Tile Drainage in Massachusetts Cranberry Production

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DeMoranville, Carolyn J.; Jeranyama, Peter; Kennedy, Casey; and Alverson, Nick, "Tile Drainage in Massachusetts Cranberry Production" (2016). Cranberry Station Extension meetings. Paper 215.
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Tile drainage in Massachusetts cranberry production

Carolyn DeMoranville, Peter Jeranyama, Casey Kennedy, and Nick Alverson

• Funded by Northeast SARE
• Looked at spacing: horizontal and vertical (depth)
• Looked at functionality
## Tile Drainage Study - spacing

<table>
<thead>
<tr>
<th>Tile Spacing, feet</th>
<th># of vegetative uprights ft$^{-2}$</th>
<th># of uprights with 1 berry ft$^{-2}$</th>
<th># of uprights ≥ 1 berry ft$^{-2}$</th>
<th>Yield (BBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>36</td>
<td>7</td>
<td>20</td>
<td>270</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
<td>11</td>
<td>28</td>
<td>339</td>
</tr>
<tr>
<td>25</td>
<td>55</td>
<td>12</td>
<td>24</td>
<td>307</td>
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</tbody>
</table>

### Contrasts

<table>
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<tr>
<th></th>
<th>15 vs. 20</th>
<th>15 vs. 25</th>
<th>20 vs. 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 vs. 20</td>
<td>NS</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>15 vs. 25</td>
<td>*</td>
<td>**</td>
<td>NS</td>
</tr>
<tr>
<td>20 vs. 25</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>
Tile depth study

Soil tension (kPa)

<table>
<thead>
<tr>
<th></th>
<th>Peat 8&quot;</th>
<th>Peat 12&quot;</th>
<th>Upland 12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil depth</td>
<td>-1.5</td>
<td>-1.5</td>
<td>-3</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td></td>
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<td>0.5</td>
<td>0.5</td>
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<td>1.5</td>
<td>1.5</td>
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<td>2</td>
<td>2</td>
<td></td>
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<td>2.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
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</tr>
</tbody>
</table>

2015

Wetland Bog Location

Upland Bog Location
Tile depth/drainage – Fruit Rot

Depth matters but so does subsoil base.
Soil Tension and Tile Drainage Depth Effects on Cranberry Yield

Berry Yield (BBL/Acre)

- shallow/wet
- regular/wet
- regular/dry
Tile drain function

Ditch elevation lower at this end
Case study – the work of graduate student Nick Alverson

Depth: 18 in. sloping to 2 ft.

Width: 25 ft.
Hydrologic Inputs – inches of water

- Precip: 4.10 inches
- Flood input: 6.50 inches
- Input from adjacent bed: 1.48 inches
- Irrigation: 1.17 inches

Legend:
- Precip
- Flood input
- Input from adjacent bed
- Irrigation
Surface Water Discharge: Storms vs. Harvest Flood

Drainage rate:
~100x vol. per sec. vs. storm
August Storm Event - Flow

1.6 inches of Rain
Total Discharge from Bed vs Discharge from Tiles (cubic meters) 2014

Discharge from tiles represents approximately 42% of the flow
Survey

• Have asked questions about your use of tiles
• Today’s survey will be used to provide the ‘end of project’ information to compare to start.
• Two more workshops in the spring – depth and installation