

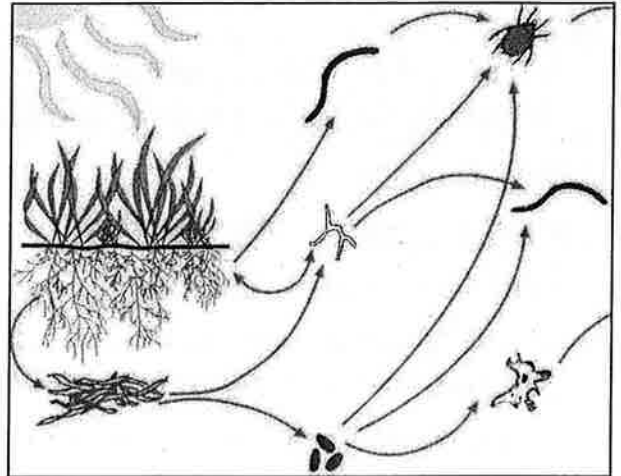
Cover Crops for NYC Urban Gardens

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 late April or early 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 urban gardeners:

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



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.

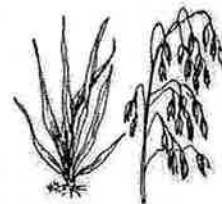
Peas + Oats

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



← Field peas

Oats →

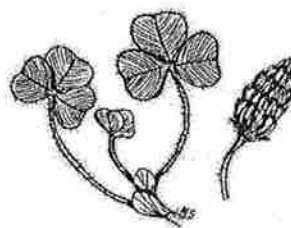


Over-wintering cover crops: These are planted in fall and survive the winter. Spring growth adds more organic matter and nitrogen (for legumes), but you need to wait until late April or early May to cut down the cover crop before you can plant vegetables.

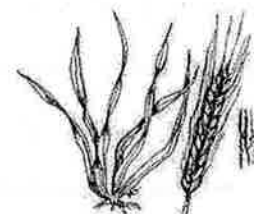
Crimson clover or

Crimson clover + Winter Rye

- **Plant date: early September**
- Crimson clover is a legume (fixes N), & attracts beneficial insects. Somewhat shade-tolerant.
- Rye grows quickly and produces lots of plant material for soil quality, weed suppression, and mulch.



Crimson clover

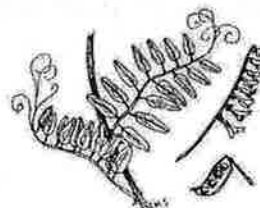


Winter rye

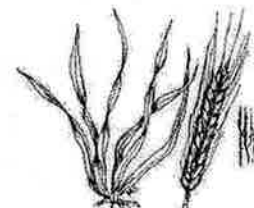
Hairy vetch or

Hairy vetch + Winter Rye

- **Plant date: late September – early October**
- 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

Summer cover crops: These are planted in the window after early spring crops (like lettuce) and before crops for a fall harvest (like broccoli or kale). These cover crops can shade out weeds and add organic matter in the few months between spring and fall plantings.

Buckwheat or Buckwheat + Crimson Clover


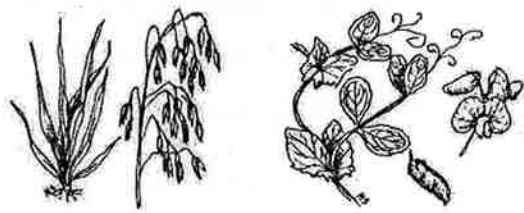
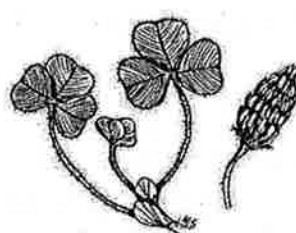
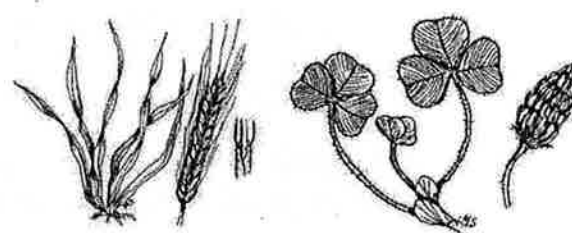
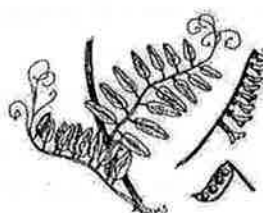
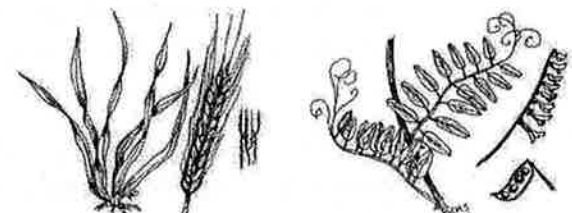
- **Plant date: May – early August**
- Buckwheat grows quickly, suppresses weeds, and attracts beneficial insects. Trim the buckwheat when it starts flowering to give the clover light to grow & fix nitrogen.



Buckwheat

Winter-Kill and Over-Wintering Cover Crop Options for NYC Gardeners: An Overview and Decision Guide

Cover crops -- close-growing plants that are cut down and mulched, or turned into the soil -- can protect the soil, improve soil quality and water-holding capacity, add nutrients, shade out weeds, and attract beneficial insects. Here are some options for NYC gardeners in the *winter-kill* and *over-wintering* niches:

	~ LEGUMES ~	~ GRASS-LEGUME MIXTURES ~
WINTER-KILL COVER CROPS		
<ul style="list-style-type: none"> • Plant: Mid- to late August • Killed by frost • Plant before: Early spring crops (greens) 	<p><u>Field Peas (P)</u></p> 	<p><u>Oats & Field Peas (O/P)</u></p> 
OVER-WINTERING COVER CROPS		
<p>Crimson Clover group:</p> <ul style="list-style-type: none"> • Plant: Early to mid-September • Cut down: Mid- to late April • Plant before: Warm-season transplant crops (tomatoes, zucchini) 	<p><u>Crimson Clover (C)</u></p> 	<p><u>Rye & Crimson Clover (R/C)</u></p> 
<p>Hairy Vetch group:</p> <ul style="list-style-type: none"> • Plant: Early to mid-October • Cut down: Late April to early May • Plant before: Warm-season transplant crops (tomatoes, zucchini) 	<p><u>Hairy Vetch (V)</u></p> 	<p><u>Rye & Hairy Vetch (R/V)</u></p> 

Winter-Kill or Over-Wintering?

- ***Plant a winter-kill cover crop if you want to plant early spring greens in that bed next season.***
 - Advantages: Since these cover crops are killed by frost, they are easy to manage. You can plant early spring crops into the dead cover crop mulch without waiting.
 - Disadvantages: Due to their short growth period, winter-kill cover crops produce less plant material and nitrogen to enrich the soil.
- ***Plant an over-wintering cover crop to get the most benefit for soil quality and fertility.***
 - Advantages: Since they grow through early spring, over-wintering cover crops produce more organic matter and nitrogen to enrich the soil (2 – 7 times as much as winter-kill cover crops!)
 - Disadvantages: These cover crops are more work to cut down. You also must wait until May to plant vegetables – so you should follow over-wintering cover crops with warm-season veggies.

Legumes or Grass-Legume Mixtures?

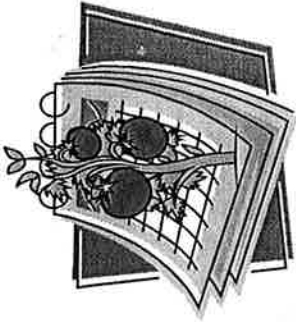
- ***Legumes are nitrogen-fixing crops like peas, crimson clover, and hairy vetch.***
 - Benefits of Legumes:
 - Soil fertility: Rhizobia in legume roots add Nitrogen to soil for future food crops.
 - Soil conditioners: Legumes promote loose, porous soil structure.
 - Disadvantages of Legumes: Legumes provide less soil cover, organic matter and weed suppression than grasses (since legume plants break down quickly).
- ***Grass-Legume mixtures include a non-nitrogen fixing grass (like oats or rye) mixed with a legume.***
 - Benefits of adding grasses to the cover crop mixture:
 - Grasses grow quickly, providing soil cover & organic matter.
 - Grasses conserve nutrients over the winter.
 - Grass mulch breaks down slowly, and suppresses weeds for longer.
 - Disadvantages of adding grasses: Grasses may decrease yields if food crops are planted too early after cutting down the cover crop (grass debris ties up Nitrogen as it breaks down.)



To learn more about cover crops for urban gardeners:

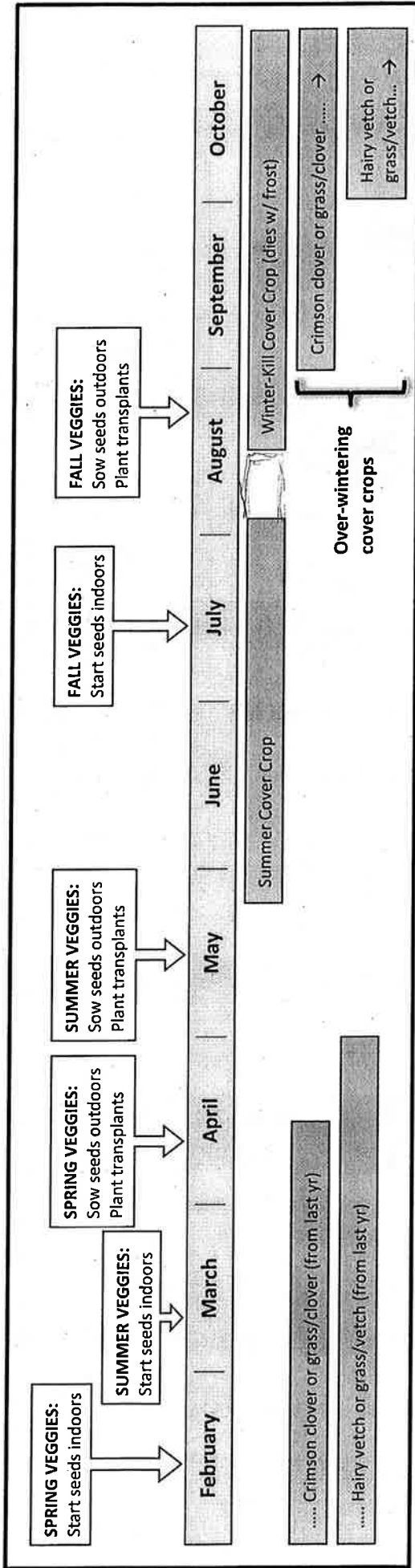
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A New York City Garden Calendar: Veggies and Cover Crops for All Seasons

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 (for example, plants in the Tomato and Cucurbit families).

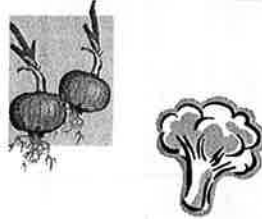
	Year 1	Year 2	Year 3	Year 4
Spring Veggie: Ex: peas		(over-wintering cover crop from last year – cut down in late April)	Spring Veggie: Ex: spinach or beets	Spring Veggie: Ex: lettuces, salad greens
Summer Veggie: Ex: tomato/ pepper/ eggplant		Summer Veggie: Ex: cucumber or zucchini	(short) Summer veggie: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

Vegetable Planting by Season & Family

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

Transplants:

- **Alliums:** Onions, Scallions (sets)
- **Brassicas:** Bok choy, Broccoli, Cabbage, Cauliflower, Collards, Kale
- **Chenopods:** Chard



Direct seeding:

- **Alliums:** Leeks
- **Aster family:** Lettuce
- **Brassicas:** Kohlrabi, Radish, Turnip
- **Chenopods:** Spinach, Beets
- **Legumes:** Peas

SUMMER VEGGIES: Start seeds indoors in March. Sow seeds outdoors & plant transplants in May-early June.

Transplants:

- **Basellaceae Family:** Malabar spinach
- **Cucurbits:** Cucumber, Melon, Pumpkin, Summer & Winter Squash
- **Mallow Family:** Okra
- **Solanaceae (Nightshade) Family:** Tomato, Pepper, Eggplant



Direct seeding:

- **Apiaceae Family:** Carrots
- **Legumes:** Beans



FALL VEGGIES: Start seeds in mid-July. Sow seeds outdoors & plant transplants in mid-August- early September.

Transplants:

- **Brassicas:** Bok choy, Broccoli, Cabbage, Cauliflower, Collards, Kale
- **Chenopods:** Chard
- **(Cucurbits:** Planted in summer, Pumpkin & Winter Squash will grow through the fall)

Direct seeding:

- **Apiaceae Family:** Carrots
- **Aster family:** Lettuce
- **Brassicas:** Kohlrabi, Radish, Turnip
- **Chenopods:** Spinach, Beets
- **Legumes:** Peas

Cover Crop Seasonal Niches

WINTER-KILL COVER CROPS: Seed in mid-August; killed by the cold. Plant Spring crops into the mulch.

- **Legumes:** Field Peas
- **Grass-Legume Mixture:** Oats & Field Peas

OVER-WINTERING COVER CROPS: Interseed in September & October beneath & between summer vegetables. Cut down at flowering in mid- to late-April before planting summer vegetables.

- **Legumes:** Crimson Clover (seed in early Sept); Hairy Vetch (seed in early October)
- **Grass-Legume Mixtures:** Rye & Crimson Clover; Rye & Hairy Vetch

SUMMER COVER CROPS: Seed after early spring crops in May – June. Cut down in August before fall crops. In buckwheat/legume mixtures, trim the buckwheat at flowering to increase space & light for legume growth.

- **Legumes:** Berseem Clover, Crimson Clover
- **Buckwheat-Legume Mixtures:** Buckwheat & Berseem or Crimson Clover

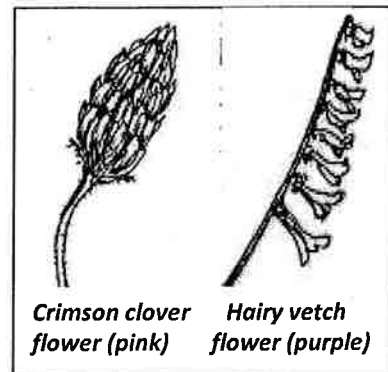
Managing your Over-wintering Cover Crops in Spring

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

❖ Wait for legumes to flower

Legume cover crops -- 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 a garden knife or small sickle, and leave them as mulch on the soil surface.
 - Cut-and mulch before planting crops you will **transplant** (tomatoes, peppers, etc.).
 - Advantages: Best for soil quality (reduces disturbance); mulch on the soil surface conserves moisture & keeps down weeds; less labor
 - Disadvantages: You **MUST** wait until the cover crop is flowering!
- **Digging In:** Use a digging fork and 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.

