

# Sustainable Landscape Management from a Soil Foodweb (SFW) Perspective

Notes from the 10/27/07 CLCA SFBA Sustainable Landscape Series. by Alane O’Rielly Weber, Botanical Arts, San Mateo, CA

## **1. Stop killing the beneficial resident soil biology:**

- a. Stop or significantly reduce the use of chemical fertilizers, pesticides, and herbicides.
- b. Stop manipulating soil pH with lime, dolomite, or gypsum. If calcium need is indicated by soil testing, use oyster shell flour or azomite along w/ compost/organic matter to increase SFW development, which will buffer pH, and hold plant available calcium in the soil.
- c. Stop manipulating soil pH lower with “acid food” fertilizers high in sulfur. Instead, increase compost/organic matter use and let the SFW microbes mitigate pH naturally. Sulfur is a fungicide.
- d. Stop destroying the natural placement and organization of the SFW (soil foodweb) with unnecessary roto-tilling and turning of soil.
  1. annual plants are able to benefit from some soil disturbance. When possible leave roots of last seasons’ annuals in the ground for organic matter & place new plants 1 off the grid.
  2. in severe compaction, where faster results are required, till soil once only, while adding 2 – 6 “ of compost into the re-worked soil horizon, followed with a mulch after planting.
  3. when possible, do not till large spaces; dig & amend each planting hole only. Mulch w/ compost &/or raw organic materials; use microbial rich additives like actively aerated compost tea (AACT).

## **2. Add the Soil Foodweb (SFW) microbes:**

- a. Increase all microbial components of the SFW by using an aerated compost tea (AACT), or well made, biologically active compost; use mycorrhizal fungi at planting or when aerating turf.
- b. Test for the specific categories needed: bacteria, fungi (both decomposers), protozoa (bacterial predators for nutrient cycling), nematodes (fungal predators for nutrient cycling); note: predatory nematodes have other benefits of controlling specific soil insects; single species products available.

## **3. Create a biology-friendly habitat for the microbes to proliferate.**

- a. Mulch is the simplest effective way of improving soil health. Different materials will affect the soil and support the SFW microbes and their plants in different ways: (Keep away from base/trunk of plants)
  1. compost (as alive and mature as possible) is always appropriate; but may be expensive.
  2. raw (un-composted) organic matter is available and frequently reduces a waste stream.
    - a. a very thin layer (or successive layers over time) of grass clippings around annuals. This tactic favors SFW bacterial counts and increases biological nitrogen retention.
    - b. a thin, single layer of cocoa hulls around annuals or perennials (caution around dogs)
    - c. straw mulch appropriate for use w/veggies, annuals and perennials
    - d. ‘coco-peat’ (coarsely-shredded coconut husk) around annuals, perennials or shrubs; or as a finely shredded amendment, a.k.a. coir, can be used to replace peat moss.
    - e. longer lived plants, such as perennials, shrubs, trees are more tolerant of high carbon mulches such as arborists’ wood chips, chipped bark products, sawdust, or nut shells.
  3. layered, multi-component mulch (a.k.a. lasagna composting) can also be very effective.
- b. Use caution and understanding with raw wood products that are unusually high in tannins or anti-microbial/anti-fungal properties; they are temporarily resistant to microbial breakdown (it’s why we use redwood lumber outside) and may not support your SFW for months to years. Sm. amount of N to start.

## **4. Feed the beneficial SFW microbes (“feed the soil”) and jump-start the “poop loop”**

- a. Some plants and plant groups do better w/ higher levels of nitrogen and supporting macro and micro-nutrients than may be available in poor, damaged, or only raw-fed soil systems. Many nursery

grown and cultivated species are peak-performers, chosen for their performance in trials while fed high levels of inorganic fertilizers. Many plants which produce fruit or blooms profusely also bear better with seasonal additions of full-nutrient organic fertilizers. Reward them with the extra nutrients in order to maintain their expected performance. Use mixed component or animal based raw organic fertilizers.

b. On the other hand, many natives, like chaparral or other dry-land/drought-tolerant types, require no regular additions of nutrients other than compost and mulches.

c. 'Organic fertilizers' are typically concentrated liquid or dried down pulverized and concentrated plant, animal or mineral materials. They are naturally high in particular minerals and available in single stream packaging (i.e. alfalfa meal) or blends of materials. They, like compost and mulch, must be acted upon by the SFW microbes in order for "nutrient cycling" to occur. Some immediately available nutrients (nitrogen) occur in animal based products; especially manure and guano; use w/ caution & understanding.

1. use proprietary blends or single source organic fertilizers made from processed plant or animal parts; clays or mined mineral sources and kelp can provide most non-N mineral nutrients.
2. alfalfa meal, fish meal, feather meal, composted manures for increased nitrogen; caution with blood, bone, and other slaughter house by-products.
3. Reduce or avoid manufactured urea or ammoniacal nitrogen products (salty)
4. use kelp/seaweed products or mined minerals for micro-nutrients.
5. growing "green manure" cover crops, grown in between rows or seasons, can add nutrients and microbes to your soil system.

## **5. Choose compatible plants to match the soil biology's level of succession**

a. Like the concept of grouping plants with similar water needs, keep in mind that plants' roots' microbial partners can be categorized into a gradient from bacterial dominance, as in annual plants, to fungal dominance, as in woodland/climax forest-type plants. Plants do better when the surrounding soil habitat supports the microbes that they prefer. Alkalinity and acidity are influenced by the microbe groups.

## **6. Specific Recommendations for Soil Preparation & Compaction Mitigation:**

a. Individual plantings: It is best to treat most soils for individual plantings alone and mulch the surrounding soil to let nature do the bigger job between the plantings.

1. backfill with 5 – 25% mature compost or organic planting mix.
2. use appropriate mycorrhizal fungi for plant, dusted on root ball, in backfill or dipped.
3. use Rhizobia to inoculate the seeds/roots of all Leguminous plants.
4. include a very small amount of organic fertilizer in bottom of planting hole; tps. per 5 gallon.
5. if compaction was an issue in planting area, subsequent applications of well-made compost or compost tea (AACT) can increase microbial component to aerate soils more quickly.
6. Mulch is a verb: Do it on the surrounding soil area to improve SFW habitat.

## **7. An alternate spot treatment for compaction mitigation:**

a. vertical plugging using an auger to punch past compaction layers; fill with high-fungal compost or decomposed leaf litter. Addition of AACT and mycorrhizal fungi (if close to root zones) very helpful.

b. trenching (where appropriate) and filling with high-fungal compost or composted organic mixes. Subsequent applications of compost tea helpful.

c. Compost tea can be applied to individual plants or soil drenched into larger areas. When used alone, without any mechanical intervention, the power of the SFW microbes can do the job, however expect them to take several seasons to several years to open up soil and mitigate compaction.