

Healthy soil is the cornerstone of a healthy, productive garden. Healthy soil is a living ecosystem which includes macro and micro organisms – from earthworms to beneficial fungi and bacteria. This soil life digests organic material and interacts with plant roots, providing plants with the nutrients they need. Good gardening practices support and enhance the living soil ecosystem. The primary ways to aid soil life are by adding organic material such as compost and decomposed manures, by growing cover crops, and by using organic mulches. Reducing soil compaction and balancing soil minerals are essential for healthy soil too.

### **Cover crops**

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These are crops grown specifically to improve the soil. They are the most economical way of adding large amounts of organic matter, especially to larger areas. Other benefits include protection from erosion, improved soil structure, increased water absorption and retention, providing homes for beneficial insects, and smothering weeds. Cover crops can help to break up compaction in the soil and bring deep minerals to the surface where they can be more readily used. When cover crops are mowed and turned into the soil at their highest biomass capacity – at full bloom – they are called “green manures.” Green manure can add a significant amount of nitrogen to the soil as well, especially if legumes are included. Legumes are members of the bean and pea family whose roots can be colonized by beneficial bacteria which take nitrogen out of the air and make it available to the plant. Even if cover crops are taken off and composted, the roots will still have added considerable organic material and many of these other benefits will have been provided. Adding organic material to the soil is sometimes called “carbon farming”, as carbon is the main component of plant material. In addition to all the wonderful things it does for the soil, this carbon is being “sequestered,” or captured by the growing plant from carbon dioxide (CO<sub>2</sub>) in the air and held in the soil. As root masses increase, they use even more carbon dioxide, creating a “sink” for atmospheric CO<sub>2</sub>. Many scientists now believe

that the fastest and cheapest way to reduce CO<sub>2</sub> levels and slow climate change is by “carbon farming”. By growing cover crops, we can improve our soils, feed ourselves and help the planet in many ways!

Cover crops can be annuals or perennials, warm season or cool season. Here on the West Coast, it is most common and perhaps most important to plant cool season annual cover crops in fall. In most parts of Northern California, they should be planted mid to late October while the soil is still warm enough for fast germination. If the soil is too cool, weeds will get going before the cover crop and there may not enough plant growth to protect the soil from the first big storms of the season. The greatest benefit from cover crops will be gained if prior to planting them, any deep compaction has been broken up and any needed minerals have been incorporated. Clear the area of large plant material and sow larger seeds in shallow furrows; rake in small seeds and cover lightly with straw or compost. If no rain has fallen by Halloween, irrigate to get seeds started.

Fall planted choices include

**Soil builder mix:** This classic mix of legumes and grasses is often used on farms and larger gardens. It includes bell beans, (much like fava beans but the smaller seed is cheaper and easier to plant), Austrian peas, vetch, and barley or oats. Each of these ingredients could be used alone, but this mix generates the most biomass; it can get 4-5 feet tall.

**Crimson clover:** A lovely annual clover with large deep red flowers in spring. Eighteen-inch plants form a dense cover but are easy to manage.

**Fava beans:** Have your cover crop and eat it too! If you let favas come to maturity, some of the biomass will be lost and nitrogen gone into the beans. But growing them is still a benefit that you can share with the soil. Their tall, upright plants need space between them, so if grown alone, spread a mulch like straw to protect exposed soil. Leaves and flowers are edible too.

**Fenugreek:** This beautiful legume is easy and fast-growing to about 2 feet. The aromatic leaves can be added to salads and the seeds can be used as sprouts or in curries. One drawback is that other critters love the tender leaves too.

**Phacelia:** *P. tanacetifolia* is a California native that grows fast, makes a dense carpet and is outstanding habitat for beneficial insects.

**Wildflowers:** Most annual wildflowers do not provide enough biomass to be good cover crops by themselves, but are lovely to sprinkle in with the other seeds.

For more choices and seeds, check out Harmony Farm Supply, LeBallister's Seed and Fertilizer, Peaceful Valley Farm Supply, and Bountiful Gardens.

### **Organic mulches**

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These are layers of organic material on the soil surface which provide many of the same benefits as cover crops. Unlike cover crops, they can be laid down on bare soil at any time in the fall and winter and there is no need to mow or turn them under in the spring. However, mulch provides insulation to the soil, so depending on the material, you may need to incorporate or clear it off to allow soil to warm before planting. If a mulch is thick enough it can suppress weeds, it encourages earthworms, keeps adjacent crops cleaner and if used in paths, reduces soil compaction. As a mulch slowly decomposes, it can add organic material and nutrients to the soil. Because mulches hold moisture in the soil, they should not be used closely around plants that need good drainage, like lavender and many natives, and should not be piled up against the trunk of trees or shrubs. It can be hard obtain and spread enough material to mulch a large area, and gophers, voles, mice, snails, slugs can thrive in and under mulch.

Some mulches provide more nutrients than others. You can layer materials like coffee grounds and kitchen waste under mulches, but beware of attracting rodents, raccoons, or other pests.

Here are some choices, starting with those with higher nutrients

**Manure:** Poultry manure is the highest in nitrogen, while horse manure mixed with a lot of bedding can be very low in nitrogen. Manures are often free and abundant. Do not use fresh manure directly around crop plants; it should be composted or aged first.

**Alfalfa hay:** This is a great mulch as there is no weed seed in it and it will provide a slow release of nitrogen as it breaks down. Good in vegetable gardens and around citrus and other fruit trees.

**Rough compost:** Great all-round soil conditioner and mulch.

**Straw:** Good for protecting the soil surface, keeping soil cool, and holding in moisture. Do not mix in with soil. (Do not use hay, which has seeds in it, except for alfalfa hay.)

**Shredded leaves:** Running a lawn mower over leaves helps them stay in place and not mat up.

**Cardboard or newspaper:** These need to be covered by another material such as compost, chips or straw to keep from drying out and blowing away. Great for "sheet mulching"- see the iGROW page, "How to Transform Your Lawn."

**Wood and tree trimming chips:** This should only be used around perennials like fruit trees and shrubs, or in paths.

### **Compost**

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Adding compost is one of the best ways of feeding your soil. Rich in decomposed organic material and beneficial microorganisms, compost is a magical way of transforming waste into abundance. When the last tomatoes and peppers are picked, make sure to clean up your old crops by either turning them into the soil or making them into compost. See the iGROW link to the Master Gardener composting guide for further information on composting.