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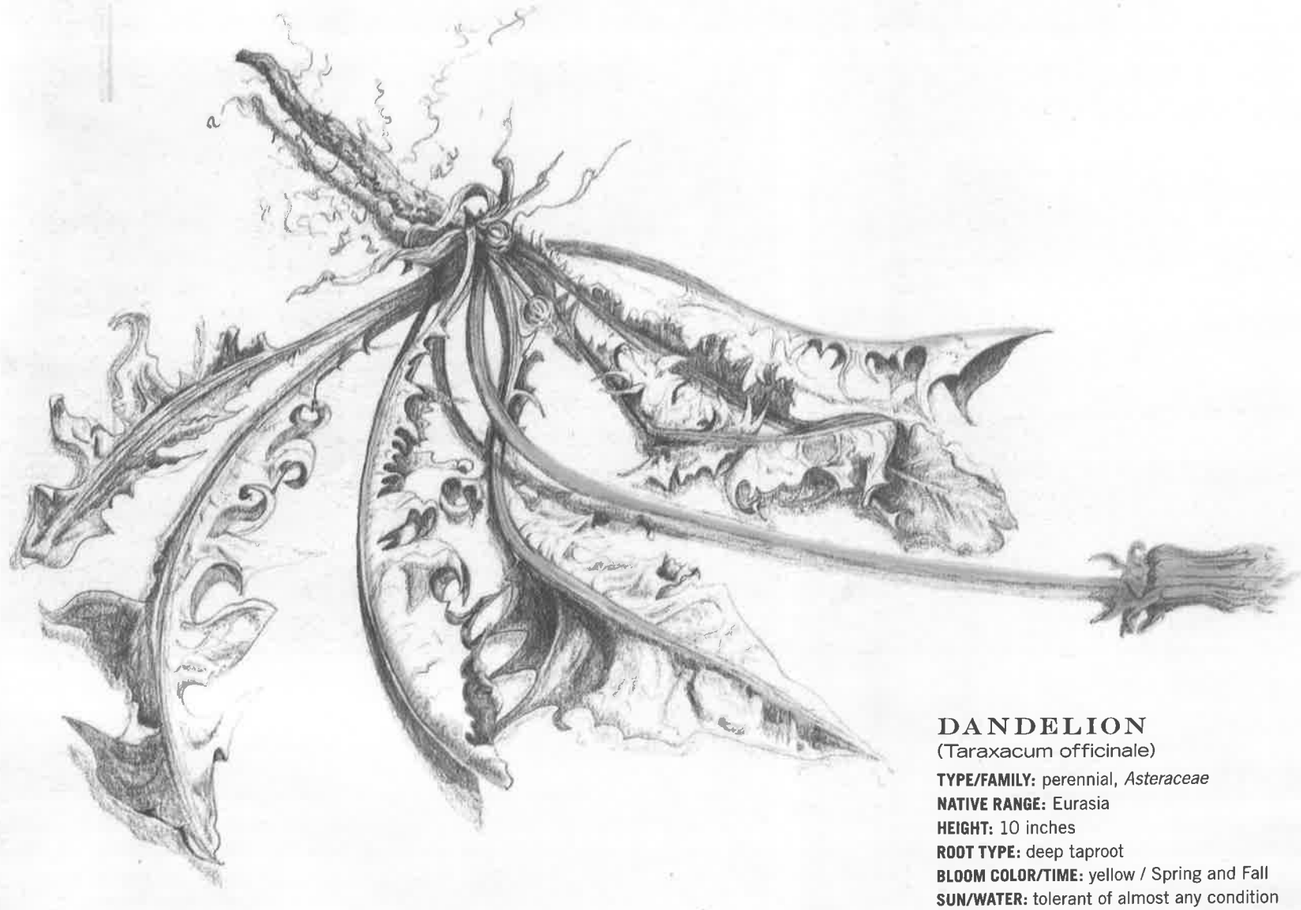
THE GROUND RULES
TERRA FLUXUS

The Ground Rules

A MANUAL TO RECONNECT SOIL AND SOUL



DANDELION
(Taraxacum officinale)

TYPE/FAMILY: perennial, *Asteraceae*
NATIVE RANGE: Eurasia
HEIGHT: 10 inches
ROOT TYPE: deep taproot
BLOOM COLOR/TIME: yellow / Spring and Fall
SUN/WATER: tolerant of almost any condition
ATTRACTS: bees
REMEDIATES: currently testing
SOIL CONDITION/TOLERATIONS: almost any climate

Introduction

Store Meat in the Bellies of Your Brothers and Sisters

If every square foot of Chicago's land mass of just under 150,000 acres* was cultivated (assuming the land was clear of all built structures, people had moved to the suburbs so the entire 150,000 acres of the city was used for intensive farming, the soil was safe and fertile, there was adequate rainfall and there were no droughts, floods, insect plagues or diseases, there were working teams of people who were very proficient in the combined skill set of growing-processing-storing-distributing, and everyone converted to strict vegetarianism), the landmass of Chicago would only be able to produce enough food to sustain 18% of its current population.*

In 2010 I was hired by one of the many celebrities that got involved in earthquake disaster relief in Haiti to work on an ecologically sound sanitation plan for an encampment of 3,000 people. I worked in Port-au-Prince for several weeks and after I came home I had many dreams of disaster being superimposed onto Chicago, and specific visions about how my neighborhood of Little Village could be best reorganized as a more resilient, true self-sustaining village—one in which culture was built on shared complementary practices instead of detatched hierarchical economies. My imagination was fueled by the way I had seen the Haitians navigate their devastated landscape and communities. There, in the midst of so much displacement, grief, and rampant chaos and violence, I watched a group of five men spend many days in 100-degree heat sorting building rubble by to size and restacking the resulting "grades" into useable piles. Their performance was markedly the most farsighted and sustained public performance I have seen anywhere in a long time. After several days of this, they moved their makeshift tents to camp around the piles, and claim their new "materials yard."

These individuals were united in creating new economies with their natural capital – the waste around them. This small crew of brilliant people haunts me still. They followed specific principles and practices followed. Resources were broadly defined; they recognized that the industrial relics they harvested stored the energy they had been built from, and that their value—if not inherent—could be created through exchange. I have always understood my species' reliance on soil for food and materials, but these new stonemasons blew a hole right through 20 years of my thinking, and I started seriously turning my attention to soil.

The same year I went to Haiti, I received a grant from The Annenberg Foundation for a new community-based composting project, "The Ground Rules." The foundation wanted me to launch it in Philadelphia, so I travelled to Philly and scoped out what seemed to be a decent community partner, and hired my field crew. For eight months I travelled on a monthly basis back and forth from Chicago to Philly to train my crew and build the legs of the project. The Ground Rules Philadelphia was both a success—we made a lot of compost and had a lot of conversations on a local and broader city level—and it was a failure. We were working in a neighborhood too poor to charge for our services, our community partner was lackadaisical, and our funding wasn't picked up after we had gotten our engines whirring, reducing our efforts to a "pilot."

For three years after returning from Philly, I worked with others in Chicago to propose bills to change Illinois state laws around organic waste hauling and processing. I attended countless meetings to write and propose a new compost ordinance for the city of Chicago. I also tried to get The Ground Rules off the ground in my hometown. I talked to nonprofit agencies about partnering with me. I offered intermediate and advanced classes around the city on composting technologies and soil health. It was a lot of work that didn't seem to be getting me anywhere. But when the land where a garden I was partnering with was sold (Humboldt Park's El Parquito, discussed on page 18), I saw it as an opportunity. With zero project funding, The Ground Rules began in Chicago, because, frankly, it was time, even if no one else knew it. But shortly after the project (re) launched into the dark, I realized that the years of dormancy actually had been a healthy incubation period, making The Ground Rules and what it has to offer others richer for the wait.

* This calculation is based on John Jeavon's biointensive research that 4,000 square feet are needed to produce a balanced and high-calorie vegetarian diet for one person. This area also includes land to grow crops that replenish and build the soil from the extraction of this food.

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The conservation strategy known as "source reduction" aims to take a bite out of our waste stream by assessing inputs and processes at their start. This is commonly one of the goal of most businesses: They want to minimize costs both at the production end as well as at the pay-as-you-throw end. This is admirable, and definitely a good beginning, even if it is mostly economically driven.

However, waste reduction is the goal of municipalities. Our cultural relics are many and there is cash to be made by cacheing them and in downcycling them. Lately, as citizen consciousness has changed, waste haulers in Chicago and elsewhere have found cash in creating another wing of their operation—an industrial compost site out past city limits where they receive a tipping fee for delivering and depositing landscape, food, and agricultural wastes. These "regenerative landfills" produce compost of different grades that is sold to retail and wholesale customers and used everywhere from municipal- and state-driven projects to community gardens and backyards.

An example: Portland (of course). Portland's much-lauded compost program is a two-hour drive from the city limits. I had the privilege of going there as part of a tour during the Biocycle Conference a few years back. The operation was simple: dump a city curbside compost collection truck, grind the whole of its contents, scoop the resulting steaming pile into trucks to be driven 90 miles away to load and bounce on a conveyor belt, be mixed with wood scraps, and laid into windrows built onto a serrated pipe with chimney releases. Three humans ran the entire operation with a few front-end loaders and a truck. Leachate flowed from these piles across the compacted pad and somehow not into the adjacent waterway, because filtration tubes were put into place. Unlike at the city bay, there were no patrol falcons at the site, and no visible bird or rodent pests—thanks to the "ecoservices" of the local coyote clan, who ate or deterred hungry mice, rats, seagulls, and possums.

This is all well and good, and definitely can be categorized as an acceptable sustainable practice, but what if we, as individuals—or maybe even as motivated collections of citizens—were to take a different approach and own our waste, even value it as a food source and choose to not pay to cart it off? If we value it enough to grapple with it and all its rotting chaos ourselves, in one ever-transforming pile in our backyard or maybe in our neighborhood? Ah ha! This is where it gets interesting. This would require us to don the perceptive lens and dexterous fingers of human scavengers. And if a collection of citizens saw themselves as such resourceful (and hungry) animals, we would create this economy. We would own this wealth. We would form a scavenger society and realize our relics store the energy they were built from and reestablish this energy flow. After all, investing in soil has a practical redeemability. Whether it is the soil within us or the soil known as earth outside of our bodies, soil is our true wealth.

If the monetary system collapses, what would you want your dollar backed by? Pork bellies? Gold? Oil? Soybeans? Or..._____ (you fill in the blank). If the monetary system doesn't collapse, isn't the question the same?

And so I ask you: Do you know the soil outside your front or back door? Do you know its fertility? Its degree of disturbance? Its level of contamination? Its social history? How is your body connected to that which is underneath your feet and supporting your every step?

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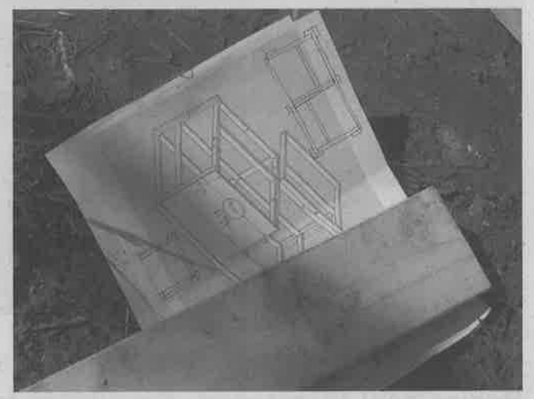
Uncovering and articulating the environmental history of any urban place is no easy task because it hasn't been written and the histories and stories need to be written by us. The Ground Rules team has done our best to get you started on your journey with this manual.

Good luck, connect with us, and share your findings and your work. And remember, this is just the beginning.

Nance Klehm
Autumn 2015

What Is a Ground Rules Soil Center?

A Ground Rules Soil Center is where we take organic waste collected from local restaurants and businesses and process it into high-quality compost. These Soil Centers are not standalone composting sites, they are in residence at an existing community garden or urban agriculture site, where we form a partnership with the group that runs that site. This partnership brings many mutual benefits: we build diverse alliances with individuals across town, we help our garden partners (and broader neighborhood connections) meet their need for high-quality soil amendments, we create compost for use in microbial remediation, we build awareness of local soil issues, gardeners and other community members are trained in composting technologies and community bioremediation and we do so at the same time in compliance with both city ordinance and state law.*

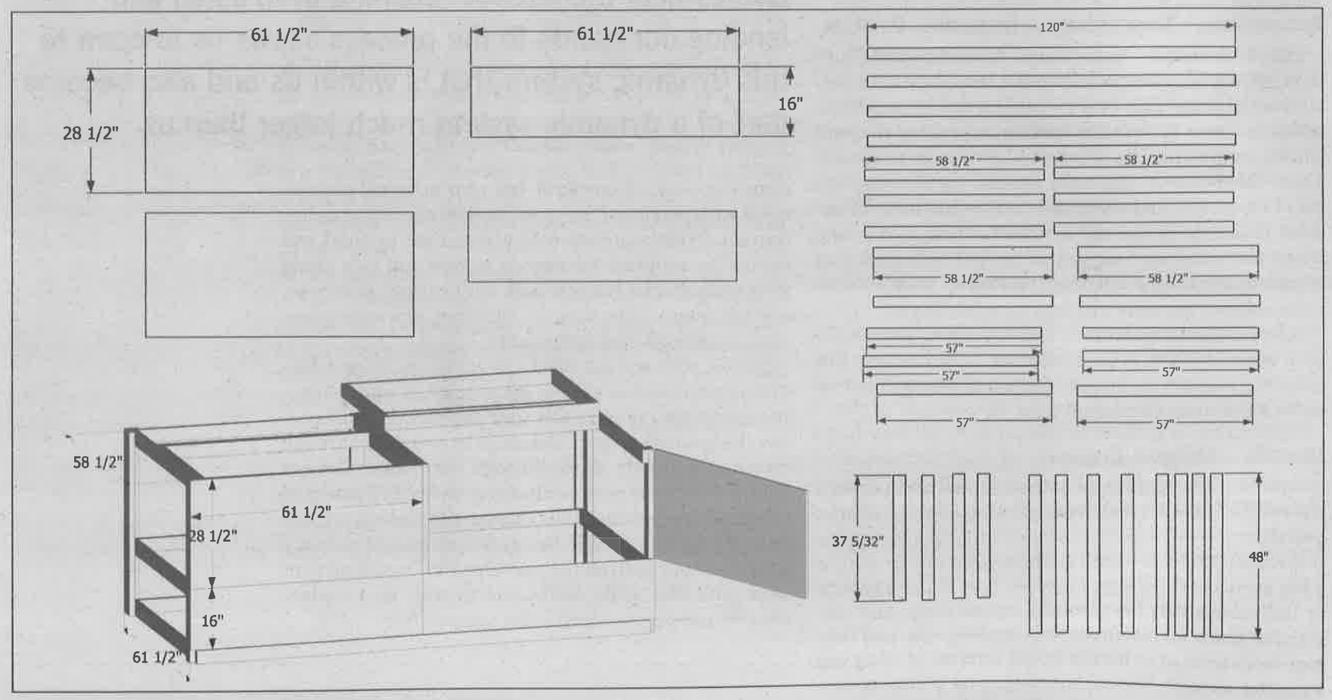


Designed by Social Ecologies and Erik Newman. Drawing by Erik Newman.

We build our piles thermophilically, to ensure the killing of any potential pathogens that unbeknownst to us may be contained within the material we are processing. In exchange for space on our community partner's site, we offer seasonal community classes on various composting methods, compost problem troubleshooting, soil science, and bioremediation as requested.

TGR manages these Soil Centers to mitigate any nuisance issues or human missteps that may occur during the collection and composting processes. Our management also ensures that the inputs to the bin are carefully chosen and monitored, to produce very high quality and stable compost. Finished soil amendment is harvested from our systems twice a year. There's usually far more than the partner garden can use, so the remaining product is distributed to other neighborhood growing and soil remediation projects as needed. Having too much healthy soil is never a problem—it can always be shared! *—NK*

*In Illinois one cannot have a standalone compost site without a special permit costing $20,000, which allows you to operate a landfill.



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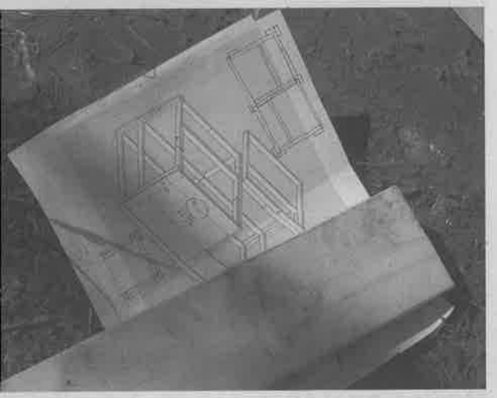

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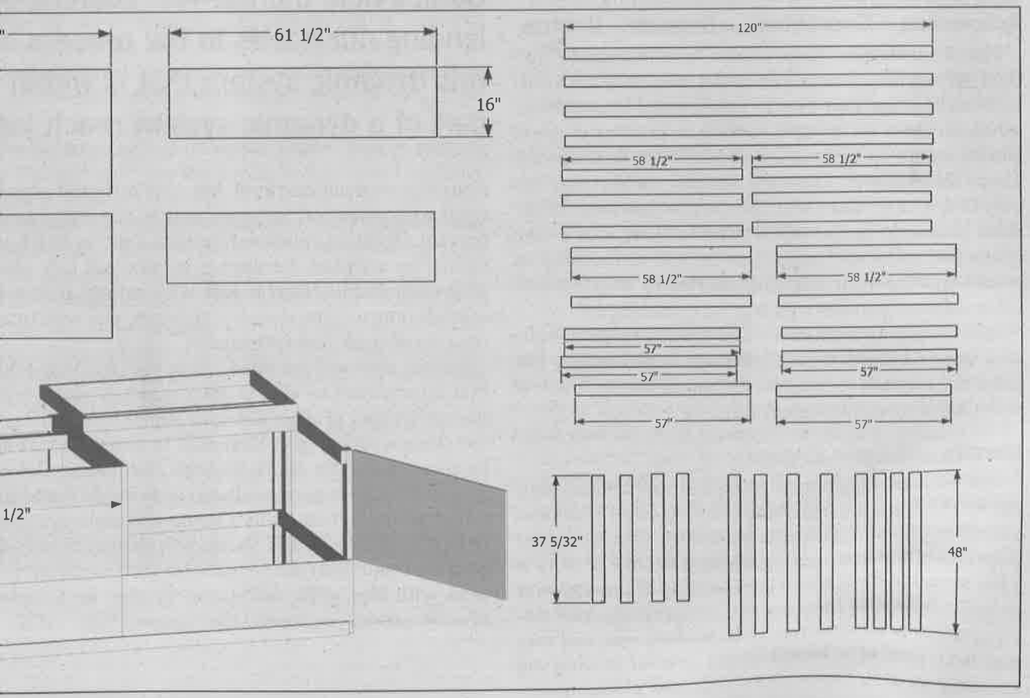
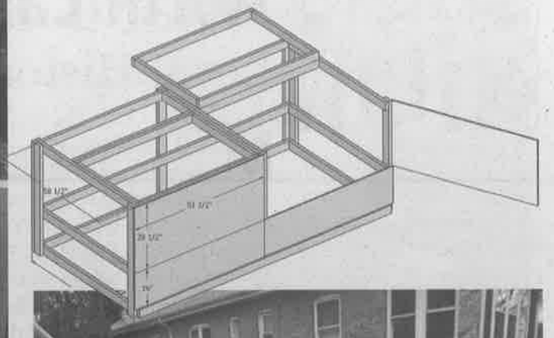




METHODOLOGY

Growing the Microbial Zoo

Working with plant extracts, compost teas, and other potencies

Grow (and drop) your compost crops.

Nettles, yarrow, and comfrey are three perennial plants considered "dynamic accumulators," as their long roots source minerals from deep in your soil, drawing them up to the "A" soil horizon and making them available to other plants. Nettles, yarrow, and comfrey are also very well-known plant medicines used in both eastern and western herbal traditions for exactly the same reason: taking them internally fortifies your body with their minerals as well with their specific herbal actions.

These plants are best direct-seeded or planted on-site close to fruiting trees and shrubs, or near a compost pile for convenience of harvesting. You can harvest their leaves and use them as a side dressing to mulch around your plants. As an added benefit, all three very attractive to pollinators.

Grow (and drop) your mulch.

Perhaps your composting is of a looser nature. One method is to grow long strips of low-growing cover crops on either side of your growing beds to hold and feed soil. Mowing these paths goes beyond making these paths easier to walk, mowing drops the cover crop biomass onto the paths and beds, building the organic matter of the soil in both the paths and the garden.

Good plants for these mulching paths are mammoth red clover, crimson clover, and dutch white clover, as well as alfalfa. All of these are nitrogen fixers, meaning that they work with a bacteria in their roots to convert nitrogen in the atmosphere into a digestible nitrogen for plants nearby. They are also perennials and very attractive to native pollinators and honeybees, don't mow them too aggressively; if you do they won't throw the blooms the pollinators are looking for. (Both mammoth red clover and alfalfa are known as "blood plants" and both clean and build the blood in our bodies when we take them as teas or juice them. They are also phytoremediators of contaminants in soil. Are you getting the picture? SOIL=BODY; BODY=SOIL.)

A few other plants that I enjoy harvesting and mulching instead of tilling under, as is conventional practice with cover crops, are oats, rye, and wheat. These annual cereal grains are often included in cover crop mixes as they have deep fibrous roots and can source minerals from deep in the soil. I just cut and drop the cuttings on the soil surface or gather the cuttings with a rake and layer them into my compost pile.

Grow (and drop) your carbons

Instead of importing carbons such as straw, paper, woodchips, and cardboard onto your site why not simply grow them right where you are?

We work with annual as well as perennial and woody carbon sources. A few annuals that are great carbon sources at the end of their growing cycle include:

- Common beans
- Soybeans
- Sunflowers
- Buckwheat
- Corn
- Oats
- Wheat
- Rye

We sow and let these go to seed and collect seed from them for use in the following year as food and as seed. We don't "tidy" our gardens once seed is collected, we allow the starchy stalks to dry in the late fall and early winter when there is a killing frost and on a dry day, when they are brittle, we then chop them up with pruners or machetes, and drop them onto a tarp to take them to a compost pile, or step on them to break them up and then simply spread them over the soil surface.

Dropping carbon onto your soil shields it from sun and moisture loss, helps with erosion and feeds the microbes within it. Using a wide variety of carbons encourages their populations to increase and their species to diversify. Incorporating woody species as part of your carbon source will attract fungi to your soil and compost piles, increasing nutrient exchange between all the plants on your site as well as increasing the moisture-holding capacity of the soil.

These are a few perennial woody species that are easy to work with:

- Willow
- Hazel
- Poplar
- Any other shrub or tree trimmings

These woody species recover quickly from trimming and have for centuries been used for animal fodder, in making hedgerows, and as building material. (They are also plant medicines, surprise.)

Working with O2 loving bacteria in liquid form

Aerated compost tea (or ACT) is a useful way to introduce abundant microorganisms into soil or onto plants. Recently there have been a lot of arguments that it is a poor substitute for compost itself, but given the fact that most everyone does not have enough compost to cover the area they are needing to work with, aerated compost tea will allow you to work in a larger area with less material, even though nothing beats working with the compost material if you have it. This is especially true if the area you are working is as extensive as a neighborhood or on an even larger community scale. (And if you do have enough, congratulations on your careful planning and diligent compost management!)

One of the first community bioremediation projects was conducted on the backyards of several wards in New Orleans after Hurricane Katrina. These yards were waterlogged and full of petrochemicals due to the inundation of water from the bay. The community bioremediators first perforated the soil to allow oxygen to enter the waterlogged soil. (Aeration is key to ensure that you are maintaining an oxygen-rich environment aerobic for the oxygen loving microbes present in healthy soil and stable compost.) Later they sprayed ACT over the sites to help reintroduce healthy microbiology into the soil, which began rebuilding the soil's structure and started the digestion and breakdown of the inorganic chemicals and petrochemicals that had been absorbed.

Making only the best compost for your ACT

All compost is not created equal! And the compost you use for compost tea should be created using a wide variety of nitrogens and carbons and built using the thermophilic method (see page 54). Good compost is a stable material. For an easy test of stability, put some compost in a glass jar, adding water to it and shaking it up. Leave the jar closed for two days. On the third day open it and smell. Stable compost smells like moist soil. But if you open it and it smells like a nasty fart, it isn't stable and shouldn't be used in your ACT, or on your garden for that matter, until it has finished its active composting process. Trust this simple cue, your nose knows!

Here is a basic "recipe" of the compost tea we use. This recipe is not a rule and can and should be modified as needed. In other words, if you don't want to shop for these ingredients, use what you have on hand in your backyard or can forage in your neighborhood.

The Ground Rules' ACT

- One five-gallon bucket
- Four gallons of nonchlorinated water or, if using city water, allow it to sit uncovered for 24 hours to allow chlorine to evaporate.
- Fill a fine mesh bag or knee-high nylon stocking with a small handful of the following:
  - Well-prepared, finished compost (large diversity of microbial life)
  - Worm castings (high biological activity)
  - Tablespoon of kelp meal (trace minerals, amino acids, micronutrients, growth hormones, including cytokinins, auxins, and gibberellins, which stimulate cell division and larger root systems)
  - and if you have them on-hand—some finely chopped fresh or dried of some or any of the dynamic accumulators *

Tie this bag closed and plop it into the bucket. Add a few tablespoons of unsulfured molasses (bacterial food) to the water and cover the bucket loosely to avoid spillage and start the aeration.

Run the aeration for 48-72 hours. A shorter aeration will produce a weaker tea and an aeration lasting more than 72 hours might exhaust the available food source for the multiplying microbes.

Use the ACT full strength by feeding through drip tape, or apply on the leaves (foliar spray), on the roots or as a soil drench. Important: Use the brew within four hours of turning off the aeration or the rich tea can collapse into an anaerobic condition, which your nose will identify easily.

Note: High aeration means using a compost tea brewer which produces prodigious bubbles and tends to run around $150. Perhaps your community can purchase one and share as needed. You can also substitute a home bathtub spa agitator found used at thrift stores or—less recommended, but sometimes the easiest choice—use several aquarium bubblers to make sure that the aeration is evenly distributed through the bucket.

Plant extracts and other anaerobic brews

Since we are growing phytoremediators on our site we want them to be as strongly fed as possible so they can do the work that they do! Plant extracts tend to be fermented or anaerobic and are mostly employed as fertilizers. Making these extracts is as simple as gathering and chopping any of these plants into a bucket, covering them with unchlorinated water, and letting them sit to ferment for a few days lightly covered.

This time it is good that your brew stinks intensely like some serious manure, because this means it is fermented!

Some plants that are amazing in an anaerobically fermented fertilizer (and the minerals they carry) are:

- Yarrow (K, Mg, Ca, P, Cu)
- Nettles (Fe, Si, Ca, Mg, S, P)
- Comfrey (Si, Mg, Ca, K)
- Dandelion (Si, Mg, Ca, K, P, Fe)
- Bracken (K, P, Mn, Fe, Cu, Co)
- Coltsfoot (S, Mg, Ca, K, Fe, Cu)

Observe and identify your local spontaneous vegetation and research what minerals they tend to accumulate and what your soil site needs and design from this point! —*NJ*

METHODOLOGY

Growing the Microbial Zoo (CONTINUED)

The scoop on bokashi

Bokashi was developed in Japan for small-space indoor composting; it's a method of composting where food waste is fermented by packing it in wheat or rice bran that is saturated with water and a product called EM, for "effective microbes." EM(TM) consists of microbes that are anaerobes in that they don't need an oxygen-rich environment to thrive in. Organisms that produce fermented foods such as miso, sour cream, and beer are examples of beneficial anaerobic bacteria. Once the organic waste in the bokashi container is fermented, this food waste is then introduced into the soil where the aerobic soil microbes break down the partially digested material very quickly.

All compost is not created equal! And the compost you use for compost tea should be created using a wide variety of nitrogens and carbons and built using the thermophilic method.

EM is expensive to buy, but you can make your own lactobacillus and other beneficial anaerobic microbes through a method called "newspaper bokashi."

Newspaper bokashi, or how to make your own effective microbes

Decide to make some rice to eat, wash it, and collect the rinse water. Cook your rice and enjoy this as you slowly ferment this starchy water with milk, give your newspaper a bath in the potion, and dry the newspaper. The newspaper is inoculated with your microbes. You then use it to layer your kitchen scraps with the newspaper instead of bran.

STEP 1: Collecting wild lactobacillus

Combine one part rice to two parts water. Shake or stir vigorously. You are effectively "washing" the rice of some of its starch and the resulting wash water will be cloudy. Drain the water off into a jar or jars, filling them only half full, and lightly cover them. Canning jars work great and have rings that can hold a coffee filter, cheesecloth, or piece of paper towel in place as a filter from dust. Air should be able to move in and out of the jar. Place your jars in a cool dark place for four-eight days. It should smell somewhat sour. Strain out and compost any particles.

STEP 2: Purifying the lactobacillus

Put the fermented rice water in a larger container. Add 10 parts milk or skim milk. Cover lightly, ferment for 14 days. Most of the solids should float to the top, leaving a yellowish liquid. Strain off the solids. This is your purified lactobacillus serum. (Don't you feel like a real scientist now?)

STEP 3: Inoculating your newspaper

Take one part serum, one part molasses and six parts water. Soak newspapers, then drain. Put the newspaper in sealable plastic bags, squeeze air out, and ferment for 10 days to two weeks. Remove newspaper, separate the layers, and lay them out to dry.

How to make your own fish hydrolosate

Many cities have wholesale fish houses that always seem to have waste materials available. Any unwanted part of the fish can be used, including bones. (Bones are especially wonderful as their phosphorus helps bind lead, making it less bioavailable.) Collect as much as you can stomach and work quickly. Chop up all the fish parts as finely as possible and pour them into a bucket. Add unchlorinated water at a ratio of 3:1 water to fish parts. Add two tablespoons to one liter of lacto bacilli and stir well. Cover it well as this will be attractive to animals and keep it in a well-aerated place, preferably outside for a day or two until the microbes have time to eat through the fish. It will smell more like fish sauce then dead fish when it is ready. Use two tablespoons of fish hydrolosate per gallon of water. —~~Martin Bruun~~ NK

TRADITIONAL BOKASHI COMPOSTING: a first person account

At Waite House Community Center, in Minneapolis's Phillips neighborhood, we aren't afraid to break rules. Half of our gardens are actually guerrilla gardens, planted on land owned by Minneapolis's Park Board. These spaces were previously turf and the Board was unresponsive to our repeated requests to use them for food production. We moved forward with our garden projects anyway, and now we use this public land to grow food, which we feed to hundreds of people every day through our community café and food shelf programs.

When we set out to design a composting system for the Community Center, we were dealing with some significant constraints. Our outdoor space is small, shared with a neighborhood organization and City parks programming. There is no convenient way to bring dry, carbon-rich material onto the site for traditional composting. And, the system had to be able to handle veggie waste from our food shelf, meat and dairy scraps from the community cafe, and the coconut-coir-based growing medium we use in our microgreens production.

We chose to pilot bokashi composting, a Japanese method that ferments food waste in a closed container. We liked the idea of bokashi because it is compact system with a quick turnaround. This keeps us from taking up too much of the shared space we occupy, as we need to compost about 55 gallons of food waste per week. We also appreciate the "bucket-ness" of bokashi and bokashi doesn't require mixing of carbon-rich materials or turning, and it can handle meat scraps and even bones—it is truly the rule-breaker's compost system!

Bokashi uses a strain of lactobacillus to ferment food waste, similar to the bacteria used for yogurt or sauerkraut. The bacteria is often inoculated onto bran flakes for storage—we purchase ours. Our fermenting takes place in 55-gallon drums, which we keep sealed in between additions of food waste. With each addition, we mix the waste material with a half cup to two cups of inoculated flakes. We try to break up any chunky items for faster fermentation. And, we sprinkle a quarter cup of the flakes over the top with each addition, since the point of contact with air is the most likely place for other microorganisms to colonize. Once the bucket is full, it remains sealed until the fermentation is complete.

To this point, we have been mixing our food waste and spent growing medium together, but we will be trialing separate systems next as the growing medium composts much faster. Finer matter like this can compost in 4 to 6 weeks but coarse materials can take two months or longer.

The "product" of bokashi is different than aerobic, carbon-based composting. The bokashi compost is very rich in nitrogen but often very acidic. We do not use this compost in the garden directly, although I have been told that, mixed with aerobic garden soil and given two weeks to condition, it works great. We have used bokashi in perennial plantings, as a compost accelerator, and as a soil conditioner in remediation. We also use it in sheet mulching and lasagna garden building.

In addition to the end product, bokashi produces potent compost tea throughout fermentation. This tea must be diluted (1:500 – 1:100) but has been helpful for treating fungal problems and has improved growth dramatically in our microgreens.

Bokashi, is an optimal system for Waite House since we have little space, diverse waste streams, multiple growing systems, and a significant need for soil replacement and remediation in the Phillips neighborhood of Minneapolis. *—MB*

How to Work with the EPA from a Community Standpoint

As a community member or organization, it can be difficult to work with governing bodies. Almost always, the voice of the community is undervalued by the laws and ideas of the politicians who are supposed to represent them. When dealing with environmental issues, a community should be able to turn to the Environmental Protection Agency for help in addressing those issues, but there are challenges to working with the EPA. Here are some answers to frequently asked questions and explanations of the jargon and practices of the EPA that might be unclear if you do not work for the EPA—or maybe even if you do.

Q: How do I get in touch with the EPA about a concern?

A: "You have to be a scientist. You have to be an attorney. You have to be a politician to work with these people. I'm none of those things." Maria Chavez told me this when asked about her experience working with the EPA. "Everybody plays a role." Maria's role in the Pilsen Environmental Rights and Reform Organization (PERRO) has been maintaining relationships with government officials. She kept repeating the words: "Persistence pays off" and "You can't give up." This seems to be the theme when working with any government organization. When you are a community member without a title, this is the only way to get the attention of those with power. There is no cut-and-dried method of drawing the attention of the EPA.

This process can take years. Each branch of the EPA has a community engagement team, but you may have to force them to engage with your community, and you may have to call 20 people before finding someone who will listen. If there is pollution in your neighborhood, it is best to do the research, rally support, and organize individuals to form a group to address them. There is power in numbers. Someone experienced with legal language is helpful. If you can find a pro bono lawyer to be on your side and to be a liaison to the EPA, they will respect that. But most importantly, even if you have been trying for years, DON'T GIVE UP. Once you get a contact within the EPA, maintain it. There are numbers to call for the local EPA or the USEPA about pollutants, but generally, significant pressure from the community will be necessary.

Q: What are the types of sites the EPA will get involved in?

A: Brownfields: A brownfield is generally an empty lot or building that may have had an industrial past, and may be contaiminated by hazardous chemicals, heavy metals, and other pollutants These sites could be remediated by the EPA by becoming Superfund Sites.

Superfund Sites: "Superfund" is the environmental program and fund established to address abandoned hazardous waste sites in the wake of the discovery of toxic waste dumps such as Love Canal and Times Beach in the 1970s. It allows the EPA to clean up such sites and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups." A list of Superfund sites for each region of the United States is publicly accessible on the EPA website.

Supplemental Environmental Projects (SEP): Federal actions against businesses or individuals for failing to comply with environmental laws are often resolved through settlement agreements. As part of a settlement, the violator may voluntarily agree to undertake an environmentally beneficial project in exchange for mitigation of the penalty. It is useful to have a relationship with local EPA representatives to influence these proposals. It could be a riverwalk, planting trees, or replacing fixtures in homes. But if a group works with the EPA to write a proposal, it could be a good source of funding for something that is needed in the community.

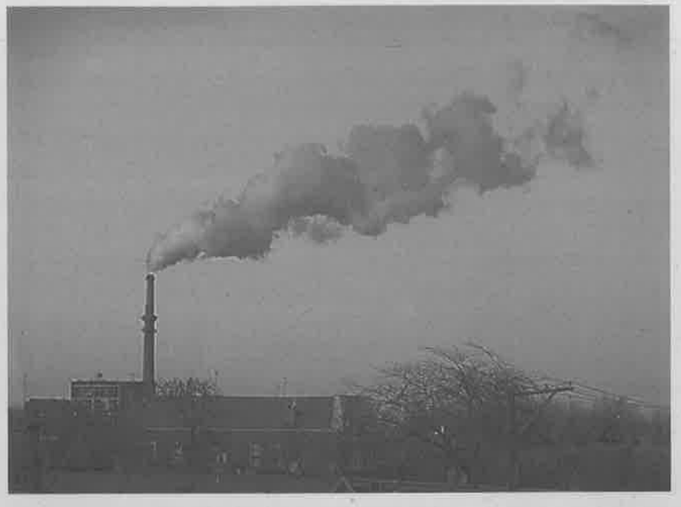
Q: What does the process of working with the EPA look like once you have made contact?

A: When the EPA takes on a contaminated site in a community, they are required to do outreach and education. This may be door-to-door communication to request permission to do testing or to distribute educational materials such as fact sheets and coloring books about lead contamination. They are supposed to hold open community meetings to explain their work and findings and form a task force or Community Advisory Group (CAG) that involves community members and stakeholders in their decision-making process. The EPA has even established environmental justice as a strategy with their "EJ Plan 2014", but it is unclear what that strategy is and how well it is communicated with their community engagement teams. Some members are dedicated to working with and collaborating with community members, but they still rely on community members to hold them to this whether it is through the threat of bad press or constant inquiry on their progress.

Q: What is the "remediation" process?

A: The EPA recognizes only one permanent remediation strategy, which is removal. This means contaminated soil is dug up to the legal limits of the existing contaminants and taken to either a soil cleaning facility or a landfill. According to the EPA, there are different levels of removal depending on the usage of the land. Residential use tends to warrant up to 12 inches of removal with a barrier in place. Removal for gardening purposes requires at least 24 inches of soil to be removed and the placement of a barrier. For unrestricted use, all contaminated soil must be removed to the legal "safe" limit of contamination and new soil replaced.

The EPA considers other methods such as rototilling and phytoremediation, and interim controls, such as mulching, seeding, and sodding, ineffective. The EPA has the capability to critique their own methods and are required to get community feedback and suggestions, but unfortunately the legal requirements they must adhere to are limited to removal or capping with some barrier.



Q: What is a soil cleaning facility??

A: The EPA likens the soil cleaning process to the act of doing laundry. The contaminated soil is placed in a machine with washing solution, which can be just water or water mixed with a detergent. The soil is then agitated, and the idea is that the different-sized particles of clay, sand, and silt are separated and all contaminates are transferred to the wash water. The soil is then tested again and, depending on its levels, is either run through the process again or sent to another facility for further cleaning by means of phytoremediation or chemical cleaning treatments. The wastewater that now contains all the contaminants is sent to a water treatment facility to be cleaned, and the "clean soil" may now be used for fill or other uses.

More information can be found at http://www.epa.gov/tio/download/remed/soilwash.pdf.

Q: What are the legal limits for different contaminants? What does that mean and where can I find them?

A: Each city has a "safe" level of pollutants that are allowed in the soil, water, or air. This is usually measured by parts per million (ppm) and varies from place to place. Look at the USEPA website or the Agency for Toxic Substances and Disease Registry (ATSDR) website. It is difficult to find the local standards but the US standard for common pollutants are more accessible. Each city has a different understanding of what is a "safe" level for these pollutants. In reality, a safe level is no level, but lower is better.

Q: How long is the process from contact to clean up?

A: The EPA is a government agency, and therefore the process can take years. From testing, to finding every single person and their grandma who could be responsible for the contamination, to negotiations in trying to get those responsible parties to throw down the cash to make remediation happen. It's a long process.

But that does not mean they are not useful. They have the resources most communities do not: access to labs and scientists who can do the testing and explain their findings in laymen's terms. They have the ability to refuse permits, enforce cleanup, and even employ people whose job it is to work with you. That is what local branches and community engagement teams are for! But it is up to you to put on the pressure. They will not remember you if you do not remind them. —*VT*