

Cover cropping and zone tillage for pumpkins

John Halsey and Jennifer H. Dupree - Milk Pail Farm, Water Mill, NY, Suffolk County
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Background

The Halsey family began farming in the Water Mill and Bridgehampton area in the 1640s. They are the founders and owners of The Milk Pail Store & Orchard. John and Evelyn Halsey, along with their daughters Amy and Jennifer, are the 11th and 12th generation of Halsey's carrying on a farming tradition that began more than 350 years ago. Jennifer attended Cornell University and graduated with a Bachelor of Science in the spring of 1997 with a concentration in fruit science. After college, she came back to the family farm to manage the vegetable and fruit production operations.

The farm is situated on 70 acres of land in Suffolk County, where they grow 18 acres of apples, 10 acres of pumpkins, three and a half acres of peaches, three quarters of an acre of pears, and a quarter acre of blueberries. Jennifer manages the farm production end while her sister, Amy, manages the fresh market where the produce is sold retail. The farm employs one additional person year round, three more during most of the growing season, and two part-time employees at the store.

Soils are Bridgehampton loam and sandy loam and low in organic matter. In the late 1990's, they had growing concerns about damage from *Phytophthora capsici*, a common fungal disease of cucurbits, on their pumpkins. Their goal was to develop a system that added organic matter to the soil, improve drainage to slow down *P. capsici*, and more effectively control weeds.

Cover crop and zone till management

They have two fields that are alternated every year - one in pumpkin production and the other left in a cover crop fallow. Traditionally, in the off year, tillage consisted of plowing, disking and seeding a cover crop. They started with growing sorghum sudangrass to build up organic material, aerate the soil and to suppress weeds, chopping the sudangrass to manage residue and encourage root growth. In 2003, they stopped plowing the cover crop and transitioned to a reduced-till system. With this approach, they found that a major benefit of heavy cover crop residue was clean pumpkins at harvest. However, as the residue on their fields increased, it was increasingly difficult to get pumpkin transplants into the ground using their waterwheel transplanter and they were still experiencing weed control problems.

After extensive research into alternatives for opening up the soil to make transplanting easier, they decided



to buy a zone tiller in 2007. A one row zone building unit from Yetter for \$2K had two sets of coulters mounted before the shank and could handle large amounts of residue. They also purchased a Sunflower no-till grain drill in 2010 which has performed well for establishing cover crops. The next year they added a vacuum seeder for planting pumpkins, and a fertilizer applicator on both sides of the row for even fertilizer application at planting.

Now, they manage a series of cover crops in the fallow year. Spring seeded oat-peas lead to sorghum/hemp in mid-summer and then they establish a rye/vetch cover crop mix in the fall. This sequence is all managed with no-till direct seeding. The following spring, they roll the rye-vetch cover crop in late May or early June to build a mulch layer for pumpkins. They moved away from using a rotary mower to save labor and fuel. After rolling, they build zones for planting and apply 40-60 lbs N/A (13-13-13 MAP, AS 50% ESN) at planting. In direct seeded pumpkins within 2 to 3 days of planting a mixture of Gramoxone, Sandea DF and Reflex is broadcast sprayed over the top. The Gramoxone is to aid in any regrowth of rye or vetch. Sandea DF provides good control of lambsquarter, ragweed and nutsedge. Reflex is used predominantly to fight Eastern Black Nightshade, but with little success. Early mechanical hoeing provides the best control of Nightshade.

Observed Benefits and Challenges

Within a few years of the transition away from moldboard plowing, Cornell Cooperative Extension soil tests showed an unusually rapid increase in organic matter levels in their fields. Soil water retention and biological activity also increased substantially. Traditionally, they sprayed fungicide every week for six or seven weeks during the growing season to adequately control *P. capsici*. Since using zone tillage, they have reduced that to four or five sprayings.

They have experienced a number of challenges. When conditions are particularly dry, irrigation can be necessary to make herbicide applications effective. Although they feel direct seeding rather than transplanting pumpkins is best, the large amount of debris from cover crops may lead to slug problems. They continually need to modify their zone builder to handle the increase in residue in their fields. They added three cutting coulters to the front of their zone builder to more aggressively chop straw residue, as well as bigger discs to create a larger seed mound. They have phased out nutrient delivery through drip irrigation in favor of slow release fertilizers, which have lower maintenance requirements and safer for the groundwater.

Advice to growers considering these systems - Have patience and be open to trying anything.