Cover Crop Contribution to Ground Cover, Soil Nitrate, and Corn Production

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Objective

Evaluate the contribution of various cover crops for surface residue cover and soil nitrate as well as stand and yield effects on corn.

Background

Cooperator:	OARDC NW Branch	Tillage:	No-till
County:	Wood	Planting Date:	May 12, 1999
Soil Type:	Hoytville clay	Harvest Date:	October 3, 1999
Previous Crop:	Wheat		

Methods

Wheat stubble was mowed after harvest. On July 30, 1998, cover crops were drilled no-till at the following rates: Vertex soybeans - 102.8 lbs/acre, oilseed radish - 12.1 lbs/acre, cowpea - 96.8 lbs/acre, berseem clover - 16.1 lbs/acre. A check with no cover crop was included. Treatments were randomized and replicated three times. Biomass was measured on October 6, 1998, before a killing frost by removing above-ground cover-crop growth in one square foot and drying the material at 180 degrees F for 48 hours. Corn was no-till planted into cover crop/wheat stubble residue. On June 1, 1999, pre-sidedress nitrate soil levels were measured. All inputs remained constant over treatments.

Results

Table 1. Cover Crops and Yield Results.

Cover Crop	Biomass (grams/ft^2)	Soil Nitrate (ppm)	Final Stand (plants/A)	Corn Yield (bu/A)
Vertex Soybean	13.3 b	13.5	24,500 a	172.3
Oilseed Radish	0.3 a	10.5	26,250 b	168
Cowpea	0.3 a	9.5	24,750 a	172.8
Berseem Clover	1.0 a	10.5	25,500 ab	174.2
No Cover (check)	---	9.5	25,250 ab	171.1
LSD (0.05)	4.24	NS	1,468	NS

Treatment means followed by the same letter are not significantly different at P = 0.05.
NS = No significant differences found among all the treatment means.

Summary and Notes

Vertex soybean was the only cover crop that established well during August and September 1998 as shown by its significantly higher biomass accumulation. Above normal rainfall in mid-August may have caused the other cover crops to be drowned out, reducing stands significantly. Also, volunteer wheat was competitive with cover-crop growth.

Soil nitrate levels were not significantly different among all cover crops. Even with soybeans the highest at 13.5 ppm nitrate, these levels were too low to allow any reduction of applied nitrogen. Full rates of nitrogen would be recommended for corn at the soil nitrate levels found. Due to minimal cover-crop growth, natural winterkill of the cover crops, and no-till corn planting, potential nitrate contributions were limited.

Corn populations showed adequate stands in all entries (> 24,000 plants/acre). Oilseed radish had the highest corn population due in part to the minimal cover-crop growth the preceding fall. Even though there were differences in corn populations, none of the cover crops had a significantly different stand compared to no cover.

Yields were not significantly different between any of the cover-crop comparisons.

The soil-quality benefits of cover crops were not accounted for, yet need to be recognized. The amount of nitrogen contribution from cover crops is difficult to predict and may not become available until after corn sidedress time (mid-June).

For additional information, contact:

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