Wisconsin Soil Test Summary: 2005-2009

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University of Wisconsin-Madison
Data obtained from WDATCP approved Labs

Over 1,079,000 in-state samples analyzed, 2005-2009

Soil pH

Bray-1 P

Bray-1 K

Organic matter

Secondary and micronutrients
Wisconsin DATCP Approved Labs
Providing data for the summary

- A&L Great Lakes Laboratory
- Agsource Laboratory
- Dairyland Laboratory
- Mowers Soil Testing Laboratory
- Rock River Laboratory
- Soil and Plant Analysis Lab - Madison
- Soil and Forage Analysis Lab – Marshfield
Data Summarized by:

Texture code

Soil series

County
Highlights

• 1,079,408 total samples analyzed (58% increase)
• 403,708 total fields tested
  – Average of 2.67 samples/field
• 50% of fields listed the acreage
  – Average of 15.45 acres/field
  – 2.80 samples/field when acreage indicated
  – 5.51 acres/sample (6.99 acres/sample in 2000-04)
Sample Trends
Recent Sample Trends

<table>
<thead>
<tr>
<th>Texture/Type</th>
<th>Number</th>
<th>pH</th>
<th>OM</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>all soils</td>
<td>1,079,408</td>
<td>6.6</td>
<td>3.0</td>
<td>51</td>
<td>126</td>
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<tr>
<td>coarse</td>
<td>95,346</td>
<td>6.3</td>
<td>1.4</td>
<td>84</td>
<td>103</td>
</tr>
<tr>
<td>med/fine</td>
<td>970,078</td>
<td>6.7</td>
<td>3.2</td>
<td>48</td>
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<tr>
<td>&gt; 10% OM</td>
<td>12,579</td>
<td>6.3</td>
<td>32.0</td>
<td>63</td>
<td>128</td>
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<tr>
<td>red calcareous</td>
<td>526</td>
<td>7.3</td>
<td>2.9</td>
<td>38</td>
<td>144</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Test</th>
<th>Quartile Estimate*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90</td>
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<tr>
<td>pH</td>
<td>7.4</td>
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<tr>
<td>OM, %</td>
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<tr>
<td>P, ppm</td>
<td>110</td>
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<tr>
<td>K, ppm</td>
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</table>

*Percentage of all soil samples less than estimated value.

**Median value, one-half test higher and one-half lower than this value.
Average soil test Ca, Mg, and Mn results by soil texture/type. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Texture/Type</th>
<th>Ca</th>
<th>Mg</th>
<th>Mn</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>coarse</td>
<td>603</td>
<td>121</td>
<td>19</td>
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<tr>
<td>med/fine</td>
<td>1615</td>
<td>412</td>
<td>24</td>
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<tr>
<td>&gt; 10% OM</td>
<td>4440</td>
<td>708</td>
<td>9</td>
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<tr>
<td>red calcareous</td>
<td>1969</td>
<td>536</td>
<td>25</td>
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</table>
Distribution of soil test Ca, Mg, and Mn. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Soil Test</th>
<th>Quartile Estimate*</th>
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<tr>
<td></td>
<td>90</td>
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<tr>
<td>Ca, ppm</td>
<td>2460</td>
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<tr>
<td>Mg, ppm</td>
<td>670</td>
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<tr>
<td>Mn, ppm</td>
<td>35</td>
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</table>

*Percentage of all soil samples less than estimated value.

**Median value, one-half test higher and one-half lower than this value.
Average soil test B, S, and Zn results by soil texture/type. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Texture/Type</th>
<th>B</th>
<th>S</th>
<th>Zn</th>
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</thead>
<tbody>
<tr>
<td>all soils</td>
<td>0.62</td>
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<tr>
<td>coarse</td>
<td>0.41</td>
<td>6.6</td>
<td>5.5</td>
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<tr>
<td>med/fine</td>
<td>0.63</td>
<td>6.4</td>
<td>5.0</td>
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<tr>
<td>&gt; 10% OM</td>
<td>1.07</td>
<td>25.7</td>
<td>8.7</td>
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<tr>
<td>red calcareous</td>
<td>1.20</td>
<td>9.6</td>
<td>12.6</td>
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<table>
<thead>
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<th>Soil Test</th>
<th>Quartile Estimate*</th>
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</thead>
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<td>90</td>
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<tr>
<td>B, ppm</td>
<td>1.0</td>
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<tr>
<td>S, ppm</td>
<td>10.3</td>
</tr>
<tr>
<td>Zn, ppm</td>
<td>8.3</td>
</tr>
</tbody>
</table>

*Percentage of all soil samples less than estimated value.
**Median value, one-half test higher and one-half lower than this value.
Soil Series Distribution
789 Soils in RFS Program

- 8 soils – listed more than 10,000 times
- 16 – 5000-10,000
- 72 – 1000-5000
- 73 – 501-1000
- 90 – 201-500
- 195 – 26-200
- 197 – 1-25
- 138 Soils never used at all in five years

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>Soil Group</th>
<th>Number</th>
<th>% of soils*</th>
<th>pH</th>
<th>OM %</th>
<th>P ---ppm---</th>
<th>K ---ppm---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kewaunee</td>
<td>C</td>
<td>37635</td>
<td>7.6</td>
<td>7.1</td>
<td>3.2</td>
<td>34</td>
<td>116</td>
</tr>
<tr>
<td>Hortonville</td>
<td>C</td>
<td>21650</td>
<td>4.7</td>
<td>7.2</td>
<td>3.0</td>
<td>38</td>
<td>118</td>
</tr>
<tr>
<td>Loyal</td>
<td>D</td>
<td>15872</td>
<td>3.7</td>
<td>6.6</td>
<td>3.5</td>
<td>37</td>
<td>130</td>
</tr>
<tr>
<td>Plano</td>
<td>B</td>
<td>14896</td>
<td>3.6</td>
<td>6.5</td>
<td>3.6</td>
<td>57</td>
<td>166</td>
</tr>
<tr>
<td>Withee</td>
<td>D</td>
<td>13957</td>
<td>3.5</td>
<td>6.5</td>
<td>3.6</td>
<td>37</td>
<td>131</td>
</tr>
<tr>
<td>Onaway</td>
<td>C</td>
<td>13640</td>
<td>3.5</td>
<td>7.1</td>
<td>2.6</td>
<td>40</td>
<td>119</td>
</tr>
<tr>
<td>Fayette</td>
<td>A</td>
<td>12506</td>
<td>3.3</td>
<td>6.6</td>
<td>2.9</td>
<td>37</td>
<td>107</td>
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<tr>
<td>Plainfield</td>
<td>E</td>
<td>12031</td>
<td>3.3</td>
<td>6.2</td>
<td>1.3</td>
<td>129</td>
<td>103</td>
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<tr>
<td>Seaton</td>
<td>A</td>
<td>8864</td>
<td>2.5</td>
<td>6.6</td>
<td>2.8</td>
<td>44</td>
<td>131</td>
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<tr>
<td>Manawa</td>
<td>C</td>
<td>8686</td>
<td>2.5</td>
<td>7.1</td>
<td>3.6</td>
<td>33</td>
<td>116</td>
</tr>
</tbody>
</table>

* Percentage of named soils.
Distribution of soil test P and K for the top ten named soils. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>P 90</th>
<th>P 50</th>
<th>K 90</th>
<th>K 50</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Kewaunee</td>
<td>68</td>
<td>24</td>
<td>184</td>
<td>103</td>
</tr>
<tr>
<td>Hortonville</td>
<td>78</td>
<td>25</td>
<td>193</td>
<td>103</td>
</tr>
<tr>
<td>Loyal</td>
<td>64</td>
<td>31</td>
<td>222</td>
<td>116</td>
</tr>
<tr>
<td>Plano</td>
<td>109</td>
<td>46</td>
<td>275</td>
<td>146</td>
</tr>
<tr>
<td>Withee</td>
<td>63</td>
<td>31</td>
<td>216</td>
<td>118</td>
</tr>
<tr>
<td>Onaway</td>
<td>85</td>
<td>27</td>
<td>208</td>
<td>101</td>
</tr>
<tr>
<td>Fayette</td>
<td>76</td>
<td>26</td>
<td>167</td>
<td>94</td>
</tr>
<tr>
<td>Plainfield</td>
<td>209</td>
<td>130</td>
<td>159</td>
<td>96</td>
</tr>
<tr>
<td>Seaton</td>
<td>89</td>
<td>34</td>
<td>214</td>
<td>108</td>
</tr>
<tr>
<td>Manawa</td>
<td>68</td>
<td>24</td>
<td>183</td>
<td>103</td>
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</tbody>
</table>
Comparison of mean and median soil test values by texture category. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Med/fine soils</th>
<th>Sandy soils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>P</td>
<td>48</td>
<td>33</td>
</tr>
<tr>
<td>K</td>
<td>128</td>
<td>112</td>
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<tr>
<td>pH</td>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td>OM</td>
<td>3.2</td>
<td>3.0</td>
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</tbody>
</table>
Comparison of mean and median micro-nutrient soil test values by texture category. Wisconsin, 2005-09.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Med/fine soils</th>
<th>Sandy soils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>B</td>
<td>0.63</td>
<td>0.60</td>
</tr>
<tr>
<td>Zn</td>
<td>5.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Mn</td>
<td>24</td>
<td>23</td>
</tr>
</tbody>
</table>
Counties With Most Soil Samples
>30,000

- Dane – 72,326
- Lafayette – 42,975
- Green – 40,176
- Clark – 36,966
- Grant – 36,702
- Dodge – 32,376
- Columbia – 31,968
- Fond du Lac – 31,376
- Marathon – 30,999
Counties With Fewest Soil Samples <500

- Florence – 394
- Milwaukee – 371
- Vilas – 319
- Forest – 246
- Menominee – 124

- 1964-67: 29
- 1968-73: 34
- 1974-77: 37
- 1977-81: 40
- 1982-85: 44
- 1986-90: 48
- 1990-94: 50
- 1995-99: 52
- 2000-04: 53
- 2005-09: 51
SOIL TEST P
2005-2009

all soils: 51 ppm

type/texture
med-fine: 48
coarse: 84
organic: 63
red calcareous: 38

Soil Test P ppm

- >150
- 75-150
- 30-74
- <30

# = number of samples
Italized text indicates no change or decrease from 2000-04 average.
Wisconsin Soil Test K Trends: 1964-2009
Most Common Crop Codes

• 327,945 – corn, grain
• 230,579 – alfalfa, established
• 187,366 – soybean, grain
• 72,454 – corn, silage
• 71,702 – alfalfa, seeding
• 49,737 – wheat, grain + straw
• 38,940 – oats, grain + straw
Most Common Crop Codes

- 13,251 – pasture, legume(<30%)-grass
- 12,443 – pasture, managed
- 10,142 – red clover
- 5,596 – sweet corn
- 5,564 – small grain/legume silage, w/alfalfa seeding
- 4,448 – snapbean
- 4,246 – wheat, grain
- 4,023 – potato
Least Common Crop Codes

- 27 – Brussels sprouts
- 36 – lupin
- 38 – flax
- 39 – triticale, grain + straw
- 42 – cauliflower
- 54 – cherry, establishment
- 62 – spinach
- 64 – pasture, legume(>30%)-grass
- 68 – corn, popcorn
- 74 – vetch, crown/hairy
- 80 – millet
- 81 – celery
- 85 - broccoli
Legume Credits

- 19% of 403,708 fields list a previous legume crop
- **77% of crops listed were actual legumes**
- 31,204 listed alfalfa, established
- 21,527 listed soybean, grain
- 11,648 listed corn, grain (erroneously)
- 2,495 listed corn, silage (erroneously)
- 2,415 listed alfalfa, seeding
- 1,448 listed pasture, legume(<30%)-grass
- 1,125 listed red clover
Manure Credits

- 7,663 fields (2% of total) list a manure application
- 3,250 solid dairy manure, 20 tons/acre average
- 2,550 liquid dairy manure, 7,000 gal/acre average
- 865 solid beef manure, 11 tons/acre average
- 338 solid chicken manure, 9 tons/acre average
- 139 liquid swine manure, 4,500 gal/acre
- 128 liquid beef manure, 5,700 gal/acre
- All others below 125 fields each
Irrigated Fields

• 6,585 fields with 37,910 samples were irrigated – 1.6% of total fields and 3.5% of total samples

• 74% of the irrigated fields listed acreage, which averaged 49.4 acres/field and 7.6 acres/sample
Reduced Tillage

• 2.5% of fields indicate conservation tillage is used

• Most frequently listed crops include
  – Corn, grain
  – Soybean, grain
  – Alfalfa, established
  – Corn, silage
Slope

- 10.7% of total fields indicated a slope
- 43,327 fields average slope was 5%
- Median slope = 4%
Spring vs. Fall

- Spring 247,729 samples
  - March - June
  - Ave. P – 51
  - Ave. K – 123
  - Ave. pH – 6.56
  - Ave. OM – 3.18

- Fall 818,565 samples
  - July - February
  - Ave. P – 51
  - Ave. K – 126
  - Ave. pH – 6.67
  - Ave. OM – 3.40
Summary

• Soil test P and K trends indicate improved nutrient management practices are being implemented on more acres.

• Soil test P and K levels are decreasing in many counties, although in many cases these remain above the optimum level.
Regional Phosphorus Averages

![Bar chart showing regional phosphorus averages for Dane, Green, Jefferson, Rock, and Sauk from 1986-90 to 2005-09.](chart.png)
Regional Potassium Averages

![Regional Potassium Averages Graph](image-url)
Regional pH Averages

Regional Organic Matter % Averages
Regional Phosphorus Averages
Regional Potassium Averages
Regional pH Averages

![Bar chart showing regional pH averages from 1986-90 to 2005-09 for Jackson, Juneau, La Crosse, Monroe, and Vernon. The chart indicates pH values ranging from 5.9 to 6.7, with distinct color coding for each five-year period.](chart.png)
Regional Organic Matter % Averages
Regional Phosphorus Averages
Regional pH Averages
Regional Phosphorus Averages
Regional Potassium Averages
Regional pH Averages
Regional Organic Matter % Averages
Regional Phosphorus Averages
Regional Potassium Averages

![Regional Potassium Averages Chart]

- Columbia
- Dodge
- Fond du Lac
- Green Lake
- Washington

- 1986-90
- 1990-94
- 1995-99
- 2000-04
- 2005-09
Regional pH Averages

- Columbia
- Dodge
- Fond du Lac
- Green Lake
- Washington

- 1986-90
- 1990-94
- 1995-99
- 2000-04
- 2005-09
Regional Organic Matter % Averages

Columbia Dodge Fond du Lac Green Lake Washington

Regional Phosphorus Averages

![Bar chart showing regional phosphorus averages for Brown, Calumet, Manitowoc, Sheboygan, and Winnebago from 1986-90 to 2005-09.](image-url)
Regional Potassium Averages
Regional pH Averages

![Regional pH Averages Diagram](chart.png)
Regional Organic Matter % Averages
Regional Phosphorus Averages

Marinette Oconto Outagamie Shawano Waupaca

Regional Potassium Averages

[Bar chart showing potassium averages for Marinette, Oconto, Outagamie, Shawano, and Waupaca from 1986-90 to 2005-09 with different color-coded periods.]
Regional pH Averages
Regional Phosphorus Averages

![Bar chart showing regional phosphorus averages for Crawford, Grant, Iowa, Lafayette, and Richland from 1986-90 to 2005-09. Each region has multiple bars for each time period, indicating phosphorus average values.]
Regional Potassium Averages

Regional pH Averages

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawford</td>
<td>6.5</td>
<td>6.6</td>
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<td>Grant</td>
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</table>
Regional Organic Matter % Averages