Modified Relay Intercropping Wheat Nitrogen Evaluation

Dr. Steven Prochaska, AGNR Extension- Crawford County

Objective

To determine if the timing of spring nitrogen application to wheat influences wheat yield in a modified relay intercropping system.

Background

Crop Year: 1997  
Herbicide: Trt. 1: 4/14/97: 2,4-D 0.5 pt.  
Trt. 2: 4/19/97: 2,4-D 1 pt.  
Cooperator: David Brewer  
Variety: Wheat: Patterson  
County/Town: Crawford/ Bucyrus  
Soybeans: Resnick  
Drainage: Improved  
Planting Rate: Wheat: 120 lbs./A  
Soybeans: 90 lbs./A  
Major Soil Type: Blount  
Planting Date: Wheat: October 4, 1996  
Soybeans: June 20,1997  
Previous Crop: Soybean  
Harvest Date: Wheat: July 21, 1997  
Tillage: None  
Soybeans: October 21, 1997  
Soil Test: pH 7.2; P 126 lbs./A;  
K 316 lbs./A  
Fertilizer Applied: 300# 7-28-28 pre-plant

Materials and Methods

Top-dress nitrogen was applied to wheat at two different times. Treatment 1 was a single application of 65 lbs. of 28% N applied on 3/24/97, and treatment 2 was a split application of 65 lbs. 28% N on 3/24/97 plus 60 lbs. of 28% N applied 4/16/97. Individual plot size was 0.35 acre with four replications of each treatment.

Results

<table>
<thead>
<tr>
<th>1997 Modified Relay Intercropping Wheat Yield (bu/a)</th>
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</thead>
<tbody>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>Single N</td>
</tr>
<tr>
<td>Split N</td>
</tr>
</tbody>
</table>

F value 27.72, significant at .05 level, LSD 6.31 bu/a, CV = 5.25; design was completely randomized
The table below shows the MRI Wheat Yield Results for the years 1994, 1995, and 1997 with both Single N Application and Split N Application. The 3-Year Average shows a slight increase in yield with the Split N Application.

<table>
<thead>
<tr>
<th>Year</th>
<th>Single N Application</th>
<th>Split N Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>61.5</td>
<td>68.2</td>
</tr>
<tr>
<td>1995</td>
<td>71.5</td>
<td>73.0</td>
</tr>
<tr>
<td>1997</td>
<td>62.7</td>
<td>76.3</td>
</tr>
<tr>
<td>3-Year Average</td>
<td>65.2</td>
<td>72.5</td>
</tr>
</tbody>
</table>

No significant difference between three-year averages of nitrogen treatments.

1996 year not analyzed due to severe wheat winter kill. Overall average of all treatments = 68.9 bu/ac.

**Summary and Notes**

Wheat yield in split-applied nitrogen plots has not been significantly different from wheat yield where only a single rate of nitrogen has been applied. However, seven bushels of wheat (average difference over three years) would easily cover the costs of a split-nitrogen application and leave $10 or more per acre as added profit in recent growing seasons. This must be balanced with the always lower soybean yield following wheat with a split nitrogen application. The research in 1998 shall be redesigned to reflect a smaller nitrogen split-nitrogen rate in an attempt to maximize wheat and soybean yield. Finally, when looking at gross revenue generated, the MRI system has been very favorable where compared to single crops of either 80-bushel wheat or 55-bushel soybeans. Using $3.50 wheat and $6.50 soybeans, the three-year average of the MRI system averaged $445 gross revenue per acre. Eighty-bushel wheat would generate $280 per acre (no straw sales), and 55-bushel soybeans would calculate to $358 per acre.

For additional information, contact: Dr. Steven Prochaska
The Ohio State University
prochaska.1@osu.edu