Taste Test Performances of New Florida Tangerine Cultivars
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Objectives

• To identify quality attributes in new tangerine hybrids.
• To describe these attributes by sensory evaluation.
• To correlate tangerine sensory attributes with chemical data.
• In the long term, to understand characteristics of “good” tangerine fruit and to find quality markers for use in Marker Assisted Breeding.

USDA-ARS / UF-IFAS / FDOC partnership

Since 2006
• Breeders:
  ✓ Fred Gmitter (UF)
  ✓ Greg McCollum (ARS)
• Quality evaluation:
  ✓ Elizabeth Baldwin (ARS)
  ✓ Anne Plotto (ARS)
  ✓ Jinhe Bai (ARS)
  ✓ Filomena Valim (FDOC)

Tangerine material

1. Identify flavor profile from a hybrid population

2. Maturity of advanced selections

3. Consumer studies

Which hybrid to evaluate?

• Samples chosen because of their parentage and a preliminary flavor screening:

  2006-07
  42 hybrids and 13 named commercial cultivars, multiple harvests

  2007-08
  16 samples (4 Commercial) from the previous year
  9 new samples

  2008-09
  21 samples (7 Commercial) from the previous years

Sensory descriptive analysis

• 10-15 panelists
• Trained each year for 12 to 24 hours
• Ballot development
• Reference standards
Sensory descriptive analysis

Sample preparation

- Fruit washed with detergent and sanitized with PAA
- Juiced
  - 1 L for sensory analysis
  - 50 mL for volatile, sugars, acids, and carotenoids
- Juice frozen and stored at -20°C until analysis

Flavor descriptors

<table>
<thead>
<tr>
<th>Flavor descriptors</th>
<th>2006-07</th>
<th>2007-08 &amp; 2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet</td>
<td>Sweet</td>
<td>Sweet</td>
</tr>
<tr>
<td>Sour</td>
<td>Sour</td>
<td>Sour</td>
</tr>
<tr>
<td>Bitter</td>
<td>Bitter</td>
<td>Bitter</td>
</tr>
<tr>
<td>Tangerine</td>
<td>Tangerine</td>
<td>Orange</td>
</tr>
<tr>
<td>Orange</td>
<td>Orange</td>
<td>Grapefruit</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>Grapefruit</td>
<td>Floral</td>
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<tr>
<td>Floral</td>
<td>Floral</td>
<td>Fruity</td>
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<tr>
<td>Fruity</td>
<td>Fruity non citrus</td>
<td>Fresh</td>
</tr>
<tr>
<td>Green</td>
<td>Fresh</td>
<td>Cooked</td>
</tr>
<tr>
<td>Other</td>
<td>Cooked</td>
<td>Pumpkin / Fatty</td>
</tr>
<tr>
<td>Aftertaste</td>
<td>Sulfury</td>
<td></td>
</tr>
</tbody>
</table>

Suggested sample description

- **Clementine x Minneola 8-9 and 8-10**: typical tangerine flavor if harvested at the correct maturity.
- **8-9 x Murcott hybrids**: sweet, fruity, some orange and floral flavor if harvested ripe. Otherwise, can be sour with grapefruit and sulfury notes.
- **LS Murcott**: bitter, fatty, sulfury. These characteristics are brought upon by juicing and freezing, and are enhanced in unripe fruit.
- **Robinson x Fairchild 68**: sweet, balanced in fruity and citrus flavors.
- **Sanguinelli, Temple, Ortanique, 8-9 x Vol4X**: orange and floral flavor, may be sour with some grapefruit note.
Conclusion 3 seasons 2006-2008

- Wide distribution in aroma and taste attributes of tangerine hybrids.
- Sensory descriptive analysis provides the breeder with specific qualifiers about the hybrids.
- However, juiced fruit is different from whole fruit.
- Harvesting at the optimum maturity is a challenge.
- These tests must be complemented with consumer panels before releasing cultivars.

Maturity Study : 2010-2012

- To determine harvest maturity of commercial and new tangerine cultivars
- Sensory evaluation and instrumental analysis

UF-411 (8-9 x Murcott)

2010-2011 – “High acid” year
- Dec, Jan: too sour but interesting flavor
- End Jan and Feb: very sweet and sour, mix of orange and tangerine flavor

2011-2012 – “Low acid” year
- Season characterized by low acid fruit
- Fruit maturity early January
- End Feb., March already overripe

Conclusion Maturity Study

- Significant year effect: cold spring and late bloom in 2010 resulted in sour fruit in the 2010-2011 season; early season and low acid fruit in 2011-2012.
- Determined harvest windows for Sugar Belle™, UF 411, LS Murcott, and other UF and USDA hybrids.
- Volatile data being analyzed to correlate with sensory data.

Consumer Tangerine Taste Tests

- Mall intercept – 3 cities (Baltimore, Chicago, Tampa)
- 150 consumers interviewed and tasted tangerine samples
Significant Findings

- Sweetness, Shape, Acidity, Overall Flavor and juiciness were most influential for tangerine quality.
- Size, color and amount of seeds were influential, but to a smaller degree.

Summary

- Sensory evaluation helped characterize new tangerine hybrids.
- Consumer panels determined which characteristics of the fruit are important and which hybrids are preferred.
- Optimum maturity remains a challenge because of year-to-year variation.

Questions?