Use of Interspecific Hybrids in Squash for Fresh Market, Processing, and Grafting Rootstocks for Melons

Brent Loy
NH Agricultural Experiment Station
University of New Hampshire
Cucurbita pepo ssp. ovifera

Gourds – hard shelled fruit

Yellow summer squash

Acorn/Delicata winter squash
Cucurbita pepo spp. pepo

Ornamental pumpkins

Zucchini summer squash

Naked Bear
Cucurbita maxima

Buttercup

Kabocha

Blue Hubbard

Banana

Show pumpkins
Cucurbita moschata

Fresh market types

Processing types
C. pepo

C. maxima

C. moschata

Will sometimes cross with good seed, F₁ sterile.

Will rarely cross, but gene transfer possible.

Good luck!
Interspecific *C. maxima* x *C. moschata* F$_1$ hybrids have found some market niches.

- A few varieties have become popular in scattered regions of the globe – eating quality questionable.

- At UNH, we are testing different interspecific hybrids for both fresh market and processing using a bush strain as the female *C. maxima* parent.

- Afford a good root system and graft union for watermelon, melon, and some *Cucurbita pepo* cvs.
Potential Benefits of Interspecific F₁ Hybrids

1) Semi-bush growth habit, with upright leaf canopy and rapid development of leaf canopy.

2) Wider adaptability due to *maxima/moschata* parentage.

3) Improved disease and/or stress resistance.

4) Higher mesocarp yield due to availability of photosynthate typically allocated to seed development.
Bush *C. maxima* breeding lines developed at the NHAES deemed useful for producing interspecific processing hybrids.
Butternut cultigens did not make good male parents in hybrids – female flowering tendency too strong.
NH65 found to be compatible with most C. moschata cultigens in terms of fruit set, seed yield and seed fill.

Available C. moschata processing lines:

- Dickinson Field strain, SC936
- Rupp Seeds
- Long Island Cheese
Harvest in October
# Productivity of Interspecific Hybrids in 2012

<table>
<thead>
<tr>
<th>Cultigen</th>
<th>Fruit FW (kg)</th>
<th>Mesocarp %DW</th>
<th>Fruit No./plot</th>
<th>Fruit FW t/acre</th>
<th>Fruit DW t/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC936</td>
<td>4.3 b</td>
<td>5.8 a</td>
<td>30.5 a</td>
<td>44.8 a</td>
<td>2.6 a</td>
</tr>
<tr>
<td>NH1321</td>
<td>3.9 a</td>
<td>10.8 c</td>
<td>31.5 a</td>
<td>42.1 a</td>
<td>4.5 b</td>
</tr>
<tr>
<td>NH1310</td>
<td>5.8 c</td>
<td>8.0 b</td>
<td>31.5 a</td>
<td>62.4 b</td>
<td>5.0 c</td>
</tr>
</tbody>
</table>
What about interspecific hybrid squash for the fresh market?
Bush *C. maxima* × Vine *C. moschata* → F1
Bush C. maxima

X

Vine C. moschata

F1

Bush C. maxima

Vine C. moschata
Kabocha size interspecific hybrids display the same vigorous growth as the processing hybrids.

Plants very tolerate to powdery mildew, resist predation by vine borer, and show generally good tolerance to fruit rots and foliar disease.
Interspecific *Cucurbita* Hybrids as Rootstocks for Melon Culture

1. Root systems resistant to many soil borne diseases.

2. Root systems more tolerant to abiotic stress than melons.

3. Sudden wilt, incited by a soil-borne pathogen, has become a problem at Kingman Research Farm.

4. UNH has developed interspecific hybrids which show promise for use as rootstocks for grafting melons.
Leadership in evaluating interspecific hybrids at UNH is being spearheaded by Janel Martin, a graduate student.
Grafting Experiment 2015
Melon variety Halona

1. Non-grafted control
2. NH1320 rootstock
3. NH1315 rootstock
4. Carnivor rootstock (Syngenta)
5. Kazako rootstock (Syngenta)
Grafting Technique
One cotyledon splice graft
Plant Growth on July 22

Grafted to Carnivor

Nongrafted
Plant Growth at Harvest
Interspecific rootstocks increase yields.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ave. fruit wt. lbs.</th>
<th>Fruit wt. lbs./plot</th>
<th>Soluble solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.3 a</td>
<td>250 a</td>
<td>11.9 a</td>
</tr>
<tr>
<td>Kazako</td>
<td>4.0 b</td>
<td>452 ab</td>
<td>10.7 b</td>
</tr>
<tr>
<td>Carnivoor</td>
<td>4.3 b</td>
<td>642 bc</td>
<td>10.7 b</td>
</tr>
<tr>
<td>NH1320</td>
<td>4.2 b</td>
<td>667 bc</td>
<td>10.9 b</td>
</tr>
</tbody>
</table>
Melon Maturity

1. Nongrafted plants mature fruit earlier.

2. Grafted plants extend harvest season.

3. Need for evaluating more varieties, especially those with earlier maturity.

4. Studies planned to evaluate earlier planting schedules.

5. More research needed on determining optimum conditions for healing grafted plants.
Research Supported by the NH Agricultural Experiment Station

Jon Wraith – COLSA Dean and Director of Agricultural Experiment Station

Professor Anita Klein – faculty fellow: oversees grants and reports for experiment station.

Business Service Center

Lori Wright – Communications Director
Research Farm and Greenhouse Assistance

- John McLean – Manager, Horticulture Farms and Greenhouses

- Evan Ford – Assistant Manager, Horticultural Farms and Greenhouses

- David Goudreault – Assistant Manager, Farms and Greenhouses
Research Assistants and Technicians

Jake Uretksy
Kaitlyn Orde
Tucker Cole
Janel Martin
Lindsey Sumner
Questions