

## Sattin Hill Farm Course

### Module 17: Composting

#### Introduction

In this module, Josh discusses the many aspects of composting. He addresses determining compost needs, timeframes, building a compost setup, moisture, inputs, carbon sources, temperature, inoculating compost, how to build a pile, and finishing options for compost.

#### Determining Your Compost Needs

Before deciding on the compost program you would like to implement on your farm or property, it's essential to determine your compost needs.

Josh used to raise chickens as well before he scaled back to focus on only vegetables. He gave the old crop residue from the farm and his kitchen scraps to the chickens. Once he phased out the chickens, he needed a new composting system incorporating the garden's plant waste.

Josh's primary motivation for composting is not to produce everything he needs for the farm but rather to have a method for processing farm waste. It's about keeping that fertility on the farm rather than sending it elsewhere.

#### Purchasing Vs. Making Your Own

Josh doesn't recommend trying to make all of your own compost when it comes to the volume and quality of compost needed to operate a small-scale, not-till, high-yielding farm. At his scale, he can only produce a few yards of compost per year. To put that in perspective, when he started his  $\frac{1}{8}$  acre farm, he purchased 90 yards of compost! In addition to the sheer volume needed, he can't make the same quality of compost that he buys from a professional local producer. Decently good compost at any scale takes a lot of time and effort. Making a good quality compost to suit his needs requires a greater variety of inputs available on his farm. He would need to bring in materials from elsewhere, which creates a need for storage and machinery to move it around.

Storage space, materials, and infrastructure are expensive and time-consuming and often the reason that companies producing compost specialize in soil products alone. From managing the piles, sourcing the ingredients, having them transported, and all logistics involved, hiring a professional can make the most sense.

Josh recommends purchasing professionally made compost needed to build and maintain your beds. However, purchasing the bulk of your compost from an off-farm vendor doesn't mean not to make your own compost too. Josh believes everyone should compost and claims it's rewarding, enjoyable, and a great way to convert waste into usable fertility.

## **Different Ways to Make Compost**

There is a multitude of ways to make compost, and one way isn't necessarily better than the other. Whether it's a Johnson-Su bioreactor, aerated compost piles, windrows, or bins, Josh believes they can all work well in different contexts. Some methods are centered around a fast turnaround from raw materials to a finished product, while others take a long time to complete.

Josh doesn't rely on his homemade compost for production, so a slow processing time isn't a drawback. Once the process is started, it can take six months to a year for the first finished product. Once it's going, it provides a continual flow. He's adding the same amount of new material every month and gets the same output.

To speed up the process of converting organic material into finished compost requires more time upfront; materials need to be shredded or chopped to speed up the decomposition process. Quick turn around compost also requires consistently checking temperature and moisture levels and multiple turns of the pile.

## **The Sattin Hill Farm Compost Setup**

**Location:** A designated, strategic space for your compost setup is essential. As soon as you start farming, there will be crop residue and waste. You need a space and a plan to manage that, or it will get out of control quickly. Create a space in close proximity to where the crops are coming off the field so it will be easier to stay on top of it. If your compost space is too far from your growing area, it will slow you down, ultimately leading to less consistency. You'll be setting yourself up for success if it's conveniently located.

Another aspect of choosing your location is water supply. It's important to have an accessible water supply for your piles. Ensure adequate moisture levels in them.

**Design:** While it's definitely a viable option to simply create a pile of compost, Josh prefers a built-out station with multiple bins for the compost. He found a nicely designed station looks better (with the compost not in sight), and it's more enjoyable to use.

General compost piles should have at least one cubic yard for the volume to generate enough heat. Josh built his bins out of repurposed pallets, which are about 40" x 40", to accommodate this volume.

The number of bins depends on the size of your farm and how much material you need to process. For Josh's farm, he built a five-bin setup. He recommends creating a station with more bins than you think you'll need. More bins increase your options for flipping the piles. "Flipping a pile" means transferring the material from one bin into the bin immediately to the right of it. This process reintroduces air into the material, continuing the decomposition process. Five to seven bins is a good starting point. Additional bins available to store finished compost are also a nice option.

**Scaling Up:** A system with multiple bins best suits a smaller-scale operation. You could definitely construct larger bins to hold more material and process quite a bit of compost. However, as a farm scales up and generates considerably more compost material, it will necessitate using a front-end loader and moving to a windrow system.

**Building Materials:** Josh's bins were put together with pallets and scrap wood. After screwing the pallets together to form the sides and backs of the bins, they added scrap wood panels to fill in the gaps and prevent compost materials from falling out. Visit his YouTube channel for a complete illustration of his compost station build.

Many people use chicken wire or other kinds of wire mesh for the sides to increase airflow, but Josh has found the cracks between the panels of wood to be adequate. In fact, some people choose completely solid walls to prevent the sides of the pile from drying out. Solid (or mostly solid) walls will be optimal when retaining more moisture in a pile is required.

**Removable Slats:** One key feature of Josh's design is removable slats on the front of the bins. There are simple channels constructed from scrap strips of wood. These are installed on the left and right, inside the front edges of each bin. Slats are then cut to size and slide horizontally into the channels. The slats form a front wall that increases in height with each slat added.

As you are loading or unloading material, you can add or remove as many slats as needed for easy access. The removable slats are more ergonomic to prevent reaching over a solid front panel door and hyper-extending your back.

Diagonal cross-bracing runs along the back of the bins. The bracing is instrumental in maintaining the rigidity of the setup. Without the bracing, the bins would float around and shift, especially if one bin is more full than another.

**How To Maintain Moisture:** Josh uses remnants of black plastic to cover the top of each pile in its bin. This prevents evaporation and drying of the piles, and it also protects from oversaturation in heavy rains.

**Open Bottom Bins:** Josh intentionally leaves the bottoms of the compost stalls in direct contact with the native soil. Compost piles cool down after the initial heat from a fresh layer, then worms travel up from the bottom and work through the material. Josh hasn't needed to inoculate his piles with purchased compost worms. The worm castings greatly enhance the compost, making for a beautiful finished product.

## Ingredients for Successful Compost

It's often recommended to layer a compost pile with a ratio of 30 parts carbon to one part nitrogen. While this sounds good in theory, not everything is just carbon or just nitrogen. To get close to this ratio (practically speaking), try to layer a pile as follows:

1. 3-4" of nitrogen ("greens" - fresh cut materials like crop residue, kitchen scraps, grass clippings, etc.)
2. Sprinkle of soil (just a trace of living soil in the mix will introduce more microbes needed for breaking down the material)
3. 6-8" of carbon ("browns" - dried out material like wood chips, straw, leaves, paper, bark, etc.),
4. Water (the greens already contain moisture, but the browns will need to be watered to activate the process)
5. REPEAT!

**Variety of Inputs:** When it comes to inputs for compost, what you put in is what you get out. If the inputs are mostly homogenous, your finished product will lack biological diversity and have less to offer your plants. A rich variety of inputs will result in a biologically complex, nutrient-rich compost product.

## Nitrogen

The majority of nitrogen inputs from a small farm are from the crop residue coming off the field, a big advantage for producing a large source of diversified inputs. Household food waste (such as fruit and veggie scraps, coffee grounds, and eggshells) will be a

small percentage of your total input but adds some good diversity to your nitrogen sources.

## **Carbon**

Unless you have a lot of trees on your small farm to collect leaves from or a chipper to create wood chips, carbon sources are most commonly brought in from off of the property. When finding a local source for your carbon inputs, ensure you know where it originated and if it was sprayed with pesticides. This material will be spread all over your farm, so it's essential to make sure inputs are not contaminated.

**Leaves/Grass/Straw:** On Josh's farm, the primary carbon source they use for layering piles on Josh's farm is leaves. They are collected from an area with many deciduous trees. If you don't have access to a large volume of leaves on your own property, local municipal operations typically allow you to acquire leaves for free, or at least for a low price.

Leaves are very nutritious for the soil and break down quickly. Another benefit of leaves is they don't usually have pesticides on them. If you're getting grass clippings from people's lawns, be cautious. There is a high likelihood they've been treated with chemicals.

If leaves are hard to come by, straw is a viable carbon source and usually available. Do not use hay; it contains a high volume of seeds. That is the last thing you want to be broadcasted over your beds!

**Cardboard:** Cardboard is another source of carbon for your compost pile. With so many packages delivered these days, cardboard is readily available to most people. While it is a good source of carbon, it is not as complex as leaves but can still meet a carbon need.

**Wood Chips:** Wood chips are a good carbon source for your compost pile, the only caveat being that they take a long time to break down. Using wood chips will mean a lot of sifting when preparing your finished product. If you do use wood chips, Josh recommends using them very sparingly.

## **Water**

For the biology in the soil to do its job, your compost will need moisture. If the compost pile is too dry, the microorganisms will not be able to sustain life. Conversely, if the pile is soaking wet, it will become anaerobic (lacking air) and very smelly. Balanced, even

moisture is the goal. Some say the ideal is a pile with the moisture level of a “wrung-out sponge.”

As with most things in farming, there is no hard and fast rule regarding moisture level. With more experience, you will get a sense of what works and what doesn't for your farm.

In some situations cropping out a bed, you'll have fresh greens still alive and full of moisture or fruiting plants like squash or tomatoes. With these inputs, you don't need to water your pile as much; the ingredients already have a high water content. There will be other times when the inputs are really dry and need more moisture. When flipping the compost from one bin to the next, you should monitor the moisture level and water as needed.

Also, consider the moisture that's in your environment. Where Josh farms in North Carolina, he experiences heavy rains. He also covers his compost piles in the same way he uses caterpillar tunnels to protect crops from getting flooded. Some people even put a roof over their compost set up to keep the water out, giving them greater control.

## **Inoculating the Pile**

Inoculating your compost pile refers to adding a small amount of nutrient-rich, biologically active compost to a new pile to introduce microorganisms. Once your compost system is rolling, you can use compost from a pile that's further along to inoculate your newest pile.

When starting, it's a great option to get some active compost from a friend or neighbor and add some into your first pile. You can also go to a local forest and harvest some compost from the forest floor that looks really healthy. Or, if you know of a wood chip pile that has been sitting for multiple years, digging into the center will yield some fantastic compost for inoculating your pile. It doesn't have to be much—just a small bucket will do.

## **How To Build A Pile**

Josh takes an “add as you go” approach to layering his compost piles. Anytime he is cropping out a bed, the crop residue is taken directly to the compost bins and layered into whichever pile is currently being built. You can also store the material in a pile near the bins and layer it in at a later time.

When Josh flips his compost to the next bin, he intentionally leaves a few inches of material at the bottom to inoculate what is added in for the new pile.

For woody or dense material, it's best to break it apart or chop it up a little before layering it into the pile. The smaller the pieces are, the faster and more evenly they will decompose. A machete next to the compost bins works well for quickly chopping up the more dense material.

After layering in 3-6 inches of fresh crop residue, Josh sprinkles it with some finished compost and then adds a 4-8 inch layer of leaves from a stockpile kept next to the bins. Then he lightly waters the leaves. These steps are repeated until all of the crop residue (or whatever "greens" are on hand) is incorporated. Always finish out a layering session with carbons (or "browns") as the final step. If greens are left on top, the nitrogen will be lost into the atmosphere as they dry out. If fresh kitchen scraps are on top, they will attract flies and begin to smell. By always covering the fresh nitrogen material with an 8" layer of carbon, the pile will not smell or attract flies. When finishing a pile, layer it higher than the bin itself. As it sits it compresses; it will shrink considerably. Higher layers maximize the volume of compost in your bins.

## **Finished Compost**

The last bin in Josh's lineup holds finished compost. It doesn't matter how long the finished material stays in that bin. The longer it's there, the better it gets.

Finished compost will be dark and moist, with a sweet earthy smell. It's normal to see some larger aggregates that have not fully decomposed. If you plan on using the compost in a bed that will be direct-seeded or as a potting mix in the nursery, sift out the larger chunks through a screen. However, in beds you transplant by hand, the larger chunks won't interfere and can be left in.

## **Sifting Compost**

**Hand Screener:** A hand screener is a simple wooden frame with hardware cloth wire mesh. You place a hand screener over a wheelbarrow and pour the compost through, sifting it into the wheelbarrow. It helps to have one person shimmying while sifting over the wheelbarrow while another person shovels in the compost.

**Trommel:** Another sifting option is a trommel. A trommel is a rotating cylindrical sieve for sifting coarse material. You can make your own trommel for sifting compost using a cement mixer, a garbage can, and hardware cloth. Josh has a how-to video posted on his channel for reference. This system is more efficient and less labor-intensive than a

hand sifter. Larger material sifted out of the compost can be tossed back into a pile to continue breaking down.

### **Additional Compost Products**

Homemade compost can be used to make compost teas and slurries, where the biology is extracted and enhanced, then applied to your beds as a foliar spray.

### **Monitoring Temperature**

Josh uses a compost thermometer to periodically measure the temperature of his piles. Since he doesn't rush the process nor rely on this compost as his primary source of fertility, he won't spend a lot of time and effort managing temperatures. For him, monitoring the compost temperature is mostly curiosity; he likes to have a general idea of how hot his piles heat up when active.

An important note about compost temperature: if you use the compost on a certified organic farm, it's required to heat the pile between 131-170° F and maintain that range for three days. This must be documented.

### **Conclusion**

Josh's motivation for generating his own compost on the farm is to 1) have a sustainable way of managing his crop waste and 2) to keep the fertility that came from his farm on-site to ultimately be returned to feed the soil.