The Sterilized Mulch Method

Our neighbor Tom commented, "You've taken this beat out hilltop farm and made it bloom."
I said, "Thanks Tom."
We started our market gardening adventure on some beat out sandy land. It is now very productive.

Here is what we do:

We make a LOT of HOT compost. Before planting or transplanting we put down about two inches of sterilized organic matter (was hot compost). We plant or transplant through this sterilized mulch. There are no living weed seeds in this mulch. It is thick enough to suppress the germination of weed seeds in the mineral soil beneath, so the only weed pressure comes from the edges of the bed.

Our beds are 42" wide. We cultivate only the edges, either with a hoe or with twin discs or single disc on a tractor. The top of the bed does not require cultivation after rain because it does not seal and there are no weed seeds in the germination zone.

Our composting method requires a thermometer and a tractor with a loader bucket. We combine likely material, ALWAYS INCLUDING SOME COARSE, OVERSIZED MATERIAL. The ideal temperature is 140º F. The text book ratio is 25-30/1 carbon/nitrogen. We go heavy on the carbon. Sterilized mulch is the objective not total breakdown. Going heavy on the carbon preserves more nitrogen. A low carbon pile loses more nitrogen to ammonia gassing off. At the end of the process we sift the mulch for some applications and then return the oversized stuff to the next pile.

Here is how it goes:

The livestock who drive this process must have: moisture, food and air; all at the same time.

Combine materials, (including some alkalizer helps, but is not required). Give it a day or two and check the temperature. Anything over 130º F is good. The pile will get to its temperature, plateau for a few days and then begin to drop. Turn it. It will heat back up, plateau and then begin to drop. Turn it. It will heat, plateau, and then begin to drop. Turn it...the plateaus get longer and longer.....When you turn it and it heats only to 120º F or less, it is ready to use for most applications or may be left to cure until needed.

Without oversized material in the pile you will have to turn it more often. The oversized material maintains porosity, allowing air to enter. Unless the pile is very dry the limiting factor which precipitates the drop in temperature is lack of air. The thermophilic microbes who create the sterilizing heat are AEROBIC. They require oxygen. If oxygen is not available they shut down and go dormant. Decomposition continues via ANaerobic bacteria. Many of the byproducts of ANaerobic decomposition are plant toxic and smell bad. When you turn and fluff up the pile the ANaerobic bacteria must shut down and the AEROBIC bacteria crank back up. The blessed AEROBES clean up the mess the ANaerobes left and get on with their business. Their business is breaking big molecules into small molecules so plants can use the stuff of life again.

Mulch Sterilized by the Process of Composting with Fish Waste as the Nitrogen Source & Wood Chips as the Carbon Source

We make a bed of chips using about 6 cubic yards. We flatten the pile so we can back the truck onto the pile and dump the four to seven 32 gallon cans of fish waste. We fold the fish waste into the chips. When we have 6-8 of those piles we mix them up by pushing them to a new, adjacent, location. We continue to roll the piles over as needed. They are moved up a slight slope. Each turning attempts to put what was on the outside on the inside and homogenize while fluffing.

Sub-soiling:

If the area was ever farmed there is probably a plow-pan/hard-pan just below the deepest it was worked. This impedes the movement of water both down and up and stops the penetration of the roots of many plants. We break this up with a sub-soiler at a time when the soil is not wet. One rip down the center of where the bed is or will be is what we do, as needed.

Bedding:

Our two disk bedder consists of two 16 inch discs on a 6 foot tool-bar. With this tool we move the top 3 or 4 inches of soil from both sides of the bed-to-be up onto the bed-to-be. It requires four passes with the bedder. After each pass the discs are moved toward center about 4 inches. The result is a mound down the center with a 16 inch wide depression on each side. If any amendments are added this is the time. Next, this is worked with the 40 inch tiller. The result is a bed about 42 inches wide on top with a foot wide depression on each side. The tires of the wide set tractors fit neatly in this depression. We do not do this operation every time we rework a bed, only as needed.

Application:

We clean up a bed and lay drip tape, then cover with a couple of inches of the sterilized mulch. We put it down by straddling the bed with a tractor and spreading from the bucket or from a trailer behind a tractor.

Planting/transplanting:

We direct seed with a push seeder through the sterilized mulch. To transplant, we dibble or dig through the mulch to set plants. This gives little opportunity for weeds to emerge.

Cultivation: We work the edges of the beds with a sharp hoe or the bedder disc or discs.

Layout

In the open, un-forested areas where we grow, the layout pattern is 10' modules; 4' growing bed and 6' path between beds. We mow the paths. These mowed paths provide easy access and erosion prevention. There are many other benefits to the sodded paths between beds. They are never muddy. They are a "pasture rotation" which is quite a soil builder. They provide a reservoir for re-inoculation of soil microbes which are abused by tillage in the beds. The sod brings up and holds water from the subsoil.

At some point we rotate the beds and paths. The paths become beds and the beds paths. Because of the fit of this layout to our equipment, the tractor tires fit in the same place so the actual growing areas never get tractor compaction. The paths do get the small tractor on them when mowing, but the big tractor straddling the beds to spread compost or cultivate never has its tires in the growing areas. In the high shade, sparse mature pine areas where we grow in the hottest part of the year, we have sodded paths, but cannot be as flexible about switching paths to beds because we are fitting between trees.

Agro-forestry

We grow in sparse, mature pines and utilize micro-climates. These practices are amazingly helpful in dealing with temperature extremes. For example, tomatoes and peppers grown in the high shade of pines or with woods to the west perform far better in the late summer heat than those grown in the full sun. What is more amazing to me is the difference in temperature under the pines in the winter.

Cover Crops

Weeds can be cover crops. Many of our weeds were introduced as cover crops. We plant most of our covers. In the winter we grow: rye, winter peas, oats, wheat, rye grass, clovers. We often mix marketable plants with these green manure plants. Mustard, daikon, arugula and kale are regulars along with what ever old seed we have of cold weather crops such as Asian greens and radishes. Cold weather crops such as kale can be started with buck wheat as a nurse crop in the fall heat and then the buck wheat disappears with the first frost. Warm weather covers we use include: buck wheat, iron and clay peas, sorghum, hairy indigo, Desmodium heterocarpus, Cassia obtusifolia and velvet bean.

Equipment:

JD 2030 (1970-1) 54 HP --set up wide enough to straddle the growing beds
this tractor's bucket holds about 3/4 yard; used to turn, load and spread compost/mulch

Ford 1700 1980s 25 HP---set up wide to straddle beds
used to pull trailers, till, cultivate, sub-soil and bed

Ford 1300 1980s 17 HP set up narrow
used to mow between growing beds, cultivate and spray foliar feeding liquid

4' rotary mower, 40" tiller, spray rig, 6 foot "bedder"for wide tractors, 48" "bedder" for narrow, subsoiler, roller, middle buster, 4' disc harrow, 6' disc harrow

We do concern ourselves with some things beyond making a lot of hot compost and a cover crop in every growing area sometime during every year.

1. Maintaining at least 3% soil organic matter
2. Maintaining the "Albrecht Proportions" in base saturation: K-2-4%, Mg-15%, Ca- 65-70%
3. Supplying the full spectrum of minor elements: Azomite, greensand, granite dust, clay
4. Soil test often and respond appropriately

The rest of market gardening is so complicated, thank goodness soil building is so simple. (joke)

Reading list: <journeytoforever.org> go to “small farm library”

An Agricultural Testament by Sir Albert Howard

The Earth's Green Carpet by Louise E. Howard

Sir Albert in India by Louise E. Howard

(There is a paperback edition combining the two Louise Howard books. They are jewels.)

Farmers of Forty Centuries by F.H. King

Managing Cover Crops Profitably from Sustainable Agricultural Network, USDA

Weeds: Control without Poisons, by Charles Walters

Eco Farm An Acres USA Primer by Charles Walters

The Secret Life of Compost by Malcom Beck & Charles Walters

The Ideal Soil v 2.0 by Michael Astera with Agricola, demystifies reading a soil test.

(ACRESUSA.com is the source for the preceding five)

Teaming with Microbes by Jeff Lowenfels & Wayne Lewis

Weedless Gardening by Lee Reich, is a very good book with all the principles of healthy soil building addressed on garden scale.

Holistic Management by Allan Savory