Brian A. Krug

Greens Production in Greenhouses

University of New Hampshire
Cooperative Extension

Bench Top Production

Hydroponic Production

Does it make money?

<table>
<thead>
<tr>
<th>Media</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Vee mix</td>
<td>$9.15</td>
</tr>
<tr>
<td>Vermont compost</td>
<td></td>
</tr>
<tr>
<td>Press +</td>
<td>$8.26</td>
</tr>
<tr>
<td>Osmocote Start</td>
<td></td>
</tr>
<tr>
<td>12-17-11</td>
<td></td>
</tr>
<tr>
<td>Germination mix</td>
<td>$6.10</td>
</tr>
<tr>
<td>Living Acres compost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$1093</td>
</tr>
</tbody>
</table>

http://extension.unh.edu/Grower-Resources/
Research-Reports

• Bench Top Production
• Hydroponic Production

University of New Hampshire
Cooperative Extension
Greens Production

• Why (or why not) to grow in the winter?
• How is winter growing different
• Special considerations for winter
  – Dealing with snow
  – Crop scheduling and management
  – Harvesting
  – Etc.

Greens Production

• Year-round income is nice
• Gaining value from vacant space is nice
But…it’s challenging
• Planning winter crops in July, August & Sept
• Dealing with harvest logistics in snow and cold
• Not having a “Down time”

How is Winter Growing Different?

University of New Hampshire
Cooperative Extension

Light is the #1 Problem

There is less light during the winter months

Daily Light Integral

New England receives a max of 25-30 mol m⁻²d⁻¹
New England receives a min of 15 mol m⁻²d⁻¹
Light is the #1 Problem

- How much light is needed
  - Lettuce needs a minimum of 12 to 14 mol m⁻² d⁻¹
- Greenhouse will reduce the DLI by 40% (6 mols in Dec)
- High-pressure sodium lights (1,200 fc)
  - Lights need to be on 7 to 14 hr/day

Base temperature = Temp below which the plant will not grow
Base temperatures for vegetable crops range from 35-60F.

Temperature

- Increased heat will increase production
- Will heating expense be offset by income?
  - Maybe
  - Maybe not

Fertility

- Bench Top
Fertility

- Bench Top
- Hydroponics
  - Water-soluble
    - Peters Professional 5-11-26
    - Jack’s 5-12-26
    - Jack’s 16-4-17
  - Need to add Calcium Nitrate

Food Safety

- Need to rethink our pest management methods
  - Products for ornamentals may not be registered for edibles
    - Fundamental difference from transplants

Price comparison per cu ft

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Vee mix Vermont compost</td>
<td>$9.15</td>
</tr>
<tr>
<td>Peat + Osmocote Start 12-17-11</td>
<td>$8.26</td>
</tr>
<tr>
<td>Peat + Suståne 8-4-4</td>
<td>$8.01</td>
</tr>
<tr>
<td>Sunshine LB2 peat</td>
<td>$7.67</td>
</tr>
<tr>
<td>Germination mix</td>
<td>$6.10</td>
</tr>
</tbody>
</table>
Food Safety

- FSMA (Food Safety and Modernization Act)
  - Passed in 2011
  - Rules and regulations are in draft form and will go into affect Fall of 2015
  - 1-6 years to come into compliance

FSMA – Food Safety

- Food based illnesses
  - You are liable – have liability insurance
- Talk to your local extension, and regulation folks
  - Mass – Rich Bonanno
  - CT – Diane Hirsch

FSMA – Food Safety

- Keep good records of sales!
- You may not be covered by FSMA
  - < $25,000 in sales of produce
  - < $500,000 in food and ½ is direct marketed

Post-Harvest

- Cleaning
- Perishable Product
  - Immediate market
  - Cold storage

Marketing

- Direct sales
  - Garden Center
  - Farm stand
  - Farmers’ market
- Restaurants
- Grocery Stores
Growing Greens In a Nutshell!

Varieties of salad greens:
- kale
- spinach
- Chinese cabbage
- lettuce
- mustards
- chard
- beets
- pac choi
- tat soi
- arugula

Growing Greens In a Nutshell!

Baby salad greens:
- Mizuna Spinach 'Defender'
- lettuce

Growing Greens In a Nutshell!

Questions?
Brian.krug@unh.edu

Univeristy of New Hampshire
Cooperative Extension