

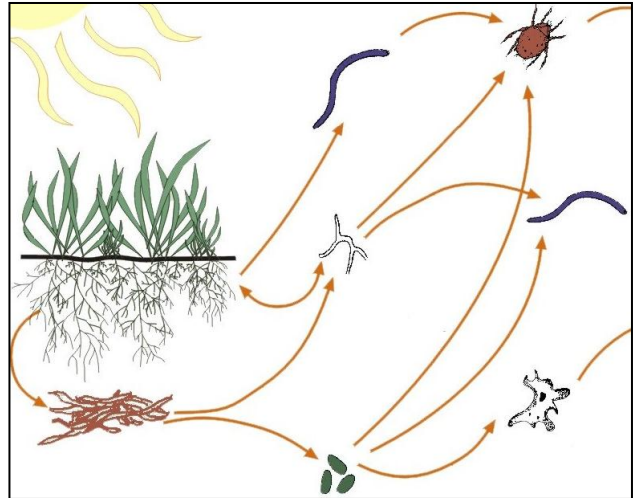
Cover Crops for Tompkins County Gardens

What are “cover crops”?

Cover crops are close-growing crops planted either in rotation with food crops, or between food crops to enrich the soil. Before planting the next vegetable crop, the cover crops can be cut and left as mulch on the soil surface, or turned in to the soil.

How can cover crops contribute to a healthy garden?

- Protect the soil from wind, rain, and melting snow
- Improve soil structure by creating pores, which increase aeration and help the soil hold more water
- Feed beneficial soil critters
- Add nutrients to the soil
- Shade out weeds early in the season
- Attract beneficial insects like bees & ladybugs
- Increase crop yields



Steps to cover cropping in your garden

- **Choose a cover crop:** Use the chart on the opposite side of this page to choose a cover crop that fits your vegetable planting schedule, gardening goals, and garden site.
- **Plant the seed:** (Remember: you can “under-seed” beneath & between food crops!)
 - ✓ Clean your plot. Remove weeds & crop residues, and stake and prune crops that are still producing. This creates space and light for your cover crop to grow.
 - ✓ Rake the soil to create a fine seedbed.
 - ✓ Broadcast the seed evenly and gently rake in.
 - ✓ COVER the newly planted seeds with row cover, to protect them from birds until the plants are established.
- **In the spring, cut down cover crops when they start to flower but BEFORE they produce seed,** in mid- to late May. Leave the shoots as mulch, or dig them into the soil. If you dig them in, wait 2-3 weeks before planting vegetables.



To learn more about cover crops for gardeners:

Please visit our website at <http://blogs.cornell.edu/gep/gardeners>



Winter-kill cover crops: These are planted in late summer and killed by the winter cold. These don't grow as much as over-wintering cover crops (see below), but you can plant early spring crops into the dead mulch next season.

Peas + Oats (mixture)

- **Plant date*:** early to late August
- Oats grow quickly & suppress weeds
- Pea is a legume (fixes N)



← Field peas

Oats →

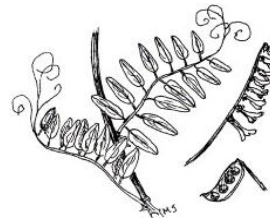


Other winter-kill cover crops include: Mustards, Tillage Radish (both Brassicas)

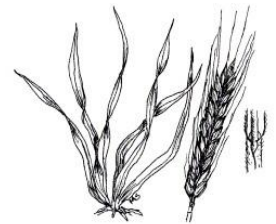
Over-wintering cover crops: These are planted in fall and survive the winter. Spring growth adds more organic matter and nitrogen (for legumes), but you need to wait until mid- to late May to cut down the cover crop before you can plant vegetables.

Hairy vetch + Winter Rye (mixture)

- **Plant date*:** early to mid-September
- Hairy vetch is a legume (fixes N) & attracts beneficial insects.
- Rye grows quickly and produces lots of plant material for soil quality, weed suppression, and mulch.



Hairy vetch



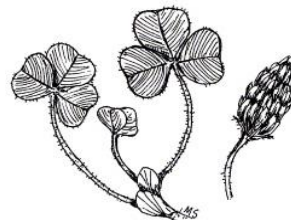
Winter rye

Other over-wintering cover crops: Crimson clover planted in September may over-winter during mild winters in downtown Ithaca (Zone 6a). However, it only over-winters reliably in Zones 7 and warmer.

Summer cover crops: These can be planted in fallow beds for the whole summer, or in the window after spring crops (like lettuce) and before fall crops (like broccoli). These cover crops can shade out weeds and add organic matter between spring and fall plantings.

Crimson clover

- **Plant date:** June-July
- Crimson clover is a legume (fixes N), & attracts beneficial insects. Somewhat shade-tolerant.



Crimson clover

Buckwheat or Buckwheat + Crimson Clover (mixture)

- **Plant date:** late May – July; cut down ~ 40 days after planting
- Buckwheat grows quickly, suppresses weeds, and attracts beneficial insects.
- If you plant a mixture, trim the buckwheat when it starts flowering to give the clover light to grow & fix nitrogen.



Buckwheat

Other summer cover crops: Cowpea (legume) + Millet (grass) mixture, Sorghum-sudangrass

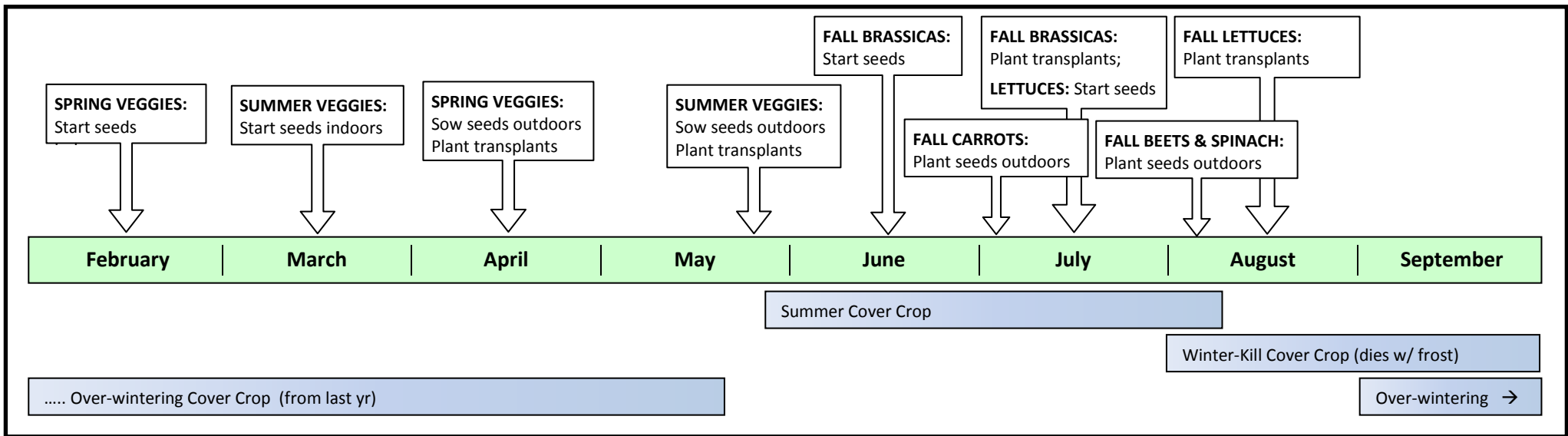
*Use earlier planting dates for rural areas and later planting dates for downtown Ithaca, which is warmer.

Soil food web diagram by N. Marshall. From: http://soils.usda.gov/sqi/concepts/soil_biology/soil_food_web.html. Cover crop drawings by Marianne Sarrantonio. From *Managing Cover Crops Profitably*: <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>

A Tompkins County Garden Calendar: Veggies and Cover Crops for All Seasons



Have you ever had early-planted tomatoes get zapped by a late frost? Or summer-planted broccoli flower and turn bitter? If so, you know that planting crops at the right time is important to ensure healthy plants and a good harvest! This timeline shows rough planting dates for **Spring, Summer, and Fall vegetables** and seasonal niches for **Summer, Winter-Kill, and Over-Wintering cover crops**. See the back of this handout for lists of vegetables and cover crops in each category.



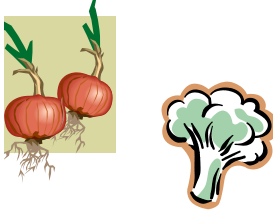
Rotation Planning

- Each year, try to **plant 1-2 vegetables AND a cover crop in each section of your garden**. Below are example rotation plans.
- Be sure to **rotate to vegetables in a different plant family each year**, to avoid building up soil-borne diseases and pests, and to replenish nutrients after periods when heavy-feeding crops are grown. See the back of this handout for lists of crops grouped by plant family.


Year 1	Year 2	Year 3	Year 4
Spring Veggie: <i>Ex: peas</i>	(over-wintering cover crop from last year – cut down in late May)	Spring Veggie: <i>Ex: spinach or beets</i>	Spring Veggie: <i>Ex: lettuces, salad greens</i>
Summer Veggie: <i>Ex: tomato/ pepper/ eggplant</i>	Summer Veggie: <i>Ex: cucumber or zucchini</i>	(short) Summer veggie: <i>Ex: string beans</i>	Summer Cover Crop: <i>Ex: buckwheat & crimson clover</i>
Over-wintering Cover Crop: <i>Ex: rye & hairy vetch (underseed)</i>	Fall Veggie: <i>Ex: kale</i>	Winter-kill Cover Crop: <i>Ex: oats & field peas</i>	Fall Veggie: <i>Ex: broccoli or cauliflower</i>

Vegetable Planting by Season & Family

SPRING VEGGIES: Start seeds indoors (transplants) in **Feb.** Sow seeds outdoors & plant transplants in **April.**

<p style="text-align: center;">Transplants:</p> <ul style="list-style-type: none"> • Alliums: Onions, Scallions (sets) • Brassicas: Bok choy, Broccoli, Cabbage, Cauliflower, Collards, Kale • Chenopods: Chard 		<p style="text-align: center;">Direct seeding:</p> <ul style="list-style-type: none"> • Alliums: Leeks • Aster family: Lettuce • Brassicas: Kohlrabi, Radish, Turnip • Chenopods: Spinach, Beets • Legumes: Peas
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SUMMER VEGGIES: Start seeds indoors in **March.** Sow seeds outdoors & plant transplants in **May-early June.**

<p style="text-align: center;">Transplants:</p> <ul style="list-style-type: none"> • Basellaceae Family: Malabar spinach • Cucurbits: Cucumber, Melon, Pumpkin, Summer & Winter Squash • Mallow Family: Okra • Solanaceae (Nightshade) Family: Tomato, Pepper, Eggplant 		<p style="text-align: center;">Direct seeding:</p> <ul style="list-style-type: none"> • Apiaceae Family: Carrots • Legumes: Beans
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FALL VEGGIES: For **Brassicas**, start seeds in **mid-June** and transplant in **mid-July.** For **lettuces**, start seeds in **mid-July** and transplant in **mid-August.** Seed carrots around **July 1**; beets and spinach around **August 1.**

<p style="text-align: center;">Transplants:</p> <ul style="list-style-type: none"> • Brassicas: Bok choy, Broccoli, Cabbage, Cauliflower, Collards, Kale • Chenopods: Chard • (Cucurbits: Planted in summer, Pumpkin & Winter Squash will grow through the fall) 		<p style="text-align: center;">Direct seeding:</p> <ul style="list-style-type: none"> • Apiaceae Family: Carrots • Aster family: Lettuce • Brassicas: Kohlrabi, Radish, Turnip • Chenopods: Spinach, Beets • Legumes: Peas
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Cover Crop Seasonal Niches

WINTER-KILL COVER CROPS: Seed in **early- late Aug;** killed by the cold. Plant Spring crops into the mulch.

<ul style="list-style-type: none"> • Legumes: Field Peas • Non-legumes: Oats (mix with Field Peas), Mustards, Tillage Radish 	
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OVER-WINTERING COVER CROPS: Interseed in **early- to mid-September** beneath & between summer vegetables. Cut down at flowering in **mid- to late May** before planting summer vegetables.

<ul style="list-style-type: none"> • Legumes: Hairy Vetch (seed in early October); Crimson Clover (seeded in September) <i>may</i> survive the winter • Non-legume: Rye (mix with Hairy Vetch) 	
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SUMMER COVER CROPS: Seed after early spring crops in **June-July** and cut down in **August** before fall crops. In buckwheat/clover mixtures, trim the buckwheat at flowering to increase space & light for clover growth.

<ul style="list-style-type: none"> • Legumes: Crimson Clover, Cowpea • Non-legumes: Buckwheat (mix with Crimson Clover), Japanese Millet (mix with Cowpea), Sorghum-sudangrass 	
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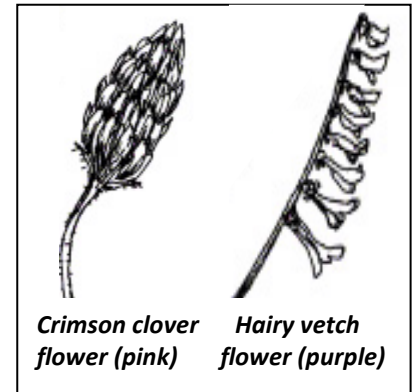
Managing your Over-wintering Cover Crops in Spring

So you planted an over-wintering cover crop last fall and now you have a beautiful stand of vetch, rye, or a mixture! Here are some tips as you prepare beds for planting vegetables.

Wait for legumes to flower

Legumes like clover and vetch should be killed while in full bloom, but before they set seed. Here's why:

- **Soil quality and fertility.** Allowing cover crops to grow until flowering maximizes their contributions to soil organic matter and nitrogen. Most nitrogen fixation happens during *spring* growth!
- **Prevent weed problems.** Legumes that are cut before they flower may regrow, and become weeds among your veggies! ☹️



To Dig or Not to Dig? : Cut-and Mulch or Dig In your cover crop

When the time comes to cut down your cover crop, you have two options:

- **Cut-and-Mulch:** Cut off the shoots **at ground level** using hedge shears or a small sickle, and leave them as mulch on the soil surface. **DO NOT pull up the plants** – letting the roots decompose in place aerates the soil and preserves organic matter.



- Cut-and mulch before planting crops you will **transplant** (tomatoes, peppers, zucchini, etc.).
- Advantages: Best for soil quality (reduces disturbance); mulch conserves moisture & keeps down weeds; less labor
- Disadvantages: You **MUST** wait until the cover crop is flowering!



- **Digging In:** Use a shovel to chop the shoots and work them into the top 3-5 inches of the soil.
 - Dig in cover crops for a **fine seedbed** (for small-seeded crops, like carrots).
 - Advantages: Best for rapid release of nitrogen from the cover crop
 - Disadvantages: Less weed control than cut-and-mulch; lots of work!

Preparing beds for planting vegetables

- **If you Cut-and-Mulch:** You can transplant right away... just push apart the cover crop mulch, leaving space around the transplants.
- **If you Dig In:** Wait **at least 10 days**, then check the seedbed. If there are clumps of plant material, wait a little longer before planting seeds. Grasses (e.g., wheat, rye) may take longer than legumes (e.g., clover, vetch). Allowing enough time for the cover crop to break down in the soil is important to replenish soil water and nutrients before planting vegetable crops.