Improving soil health by interseeding cover crops in the northern Plains

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Where do cover crops fit in a crop rotation?

After a cereal harvest (Aug. 15)

Before hard frost
Oct 20
Faba bean

After hard frost
Nov. 3
Faba bean

Corn-soybean Interseeding
Cover crops in cereal-soybean

August-November

Cereal

February-April

Soybean

NO₃
PO₄

Winter rye
Cover crops after wheat - N accumulation in cover crop aboveground biomass

Planting date Aug. 15
Biomass harvest Nov. 15

Seeding date August 10
Cover crops corn-soybean

February-April
- NO₃, PO₄

Interseeding at V₆-V₈

Soybean

Sept.-April
- No time to establish a cover crop

Interseeding at R₄-R₆

Corn
Interseeding of cover crops into soybean at R4 and R6

<table>
<thead>
<tr>
<th>Cover crop</th>
<th>Soybean</th>
<th>Spring wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>--- grain yield (bu/acre)---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter camelina</td>
<td>44.6</td>
<td>.</td>
</tr>
<tr>
<td>Winter pea</td>
<td>44.8</td>
<td>32.4</td>
</tr>
<tr>
<td>Radish</td>
<td>43.8</td>
<td>36.4</td>
</tr>
<tr>
<td>Winter rye</td>
<td>44.4</td>
<td>25.5</td>
</tr>
<tr>
<td>Mix</td>
<td>44.4</td>
<td>34.5</td>
</tr>
<tr>
<td>No cover crop</td>
<td>43.3</td>
<td>33.0</td>
</tr>
<tr>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Combined across both locations and both planting dates
Austrian winter pea
Radish
Cereal rye
Mix

N or P accumulation (lbs/acre)

N uptake
P uptake

77
78
44
b
60
Cover crops decreased soil residual N significantly from the check.
Interseeding in corn

Pea

July 13

Faba bean

Interseeding on June 23, V8 stage

Winter rye

8 September
On-farm research: Interseeding into standing corn at V8 stage same time as side dressing

Photo: Abbey Wick

Photo: Karen Hertsgaard
Going into Winter

11 November 2016

Photo: Abbey Wick
Interseeding into corn

• 2016
  – 4 sites
  – 3 cover crops
  – 3 planting dates

Winter camelina
(Camelina sativa)

Pennycress
(Thlaspi arvense)

Winter rye
(Secale cereale)
Soil NO$_3$-N @ 24” depth fall and spring

LSD(0.05) fall = NS
LSD(0.05) spring = 6.9
Camelina harvest in Morris, MN in 2017

Soybean relayed rows
Summary

- Interseeding after R4 stages does not decrease corn or soybean yield.
- Interseeding cover crops into soybean and corn reduces soil nitrate in the inter-row, which potentially could decrease nitrate losses.
- Interseeding keeps soil covered in fall and spring
Thank you

Thank you for your attention and interest

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