Nitrogen and Phosphorus Recalibration for Sunflower

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Nitrogen and phosphorus recommendations for sunflower haven’t changed in about 40 years.

General recommendations for N in North Dakota

N rate = (Yield X 0.05) – credits

P recommendations assume critical level of 20 ppm. Significant P rates 15 ppm and less.
Also, N rate studies were conducted in one oil seed and one confection sunflower site in both 2012 and 2013.

Oil seeds near Valley City

Confections near Mayville
Experimental design- 2012-2013
RCB, 6 treatments- 0-200 lb N/acre
4 replications

2014-
RCB, split-plot
Main plots- 6 N treatments 0-200 as ammonium nitrate or Agrotain-treated urea
Sub-plots- 4 P treatments 0-90 lb P$_2$O$_5$ as 0-46-0
$y = -0.0089x^2 + 5.6794x + 1224.8$

$R^2 = 0.1445$
All Sites 2014, Sunflower Yield with Total Available N

\[ y = -0.0137x^2 + 6.2886x + 1189 \]
\[ R^2 = 0.1088 \]
Sunflower Yield with Total Known Available N, All Oilseed Sites

\[ y = -0.0013x^2 + 3.4224x + 1302.1 \]

\[ R^2 = 0.1875 \]
Confection Sunflower 2014 and 2012/2013 N rate Trials vs Return to N

\[ y = -0.0135x^2 + 5.3003x + 1410.1 \]

\[ R^2 = 0.0755 \]
The “Return to N” model-


This model is used in several corn-belt states, including Iowa, Illinois, Wisconsin, Minnesota, Ohio, and Michigan
Sunflower Oil Seed 2014 with 2012/2013 N rate
Trials included vs Total Known Available N
## P response, 11 ND sites, 2014

<table>
<thead>
<tr>
<th>Site</th>
<th>P test</th>
<th>Response?</th>
<th>Ave Yield</th>
<th>Yield increase w/90 lb P$_2$O$_5$</th>
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</thead>
<tbody>
<tr>
<td>Hazelton</td>
<td>19</td>
<td>No</td>
<td>1750</td>
<td>0</td>
</tr>
<tr>
<td>Walcott (c)</td>
<td>12</td>
<td>No</td>
<td>2130</td>
<td>0</td>
</tr>
<tr>
<td>Cummings (c)</td>
<td>21</td>
<td>No</td>
<td>1600</td>
<td>0</td>
</tr>
<tr>
<td>Valley City</td>
<td>16</td>
<td>No</td>
<td>1500</td>
<td>0</td>
</tr>
<tr>
<td>Beach</td>
<td>14</td>
<td>No</td>
<td>1350</td>
<td>0</td>
</tr>
<tr>
<td>Belfield</td>
<td>17</td>
<td>Yes</td>
<td>1900</td>
<td>220</td>
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<tr>
<td>Amidon</td>
<td>5</td>
<td>Yes</td>
<td>1750</td>
<td>320</td>
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<tr>
<td>DickinsonS</td>
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<td>No</td>
<td>1700</td>
<td>0</td>
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<tr>
<td>Heil (Elgin)</td>
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<td>0</td>
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<tr>
<td>Hazen</td>
<td>18</td>
<td>No</td>
<td>2050</td>
<td>0</td>
</tr>
<tr>
<td>DickinsonN (c)</td>
<td>32</td>
<td>No</td>
<td>1750</td>
<td>0</td>
</tr>
</tbody>
</table>
Moving forward-

- Finish analysis of SD sites and Linton ND site, and incorporate into data set

- Next spring- at least 12 ND sites, 4 SD sites
  Split plot- 2 P rates (0 and 60 P2O5) within same 6 N rates
  (0,40,80,120,160,200 lb N/acre)
Goal-
Have new N and P recommendations ready by spring planting, 2016.