Red Clover Nitrogen Contribution For Corn

Alan Sundermeier
Ohio State University Extension, Bowling Green, Ohio

Abstract

The use of clover as a nitrogen source for corn production may allow producers to reduce commercial nitrogen rates. To evaluate the effect of clover cover crop and nitrogen rates on corn production, an experiment was conducted at the Ohio State University Research Farm in Wood County, Ohio. The entries were replicated four times in a randomized complete block design. All systems in this comparison were no-till. Medium red clover was frost seeded in wheat on April 18, 2008. After wheat harvest, clover was allowed to grow until 10-29-08 when Roundup and Clarity herbicides were applied to kill the clover. Corn was planted at the same time in all plots as no-till on 5-12-09. Sidedress nitrogen was applied on 6-16-09 at V6 growth stage. All plots harvested the center two rows. Red clover biomass analysis from late fall 2008 showed 120 lb/ac of available nitrogen. Chlorophyll content of corn on 8-8-09 ranged from 24.1 SPADD meter reading for no clover and no nitrogen to 53.1 with clover and 160 lb/ac nitrogen applied. In all comparisons, clover increased chlorophyll content of corn leaves. Soil nitrate nitrogen tested on 8-8-09 ranged from 2.7 ppm for no clover and no nitrogen to 22.7 ppm with clover and 160 lb/ac nitrogen applied. In all comparisons, corn yields were significantly increased when clover was included. An economic analysis showed that when clover was used, corn yield increased 9.9 bu/ac with a net return of $13.65 above costs of clover.

Clover Underseeded in Wheat

A typical method to establish red clover is applying early spring nitrogen fertilizer to wheat with clover seed included. Frost heaving and rain incorporates seed into soil. Clover grows underneath wheat.

Chlorophyll Content

SPADD meter reading 8-8-09

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>N</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>No clover</td>
<td>0</td>
<td>8</td>
<td>77</td>
</tr>
<tr>
<td>Clover</td>
<td>80</td>
<td>160</td>
<td>160</td>
</tr>
</tbody>
</table>

For more information contact

Alan Sundermeier,
Ohio State University Extension
Wood County
639 Dunbridge Rd., Suite 1
Bowling Green, Ohio 43402
Ph 419-354-9050
sundermeier.5@osu.edu

Nutrient Content Red Clover

Corn Yield

2009 NW Ag Research Station
Red Clover, N Rate, No-till

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>Sidedress N Rate</th>
<th>Corn Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>No clover</td>
<td>0</td>
<td>39.9 A</td>
</tr>
<tr>
<td>Clover</td>
<td>0</td>
<td>47.6 B</td>
</tr>
<tr>
<td>No clover</td>
<td>80 lb N</td>
<td>93.3 C</td>
</tr>
<tr>
<td>Clover</td>
<td>80 lb N</td>
<td>103.2 D</td>
</tr>
<tr>
<td>No clover</td>
<td>160 lb N</td>
<td>129.5 E</td>
</tr>
<tr>
<td>Clover</td>
<td>160 lb N</td>
<td>135.4 E</td>
</tr>
</tbody>
</table>

LSD (0.10) 6.3

Economics

Cost of Clover Analysis:
At 80 lb/ac sidedress nitrogen clover cover crop increased corn yield by 9.9 bu/ac.

Value of Corn = 9.9 bu/ac x $3.50/bu = $34.65
Cost of clover = 12 lb/ac x $1.75/lb = $21.00

Net return on clover = $13.65

Nutrogen in Soil

Soil Nitrate ppm 8-8-09

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>N</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>No clover</td>
<td>0</td>
<td>8</td>
<td>77</td>
</tr>
<tr>
<td>Clover</td>
<td>80</td>
<td>160</td>
<td>160</td>
</tr>
</tbody>
</table>

For more information contact

Alan Sundermeier,
Ohio State University Extension
Wood County
639 Dunbridge Rd., Suite 1
Bowling Green, Ohio 43402
Ph 419-354-9050
sundermeier.5@osu.edu

Black clover, covered N rates, no till

Black clover underseeded in wheat for 2009 NW Ag Research Station under these conditions:
Red Clover Nitrogen Contribution For Corn

Abstract

The use of clover as a nitrogen source for corn production may allow producers to reduce commercial nitrogen rates. To evaluate the effect of clover cover crop and nitrogen rates on corn production, an experiment was conducted at the Ohio State University Research Farm in Wood County, Ohio. The entries were replicated four times in a randomized complete block design. All systems in this comparison were no-till. Medium red clover was frost seeded in wheat on April 18, 2008. After wheat harvest, clover was allowed to grow until 10-29-08 when Roundup and Clarity herbicides were applied to kill the clover. Corn was planted at the same time in all plots as no-till on 5-12-09. Sidedress nitrogen was applied on 6-16-09 at V6 growth stage. All plots harvested the center two rows. Red clover biomass analysis from late fall 2008 showed 120 lb/ac of available nitrogen. Chlorophyll content of corn on 8-8-09 ranged from 24.1 SPADD meter reading for no clover and no nitrogen to 53.1 with clover and 160 lb/ac nitrogen applied. In all comparisons, clover increased chlorophyll content of corn leaves. Soil nitrate nitrogen tested on 8-8-09 ranged from 2.7 ppm for no clover and no nitrogen to 22.7 ppm with clover and 160 lb/ac nitrogen applied. In all comparisons, corn yields were significantly increased when clover was included. An economic analysis showed that when clover was used, corn yield increased 9.9 bu/ac with a net return of $13.65 above costs of clover.

Clover Underseeded in Wheat

A typical method to establish red clover is applying early spring nitrogen fertilizer to wheat with clover seed included. Frost heaving and rain incorporates seed into soil. Clover grows underneath wheat.

Chlorophyll Content

SPADD meter reading 8-8-09

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>N</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>No clover</td>
<td>0</td>
<td>8</td>
<td>77</td>
</tr>
<tr>
<td>Clover</td>
<td>80</td>
<td>160</td>
<td>160</td>
</tr>
</tbody>
</table>

For more information contact

Alan Sundermeier,
Ohio State University Extension
Wood County
639 Dunbridge Rd., Suite 1
Bowling Green, Ohio 43402
Ph 419-354-9050
sundermeier.5@osu.edu

Black clover, covered N rates, no till

Black clover underseeded in wheat for 2009 NW Ag Research Station under these conditions: