

Farmer/Farm Profile – Dan Pratt at Astarte Farm

Astarte Farm is a certified organic market garden in Hadley established by Dan Pratt in 1999. When Jim Mead took ownership of Astarte in 2014, Dan maintained management of the farm's 6.6 acres. No-till practices there began at that time, and include the use of biochar, compost, occultation strips, and predator and pollinator habitat in beds and along buffer zones.

History of Astarte Farm

The land encompassing Astarte Farm was first settled by the English in 1650. It was abandoned after the soil was exhausted by mono-cropping of sweet and broom corns, pumpkin, and tobacco. Polish immigrants began farming it again in the 19th century.

When Dan first began plowing the land in 2000, he found only two worms in a half-acre, which was highly compacted clay down to 8-10 inches. This caused standing water in the fields for 2½ years until Dan switched to more natural methods. While the farm was successful in its first 3-4 years, the beds began to sink around year 6. In contrast, areas that were mowed and undisturbed by cultivation were rising. He was using an Italian spader, which inverts the soil profile less than tilling, but still disturbed fungal, beetle, and worm activity.

The farm in a highly diversified market operation, selling nearly 100% of its produce to River Valley Co-op in Northampton. The co-op's produce manager determines the vegetable crops on 3.5 acres. The remaining acreage consists of grapes, blueberries, and pollinator buffer zones.

No-till

In 2014, the farm went completely no-till. Dan was inspired by various workshops he attended as well as Elaine Ingam's *Soil Food Web*. In her research, Ingam claims there are enough nutrients in the soil to grow any crop as long as there is enough of a "soil food web" (biological activity) to support it and keep naturally occurring chemical processes regular. This is comparable to the activity of the duff layer of forest soils. Dan first began no-tilling with garlic, simply because it was autumn when he made the decision. The process started with a cover crop of buckwheat (mowed down with a mulching lawn mower), followed by the layering of a small amount of biochar, two inches of compost, and then weed-guard paper mulch. Astarte uses an OMRI-listed 3-foot wide roll of paper mulch with pre-punched holes for planting.

Today the process looks quite similar, except that Dan is now adding an additional two inches of compost after planting as well as using occultation strips to prepare the beds. The occultation strip is a ground cloth made of woven polyester, so it is both durable and permeable, letting water and oxygen through. It is conducive to life in the soil, but not to plant growth.

The beds at Astarte are semi-permanent with a grass or woodchip/cardboard pathway on each side. Dan often starts transplants 3-6 weeks earlier than usual so that 160-foot beds can be established ahead of time.

Cover Crops

Astarte tends to use cover crop cocktails and summer alfalfa or buckwheat in its beds. Historically Dan used winter rye, however the root mass did not have sufficient time to break down before planting time, so he replaced it with oats.

The cover crop cocktail Dan uses includes oilseed and daikon radishes, oats, bush beans, a field pea mix including partridge pea. Partridge pea fixes nitrogen and also has a “gland” at each leaf stalk that produces nectar. Always buzzing with activity, Dan has noticed up to 20 varieties of bees. Radishes are planted in bands on the outside of the beds to facilitate easier harvesting. The cocktail contains a combination of nitrogen fixers, cereals, and deep-rooting plants.

The cover crops at Astarte are mostly frost-killed. Rolling and crimping techniques are also used to terminate them. The Rodale model roller-crimper used on the farm attaches to the front forks of the tractor and is the width of the beds. This makes it easier to move around due to the ability to down pressure. Unfortunately the roller crimper is problematic when used for the buckwheat as it tends to clog from the wetness of the stalks and necessitates a stop every 50 feet or so.

Biochar

Before the days of no-till, Astarte relied on organic blended fertilizers. Dan’s biggest leap of faith was to discontinue their use, and replace them with biochar, a practice complimentary with no-till. Although it is technically not a fertilizer, biochar allows processes to take place that help the crops succeed. Basically, biochar has the ability to soak up unused nutrients and then release them when needed. The biochar is also porous, which provides moisture and a refuge for soil organisms that would normally die off when a plant is harvested. This way, the sugar exchanges remain active in the soil. Because biochar is such a strong purifying agent, Dan typically uses a 20% blend with compost or pre-inoculates the biochar. The biochar is pre-inoculated with a worm compost tea and a lactobacillus EM-1. He also uses a 5% blend with compost for potting soil, which helped to refine and protect against herbicide or other chemical residues that may exist in the compost.

Weeds and Insects

Weeds on Astarte Farm tend to be in the form of grasses. Whereas annuals such as pigweed and lambsquarters were more common before tilling, perennial weeds are more prevalent now. The crew at Astarte is still doing a lot of hand weeding, in addition to suppressing weeds with occultation strips. Dan has found that a bed prepared with these strips is weed-free for a month to six weeks after planting. He uses compost-like mulch wither before laying the strips or added before transplanting.

Recent and significant flea beetle damage at Astarte has been attributed to the cool, wet spring. Dan has also noticed a lot of parasitizing by wasps on aphids. He is addressing these pest issues with predator habitats based on a design by the Xerces Society. They are full beds with a two-foot high mound running the entire length and planted with three or four native grasses, mountain mint, and several flowers. This design is conducive to wolf spider and ground beetle habitat. While this method has been successful (especially keeping away aphids), it may not be necessary with no-till since ground beetles likely dwell in the undisturbed soils of a no-till plot or anywhere “you’re not running discs.”

Equipment

Astarte utilizes a Rodate model roller-crimper, which is placed on the front forks of a 27-30 horsepower Kubota tractor where buckets normally go. It also uses a bed under-cutter custom made by a local blacksmith. This is a horizontal blade for digging a trench at the end of a bed. Used primarily for pulling garlic, it leaves ½-1 inch of the root and does not disturb the soil as much as the use of a fork. Another piece of equipment is the ABI Elite Spreader, which is a hydraulically-controlled drop spreader used exclusively for spreading compost. By adjusting the speed of the motor, Dan can put down ½-2 inches of compost in a single pass.

Challenges

Dan's initial problems with no-till came with planting small-seeded crops. It took an entire year to get carrots going. Dan attributes this to inexperience with a hand-push seeder. He says it takes a delicate touch to maintain a quarter-inch planting depth, especially with less even beds due to the addition of compost. With practice, this has become less of an issue.

Another crop that Dan experienced difficulty germinating was spinach. This stemmed from compost mulching, which creates a black solar soak and makes it difficult for crops that require low soil temperatures to germinate. Addressing this is a matter of paying closer attention to weather and getting more practice with the seeder.

Results

Since transitioning to no-till, there has been a positive shift in the quality of Astarte's product. For example, Dan notices that the same lettuce he grew while tilling now lasts longer in the no-till soil. Also, he has always touted the idea of terroir – that one can taste how produce is grown. He pays attention to flavonoids and the color of his vegetables, hoping to maximize the amount of flavor and nutrition. He sees no-till as benefitting the produce in this way, creating a qualitative difference in what he's producing.

Advice

Dan upholds the roller/crimper as playing a major role in the success of Astarte's no-till operation. For farmers transitioning to no-till, he recommends investing in occultation strips to prepare beds and kill weeds, but cautions that one should have something to weigh them down as he has had issues with the strips being blown away.

The use of compost as a fertilizer and mulch is another integral component of Astarte's successful farming practices. It is a major expense on the farm since it is purchased externally. If they were able to create it onsite, the system would be more economically viable.

Resources

- <https://www.soilfoodweb.com/>
- <https://xerces.org/>
- No-till Vegetables at Tobacco Road Farm by Bryan O'Hara
<https://thenaturalfarmer.org/article/no-till-vegetables-at-tobacco-road-farm/>