

Composting at home, for better gardens and a healthier planet

Soil health is critical to the future of food sovereignty on our planet. Soil also holds the potential for massive carbon sequestration that can remove carbon from the atmosphere and increase soil microbial activity. This in turn, promotes healthier crop growth and nutrient dense food production. There are many things we can all do to help our soil be healthier. Careful agroecological management of farmland is one and that includes rigorous composting regimes. But it doesn't just apply to farms, we can take steps in our own homes to conserve precious resources and help our garden soils.

The UN warned that 2016 would be the hottest year on record, subsequent years would be hotter still, and they were right. Agriculture and food production is changing and has to change in response to this. A shift toward mindful ecological maintenance of our farming systems is critical for our survival. Resource conservation and reduction of off-site inputs are a key start to this process. Resource conservation through composting is a form of waste management (it adds the 'rot' category to 'reduce, reuse and recycle') and has the added benefit of keeping valuable nutrients from filling up our landfills. Composting helps close the loop in our food system by reducing the need for importing farm inputs.

Conserving resources on your land mean building better soil by increasing organic matter.

Organic Matter

- Holds soil moisture
- Soils are now known to be one of the largest sinks for carbon on the planet
- Improves soil chemistry and holding ability for cation exchange for nutrient uptake
- Feeds soil microbiological systems that mobilize inert nutrients and increase bio-availability of nutrients
- Fosters symbiotic relationships between plants and soil microorganisms such as ecto- and endo- mycorrhiza and bacteria

Composting: Traditional 'bin' and Vermicomposting

Why Compost?

- Resource conservation
- Provide soil enrichment for gardens, lawns and landscape
- Reduce waste and all costs associated with waste

Why build soil?

- Healthy soil is a dynamic, living ecosystem unto itself
- Soil is a Non-renewable resource
- Degrading every year due to
 - Deforestation
 - Conventional agriculture
 - Natural and manmade disasters

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Composting Process

- Decomposition of organic material by a succession of organisms in the soil (see the Biology section below for more detailed explanation of the process)
 - Microbes (bacteria, algae, protists)
 - Fungi (molds and others)
 - Nematodes
 - Earthworms
 - Insects
- Requirements
 - Organic matter
 - 3:1 ratio of "brown:green" (carbon:nitrogen)
 - *****Make sure the material (brown or green) is free from weed seed heads and diseased plant material!!!**
 - oxygen
 - aerobic decomposition vs
 - anerobic decomposition
 - Moisture
 - Volume
 - Minimum 3'x3'x3'
- Location
 - Shady or keep it covered
 - Near source of moisture
 - Easy to work around
- How?
 - Contain the pile somehow
 - Bins
 - New age composters
 - Chicken-wire and 4x4 corner posts...
 - Add "green" first, then 3 parts "brown"
 - If composting food scraps, build up a pile of browns, then dig down into that pile and add the food and cover with more browns
 - Add moisture if browns are dry and rustling
 - Turn periodically
- When is it done?
 - 6 months – 1 year
 - material is dark and crumbly
 - will not recognize raw ingredients
- Now what?
 - Use it! ☺
 - Add 2"-3" layer to your garden, work in 4"-6" deep with a pitchfork
 - Use a mulch to suppress weeds
 - Mix with equal parts sand and soil to create potting mix

Biology! What's really going on and when?

- Decomposition of organic matter occurs in a succession of steps

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1. First Phase: subdivided into three parts
 - a. Psychrophilic bacteria dominate – these are bacteria that are active at temperature below 55F.
 - i. Heat is released
 - ii. Initial decomposition begins
 - iii. Pile is heating up due to bacterial activity allowing for more heat loving organisms to wake up and begin working
 - b. Mesophilic bacteria dominate
 - i. More heat is released
 - ii. Temps reach 70-90F
 - c. Thermophilic bacteria dominate
 - i. 104-200F temps are reached
 - ii. very fast, 3-4 days
 - iii. turning pile between mesophilic and thermophilic phases keeps decomposition going
 - iv. Actinomycetes (fungi) begin to take over late in this phase
 1. Release antibiotics and kill off bacteria
 2. Begin mineralizing the soil
 - a. Breaking down carbon and nitrogen containing molecules
 - b. Makes these molecules “bio-available” for other organisms, including plant root systems
2. Second Phase
 - a. Larger organisms become active as the temperature comes back down and organic residues are more easily digestible
 - i. Nematodes
 - ii. Pill bugs
 - iii. Mites, etc.
 - b. Feed on First phase organisms and organic residues
3. Third Phase
 - a. Even larger organisms take over
 - b. Feed on First and Second phase organisms and continue to break down organic residues

Trouble Shooting:

Symptoms	Problems	Solutions
Pile not decomposing	Too dry	Moisten thoroughly
Pile smells rotten and/or attracts flies	Too wet	Mix in dry material
	Wrong materials in pile	Remove meat, bones, etc.
Rodents or animals attracted to pile	Food scraps in open bin and / or not buried	Use rodent-resistant bin Bury food scraps at least 8" deep under "browns"
	Wrong materials in pile	Remove meat, bones, etc.