

Investment Insight

Recent Research Results

Do termination dates influence corn N requirements?

Corn is an important crop in Illinois with nitrogen as a significant variable production cost each year. The integration of cover crops to decrease erosion, capture residual N and reduce N leaching is gaining popularity. However, current N management guidelines in Illinois are not adjusted for inclusion of cover crops especially with different cover crop termination dates. The termination date can influence the decomposition rate of cover crops in a corn cropping system and change the dynamics of N release to the crop.

Dr. Amir Sadeghpour, Southern Illinois University, the head researcher on this project is evaluating the biomass accumulation and nutrient uptake of wheat fertilized with 28 lbs N acre, with the purpose of predicting biomass accumulation of cover crops with Normalized Difference Vegetation Index (NDVI). Dr. Sadeghpour is looking at several variables that include:

- evaluating the decomposition rate of wheat terminated early (four weeks prior to planting) and late (at corn planting time) with and without side-dressing N at 150 lbs N acre
- determining the optimum N rate of corn

- assessing whether splitting N at 150 lbs N acre could improve N use efficiency and corn yield

Several treatments are under investigation. They include testing cover crop termination types and timing. Various N rates and timing are also being evaluated. The table shows the extent of variables being tested in this research.

Cover crops
No cover crop
Wheat terminated four weeks prior to planting
Wheat terminated at corn planting time
Wheat harvested as forage
Nitrogen Rates
Side dress N rates (0, 50, 100, 150, 200, and 250 lbs N acre)
N timing
150 lbs N acre at planting, 100 lbs N acre at planting plus 50 lbs N acre at side-dressing, 50 lbs N acre at planting plus 100 lbs N acre at side-dressing.

The preliminary data indicate that wheat accumulated 0.58 tons DM acre week biomass during the spring (late-April to late-May). Initial aboveground C/N ratio was 27 for early termination and 48 for late-termination date. Initial belowground carbon:nitrogen (C/N) ratio was 49 and 59 for early and late termination dates, respectively. Linear regression showed 0.73 increase in C/N ratio per day in aboveground biomass with delaying the termination. NDVI could predict biomass accumulation prior to heading ($R^2 = 0.76$) but the relationship did not hold due to the effect on heading on NDVI readings.

When terminated early, both root and shoot biomass of wheat decomposed at a faster rate than later termination date reflecting higher C/N ratio. Slower decomposition of late-terminated wheat indicated possible N immobilization. Side-dressing N did not change the decomposition rate of either shoot or root. Volumetric water content was 3-fold greater in both cover crop treatments compared to a no-cover crop control plot indicating moisture availability was not a factor of concern with late termination of wheat as a cover crop in a decent year in southern Illinois.

