Lime and P - Phosphorus

Andreas Neuhaus

CSBP uses a scientific method for P recommendations

• Field experiments throughout WA
• Randomized treatments (that have a control and treatment that reaches the max. yield = full response curve)
• Replicated treatments in each experiment
• Statistical data analysis
• Same experiments over many years in different locations (repeatability of results)
Improving P-use efficiency starts with knowing plant available P and crop P requirements

- Colwell P
- PBI
- Previous crop
- pH
- Gravel content
- Target Yield

Phosphorous Buffer Index (PBI) as a measure of soil P adsorption/desorption capacity
Effect of crop rotation x PBI on P requirements in cereals

CSBP long-term P x lime trial

SOIL ANALYSIS (2010):

Gravelly sandy loam

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>pH</th>
<th>EC</th>
<th>OC</th>
<th>Nit N</th>
<th>Amm N</th>
<th>P</th>
<th>PBI</th>
<th>K</th>
<th>S</th>
<th>Ca</th>
<th>Mg</th>
<th>eCEC</th>
<th>ESP</th>
<th>Cu</th>
<th>Al</th>
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</thead>
<tbody>
<tr>
<td>0-10</td>
<td>4.6</td>
<td>0.05</td>
<td>2.8</td>
<td>11</td>
<td>7</td>
<td>30</td>
<td>146</td>
<td>170</td>
<td>7</td>
<td>2.7</td>
<td>0.5</td>
<td>4.2</td>
<td>4.2</td>
<td>0.7</td>
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Soil Analysis (November 2013):

<table>
<thead>
<tr>
<th>Treatment*</th>
<th>pH</th>
<th>OC</th>
<th>Nit N</th>
<th>Amm N</th>
<th>P</th>
<th>PBI</th>
<th>K</th>
<th>S</th>
<th>Ca</th>
<th>Mg</th>
<th>eCEC</th>
<th>ESP</th>
<th>Cu</th>
<th>Al</th>
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</thead>
<tbody>
<tr>
<td>- Lime OP</td>
<td>4.6</td>
<td>3.6</td>
<td>5</td>
<td>5</td>
<td>35</td>
<td>192</td>
<td>116</td>
<td>8</td>
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<tr>
<td>+ Lime OP</td>
<td>5.0</td>
<td>3.9</td>
<td>4</td>
<td>4</td>
<td>30</td>
<td>174</td>
<td>112</td>
<td>9</td>
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<tr>
<td>- Lime 36P</td>
<td>4.7</td>
<td>3.6</td>
<td>2</td>
<td>5</td>
<td>54</td>
<td>191</td>
<td>102</td>
<td>12</td>
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<tr>
<td>+ Lime 36P</td>
<td>5.1</td>
<td>3.4</td>
<td>3</td>
<td>5</td>
<td>49</td>
<td>180</td>
<td>128</td>
<td>14</td>
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*Lime (2 t/ha) applied in 2010; 36 P applied in 2010, 2011, 2012 and 2013
CSBP long-term P x lime trial

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lime (t/ha)</th>
<th>P* (kg/ha)</th>
<th>7-Aug P uptake (mg/plant)</th>
<th>Yield (t/ha)</th>
<th>Protein (%)</th>
<th>HL Wt (kg/hl)</th>
<th>Scrns. (%)</th>
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<tbody>
<tr>
<td>1 - 0</td>
<td>0.14</td>
<td>1.94</td>
<td>11.4</td>
<td>74.5</td>
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<td>2 - 9</td>
<td>0.64</td>
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<td>11.1</td>
<td>76.4</td>
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<td>3 - 18</td>
<td>1.03</td>
<td>3.16</td>
<td>11.4</td>
<td>76.9</td>
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<tr>
<td>4 - 36</td>
<td>1.61</td>
<td>3.47</td>
<td>10.6</td>
<td>78.8</td>
<td>2.5</td>
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<td>5 2.0 + 2.5 0</td>
<td>0.26</td>
<td>2.37</td>
<td>10.9</td>
<td>75.2</td>
<td>3.3</td>
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<tr>
<td>6 2.0 + 2.5 9</td>
<td>0.63</td>
<td>3.01</td>
<td>10.9</td>
<td>76.1</td>
<td>3.5</td>
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</tr>
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<td>7 2.0 + 2.5 18</td>
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<td>10.5</td>
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<tr>
<td>8 2.0 + 2.5 36</td>
<td>1.62</td>
<td>3.79</td>
<td>9.8</td>
<td>77.9</td>
<td>2.6</td>
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</tbody>
</table>

Lsd Fert
- 0.38***
- 0.15***
- 0.33***
- 1.19**
- 0.54**

Lsd Lime
- ns
- 0.11***
- 0.24***
- ns
- ns

Lsd Lime * Fert
- ns
- ns
- ns
- ns
- ns

CSBP long-term P x lime trial
Quality Control

Internal quality control

• “NUlogic” (Decision Support Tool)
• Training
• Agronomic advice
• Field trials

External quality control

• Fertcare approval process (every 2 years)

Thank you

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