

***Bio-nutrient Raised Beds and Containers***

1990

Raised beds/containers are a boon to anyone who can’t (or won’t) get down on the ground and can be placed anywhere regardless of soil quality (or no soil at all) below the bed…But…a lot of raised beds don’t thrive and produce. Here are some tricks that will assure your success and that you can put into practice.

First – a quick look at the reasons that raised beds fail…

1. The soil is not prepared well – get a soil test, add organic material and balance minerals
2. There’s not enough nutrition to support the number of plants in the bed – plan to add fertilizers to soil and leaf surfaces starting no later than mid-July
3. The bed becomes compacted and hyper dry. Maintaining soil structure is critical to allow for adequate watering in the heat of summer – and raised beds really use water. Set up irrigation if possible.
4. The bed becomes saturated. Ditto for the soil structure. Make sure there’s some way for water to exit the bed in case of torrential water events.
5. The bed isn’t mulched. Use anything that you can find or tolerate visually and get that soil covered from day one of planting.

Never forget that your best assets are your eyes and other senses – tweak this information and make it work for you. Use soil tests, compaction tests, visual and textural tests and any other source of information you can find to help you unwind the history and the reality of any given soil situation.

Now for how to start from scratch.

**Sizing the bed:**

* For Raised Beds: Human reach is about 18” so beds that are 36”-48” wide are easy to work with and keep your feet out of. If you keep beds to roughly 4’x8’ you’ll be able to weed a whole garden in 15 minutes – and almost anyone can find 15 minutes.
* There are 32 sq ft in a 4’x8’ bed – 31 4’x8’ beds =1000sq ft, ¼ of a football field is 1/3 acre just to give you some idea of sizes and can hold 260 4’x8’ beds with 3’ wide paths.
* A 25’ bed, 4’ wide is 100 sq ft – create a cross walk area at the half way point to avoid walking on the bed.

**Siting the Bed:**

Check the ground under your Raised Bed, does the soil need to be turned under or covered over and ignored (high in lead, asphalt or other undesirable material)?

Placing the bed: Try to place the bed with a **north-south orientation** rather than an east-west one so that the sun travels across the width of the area throughout the growing season but won’t bake the soil dry in those late-summer/early-autumn days when the mercury soars.

Is the ground pretty level? It needs to be level as possible – water always flows to the lowest point.

How is the drainage in the area? Raised beds need to be able to drain either into the soil below or out drainage provided in the lowest part of the bed

Figure 1 from internet source – grade issues – level is a must!!

With a 12” raised bed you don't necessarily have to dig out the soil underneath the bed, unless you're planning on planting root vegetables such as carrots or potatoes. If you do want a little more depth then turn over the soil. You can also build a taller bed, a 24-inch high bed would be handier for gardening while sitting on a stool or even standing.

Figure 2 from internet search - drainage

**Filling the Bed:**

When you receive your soil, have them dump it onto a 10 x 12ft. tarp in your yard, near your raised bed site. Get a soil test.

Now you can add the other ingredients (amounts are listed below). Combine composted loam, leaves, wood chips, lobster compost and alfalfa meal. Mix well.

Fill the raised bed with soil within 1 to 2-inches of the top. Rake smooth, breaking up any clumps

Let the bed settle for at least 2 weeks before planting. It will heat and cool and acclimate. By letting it sit you’re allowing the soil to go through a wild swing in energy that can kill roots. Waiting allows the soil to stabilize and your plants won’t go into shock. Top off the top of the bed if settling has dropped the volume below 1.5” from the top – you’ll fill that 1.5” with mulch…

Figure 3 from internet search - planting concrete blocks

**Soil composition: Amounts are for each 4’x8’x1 ft. high Raised Bed**

* Composted loam: 3/4 yard
* Dry leaves, shredded with the lawn mower if possible: 1- packed 32 gallon barrel
* Wood chips: 1- 32 gallon barrel
* Non-medicated layer mash – 20 lbs (a partial of a 50 lb bag)
* Alfalfa meal (Do not buy pellets): 1- 20lb bag (a partial of a 50 lb bag)
* Minerals needed to balance out your loam’s soil test
* Lobster compost: 4 -40 lb. bags (can also be homemade if you’re good enough at making a quality, weed free compost – equivalent of ½ a 32 gallon barrel)
* ***Double* these amounts if making a 2 ft. H Raised Bed or (2) 1 ft H Raised Beds**

The many varieties of vegetables we grow require different levels of nutrients in the soil to maximize their success.  Vegetable beds may need additional minerals if the proper amount of nutrients are not available in the soil.  Make sure your soil pH levels are in the proper range or the nutrients the plants need may not be available for uptake from the soil



Figure 4 from internet search - anything can be an edge

**Favorite soil amendments used throughout the growing season.**

**Straight product:** Alfalfa meal, greensand, azomite, calcitic lime, rock phosphorus, gypsum, liquid kelp

**Blended products:**

**North Country Organic’s** (NCO) Pro-Gro, Pro-Start, Pro-Boost, Pro-Holly

**Neptune’s Harvest** **Fish hydrolysate and Kelp** (not emulsion!) - especially good on begonias and all vegetables if they need a pick me up. Use it extensively after the rain early in the season.

**Neptune’s Harvest Kelp –** excellent for helping with plant stressors – can help with insect and disease pressure

**Favorite soil management recipes:**

Basic High Energy planting mix – used in all annual and perennial installations. Rate adjusted by type and vitality of plant material and history of the garden. This is mixed together on a large tarp and stored in sealed plastic containers. This is a 2-2-1-1 ratio so mix the amount right for you. KEEP DRY if storing!!!!!! Very biologically active in the presence of ANY water!!!

* + 1 part Azomite or Dynamin or other paramagnetic clay
	+ 1 part Leonardite or biochar (this is the carbon source)
	+ 2 parts alfalfa meal
	+ 2 parts North Country Organics Pro Gro (or other high quality

 mineral blend fertilizer)

Work from a cup to a quart of this mix into the good-sized holes you’ve made for everything you plant. Use more for the hungrier plants…make a list of what you’re growing and learn their needs.

Fall soil development mix – used in open gardens that are coming in to production, edges of existing gardens that need refreshing or other soils that need to open up (compaction etc.) It’s spread on the surface at the rate of about 25-lbs/100 sq ft and hand cultivated in – no rototilling to preserve fungal hyphae. Promotes a strong bacterial reaction and feeds the worms well – they develop heavy muscles (almost blue in color) that allow them to really turn soil. Can also be used in the spring for new beds but there must be a 6-week lag time.

On a large tarp, on a dry day mix 1 part each:

* + Non-medicated chicken feed layer mash
	+ Gypsum (calcium sulfate)
	+ Calcite lime or aragonite – NOT dolomite unless you know you need Magnesium
	+ Rock phosphate
	+ Leonardite or biochar – stable carbon source
	+ Local stone dust – to equal weight of amt. of Rock phosphate
	+ ***2*** parts alfalfa meal.

Soil drenches:

* Use liquid fertilizer in the irrigation lines or use a watering can, trash barrel with a sump pump or other irrigation tool.  I use Neptune’s Harvest fish hydrolysate and kelp (excellent food source for micro-organisms), liquid humates (long chain carbon molecules), molasses (carbohydrate for root zone), a touch of castile soap or yucca (makes it easier for water to move through the soil – use a little more if the soil is really dry) and a microbial soil inoculant if the soil is flooded or dried out.
* Recipe: looks something like this:

1.5 tbl fish/kelp, 1 tsp humate, 2 tbl molasses, short squirt (1/3 tsp) of castile or yucca and ¼ tsp of microbes in a gallon of water.

Plan to use this quickly because it is actually a living product and it will exhaust the oxygen in the water.  Plan on a pint to a quart per plant. Don’t let it sit for more than a couple of hours – and in the shade at that. Double application amount if you’ve kept water available to the plants, but you really don’t have enough energy in the soil.  Do not double this volume if drought is part of your problem – water first until water has reached 3-4” into the soil and use soap in the water to speed water movement – usually a gentle overnight soak works well. Then use the soil drench.

Foliar sprays:

* Use a **foliar spray of the same mix as the soil drench mix** on the leaves of the plant.  This can be amazingly effective because plants can take up both minerals and sugars through the leaves.
* Make sure this happens just before or just after sunup or before sundown for maximum effect – or use a misty/moisty day… the stomata need to be open and the sun needs to not be hitting the leaf surface – will kill the microbes.
* There are lots of recipes for foliar sprays and you should experiment. I tend to use the same products to make my job easier. Check out Michael Phillips’ Holistic Orchard foliar recipes to see another approach.

Some useful links:

Advancing Eco-Agriculture: [https://www.advancingecoag.com](https://www.advancingecoag.com/)

Acres, USA: <https://www.acresusa.com/what-is-eco-agriculture/>

Bionutrient Food Association: <https://bionutrient.org/site/>

Agri-dynamics: <https://www.agri-dynamics.com/crops>