CARROTS FOR WINTER SALES; VARIETIES, PLANTING DATES AND POST-HARVEST CARE

Amanda Brown, University of Massachusetts Vegetable Extension Program
Expanding Winter Harvest and Sales for New England Vegetable Crops
3 year project (2010-2013) funded by USDA/Northeast SARE

Key Elements of Project
• Using low tunnels
• Winter storage – infrastructure and crops
• Winter farmers markets & marketing
• Farmer to Farmers exchange/educational programs
• Website

central goal is to help farmers expand vegetable harvest and sales from December-April, and thereby increasing winter income
Why carrots?

- A pre-project survey (‘09) confirmed winter production and marketing was increasing in New England in response to consumer demand.
- In follow up surveys carrot was the mostly commonly mentioned root crop.
- Variety, plant date and post harvest handling are major areas of need to increase crop quality at harvest and in storage.
## Production statistics

### Average price per pound, winter-hardy vegetable crops (all NE)

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<th>2008</th>
<th>2009</th>
<th>2010</th>
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<th>2012</th>
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2010 Variety Trial

Seedbed Source

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<th>Variety</th>
<th>Days to maturity</th>
<th>Seed source</th>
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<td>Sugarsnax</td>
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<td>Johnnys</td>
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Seeded June 28
Harvest dates;
September 29 (90 days), October 12 (104 days),
October 27 (120 days),
November 10 (134 days).

 Marketable = USDA Topped Carrots U.S. No.1 and U.S. No.2.

Unmarketable = too small, had insect damage, had splits or forking, were misshapen, or had excessive root growth.

Clean Seeder gear settings: R9, F14 Roller: X12

Carrots were thinned to 1” on July 28th
2010 Variety Trial

• At harvest measurements included; wholesale marketable weights, number of marketable carrots and culls and Brix score

All carrots were washed by hand in buckets and placed into storage at 32 degrees F and RH>95% in perforated plastic bags immediately after harvest.
Canada
95 Day
Average Brix score: 7.62
Carson

90 day
Average Brix score: 8.03
Bastia

85 day

Average Brix score: 8.03
Berlanda

85 day

Average Brix score: 7.27
Bolero
75 day
Average Brix score: 7.89
Sugarsnax
68 day
Average Brix score: 7.65
Overall Harvest Results - 2010

Percent of Carrots (by number) in Each Grading Category
Avg. of Four Harvest Dates

- Canada
- Carson
- Bastia
- Berlanda
- Bolero
- Sugarsnax

Legend:
- Average of small
- Average of insect damage
- Average of forks
- Average of mishapen
- Average of splits
- Average of marketable

% of Carrots:
- 100%
- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%
Marketability - 2010

Bastia – 54% of the total weight harvested was considered USDA US No. 1

Canada – 53% of the total weight harvested was considered USDA US No. 1

Carson – 53% of the total weight harvested was considered USDA US No. 1
Brix as a measure of Quality

A value of 8-10 Soluble Solids (Brix) is optimal for carrots

Factors that influence Brix values
- variety
- maturity
- water
- fertility

Why do we use it?
- Objective inexpensive measurement
- Compare varieties, seasons, harvest dates
- Estimate of sugar content which influences customer acceptability

Variety was most important factor influencing Brix at harvest in 2010

Brix scores varied over harvest and variety

Average Brix scores by harvest date

Average Brix score at harvest by variety
Postharvest Care

• No more than brief periods below 30°F

• RH >95% (98-100%) in package and/or room

• Ideal T 32°F (0°C) for up to 7 months

• Permeable packaging

• No ethylene producers eg apples
In storage

Water Loss in Storage
Harvest 1 - 2010

- Carrots were stored in perforated plastic bags at 32°F 95% RH
- Monthly Brix and water loss measurements were taken December – March
- No significant changes in Brix scores over time

For more details on what happened in storage see Ruth Hazzard’s talk From Field to Storage: High Quality Carrots – 4:00 today!
2011 Variety Trail

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Seeded July 26th

Harvest dates;
November 3 (98 days), November 14 (109 days), November 28 (123 days).

2011
Same grading standards

Later plant and harvest dates, 3 new varieties, effect of washing on storage life
Berlanda
86 day
Brest

90 day
Bolero

75 day, Nantes type
Carson

90 day
Deep Purple

80 day
Florida
95 Day
Marketable Weight

Berlanda—48% of the total weight harvested was considered USDA US No. 1

Bolero—47% of the total weight harvested was considered USDA US No. 1

Florida—46% of the total weight harvested was considered USDA US No. 1
Brix at Harvest

**Average Brix score at harvest by variety**

- Berlanda: 7
- Bolero: 8.5
- Brest: 9
- Carson: 10
- Deep Purple: 8.5
- Florida: 7

Variety and harvest date were significant factors on Brix scores in 2011.

**Overall Brix scores by harvest date**

- November 3: 7.5
- November 14: 9
- November 28: 9.5

-November 3
-November 14: Harvest Date
-November 28
To wash or not to Wash?

- 3 varieties
  - Berlanda
  - Bolero
  - Brest
- Stored Nov 14 to May 2
- In perforated plastic
- Rot = on root or at base of stem

Rot was worse on washed
Staining was slightly worse on unwashed
Conclusions

- There is a lot one can know about carrots!
- There are lots of varieties suitable for late fall harvest and long term storage. Know your markets.
- Variety has large effect on Brix score at harvest
- Brix values from storage trails were inconsistent – no significant increase or decrease in values seen
- Washed carrots have higher incidence of disease in long term storage

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Next Steps – Low Tunnels?

Evaluate the effect of different seeding dates on the marketable spring yield of carrots, beets, spinach, and kale.

Carrots - Harvest Weight (g) on May 22

- Sep 19
- Oct 03
- Oct 10

More results posted at www.umassvegetable.org
Special thanks to

- Ruth Hazzard
- Becky Sideman
- Andrew Cavanagh
- Jessica Smith
- Andrew Hamilton
- Sarah Berquist
- Zara Dowling
- Danya Titelbaum
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- Eric Wheeler
- Sue Scheufele
- Jan Van Der Hieden
- Ken Fine
- Dr. Susan Han
- Many farmers.....

  Farmers, Engineers. N. Connecticut

- March 6, 2014, Winter Growing and Marketing
  Publick House, Sturbridge, MA
  Logistics, Storage, Tunnels, and Marketing

Contact: umassvegetable@umext.umass.edu