Q&A

Soil Structure & Building Robust Soil Systems Webinar Emily Rockey July 15, 2020

Question: Do cinders work in the bottom of wicking beds?

Answer: Wicking beds require a special setup, and cinders or pumice can play a role. The following are the best free resources I know of on wicking beds, written by Raymond Jess, a Master Gardener in Phoenix, Arizona.

- Building My Wicking Bed by Raymond Jess : https://www.urbanfarm.org/2017/04/10/building-my-wicking-garden-bed/
- Wicking Bed 2.0: https://www.urbanfarm.org/2017/08/15/wicking-bed-2/
- Wicking Bed 3.0: https://www.urbanfarm.org/2019/08/13/wickingbeds3-0/

Question: This is our school's first year having a school garden. We will have raised beds. We have not gotten any dirt yet and need assistance as to where to go for raised bed dirt. HELP!

Answer: Buy raised bed soil in bulk, by the cubic yard or half-cubic yard. To fill raised beds, I recommend you choose a high quality blend rich in organics from a local source. Try Compost Cats, Tanks Green Stuff, Singh Farms, Arizona Worm Farm, or Gro Well. (Ask about discounts for schools!) Or, do some reading to find recipes to make your own raised bed soil mix^{*}. Make sure to install the soil a month or so in advance of planting day, watering occasionally so they don't go bone dry, and mulch well. Be patient with the soil: remember, it takes time to build it.

*Sample mix: Southwest Victory Gardens' (Tucson) Raised Bed Mix Recipe: 5 parts fully cured compost–4 parts coco fiber–½ part perlite–½ part vermiculite–Organic fertilizer

Source: https://www.southwestvictorygardens.com/

Question: Where would you recommend purchasing mulch for vegetables?

Answer: Find a local supplier of organic mulch (ideally in bulk by the cubic yard or halfcubic yard, for a much better price). Ask your local nursery or landscape materials supplier. Choose a composted mulch with a fine texture or a chunky compost -- make sure not to use wood chip mulch in veggie beds. Organic alfalfa hay or straw are good options as well because they break down over the course of the season and allow for a smoother transition to the next season's planting.

Question: What happens to the soil microbes when we turn off the irrigation in school gardens in the summer?

Answer: Microbes go dormant in dry soil. Once the irrigation is back on again, they will "wake up", but some losses will occur. Ideally, mulch beds heavily to conserve soil moisture, and irrigate the beds every couple weeks to improve survival rates of the beneficial soil microbes (bacterial and fungi).

TIP: Add a thick (4-6") of composted mulch, or layers of different mulches, on top of veggie beds before leaving for summer to protect the beds over summer break.

Question: Are cocoa shells good for veggie gardens?

Answer: Yes, cocoa (chocolate fruit pod) shells can be used for mulch on top of the soil. It is imported from chocolate growing regions outside the US. Note: This is different from coco (coconut husk, aka "coir").

Maybe try pecan shells, they are more readily available in Arizona (less expensive, less transport required), and can also make a really nice mulch. Fine composted mulch is available from most nurseries and bulk material suppliers. Pine straw or composted/decomposed pine bark works, too. Remember: Just make sure to only "turn in" to the soil fully-finished composted materials, and keep uncomposed or "chunky" materials on top of the soil as a mulch.

Question: For raised beds, do you need a bottom layer of rocks, sand, etc?

Answer: Typically raised beds should have 18" (at least 12") of good root zone soil. If you place rocks/native soil/sand in the bottom of your raised beds, make sure you still have that space for the soil. For deeper/taller planters (including the popular galvanized metal troughs), yes rocks, gravel, sand, or well-draining native soil could help fill up some of that bottom space. It can be cheaper than filling the entire deep raised bed with the high-quality rich organic soil you'll place on top. The key is to make sure it drains well, and that the bottom of the planter has very good drainage.

Question: If you use a lot of citrus in a compost will it actually get too acidic, even for our alkaline soil?

Answer: There's nothing to worry about when adding citrus or coffee grounds to compost--it won't turn out to be an acidic compost. Maybe neutral at best, if you're properly balancing the greens-to-browns in the compost pile. The fresh citrus debris would be mixed with "browns": sticks, twigs, shavings, newspaper, leaves, etc.

Question: Is there a diagram or illustration to help demonstrate the Nitrogen needs for soil and plants and how to select a good N:ratio for the type of plant(s) or garden one is growing?

Answer: Thank you for asking! Nitrogen can be tricky, because it moves with water (leaching), gets taken up by plants, and can get temporarily "tied up" in the natural decomposition of carbon by microbes. The Arizona Cooperative Extension offers guides for the minimum nutrient needs (including nitrogen) of common crops. It's a great idea to become familiar with deficiency (and toxicity) symptoms in the plants. They will exhibit signs of what is needed. Each soil, mulch, and crop combination is different, and one input often affects another. Resources can serve as a guide, but gardening requires constant observation as well.

- Here is a good guide to fertilizing home (and school!) gardens.
 - https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/AZ102
 0-2014.pdf
- Here is a fun resource to demonstrate the Nitrogen Cycle in the classroom.
 - https://nutrientsforlife.org/product/nitrogen-cycle-poster/



Photo Credit: nutrientsforlife.org

Question: Can you explain the difference between organic and inorganic amendments and when it might be appropriate to use one over the other?

Answer: First of all, plants cannot differentiate between, say, a phosphorus molecule derived from an "organic" fertilizer package versus an inorganic one. The form in which the plants uptake the nutrient will be the same. Choosing your fertilizer source can be a personal preference, and stems from your approach and specific garden goals.

Synthetic fertilizers are manufactured from finite resources (petroleum, fossil fuels). They can be more straightforward to apply, and when done correctly, one can expect a certain result or response. It can be a quicker "shot" of nutrition when the plants are very deficient. Examples include ammonium nitrate or super phosphate, or standard Miracle Gro or Osmocote.

Organic fertilizers can mimic natural processes. They are often (though not always) manufactured as a byproduct, such as in the case of blood meal or feather meal. In the garden, it is quite possible to refer to the label to calculate your necessary application rate, though there is usually a range offered (for example, apply 2.5-5 pounds/100 square feet of fish meal). Look for a trusted seal or stamp on any product labeled "organic" to ensure it meets standards--just because it is organic doesn't necessarily mean quality.

Keep in mind that organics can require more time to become fully available compared to inorganic or synthetic sources. This is because the organic inputs are consumed by beneficial soil microbes first, who mediate the uptake by the plant. But here again you're supporting those microbes, and adding organic materials to the soil which improves soil structure and much more.



(For visual learners, check out this simple image- credit Biom NZ). That being said, use of supplemental synthetic fertilizer can be used judiciously alongside organic fertilizers, if needed.

f you are one who wants to use organics, you can save a few bucks on many ingredients by purchasing them at local feed stores in 40-50# bags. Alfalfa meal "fertilizer" (displaying the N-P-K numbers on the package) can run about \$2/pound, while Alfalfa meal found at your local feed store (for livestock) can go for only \$0.60/pound.

Ask an extension agent who is familiar with your preferred fertilizer methods, the soil test lab consultant, or a qualified nursery professional for specific advice based on your particular nutrient needs or deficiencies.

My advice is to build soil over time using quality organic matter which "feeds" the soil over time and supports healthy microbe populations, which play a big role in plant nutrient availability and uptake. Apply well rounded organic fertilizers at the rate of the garden's growth, to offset what the plants take out of the soil in the form of leaves, fruits, etc.



Emily Rockey Mission Garden/ Tank's Green Stuff



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