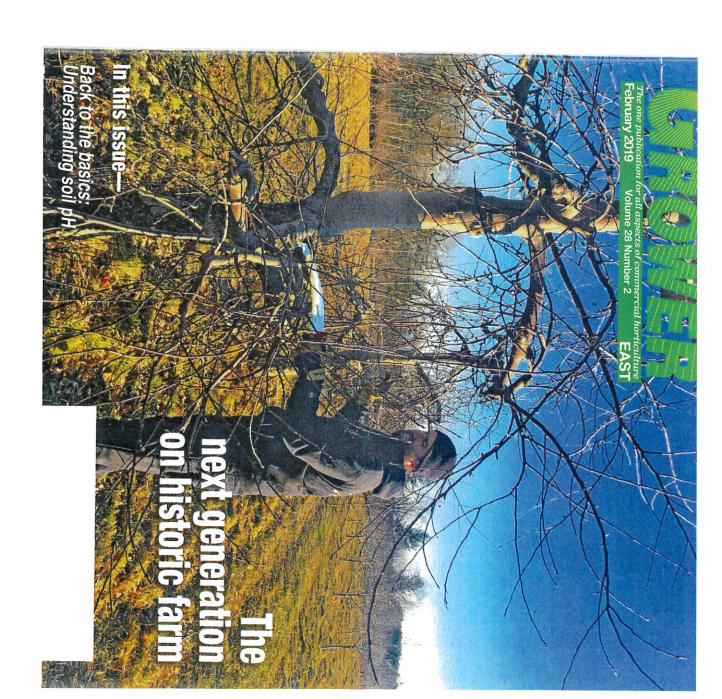
Article 1 - No-till and Cover Cropping for Vegetables - Country Folks Grower February 2019



No till and cover cropping for vegetables

by Tamara Scully

enhance soil water retention and soil nutrient retention. It is part of a healthy ecosystem for soil microbiota. Carbon helps to add stability to soil aggregates and to ter year, when attention is paid to sequestering carbon. Soil health happens in a cumulative manner, year af-

Zinati, director of the Vegetable Systems Trial at the recent No-till and Cover Crops conference hosted by Rodale Institute, said at during a presentation at the "all of these come together and integrate," Dr. Gladis When using no till in conjunction with cover crops,

> and Development. the non-profit North Jersey Resource Conservation

nutrient decline seen in vegetables today. overall soil health, Zinati said, and contribute to the carbon dioxide. These practices lead to decreases in minerals and protein in our vegetable crops. While adding oxygen which microbes digest and release as as tillage and plowing release carbon from the soil, yields may have increased, the nutrient density of tices have led to decreases in the levels of vitamins, those crops has significantly declined. Practices such Over the past 50 years, conventional farming prac-

> "no-till in vegetable is so difficult to do 100 percent." are building your soil organic matter," she said. But you are sequestering the carbon back to your soil. You By using no-till practices, combined with cover crops,

residue all have to work together, Zinati explained. rotation schedule, the right cultivar selection, good pest management and the best management of crop crop - "not allelopathic to the cash crop" - a good crop production of any crop successful. The right cover need to be successfully implemented to make no-till No matter the crop, there are a lot of factors that

Examining Nutrition

and organic legume-based growing systems. Each systational tillage plots. tem will be further divided into tillage, no-till and rocrops grown in conventional, organic manure-based parisons. They will be analyzing root, fruit and leaf in a variety of farming systems in side-by-side comby measuring the nutrient density of vegetables grown plore the link between soil health and human health The objective of the Vegetable Systems Trial is to ex-

The study, which began in 2017, will run for 20 years density of the food as well as soil health, insect and weed pressure, drought resilience and profitability Researchers will be collecting data on the nutrient

crop in the plastic or the living mulch system. Howevwith higher nutrient levels. er, the rolled oats mulch produced a cucumber crop seen between the presence of the pest grown on the any impact on the insect. No statistical difference was mulch to a rolled oats mulch to determine if there was was conducted at Rodale Institute, comparing plastic In 2017, research on the striped cucumber beetle



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said of the use of the rolled oats cover crop system. were higher than in the crop grown on plastic. Plants Polyphenol levels in the crop grown in the rolled oats use polyphenols to deter pathogens and insects. "It's really helping other things in the plant," Zinati

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> planted with two feet system, the crop was tems. In the first no-till conventional tillage and ganic conditions using termination. crimper for cover crop tor-mounted modate the use of a tracwide enough to accomrows were 10 feet apart while in the second the behind roller crimper, wide rows, using a walktwo no-till organic syssquash grown under ortrient content in winter ined the difference in nu-Further research exam-

storage would have. being in storage to deteralso measured levels after assessed. Researchers carotene, which are immine what effect time portant phytochemicals carotenoids, for human health, were lutein and After harvest, levels of including alpha-

NO TILL 10

NO TILL from 9

In both no-till systems, the levels of the carotenoids increased significantly after 30 and 60 days of storage. The squash grown in the tractor-pulled roller crimper system had the highest levels of carotenoids. The tiliage-grown squash not only had the lowest levels of these important phytochemicals, but the levels decreased in storage over time.

The results demonstrate that differences in crop management can impact the nutrient properties of the crop itself. Further large-scale studies to examine how and why these changes in phytochemical levels occur will be conducted.

Utilizing Cover Crops

"Equipment really plays a huge role in our success" with no-fill and cover crop systems, Zinati said.

Having the right equipment, such as roller crimpers, which allow farmers to terminate a cover crop without chemicals or tillage is crudial to cover cropping and no till success. The biomass produced by the cover crop is also important. The residue has to allow planting into it, but also has to be sufficient to suppress weed growth.

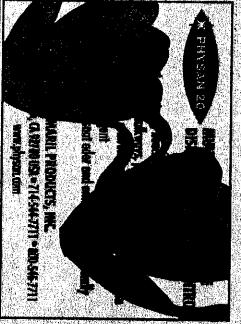
Depending on the species of cover crop chosen, the amount of nitrogen fixed will vary. After termination, time for the cover crop to release nitrogen is key. The amount of soil fertility needed will depend on the requirements of the cash crop.

A tiliage radish crop provides "biological tiliage," she said, and takes the nutrients from the soil and moves them up. The tiliage radish does not overwinter, so in

the spring, transplanting vegetables into this soil allows the crop to access the now-available nutrients.

Zinati explained there are four stages to the transition from tillage to no-till practices using cover crops. The first five years are needed to start to build the soil. Years six through 10 will see increases in soil organic matter, increases in soil structure and in microbial activity. The next 10 years will accumulate carbon reserves in the soil, and the enhanced nutrient cycling that occurs with high levels of soil health means 'you will see the cyclence,' she said.

From 20 years onward, it's a matter of maintaining optimal soil health. Adding nutrients back to the soil and not letting the crops depicte fertility while continuing to sequester carbon and feed the soil microbiota



will keep soil health and productivity optimized, and will translate into nutrient dense crops.

"It takes a lot of effort and vision and planning" to continually improve soil health, Zinati said.



