

Death by Compost

I have always been fascinated with the art of composting. No matter which source of information is referenced, the number one addition you can make to your garden is compost. So, following the advice of thousands, I decided to try out compost.

As I am not a 'follower', I decided to try out a sourced compost on some shelterbelt trees I was planting before I went to the trouble of producing compost myself. I purchased compost from a local supplier who used grass clippings (and miscellaneous greens, no animal matter) from a local town. This compost could not be designated as 'organic' (municipal collection is disallowed) so I figured my shelterbelt trees would have to be my choice of experimentation as they are not on certified footage. My garden is organic so I did not dare to use the compost there and risk decertification. I planted the little trees during August, September, and October of 2016, and worked in about two inches of compost in an eighteen inch circle around every little tree. It was a late fall and all seemed well.

In spring of 2017 I waited for the little trees to leaf. At the end of May little buds started opening on their one to two feet high trunks and all looked promising. What followed I can only guess at. The tops of the trees turned a shiny dark brown/black colour and wilted. The new leaves disappeared and most of the shelterbelt died. The only explanation I could come up with was poisoning. From what? There was no chemical spraying done in the area as it is surrounded by pasture. After scouring the internet I came up with one explanation and whether or not it really had any bearing on the situation is unknown, but it was something I investigated.

The option I was investigating was the reason for their demise being 'death by compost'. I didn't think this was possible but quickly learned that compost can be as deadly as it can be miraculous. My first realization was the source of the compost. The compost was sold as being organic, and we all know the many definitions of this word. When I questioned this label and the source of the material, I was told that once grass is composted any herbicides and pesticides are removed. I didn't believe a word he said, however, the compost looked nice and smelled good and I rationalized that my use of the product would be no different than anyone else's, and this person has been in business for years so who am I to argue. Unfortunately, this is what I learned about herbicides (copied from <http://smallfarms.oregonstate.edu/sfn/f09Herbicide>) :

The Herbicides of Concern

Aminopyralid, clopyralid, fluroxypyr, picloram, and triclopyr are in a class of herbicides known as pyridine carboxylic acids. They are registered for application to pasture, grain crops, nonresidential lawns, certain vegetables and fruits, and roadsides. They are used to control a wide variety of broadleaf weeds, including several toxic plants that can sicken or kill animals that graze them or eat them in hay. Based on USDAEPA and European Union agency evaluations, when these herbicides are applied to hay fields or pasture, the forage can be safely consumed by horses and livestock – including livestock produced for human consumption. These herbicides pass through the animal's digestive tract and are excreted in urine and manure. They can remain active in the manure even after it is composted. They can also remain active on hay, straw, and grass clippings taken from treated areas. The herbicides

leach into the soil with rainfall, irrigation, and dew. As with many other herbicides, they can remain active in the treated soil.

The chemicals of greatest concern are picloram, clopyralid, and aminopyralid because they can remain active in hay, grass clippings, piles of manure, and compost for an unusually long time. These herbicides eventually break down through exposure to sunlight, soil microbes, heat, and moisture. Depending on the situation, the herbicides can be deactivated in as few as 30 days, but some field reports indicate that breakdown can take as long as three to four years. Degradation is particularly slow in piles of manure and compost. When mulches, manures, or composts with herbicide activity are applied to fields or gardens to raise certain vegetables, flowers, or other broadleaf crops, potentially devastating damage can occur.

Farmers and Gardeners Wanting to Use Hay or Grass Clippings

If you want to use hay or grass clippings as mulch or in your compost pile, find out what, if any, herbicides were used on the field or lawn. Be particularly careful about obtaining grass clippings from golf courses and other commercial turf fields where these herbicides are commonly used. Most homeowners do not use these herbicides because they are not labeled for use on residential lawns. If you find yourself with contaminated hay or grass clippings, spread them on non-sensitive, nonfood crop areas, burn them, or arrange to have them disposed of safely. If the hay or grass clippings have already been applied to the field or garden, remove them, till the soil, sow a nonsensitive cover crop, and let it grow for a year or two to help the herbicide break down. Conduct a pot or field bioassay, as described below, before planting any sensitive crops in the area.

How to Test for the Presence of Herbicides: Pot and Field Bioassays



Some laboratories can test for the presence of these herbicides, but the tests are expensive and not as sensitive as a plant bioassay that you can perform yourself. This simple pot bioassay involves growing beans or peas, which are very sensitive to the presence of these herbicides, in the manure or compost. First, take a number of random, representative samples (small shovelfuls) from throughout the pile of manure or compost, being sure to get deep inside the pile. Mix thoroughly. If there are separate sources of manure or compost, conduct individual assays for each. Prepare 3 to 6 small (4- to 5-inch) pots with a 2:1 mix of the manure or compost and a commercial potting mix with fertilizer. Fill several control pots with only the commercial potting mix. Put saucers underneath each pot, or position the pots far enough apart so that water running out of the bottom of the pots will not reach another pot. Plant three pea or bean seeds in each pot, water, and let them grow for two to three weeks, until there are three sets of true leaves. If the peas or beans in the control pots grow normally and the ones in the pots with manure or compost do not, you can assume the manure or compost is contaminated with an herbicide which will adversely affect sensitive plants. If they all grow normally, it would be reasonable to assume that the manure or compost is fine. Keep in mind, however, that the test will be only as good as the samples you take. It would be better to err on the side of too many samples than too few (at least 20 per pile). You can create a similar test for hay or grass clippings by filling the pot with commercial potting mix and spreading a thick layer of the hay or grass clippings on top. This bioassay is explained in detail on the Washington State University Web site: <http://www.puyallup.wsu.edu/soilmgmt/Pubs/CloBioassay.pdf>

Although I did not purposely do this test, I had mixed potting soil (5 litres) with two handfuls of compost to start some lettuce for some pots in my backyard. Not one plant germinated. Again, I cannot say with certainty it was the compost that caused the lettuce to not germinate, but all the plants I started for my organic garden using OMRI potting soil germinated and grew nicely.

On another thought, the compost may not have been 'ready'. When I picked up the compost, he had just finished putting it through a sieve. In addition to the following information, I have learned that once compost has air introduced it may heat up again. Although I did not find the compost warm, putting it through the sieve could have triggered some activity. Here is what I found regarding this (from <http://urbancomposting.tripod.com/Urbancomposting%20Webs/Use%20guide.htm>) :

"CURING COMPOST FOR USE: Hot batch compost needs to be cured, finished off, seasoned before use, allowing partly decomposed compost particles to finish the composting process at a low temperature. Earthworms and other invertebrates will assist with this process. Make sure the compost is kept moist and aerated during the curing period, new batches of compost can be produced while curing is taking place giving a constant flow of finished compost. The curing process should take approximately 45 days allowing your compost to finally stabilize. An easy self-test to check the maturity of your compost is to put your compost into a couple of pots and plant some quick growing seeds (radishes are often used because they germinate and visibly grow very quickly) into them. If 75% or more of the seed sprout and grow then your compost is ready to use in any application.

UNFINISHED COMPOST: Using unfinished compost as a soil amendment may stress plants, causing them to yellow or stalling their growth. This is because the decomposition process is continuing near the plant roots and the microorganisms in the compost are competing with the plants for nitrogen. As an alternative, use compost as a mulch, and you don't have to worry about whether the compost is "finished" or not. This is because any additional decomposition is occurring above the roots, the plants still benefit from the compost.

Finished compost is dark brown, crumbly, and earthy-smelling. Small pieces of leaves or other ingredients may be visible. If the compost contains a lot of materials which are not broken down, it is only partly decomposed. This product can be used as a mulch, but adding partly decomposed compost to the soil can reduce the amount of nitrogen available to plants. The microorganisms will continue to do the work of decomposing, but will use soil nitrogen for their own growth, restricting the nitrogen's availability to plants growing nearby.

Allow partly decomposed compost particles to break down further or separate them out by sieving before using compost on growing plants."

Having totally failed at my first attempt to use compost, I did not give up on the thought of using it, even though at this point I thought it was useless and counterproductive. I have a one acre orchard which is only one acre with grass/weeds/white clover growing in between the rows of fruit bushes. So, in the late spring of 2017, I took the clippings from mowing the rows and 'mulched' the soil in a nearby garden. The clippings were spread roughly one foot deep over an area of approximately 500 square feet. The problem here was I did not feel comfortable creating a compost pile at the time because I am at the location maybe one day a week. A compost pile must be monitored to make sure it does not get too wet or too dry. If it overheats (in an aerobic pile) it must be spread out or turned to cool it off. At the time I did not consider an anaerobic compost pile as I was not aware this was a viable option. In October of 2017 I took an in depth look at the area where I spread the clippings. I was in utter amazement. The mulch had suppressed the weeds, and when it's a foot deep I would think it would suppress most anything, but the difference in the soil was amazing!! The ground was soft (under the mulch) and did not compress where I walked. It was moist and easy to grab a hand full. It was like the mulch had composted the soil underneath. Earthworms were abundant, as were predators of earthworms, ie moles. It must be noted the soil before applying the mulch was predominantly clay.

When it was wet it was saturated and if you walked on it you would sink down nearly six inches and have to pull your foot out from the suction. When dry, it was so hard you could not dig in it and when you tried to pull a weed the top would break off. After the mulch, you could pull a weed and all the roots would come out with some soil attached suggesting good fungal growth. I'm still in awe of this section of the garden and my enthusiasm for composting returned exponentially.

This spring I will start a composting regime on an acreage closer to home. I will build it from the pallets I have already collected and bring clippings from the orchard and combine it with leaves which I have already collected as well. I will be able to manage the pile on a daily basis to monitor heat and moisture. And next year, when the compost has fully finished and I have a successful test grow of seeds using the compost, I will add it to my organic garden and hopefully watch the magic unfold as it did in the garden where I applied the mulch last year.

As for the mulched garden, I will plant garden seeds this spring and see what happens. I do not think the mulch reached a temperature where it would kill any weed seeds but I've heard white clover makes a good cover crop.

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Little Willy's Fruit and Veggies