



Introduction to Cover Crops & Green Manures

Master Gardeners of Trinity County

Cover crops are usually planted to increase soil fertility and organic matter, provide a source of nitrogen, reduce soil erosion, suppress weeds and attract beneficial insects. Most cover crops are planted in the late summer on fallow areas, which allows them to germinate and reach an initial stage of growth before winter dormancy.

Most commonly, cover crops fall into one of two categories: legumes or grasses. Legumes include peas, beans, clover, alfalfa, vetch, trefoil, fenugreek, and medic. Legumes can be annuals, biennials, or perennials and have the added advantage of being able to fix nitrogen (converting nitrogen in the atmosphere to plant available nitrogen in the soil). Some legumes can fix as much as 200 lbs of nitrogen per acre per year. To ensure an adequate level of nitrogen fixation, legumes must be inoculated with the appropriate strain of Rhizobacteria. These inoculants are inexpensive and the process is simple. Annuals are ideal for short-term plantings in fall or early spring. Biennials grow much more vigorously in the second year and are best planted on areas that will not be cultivated for one year. Perennial legumes, such as alfalfa, grow deep tap roots that are very good at improving compacted soil conditions but can be difficult to eliminate from the garden once they have served their purpose.



You should try to match the legume cover crop to your goals and growing conditions. For example, Austrian field peas are a cold-hardy overwintering pea that tolerates cool, poorly drained soils. Mammoth red clover grows up to 3 feet high, is cold hardy and breaks up clay soils. However, many of the tall clovers and vetches have runners or windy stems that complicate mowing. Crimson clover and white clovers are shorter, and so produce less organic matter. Some legumes make great forage for animals. You have many choices!

Grasses are also used for cover crops. They do not fix nitrogen, but have a fine textured, fibrous root system that is efficient at stabilizing soils and is easily decomposed to add organic matter to the soil. Some common annual grass cover crops are brome, barley, millet, oats, rye, sudangrass, and wheat. Perennial grasses are usually used where tillage is unlikely to occur. These include fescues, orchardgrass, bluegrass, and ryegrass. It's important to manage cover crop grasses and to have an "exit strategy" to prevent them from becoming weeds.

A cover crop containing a mixture of grasses and legumes will have many complimentary effects. Annual grasses germinate quickly and act as a nurse crop for the legumes. As time goes on, the grasses provide a scaffold for other plants, such as legumes, to grow upward and spread. A diverse mixture of plants also encourages a diversity of insects: both pests and beneficials. The pest species will prefer the dense vegetation of the cover crop to adjacent crop plants. The beneficial insects will be present if and when the pests decide to attack your crop plants.

When the cover crop has served its purpose, it can be tilled into the soil as green manure. Green manure adds organic matter, nitrogen and other nutrients that were contained in the leaves, stems and roots of the cover crops. The green manure should be allowed to decompose for at least three weeks before planting. Here again the combination of grasses and legumes will have the greatest benefit. Legumes add nitrogen and decompose easily while grass roots add easily decomposed organic matter. The grass leaves are less easily decomposed and will contribute organic matter over a longer period.



There are some cover crops that are neither legumes nor grasses. These include buckwheat, mustard, oil seed radish, Phacelia, rape, and others. These are usually planted with a specific objective in mind. For instance, buckwheat attracts beneficial insects, mustard has a taproot that breaks up compacted soils, radish and rape are said to lower populations of crop damaging nematodes.

The practice of cover cropping and green manuring are not just for organic gardeners. These are sound agricultural practices that decrease soil losses, increase soil fertility and organic matter, and lower inputs of nitrogen from commercial fertilizers.