

## **PUSHING THE SYSTEM: DEEP PLACED NITROGEN UNDER REDUCED TILLED CABBAGE**

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Interest in reduced tillage methods is expanding in response to concerns for soil quality in vegetable systems. Reduced tillage (RT) refers to systems that minimize soil disturbance and maintain at least 30% residue cover. These systems can reduce soil and wind erosion, overcome compaction challenges typical of vegetable soils, conserve organic matter and improve overall soil health. In addition, past research has demonstrated a reduction in fuel use and equipment wear as well as an improvement in labor efficiency. Deep zone tillage is one reduced tillage (RT) method that minimizes the width of soil disturbance to the planting row while providing sufficient soil disturbance to increase drainage and aeration and decrease compaction. This disturbance results in improved conditions for seed germination compared to no-tillage systems which may not be feasible in the finer soils of the Northeast due to cooler soil temperatures and high moisture. Deep zone tillage has been tested with several crops in NYS and found to support similar yields to conventional full width plowing for sweet corn, dry beans, pumpkins, broccoli, squash, peppers, and cabbage.

Past experiments with sweet corn indicated that the full fertilizer requirement for the crop could be placed 8-10 inches deep in the zone tilled slot without any loss in yields. This practice would allow the elimination of a sidedress field pass and further reduce costs of production. Growers were interested in knowing if this practice could be applied to other RT crops.

Our research has focused on a multi-tiered reduced tillage experiment (in a conventional field) that analyzed intensive and reduced tillage with varying fertility rates and application methods for early and long season cabbage varieties. We evaluated fertilizer rates, type and placement in a cabbage field, using both conventional and deep zone tillage. The standard practice was with dry fertilizer, providing an N rate of 0, 120, 180 lb/A. Deep placed nitrogen was achieved using liquid N source (UAN) to deliver 100 lb/a N at the beginning of the season. Sidedressing with additional N during the season helped achieve the highest fertilizer rate. At planting, all plots were given starter fertilizer at transplanting.

This experiment showed that the deep zone tillage and conventional tillage methods produced similar yields (no significant differences) in 2011. The long season cabbage variety produced higher yields than the shorter season in this system. Our mid-level fertilizer rate (120 lbs/A) tended to perform the same as higher fertilizer rates. No difference was observed amongst application methods (dry or liquid fertilizer applications). In addition, an analysis of soil moisture in the DZT and conventional plots showed that the DZT plots had higher soil moisture levels that were significantly different from the conventional plots at a 6 inch depth. The 9 inch

depth probes displayed that the DZT plots had lower moisture levels but greater stability than the conventional. Analysis of the 2012 conventional cabbage data showed that the yields in DZT and conventional tillage were comparable (not significantly different). The overall result after two years has been that the application of deep placed N in cabbage supported similar yields to conventional fertilizer approaches.