Advances in Fresh Fruit Variety Development by the UF/CREC Citrus Improvement Team

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LB8-9: A New Mandarin Hybrid

LB8-9 mandarin hybrid is a mid-season maturing hybrid that combines medium fruit size, attractive orange color & good fruit flavor.

Tree characteristics:
Shape: Obloid
Growth habit: Drooping with dense branches
Height: Over 6m if unpruned, vigorous.
Scion: Smooth trunk surface
Branches: At a medium angle.
Spines: Absent
Shoot tip: Green & slightly pubescent
Vegetative cycle: Evergreen

Seed number in commercial block

Yield data

<table>
<thead>
<tr>
<th></th>
<th>Pollinator Normal</th>
<th>Girdled</th>
<th>GA3</th>
<th>&quot;Crop Set&quot;</th>
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<tbody>
<tr>
<td>Mean</td>
<td>11.74</td>
<td>1.50</td>
<td>3.00</td>
<td>2.39</td>
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<tr>
<td>Std</td>
<td>0.23</td>
<td>0.26</td>
<td>0.97</td>
<td>0.73</td>
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</table>

Girdled

Pollinator Normal: 11.74 seeds
Girdled: 1.5 seeds
GA3: 3 seeds
"Crop Set": 2.39 seeds

LBA-9 Pedigree

Duncan grapefruit
Dancy tangerine
Clementine Mandarin
Minneola tangelos

LB8-9
**Post-harvest (PH) qualities:**

When stored at 22 °C & 92-96% relative humidity for:
- 2 weeks: 35-37% decay (comparable to SB) > than MIN (36%)
- Post-harvest pitting incidence: 0% in LB8-9, MIN & 3% in SB
- Fruit peel color: hue 60 in LB8-9 and SB and hue 65 in MIN

When stored at 4 °C & 92-96% relative humidity for:
- 6 weeks: No differences in peel color, chilling injury or decay among the 3 cultivars
- Juice color: Best in SB (44) followed by LB8-9 with 40, & MIN with 38
- Fruit taste after 50 days: Better score of acceptance for LB8-9 than MIN

**Summary**
- LB8-9 fruit resemble Minneola tangelo
- Fruit mature 4 to 6 weeks before Minneola; this is a market advantage
- The color and flavor equals or exceeds Minneola
- Trees are very vigorous and will require horticultural manipulation to control size and cropping
- Fruit are seedy when cross pollinated, but can be much lower seeded in a solid block
- Foliage and fruit have much greater tolerance of Alternaria than Minneola, minimizing fungicide applications

**PREPARING FOR RELEASE!**

**Fresh market sweet orange**

Valencia Somaclone N7-3

- seedless
- attractive large fruit with rounder shape
- peels easier than typical Valencia
- holds quality late in season

**Valencia N7-3, for the Fresh Market**
Interploid hybridization using tetraploid somatic hybrids as pollen parents to produce seedless triploids for mandarin improvement:

- more than 8000 triploids produced to date, many fathered by somatic hybrids (under direction of FG Gmitter, CREC)
- oldest hybrids are now fruiting!!!!!
**TRIPLOIDS**
**THE FUTURE OF SEEDLESSNESS!**

Crec-9505 triploid mandarin hybrid

- > 8000 triploid mandarin hybrids
- Focus: seedless fresh market
- CREC 9505 – proof of concept – 0 seed!
- many beginning to fruit!

**CAN VARIETY IMPROVEMENT SOLVE THE GRAPEFRUIT/CANKER DILEMMA?**

- Pummelo hybrid – photo taken 10-25-05
- beautiful grapefruit sized fruit, early maturity with good flavor; testing for canker tolerance, and budwood irradiation in efforts to develop a seedless clone underway
- Hundreds of triploid grapefruit/pummelo hybrids produced to date, a few beginning to fruit!
- recent test shows resistance to citrus bacterial spot suggesting potential resistance to citrus canker!

A great breeding parent

**Canker-resistant acid fruit development (lime/lemon types)** (collaboration with J.H. Graham)

'Citrus Canker Assay – Stomatal Inoculation Method'

A. 'Meiwa' kumquat
B. 'Lakeland' limequat
C. Resistant triploid
D. Susceptible 'Giant Key' lime

**CYBRIDIZATION**: transfer of cytoplasmic male sterility from Satsuma using a protoplast fusion technique – goal: Making seedy varieties SEEDLESS!

'Sunburst'


Another triploid mandarin hybrid fruiting for the first time in 2005 with 0 seed - again shows proof of concept!
Somatic cybrid plant of Sunburst tangerine containing Guoqing Satsuma cytoplasm (mitochondrial genome).

### Somatic Cybridization Results

- **Scion Improvement Fusions**

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<th>Embryogenic Parent</th>
<th>Leaf Parent</th>
<th>Microcalli</th>
<th>Embryos</th>
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**Budwood Irradiation:** shotgun method to generate seedless cultivars from high-quality seedy cultivars
- numerous outstanding diploid hybrids in this program
- requires lots of field space

**Low-seeded Murcott from budwood irradiation**

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**Thanks to YOU!**

- Industry Partners
- Collaborators
- IFAS Administration
- CREC Faculty and Staff
- FCPRAC – our primary funding source!

**TAKE HOME MESSAGE:**
THE BEST IS YET TO COME, AND SOONER THAN YOU THINK!