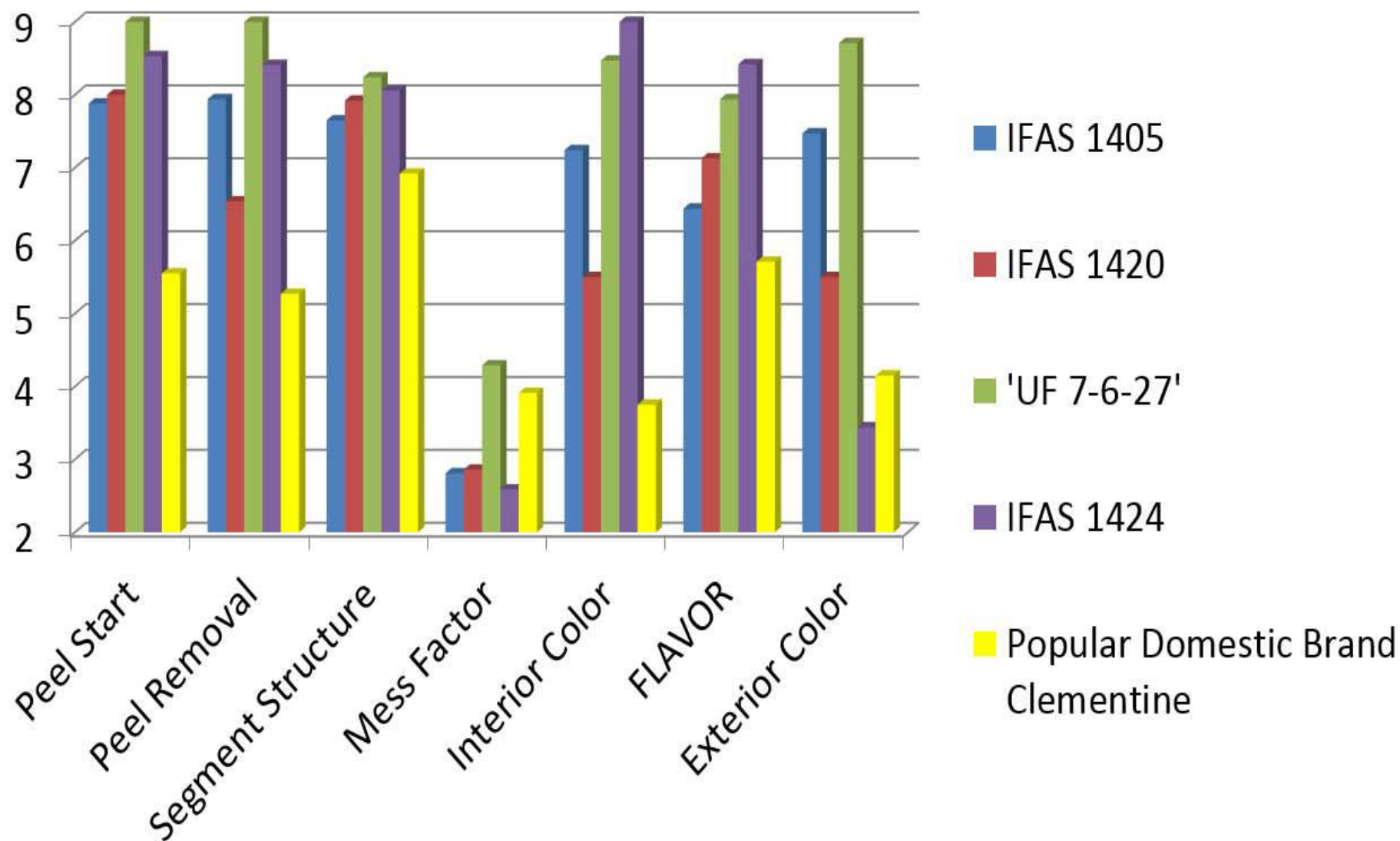
FL Glenn Navel (l) vs. RBB 7-34 (r)



BINGO!



‘7-6-27’ , aka “Bingo”



Fruit Display Day Results

- “ October-November maturity**
- “ Small to medium size fruit**
- “ Seedless, though contains inconspicuous seed traces**
- “ Deep orange-red color, inside and out**
- “ Very easily peeled and consumed, good segment integrity**
- “ Excellent flavor**
- “ Brix = 11.6; acid = 0.81; ratio = 14.32 (10/20/14)**



Fruit Attributes of 7-6-27

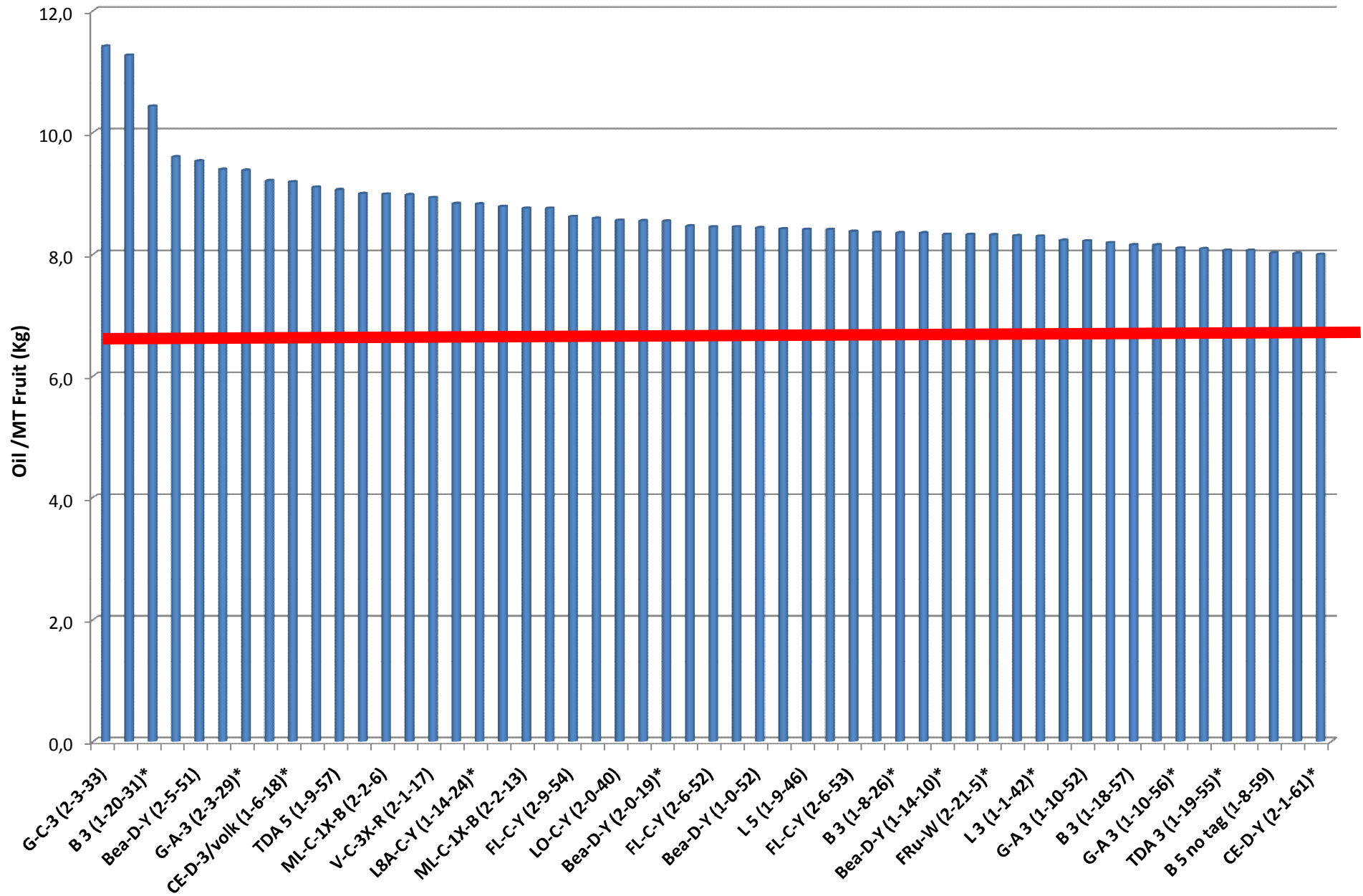


HLB Resistant Fresh Fruit Selection?



Lemons for Processing

Average oil content per MT Fruit (2002 to 2007) (Control =6.48)





Old Pathways to Commercialization

- “ Identify worthy candidates**
- “ Second level tests**
- “ Propagate selections directly for field trials**
- “ Collect data on performance and compare with standard cultivars**
- “ Increase propagation materials**
- “ General release to industry**



Historical Approach

- “ Changing marketplaces: new products, cultivars, producers, systems of management and marketing**
- “ Intellectual property: patent protection**
- “ Quickly changing targets: no time to lose!**
- “ The Fast Track!**



New Factors and Approaches

The New Age of Variety Evaluation

FAST TRACK



The Challenge

- “ Promising selections have been identified
 - . **The fruit has promise, little else is known**
- “ Growers and packers don't want to wait on extensive traditional field trials
- “ Growers want to be involved in the evaluation process

FAST TRACK

- “ FFSP, IFAS, NVDMC
- “ A means of moving experimental fresh varieties to Florida growers for evaluation
- “ Florida growers participate in experimental trials and offer input on commercial decisions
- “ Program is coordinated with Nurseries
- “ Future rates are fixed*
 - . **Encourage grower involvement**
 - . **Generate revenue to the breeding program**
- “ Reward growers for participating
 - . **Reduce future rates and head start**
- “ Allow late adopters to participate
- “ Support IFAS Plant Improvement Program
- “ Three-Tier system

- ” Tiered system to encourage grower participation**
- ” Developed by UF-IFAS and NVDMC**
- ” Tier 1: US\$50 per cultivar, no more than 30 trees**
- ” Tier 2: Commercialization, open ONLY to Tier 1 growers for 5 year head start; lower royalty fee**
- ” Tier 3: Open to other growers, higher royalty fee**
- ” Early Option: Any Tier 1 grower at any time can choose to commercialize a desired cultivar**



Fast Track Features

- ” **Currently New Varieties Development and Management Corp., in conjunction with Florida Foundation Seed Producers, manages the portfolio for fresh fruit cultivars**
- ” **Exception is LB8-9, Sugar Belle, which is managed by EMCOCAL**
- ” **Juice oranges, lemons, and rootstocks available through UF-FFSP: Invitations to Negotiate**
- ” **UF-CREC cultivars are being disseminated to California, the Mediterranean Region, South Africa, South America and Australia**

International Commercialization

And they're OFF!!!



- “ Since 2015, >1.6 million trees of UF scion or rootstock cultivars planted in Florida
- “ >500k UFR rootstock series
- “ >700k OLL sweet oranges
- “ >135k Sugar Belle
- “ >120k Bingo



IMPACTS

- “ Program interacts directly with industry
 - “ Goals and financial support
 - “ Extensive field trials
 - “ Feedback on products
- “ New cultivars for processing and fresh market
- “ Global commercialization interests

CONCLUSION



THANK YOU!