



Ground cloth used for occultation and preparing beds.

## They're Raising No-Till Vegetables

Tilling the soil is a thing of the past at Astarte Farm. The 6.6-acre market garden operation in Massachusetts is using no-till, compost, and cover crops to raise vegetables while boosting soil health. Making the combination work was only part of the challenge admits Dan Pratt, farm founder.

"Giving up the joy of seeing a clean cultivated field behind me on a tractor was the biggest challenge," says Pratt. "However, the no-till and cover crops are improving the soil and our vegetable crops. We are seeing a longer shelf life."

Pratt bought the farm in 1999 and certified it organic in 2004. In 2014 he sold it to Jim Mead, a local electrical engineer, but continued to be involved. Along with field manager Annalise Clausen, the three decided to transition to no-till.

Pratt had already begun working with cover crops on raised, tilled beds. While they improved soil texture, they didn't increase organic matter. That began to change when they went to no-till. However, eliminating tillage didn't happen overnight. Pratt warns against trying to do it in a single season.

Part of the challenge was adopting new methods of weed control. They began practicing "occultation" or weeding with tarps. Instead of tilling up germinating weeds, the farm team covers them with heavy, 6 mil poly tarp in 32 by 100-ft. sheets. The tarps can be left in place for several months. While they don't let rain penetrate, they do prevent soil moisture from evaporating. This keeps it moist and prevents weeds from germinating or growing if they do germinate.

Unlike cultivation, occultation is also

gentle on soil fungi and other microbes and invertebrates.

Occultation is also practiced on the farm's 4-ft. by 100-ft. growing beds. Ground cloth laid the length of the bed controls most annual weeds and slows perennials.

"The ground cover cloth lets water and oxygen through, but cuts out the sunlight," says Pratt. "We may leave them for as little as 2 1/2 weeks in the summer or for 2 mos. or more in early spring or late fall."

Occultation is usually used after cover crops have been either crimped with a 4-ft. I & J roller/crimper or cut with a 4-ft. flail mower from Rears Mfg. The quick attach roller/crimper can be front-mounted to the tractor loader for added down pressure. Pratt likes the evenly mulched bed that remains.

"The flail mower chops up cover crop and crop residue and drops the material straight down to create a sheet mulch," says Pratt. "If it is a low growing cover crop, we may just cover it with wood chips or the ground cloth."

When the row is ready for transplants or to be direct seeded, the ground cloth and tarps are removed, and a thick layer of compost is laid down. The farm's compost drop spreader from ABI Attachments is a key piece of equipment. The hydraulic drive lets workers vary the depth of the spread independent of tractor speed.

"With the spreader, one person can cover three to five beds an hour compared to two people with shovels and one on the tractor doing one bed an hour," says Pratt. "It works best with screened and dry material."

Compost is key to the farm's program. Instead of drilling in cover crops, the farm workers will spread the seed and drop a thin layer of compost over it.

"Our system is based on compost," explains Pratt. "For a certified organic market



Spreading compost over crop seed.

garden, the amount of compost can be a major hurdle. You need to find or create a really good source."

At the same time the farm managers transitioned to no-till, they diversified their cover crop program. Pratt had depended largely on winter rye. Although it reliably grew in temperatures above 45 degrees and produced a layer of compostable biomass in place, it also left behind a solid root mass.

"It made it just about impossible to cut out holes for transplants," says Pratt. "In recent years we've transitioned to winter kill covers like peas and oats and have experimented with daikon radish. We are moving to a more diverse cover crop mix."

A drill for use on the 4-ft. beds is the missing tool in the Astarte no-till program. Currently, multi-culture cover crops require multiple trips over the bed with one-row seeders.

"If we could incorporate cover crop cocktails in a single pass into a layer of compost, it would save a lot of time and labor," says Pratt.

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Sylvis plants willow trees that take root and grow over a 30-year cycle. Willows are selected as they are extremely fast-growing, root to the proper depth and help accelerate soil formation without loss.



## Willow Plantations Help Reclaim Land

The normal process of reclaiming coal or mineral mines is to strip off topsoil and subsoil to be collected and stored for later use. Once the mining is finished, the soils are replaced for reconstitution to their previous state.

But many abandoned sites were started too long ago and don't have a soil stockpile for reclamation purposes.

Sylvis Environmental Services helps with these situations.

"Step one is finding an efficient and renewable way to essentially manufacture a topsoil or combine the materials required to form a topsoil starter," says John Lavery, Sylvis senior scientist and business development manager. "We know it's not a topsoil yet, just a growing medium."

To begin, Sylvis contracts with cities, municipalities and mine landowners to collect biosolids, water treatment residuals, manure, compost, or pulp and paper sludge, all with a combination of nutrients and organic matter to address topsoil deficiencies. This material is then mixed, reconstituted and spread on the targeted land sites.

Sylvis then plants willow trees that take

root and grow over a 30-year cycle. Willows are selected as they are extremely fast-growing, root to the proper depth and help accelerate soil formation without loss.

The willow plantations are harvested every 3 yrs. using agricultural-style machinery. The collected bio and fiber products become usable as renewable biomass, cellulosic ethanol fuel, or as a composting agent.

"The value in this type of reclamation restoration perspective is the below-ground processes aren't being disturbed," Lavery says. "They're allowed to continue, so the natural processes of soil formation that require this biological rooting intervention are happening uninterrupted."

After harvest, access to the soil is again available and more organic materials and fertilizer are added to the reconstituted topsoil to allow new willow regrowth at a highly productive rate.

Lavery explains when the woody biomass is harvested, most nutrients remain in the soil. After the 30-year cycle, a rich and productive agricultural land base will be handed over to cereal crops or other farming systems.

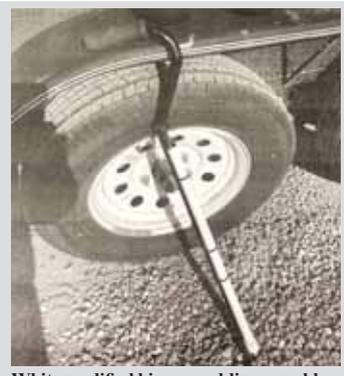
"The willow plantations also become an

oasis for wildlife, birds and prairie biodiversity," Lavery says. "Additionally, they pump carbon into the soil. We're helping mitigate climate change with carbon sequestration along with the 'top of ground' resources harvested. Plus, we're helping meet carbon footprint reduction goals by gaining carbon credits from the biosolids used on the land and from the soil root systems."

Sylvis has ongoing willow projects in Alberta and consults with dozens of cities and municipalities in the U.S. and Canada.

"It's a long-term soil building system and a great way to bring non-productive land back into production while generating some revenue with willows. The carbon sequestration and positive climate change impacts we achieve are almost unparalleled. Our willow projects have shown tremendous promise and incredible resilience."

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White modified his cane adding a grabber that fits into a piece of attached pvc.

## Cane's PVC "Holster" Holds Grabber

FARM SHOW reader Jim White has found a way to improve the functionality of his cane.

Several years back, White suffered a debilitating leg injury that left him using a cane and unable to kneel down. This posed a problem when he dropped small objects like his keys, as he couldn't bend down to retrieve them.

His solution? Modify his cane to act as a grabber that would always be available when he needed it.

The design is simple. White attached a length of 1/2-in. pvc pipe to the outside of the cane with zip ties. He then slid a standard grabber tool into the pipe. Now, when something falls on the floor, he needs only to whip out his cane to retrieve it while staying fully upright.

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