



WINTER COVER CROPS FOR THE HOME GARDEN

Why plant cover crops?

- Add nitrogen for next season's vegetables
- Add organic matter to your garden soil
- Suppress weed growth
- Provide habitat and food for beneficial insects and improve soil microbial life
- Protect soil during winter rains
- Prevent leaching of valuable plant nutrients below the root zone

What to plant

In most situations, the best way to build your soil for the long-term while also feeding next season's vegetables is to plant a mixture of legumes and grasses as a cover crop. Bacteria that live symbiotically in root nodules of legumes can convert nitrogen in the atmosphere into plant-usable forms. Turning these legumes into the soil in the spring releases this nitrogen for use by your spring and summer vegetables. This practice can reduce or even eliminate the need for additional spring fertilizer and can also reduce the need for mid-season fertilization. The grasses, on the other hand, produce a larger amount of biomass and have a higher carbon content. They break down much more slowly in the soil than leguminous plants and provide more soil organic matter over the long-run. Planting a mixture of legume and 10-25% grass seed by weight gives you the benefits of each type of plant, and moderates the release of nitrogen in the soil. However, for a "quick fix" of nitrogen in an overworked area of your garden, you can plant a pure stand of legumes.

When and how to plant

September through October is the optimal time to plant most winter cover crops in Yolo County. Some hardy crops such as fava beans and ryegrass can be planted as late as early December. Daikon seeds need to be planted during warm weather in late August or September. When planting specific legume species for the first time in a certain location, seeds should be coated with the appropriate strain of rhizobial inoculant for best growth and nitrogen production, immediately prior to planting. Some seeds can be purchased already "rhizo-coated." Small seeded crops like clover should be broadcast and lightly raked in and/or covered with compost to maintain moisture and protect inoculant from sunlight.

How to manage mature cover crops in the spring

Legumes are best incorporated into the soil at the flowering stage for maximum nitrogen content. In Yolo County this is usually mid-March through April. For best results, chop plants into pieces by hand or lawn mower and use a digging fork or rototiller to fold into the top 2-3" of soil. Vining legumes, especially vetch, may need to be chopped by hand to avoid winding around rotating equipment. For less physical work, cover crops can also be cut and left on top of the soil as mulch. A significant amount of their nitrogen content will be lost to the atmosphere, but they will protect the soil if you cannot plant the next crop immediately.

Additional Resources:

1. Cover Crops Database, University of California Sustainable Agriculture Research and Education Program:
<http://www.sarep.ucdavis.edu/ccrop/index.htm>
2. Managing Cover Crops Profitably, 3rd edition. 2007. Sustainable Agriculture Research and Education.
<http://www.sare.org/publications/covercrops/index.shtml>

Seed Sources:

1. Redwood Barn, Davis, CA.
2. www.groworganic.com (Peaceful Valley Farm and Garden Supply). Mail-order seed source and informational pages.
3. www.seedsofchange.com

Table 1. Legume Cover Crops

Name	Description	Seeding Rate – oz/ 100 sq ft	Nitrogen Contribution (lbs/acre)*
Annual clovers (<i>Trifolium</i>) – Berseem, Nitro Persian, Crimson	Fast-growing, up to 2 ft tall at bloom, may suppress small-seeded vegetable germination up to 1 month after incorporating into soil.	0.5 - 1.5	75-300
Perennial clovers – Dutch white, New Zealand white (more heat-tolerant), Ladino, Palestine strawberry clover	Shade tolerant, slow-growing, low growth form (not competitive with faster-growing annual grasses or legumes). Require summer water. Can be planted under fruit trees or bushes or around larger vegetable plants as a living mulch, if kept trimmed back. Can withstand foot traffic.	0.5 - 1.5	80-130
Fava beans	2-3 ft tall with stiff stems that break down more slowly than other legume cover crops. Lower N contribution. Seeds can be eaten when fresh or stored like dry beans when hardened.	5 - 8	50-150
Field peas -- Austrian winter peas	2-ft tall vines do well with tall grass such as oats or annual ryegrass for support.	2.5 - 3.5	100-200
Vetch – purple vetch, wooly pod vetch, common vetch	Long vines do well in combination with a tall grass such as oats or annual ryegrass for structural support. When planted alone, breaks down quickly in soil for fast nitrogen. Purple vetch is the most vigorous in Yolo County conditions with mild winters. Vines may be difficult to rototill when mature.	2.2 - 3.3	50-300

* Nitrogen needs of vegetable gardens vary from 60 to over 200 lbs/acre. (1 acre = 43,560 sq ft)

Table 2. Grass Cover Crops

Name	Description	Seeding Rate – oz/ 100 sq ft
Annual ryegrass (Italian ryegrass)	Up to 3-4 ft tall. Provides support to vining legumes. Low-cost, widely available seed germinates and establishes vigorously even in cold temperatures. Very adaptable to poor soil. Fibrous root system exceptionally good at capturing unused nitrogen in the soil.	1 - 1.5
Barley	Up to 2-4 ft tall. More tolerant of alkaline or saline soils than other cereal grains. Produces more biomass in a shorter amount of time than other cereal grain cover crops. Very good weed suppressor.	2 - 3
Oats	Up to 2-3 ft tall grass that provides support and matures the same time as vetch and Austrian winter peas. Less competitive than barley, it makes a more suitable companion for clovers.	2 - 3

Other Specialty Needs:

Daikon (Japanese radish): Long, thick, edible roots can penetrate hard, clayey soil up to several feet down. Good for opening up soil, improving workability and water penetration and capturing unused nutrients. Must be sown earlier than other cover crops. Seeding rate 0.5-1 oz/100 sq ft.

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