Nutrient Management

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Nutrient Management

Carolyn DeMoranville
UMass Amherst Cranberry Station
Results of surveys conducted in January 2008 (2007 season); January 2009 (2008 season); March 2010 (2009 season).

<table>
<thead>
<tr>
<th>Management choice</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>N:P P&gt;N</td>
<td>36%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>N:P P no more than N</td>
<td>34%</td>
<td>61%</td>
<td></td>
</tr>
<tr>
<td>Plan to reduce P use next season</td>
<td>36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced P use</td>
<td></td>
<td>51%</td>
<td>65%</td>
</tr>
</tbody>
</table>
Grower P reduction sites study

Site descriptions. P records collected since 2005 (2003 at sites 1 and 2). Reduction defined as 15 lb/a or less.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63.3</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>45.0</td>
<td>no</td>
<td>since 2006</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>42.1</td>
<td>pumped back</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>47.4</td>
<td>pumped back</td>
<td>since 2008</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>29.6</td>
<td>yes</td>
<td>since 2007</td>
<td>at 20 lb</td>
<td>at 16.1</td>
</tr>
<tr>
<td>6</td>
<td>23.5</td>
<td>yes</td>
<td>yes (record start 2009)</td>
<td>no record</td>
<td>yes</td>
</tr>
<tr>
<td>7</td>
<td>40.0</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
P fertilizers applied and yield at sampling sites. Note - site 6 no records available pre-2009.

<table>
<thead>
<tr>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>P rate</td>
<td>Yield</td>
</tr>
<tr>
<td>2005</td>
<td>16.5</td>
<td>190</td>
</tr>
<tr>
<td>2006</td>
<td>6.4</td>
<td>162</td>
</tr>
<tr>
<td>2007</td>
<td>10.4</td>
<td>156</td>
</tr>
<tr>
<td>2008</td>
<td>5.9</td>
<td>221</td>
</tr>
<tr>
<td>2009</td>
<td>7.5</td>
<td>242</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site 4</th>
<th>Site 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>P rate</td>
</tr>
<tr>
<td>2005</td>
<td>27.5</td>
</tr>
<tr>
<td>2006</td>
<td>32.5</td>
</tr>
<tr>
<td>2007</td>
<td>25.8</td>
</tr>
<tr>
<td>2008</td>
<td>7.8</td>
</tr>
<tr>
<td>2009</td>
<td>3.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site 6</th>
<th>Site 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>P rate</td>
</tr>
<tr>
<td>2005</td>
<td>19.3</td>
</tr>
<tr>
<td>2006</td>
<td>14.3</td>
</tr>
<tr>
<td>2007</td>
<td>9.7</td>
</tr>
<tr>
<td>2008</td>
<td>7.7</td>
</tr>
</tbody>
</table>
Yield (bbl/A) comparison of 4 or 6 years prior to that in 2008-2009

<table>
<thead>
<tr>
<th>Site</th>
<th>P 2008-2009 (lb/A/yr)</th>
<th>4 years prior yield</th>
<th>6 years prior yield</th>
<th>2008-2009 average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.7</td>
<td></td>
<td>153</td>
<td>232</td>
</tr>
<tr>
<td>2</td>
<td>8.2</td>
<td></td>
<td>155</td>
<td>243</td>
</tr>
<tr>
<td>3</td>
<td>4.0</td>
<td>115</td>
<td></td>
<td>130</td>
</tr>
<tr>
<td>4</td>
<td>5.6</td>
<td></td>
<td>178</td>
<td>199</td>
</tr>
<tr>
<td>5</td>
<td>18.1</td>
<td>119</td>
<td></td>
<td>195</td>
</tr>
<tr>
<td>6</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>10.1</td>
<td>155</td>
<td></td>
<td>157</td>
</tr>
</tbody>
</table>
Data from 7 sites 2005-2009

Yield (bbl/A) vs. P rate (lb/A)

- Site 1
- Site 2
- Site 3
- Site 4
- Site 5
- Site 6
- Site 7
- Regression
Total P (ppb) in water at study bogs 2009 samples.

<table>
<thead>
<tr>
<th>Site</th>
<th>P rate 2009 (lb/A)</th>
<th>Source TP</th>
<th>outflow TP</th>
<th>Harvest TP</th>
<th>Winter TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.5</td>
<td>22</td>
<td>no flow</td>
<td>99</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>8.8</td>
<td>129</td>
<td>no flow</td>
<td>731</td>
<td>67</td>
</tr>
<tr>
<td>3</td>
<td>0.6</td>
<td>200</td>
<td>225</td>
<td>354</td>
<td>131</td>
</tr>
<tr>
<td>4</td>
<td>3.7</td>
<td>150</td>
<td>389</td>
<td>628</td>
<td>111</td>
</tr>
<tr>
<td>5</td>
<td>16.1</td>
<td>30</td>
<td>68</td>
<td>604</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7.7</td>
<td>25</td>
<td>42</td>
<td>141</td>
<td>48</td>
</tr>
<tr>
<td>7</td>
<td>7.6</td>
<td>166</td>
<td>37</td>
<td>212</td>
<td></td>
</tr>
</tbody>
</table>

Note difference between harvest and winter samples
Water quality at Site 1 – P reduced since 2003

- Harvest discharge
- Winter discharge

P in water (mg/l)

Year

2002 2003 2004 2005 2006 2007 2008 2009 2010
Highlights of field research – Reduced P

All except ‘No fertilizer’ received 25 #N
Highlights of field research – Reduced P

Yield

Treatments

0N 0P
25 N Chart
25 N slow
25N 0 P
25 N, 2 P Ocean Org.
25N 8.3 P Chart SCU
High P, 22 P
25 N HyperP

bbl/acre

0
20
40
60
80
100
120
140

SB Howes

2010
Highlights of field research – Reduced P

Yield

summary
Highlights of field research – Reduced P

All except 'No fertilizer' received 25 #N
Highlights of field research – Reduced P

![Graph showing yield comparison of different treatments.]

- **Treatments:**
  - 0N 0P
  - 25N Chart
  - 25 N 8.3 P
  - 25 N 3.7 P
  - 25N 0 P
  - 25 N, 2 P Ocean Org.
  - 25N 8.3 P Chart SCU
  - High P, 25 N 22 P
  - 25 N HyperP

- **Yield:**
  - Chart
  - Slow
  - 25N 8.3 P
  - 25N 0 P
  - 25 N, 2 P
  - Ocean Org.
  - 25N 8.3 P Chart SCU
  - High P, 25 N 22 P
  - 25 N HyperP

**2010**
Highlights of field research – Reduced P

Yield

bbl/acre

0 20 40 60 80 100 120 140 160 180

0N 0P 25N 8.3P Chart 25N 3.7P slow 25N 0P 25N Ocean Org. 25N 2P Chart SCU 25N 22P 25N 8.8P HyperP

Summary

Pilgrim 09
Pilgrim 10
Highlights of field research – Reduced P on Stevens 2010

![Graph showing yield comparison for different treatments with labels for each treatment and yield values.](image)
Highlights of field research – New Plantings

- Organic 47N, 10P
- Chart (TSP) 62N, 17P
- Polyon slow 40N, 5P
- Organic then chart 50N, 10P
- Nutrelease 43N, 15P

Cuttings May 20, 09
Cuttings 2010

Percent vine cover

Year 1 fertilizer

organic 47N, 10P  chart (TSP) 62N, 17P  polyon slow 40N, 5P  organic then chart 50N, 10P  nutrelease 43N, 15P

Cuttings May 20, 09
Cuttings 2010
Highlights of field research – New Plantings

Organic 47N, 10P
Chart (TSP) 62N, 17P
Polyon slow 40N, 5P
Organic then chart 50N, 10P
Chart (less slow) Nutrelease 43N, 15P

Year 1 fertilizer

Plugs June 30, 09
Plugs 2010

Percent vine cover
2011 Plans

- Continue to study P reduction bogs
- Continue established bed plots
- Continue Stevens plots
- Continue to look at mowing recovery
- Collaborate with ARS scientist on N issues
- Begin to look at using liquid fertilizers – cooperators needed for whole bed and plot work
2011 Planning Sessions

- Grower focus groups for identification of barriers to sustainability
- Assemble a research team
- Apply for USDA funding in 2012

Want to participate in planning? – see me at break or call me by Friday.