Kick-Ass Cannabis and Veggies:

Organic Gardening Soils, Teas, and Tips for Growing Marijuana and Nutrient-Rich Vegetables

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AUTHOR'S DISCLAIMER: Although I am sympathetic to the unpleasant situations in which you may find yourself when following this book's advice, I bear no responsibility or liability for said unpleasantries. Sorry.

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INTRODUCTION

What makes kick-ass Cannabis and vegetables? A mineralized soil, alive with beneficial microbes, worms, and insects. This type of soil promotes thriving indoor and outdoor gardens and produces highly nutritional fruits and vegetables. Better yet, it also produces super-resinous Cannabis buds that provide pure, unadulterated highs.

A living soil is one of the many techniques that allow Nature to grow your garden instead of commercial fertilizers.

When I started gardening, I knew I wanted to grow organically, but I had to wade through many "flavors" of organic methods, some of which are based on dubious principles. Also, many sources of great information are poorly organized, or they assume that the reader has significant gardening experience.

This book explains organic gardening techniques that are based on soil science and permaculture principles, and it employs an organized and easy-to-understand format that is accessible to even an absolute neophyte. You are presented with the fundamental techniques for starting and maintaining an organic garden, particularly indoor and container gardens, but there's plenty here for outdoor gardeners too.

The information presented in this book is not intended to be encyclopedic as it provides, in two hours or less, the absolute essential information needed to go from seed to harvest.

Do you want to learn about gardening techniques for

a particular plant (such as cloning, breeding, sexing, re-vegging, pruning, topping, or training Cannabis)? Use this book as a supplement to other guides that cover those topics. However, when you want to learn established organic gardening practices and the science behind them, this IS the book you are looking for.

For those who want to get straight to it, skip to Chapter 6, *Organic Growing in Eight Steps*. Chapter 6 is a step-by-step guide for implementing the techniques presented in the first three chapters: *Soil, Garden Pots,* and *Water, Teas, and Foliar Sprays.* In addition, Chapter 4 has Worms and Chapter 5 covers *Cannabis Considerations*.

In more detail, Chapter 1, *Soil*, explains how to create and maintain a living soil and why high-quality compost is a soil's most important ingredient. For example, a mineralized soil that includes high-quality compost is viable for consecutive crop harvests, even when your garden is confined to a garden pot. Thus, the up-front work of mixing your own soil and obtaining quality compost can reward you with years of happy crops.

Chapter 2, *Garden Pots*, instructs you on which garden pots grow large, robust plants. This chapter also explains how you can mimic Nature, even with an indoor garden, by using techniques such as planting in a living mulch.

Chapter 3, *Water, Teas, and Foliar Sprays*, explains how water can be supplemented with do-it-yourself (DIY) enzyme teas, compost teas, and botanical teas made from kelp, alfalfa, or neem. These teas replace the conventional fertilizers and pesticides that are hostile to living soils.

Chapter 4, *Compost Worms,* is a quick overview on how to make and maintain a worm bin that produces high-quality vermicompost.

Chapter 5, *Cannabis Considerations*, focuses on how to discreetly grow and enjoy quality medicinal Cannabis and the basic techniques of Cannabis cultivation by walking you through the whole process, from seed to harvest.

Further Reading and Resources provides a set of references for learning more about the topics presented in this book, and resources for obtaining the soil ingredients and gardening products mentioned in this book. You can also find this section on my website, kickassorganics.com.

With the introductions and disclaimers now out of the way, let's get started.

CHAPTER 1:
SOIL

- The key to successful organic gardening is promoting soil life and providing sufficient soil nutrients
- Keep the soil at a constant, healthy moisture, which supports the complex soil life needed for robust plants

To the Rhizosphere

Soil is important because that's where the life is. Living soils provide the necessary ingredients, structure, and conditions to enhance a key component to plant life—the rhizosphere.[1] The rhizosphere is where root secretions and microbes interact by literally feeding off of each other.[2]

Roughly speaking, the root secretions feed microbes that in turn convert a soil's minerals and nutrients into forms that the roots can absorb (that is, minerals and nutrients become bioavailable). In fact, some rhizospheric microbes are in sync with their host plant, providing more nitrogen during the plant's nitrogen-hungry growth stages.[3]

Conventional fertilizers bypass and often impair the rhizosphere by directly feeding the roots with chemicals that are hostile to soil microbes.[4] By contrast, the rhizosphere is a central focus of the gardening style described in this book. In short, we are nurturing the soil's microbes for optimal rhizospheric activity.

This is why the ingredients of the soil mix (provided in Chapter 6) establish and maintain microbe life for optimizing rhizospheric health. Of these ingredients, high-quality compost is essential for introducing microbial life to your soil mix.

Compost

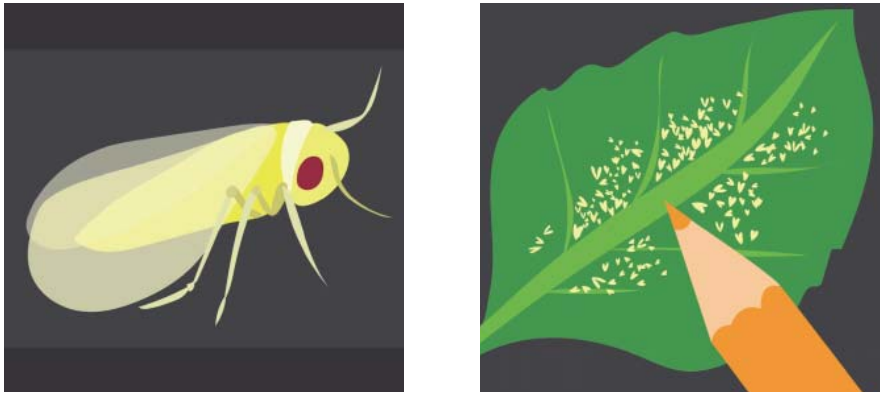
High-quality vermicompost (also called worm compost, worm castings, or worm poo) and mature composted waste are "living" because both are full of beneficial microbe, insect, and worm life. Dr. Elaine Ingham notes that compost with a diverse set of beneficial life forms has the necessary biology to provide the requisite enzymes and hormones for a kick-ass garden:

> What makes enzymes, hormones, and plant-growth-promoting materials? The bacteria, fungi, protozoa, nematodes, and microarthropods [found in compost]. So, really, what you want to be adding [to your soil] is the biology, because they will make more of the enzyme you want. Or the hormone. Make certain that the compost contains the right set of bacteria, fungi, protozoa and nematodes so the process you want will occur. If you buy really good compost, the microarthropods [which are small crawling insects] will be present too.[5]

When you see compost worms and tiny insects crawling around in compost, don't fret. It's usually a good sign. These little guys live in and on the soil,[6] so you don't need to worry about them crawling up your larger plants.

Just be sure the little crawlies in your compost aren't dark or white-colored winged creatures, which may, in fact, be fungus gnats or white flies. They are pests that are hard to get rid of and will sap the life from your garden.

Fungus Gnat



White Flies

Chapter 3 explains how to prevent or treat such pests with DIY botanical teas made from neem oil, coffee, garlic, and oregano.

Pests aside, high-quality compost has the necessary biology for obtaining peak soil nutrient bioavailability, which is the soil–plant system's capacity to supply and absorb nutrients.[7] Since we are relying on the soil and soil life to provide the nutrients for optimum growth, compost quality will largely dictate an organic garden's health and yield.

Unfortunately, the only sure way to know the diversity and quality of your compost is to send it to a lab for analysis. There are however telltale indicators of good compost: tan to dark brown in color, coffee-ground texture, damp(ish), and an earthy smell. As noted before, top-notch compost will have microarthropods and compost worms.

Vermicompost and compost can be bought locally in most places. Just search the Internet, including Craigslist, with terms like "compost" or "organic compost". Be wary of bagged compost that lists peat moss as a main ingredient—this is not compost!

High-quality bagged compost exists, but such compost tends to be regionally distributed, so ask around and inspect the compost before you buy it.

Although compost introduces soil life into your garden, this is not enough. The soil life must be maintained with a healthy and stable soil moisture level.

The Importance of Being Moist

Although soil life can recover following drought, it will be severely inhibited during drought conditions.[8] This is why commercial worm castings and other composts that are dry or sterilized have no value to your soil mix—they're mostly dead.

Maintaining soil life requires a stable soil moisture level, which is one part of optimum soil health. Indeed, with a living soil, a dry top layer will immediately spring to life after watering—tiny insects (microarthropods) suddenly appear out of nowhere, crawling with a purpose. You can even hear a faint crackling of activity.

Don't extend this principle too far by overwatering, which might kill your plants. Think of the difference between a completely soaked cloth and a cloth that only produces a few drops if wrung. You want wrung-cloth-level wetness.[9]

When and How to Water

The optimum watering amount and frequency depend on how fast the plants drink, the temperature and humidity levels, the soil composition, and the size of the soil container. For example, soil with a higher percentage of peat moss will retain water longer than soil with a lower percentage of peat moss, assuming that both soils are in the same environment.

There are several ways to check when you need to water. An old standby is sticking a finger up to the second knuckle to check if the soil is dry. For larger containers, soil moisture meters are handy for monitoring soil moisture deep below the surface. Wilted leaves are an extreme indication, and should be avoided because this unnecessarily stresses both the plant and soil microbes.

Uniform soil moisture requires gentle watering until runoff water starts dripping out of the bottom of the container. Pour out runoff water that remains in a pot saucer an hour or two after watering.

An effective technique for full soil saturation is watering in two stages: gently water until you start to see runoff water at the bottom of the container, and then water again an hour or two later, also until runoff water appears.[10] The second-stage watering can include one of the teas mentioned in Chapter 3, because the second watering is more likely to evenly penetrate the moistened soil.

If you observe droopy leaves after watering, you may have overwatered, but the more likely culprit is poor drainage (that is, the soil needs more aeration from coarse materials such as lava rocks, etc.).

Self-Watering Gardens

There are many DIY and store-bought self-watering designs, which will provide a steady moisture level. One

example is a soil moisture sensor, such as a Blumat sensor.[11] Blumat sensors include ceramic spikes that are inserted into the soil and act as a valve for tubing that is connected to the spikes and a water reservoir. The ceramic spikes expand and contract in relation to soil moisture levels. They contract under somewhat dry conditions, allowing water to flow out of the tubing and onto the soil, and then expand due to the increase in soil moisture, which stops the water flow.

Note that it is possible to incorrectly calibrate the sensor such that the valve stays open and allows the entire reservoir to drain into the soil. Although this is not a frequent occurrence, keep this worst-case scenario in mind when selecting a reservoir size. Larger soil containers (for example, garden pots of 5 gallons or more), require the larger "Tropf" Blumat sensors over the smaller "Junior" sensors.

To take the guess work out of how much water is needed, use a Blumat digital moisture meter, which measures your soil's moisture level in millibars (mb). 120 to 150 mb is considered ideal for Cannabis in the vegetative stage and 150 to 180 mb in the bloom stage, but I encourage you to use these measurements as starting points and experiment from there.

The water dispensed from these sensor systems can be supplemented with botanical and enzyme "teas", as detailed in Chapter 3.

Mineral Content

Mineral-rich soils are required to grow mineral- and vitamin-rich vegetables, which in turn provide superior nutrition for humans.[12]

You want to start a garden for healthy eating and don’t know what vegetables to plant in your mineral-rich soil? Pick the most nutrient-dense veggies,[13] which are ranked below from most to least nutritious based on 17 critical nutrients:

1. Watercress
2. Chinese Cabbage
3. Chard*
4. Beet greens
5. Spinach*
6. Chicory
7. Leaf lettuce*
8. Parsley
9. Romaine lettuce*
10. Collard, turnip & mustard greens
11. Endive
12. Chive
13. Kale*
14. Dandelion greens
15. Red pepper
16. Arugula
17. Broccoli
18. Pumpkin
19. Brussels sprouts
20. Scallion
21. Kohlrabi
22. Cauliflower
23. Cabbage
24. Carrot*
25. Tomato*
26. Radish*

*indicates popular choice for indoor gardens

Why are minerals important? Minerals feed enzymes that are required for the normal functioning of many biochemical processes in the human body,[14] microbes, and plants. In fact, mineral deficiencies have well-documented symptoms in humans and plants (for example, various leaf discolorations in plants).

A balanced soil contains important minerals to maximize productivity, yield, and plant immunity. Living and balanced soils ensure that the minerals are bioavailable for root absorption as needed by the plant.

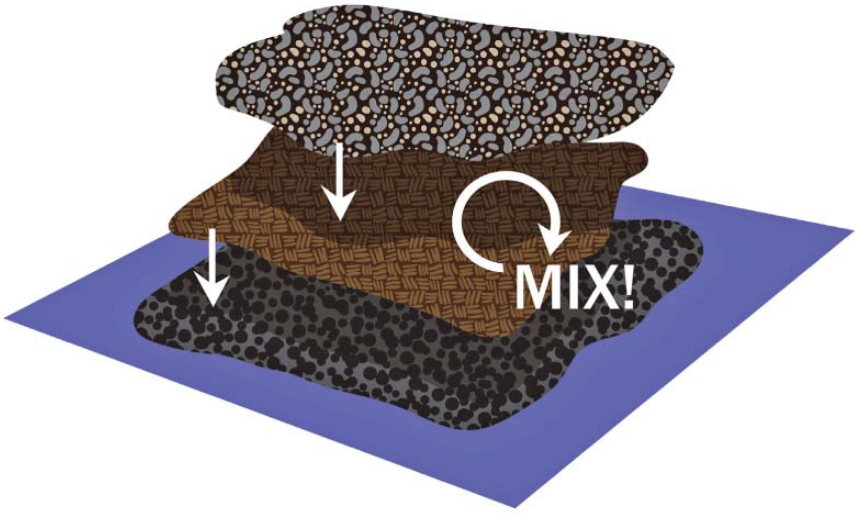
The mineral mix provided in Chapter 6 is quite wide-ranging and open. Feel free to create a diverse mineral mix—it can only help, especially for multiple-crop soils (soils intended to grow several plants, consecutively, in the same soil for multiple harvests).

To summarize the past few pages, an ideal soil has a sufficient level of nutrients and a diverse set of soil life to convert the soil nutrients into bioavailable root food.

Soil Mixing

The soil mix provided in Chapter 6 has two main components: a *base mix* (compost, sphagnum peat moss, lava rocks) and *soil amendments* (kelp, neem, etc.). Before mixing the base mix, unpack and lightly water your peat moss, preferably using water and a wetting agent such as aloe vera gel. This helps with accurately measuring the amount of peat moss you're putting in your soil mix as well as conditioning it to absorb water.

The base mix can be combined by dumping the ingredients on a tarp and shoveling them together, as shown below.



Then, mix the soil amendments together and sprinkle the mixed soil amendments on top of the base mix before shoveling everything together. This helps evenly distribute the soil amendments throughout the base mix and is an important step to creating a balanced soil.

Caution: When mixing soil, please use at least some sort of respirator or air filter and be in a well-ventilated area. Compost and soil amendments are great ingredients for soil, but not necessarily for our lungs. For example, peat moss alone can cause lung inflammation. So get a respirator when buying soil ingredients at a feed store or nursery.

If soil mixing is too much trouble, companies like BuildASoil and KIS Organics offer premixed soils that are similar to the soil mix recipe in Chapter 6.[15]

After mixing, the soil should be inoculated with an *actively aerated compost tea* (AACT). AACTs are discussed in Chapter 3, and an example is listed in Step 2 of Chapter 6.

After you've mixed the soil and watered it with an AACT, allow it to compost, or "cook", in an open container, which can be the final container for your plant (for example, a garden pot). Air exchange is important for supplying oxygen during this process. I recommend using an open container and mixing up the soil once every week or so during the first few weeks. To further establish soil life and structure, throw in some compost worms or plant a *cover crop*, such as clover, a couple of weeks after mixing the soil. Cover crops are discussed in the next chapter, *Garden Pots*.

During the composting period, the soil pH level slowly rises to around 6.5, which is an indicator that the soil is ready to grow Cannabis, chili, and tomato plants. In fact, the Chapter 6 soil mix works well for most vegetables, because the soil's pH level generally settles between 6 and 7, which is the pH range in which most soil nutrients are plant-available. Soil pH levels can be monitored with a soil pH meter.

Of course, some plants prefer more acidic soils (berries), and some prefer less acidic soils (lilacs). Similarly, the soil mix may be a bit strong for nutrient-sensitive plants, so go light on the soil amendments (kelp, neem, etc.) for such plants. For example, I planted an indoor palm tree in a strong soil mix that

had already grown two Cannabis plants (together) and a chili plant after that. Still, some of the palm tree's leaves twisted and turned and a few tips turned brown, which are classic signs of over-fertilization.[16] That said, the palm tree exploded with growth, and within a few weeks it looked the healthiest I had ever seen it. So soil strength can be a difficult balancing act.

Seedling Soil

The base mix in Chapter 6 can be used immediately after mixing and is fine for germinating seeds and young plants. In fact, high-quality compost has a high germination rate, and special germination techniques, such as soaking seeds in paper towels, are not necessary.

The complete mix (base mix plus amendments) must compost or "cook" for at least 3 weeks, but preferably longer, especially for seeds and young or sensitive plants. A three-week composting period is the bare minimum before planting larger plants, but planting cover crop seeds at that point is fine.

Multiple-Crop Soil and Soil Remixing

Depending on the quantity and quality of the soil, it can support consecutive crop harvests with minimum effort.

For example, after harvesting or chopping down the first plant grown in the soil,[17] plant another seed or dig a hole in the soil for a second plant (a *transplant*) that is already growing in another pot.[18] Take the transplant out of its first pot, plant the transplant in the hole, and cover the transplant's root ball with soil and/or worm castings. The worm castings and other topdressing layers, as explained in the next chapter, provide additional nutrients for the transplant.

These practices are known as *no-till gardening*. Tilling the soil greatly disturbs, if not destroys, soil life. The no-till approach instead replants seeds or plants into the soil after harvest and enriches the soil with topdressing layers.

Eventually there comes a point when topdressing is not sufficient and the soil needs more of the original ingredients, as detailed in the optional eighth step in Chapter 6. Unfortunately, this means it's time to restart the soil-building process by breaking up the old root balls, mixing in the new soil ingredients, and composting the soil for 3 weeks or longer. Similarly, the old soil can be combined with newly mixed soil.

The composting period can be avoided by lightly amending the soil after a few harvests. This method is also described in Step 8 of Chapter 6.

Endnotes:

1 http://en.wikipedia.org/wiki/Rhizosphere.

2 http://www.google.com/patents/US7595061 ("Soil contains a diversity of life forms which can interact with plants, such life forms including bacteria, fungi and nematodes. These biological forms are particularly abundant in the rhizosphere, the area of soil that surrounds and is influenced by the plant roots. Rhizobacteria are those bacteria which are adapted to the rhizosphere. There is a complex interaction among the various life forms in the soil, where some are antagonistic and others are mutually beneficial. Similarly complex is the interaction between the plants and the soil life forms, which can helpful to the plant in some instances, and harmful in others.")

3 For example, nitrogen-fixing bacteria found in the rhizosphere of the rice plant fix more nitrogen during rice growth stages, which is when rice requires more nitrogen. See Sims GK, Dunigan EP (1984). *Diurnal and seasonal variations in nitrogenase activity (C2H2 reduction) of rice roots.* Soil Biology and Biochemistry 16(1): 15–18.

4 Jeff Lowenfels and Wayne Lewis, Teaming with Microbes: The Organic Gardener's Guide to the Soil Food Web (Timber Press 2010), pg. 26 ("Chemical fertilizers, pesticides, insecticides, and fungicides affect the soil food web, toxic to some members, warding off others, and changing the environment."; "When chemically fed, plants bypass the microbial-assisted method of obtaining nutrients, and microbial populations adjust accordingly.").

5 http://theearthproject.org/id64.html

6 http://www.pacifichorticulture.org/articles/soil-microarthropods.

7 Hormoz BassiriRad, ed., *Nutrient Acquisition by Plants: An Ecological Perspective* (Springer 2005), pg. 1 ("The soil-plant