



Case Study

Making compost on farm

Introduction

Donnybrook farmer Brett Kirkpatrick made compost to help grow biodynamic vegetables and beef pastures for more than twenty years. Given the critical role that compost plays in a system without conventional fertilisers, South West NRM's Regional Agriculture Landcare Facilitator sat down with Brett in 2018 to ask about the compost making process.

What can you use to make compost?

You can use any organic matter on the farm. Manure is typically the source of nitrogen. For carbon we either harvest bracken with a forage harvester, which also reduces fire risk, or use leaves from a big gum tree near the house, or use straw. You can pretty well use anything that will break down.

What equipment do you need to make compost?

If you want to make your own compost, you will need a front-end loader and a rotary hoe. The rotary hoe has been brilliant for me because it helps mix ingredients and break up any big lumps of straw. If you don't break these up properly it can block the spreader.

Can you run through the steps that you go through to make compost?

I make two types of compost on my farm. The first way uses manure from my cattle. I harvest bracken or put down leaves or other material and then feed the cows with hay on top of that. Their poop and the hay they don't eat becomes part of the compost pile. The other way is to import the manure, which I need to do to grow vegetables.

The first thing I do is assemble all the materials. Manure, bracken or straw, minerals (e.g. trace elements, phosphorus, potassium), rock dust, lime and soil.

People have found that rock dust can be a good source of trace elements and has an enzymatic effect in composting. The acids from composting help to release elements from the rock dust. I get an agricultural rock dust sourced from volcanic basalt that has a significant amount of fines.

I use a small amount of lime to help bring oxygen into the heap. For a heap of 50 cubic metres, I'd only use one cubic metre at the most. Oxygen and porosity help to feed the microbes and breakdown the compost. You don't want it stagnating or getting stinky.

I also add about 10% soil, which I get from cleaning drains at the dam. It is the clay content that we want because that helps the humification process in the compost, so you wouldn't use too much sand.

I use a loader to flatten the pile of manure and then spread the minerals, lime, soil, rock dust and then the bracken or straw on top. Then I use the rotary hoe to mix it through before pushing it into a mound.

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The heap can be 2.5 to 3 metres wide and probably no more than 1.5 metres high so you don't compact the material in the bottom of the heap. I will leave the heap to heat up for about two weeks and then turn it over. It's a matter of digging in one side and then flipping it over.

You need to have a thermometer to check the temperature. The ideal temperature is around 50 / 55°C. If it gets above 65°C, you will need to turn it or water it down.

Often by opening it up again you slow the process down. If it gets really hot, you need to add more water and if it is not getting hot enough you need to aerate it and turn it again.

You need to watch the moisture content. If it is too wet, it will move towards being anaerobic. In winter the issue we have is trying to maintain that right moisture level. If it becomes very wet, you need to cover the heap.

You can either use straw or plastic tarps. If it's too dry, I set up micro sprinklers and irrigate it until I can see the water almost pouring out of the pile. Then I start to mix it again and push it up into a pile.

Generally, the first 5–7 weeks is when you will get most of the heat and then it will slowly decline. You could turn it again at that point and you will see a slight increase. Then it will come down and sit around the 40°C mark for a long time.

How often do you turn the pile?

If you don't turn, the outside areas won't be exposed to that heat and won't break down properly. We turn at least three times, but my preference is to turn it as least as possible. If you turn a lot, you stimulate a more bacterial content by putting a lot of oxygen through it. I turn enough to get the process going, but later I like the compost to sit and allow the fungi to become active.

How long does the compost making process take?

It's important to understand the different phases. There are three phases, but I will talk about the first two. The breakdown phase is usually about 12 weeks. What happens is that the organic matter decomposes and breaks down. A lot of people make the mistake of putting it out then. But it hasn't gone through the second phase.

By about 12 weeks all the microbes that have broken down the organic matter die, and then you enter the build-up phase. You get different levels of bacteria coming back in and building up.

A lot of the reasoning behind putting it out straight away is that when it breaks down, people say that you have lost that nutrient. But if you wait into the next stage, which roughly finishes at 26 weeks, then you will find that those nutrients have come back. So you end up with a stable nutrient base which isn't volatile to the atmosphere and slowly releases in the soil.



How do you know the compost is ready to use?

You know it's ready when you can pick it up and smear it between your fingers, and it has lost that strong ammonia smell. It should just smell like good fresh earth. And the fact that it smears like that means that it has moved to a colloidal stage, which is the goal because those colloids are stable.

In the past I have put it out early. I won't ever do that again because the crop (broccoli) was so riddled with aphids that we had to plough it in. As it broke down into the soil it got better. That was a very expensive lesson. So, you have to make sure that your compost doesn't smell.

Is there a specific ratio of carbon to nitrogen to aim for when you add ingredients for composting?

The general rule of thumb is that if you are growing vegetables or pastures, you want a bacterial dominant compost, so you will aim for a 40:1 ratio of carbon to nitrogen. If you are growing fruit trees or trees generally, you want more of a fungal content. This means you want a more woody component and an overall ratio of around 70 – 80:1. There are various ratios for ingredients that give you a rough idea of the ratio for the final product.

Can you add biological products into the compost?

There's different additives that you can use to help the breakdown process in composting. In my case I make biodynamic preparations. There's other microbial mixes that you can make up and spray in. Another thing that people have found to be beneficial is seaweed meal.

Where is a good place to make compost on the farm?

In my case I chose a site that is accessible by truck and where I could have a watering point. The other consideration is there will be some leachate that can wash away in heavy rain. You can set up drains to catch that valuable liquid, but the important thing is that you don't want it running down into creeks and dams. The other thing is that you don't want trees nearby because tree root invasion can be annoying.

So when do you apply compost?

Your key times for pasture is when it is growing. Around May to July if it is not too wet. It will stay moist and get washed into the soil. If you are seeding or growing vegetables, you just put it in before you plough.

What about attracting pests?

It can be a breeding ground for stable fly. We have had one incident here. We found it was quite easy to control with regular turning. So, if you have those kind of issues it is really important that you turn more often. But what we found is that as the compost heap broke down, they lost interest in the heap.

Smell can be a deterrent to using compost. How do you deal with that?

You can keep the heaps covered – you still need to turn, but it will hold the smell. I have found covering it with straw can hold the smell in beautifully, and also just covering with tarps.

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