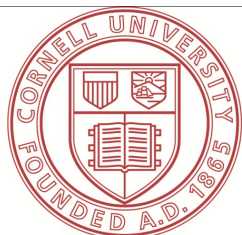


Cornell Cooperative Extension of Madison County

2011 Garden Resource Guide



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*Welcome to our 2011 garden
resource guide.*

In this guide you will find the
information you need to have a
successful home vegetable garden.
The rest is up to you and Mother Nature.

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Soil testing is available through
our office in Morrisville.

An in-office pH test is \$2.00.

You may also purchase a pH testing kit for
\$12.50, so that you may test your own soil
as well as your neighbors.

A complete soil analysis costs \$10.00 plus
postage and it usually takes a couple of
weeks to get the results. For forms and
more information go to www.dairyone.com
Soil boxes are available from your local
Cornell Cooperative Extension office.

Cornell University Garden Websites

Gardening Resources – Your portal to gardening information at Cornell.

<http://www.gardening.cornell.edu/>

Department of Horticulture Extension Programs.

<http://hort.cals.cornell.edu/cals/hort/extension/index.cfm>

Selected List of Varieties for NY Gardeners in New York State 2009.

Vegetable varieties listed in this report should be well adapted for New York State Home garden use, offer relatively high quality, be dependable, possess disease and insect resistance when possible, and have a relatively long harvest period. It is recognized that varieties not listed here may be satisfactory or even perform better under certain conditions.

<http://www.gardening.cornell.edu/vegetables/vegvar.pdf>

Vegetable Varieties for Gardeners in New York State website for detailed descriptions and seed sources of more than 5,000 vegetable varieties including those listed in this report. Compare varieties, read ratings and reviews by fellow gardeners, and offer your own observations of which varieties perform best in your garden.

<http://vegvariety.cce.cornell.edu/>

Basics

<http://www.hort.cornell.edu/gardening/homegardening/scene8904.html>

Soil basics

<http://www.hort.cornell.edu/gardening/factsheets/misc/soilbasics.html>

Growing Guides

<http://www.hort.cornell.edu/gardening/homegardening/scene0391.html>

Growing in containers

<http://www.gardening.cornell.edu/factsheets/misc/containers.pdf>

Organic gardening online course

<http://hort.cals.cornell.edu/cals/hort/teaching/distance-learning/organic-gardening.cfm>

Bluegrass Lane trials

<http://www.hort.cornell.edu/department/faculty/wmiller/bglannuals/>

Fruit cultivars – Best bets for New York gardeners. Berries, grapes, tree fruit, and more.

<http://www.gardening.cornell.edu/fruit/cultivars.html>

Sharpen your mowing practices

http://www.gardening.cornell.edu/news/mow_sharp.htm

CNY Bounty

<http://www.cnybounty.com>

Madison County Agriculture

<http://www.madisoncountyagricultur.com>

Home Grown Facts

Soil Preparation and Fertilizers For The Home Flower And Vegetable Garden

A well drained soil is preferred for flower and vegetable gardens. Avoid low areas where water tends to collect or the soil remains soggy well into spring or after rain. Avoid planting on subsoil fill. Coarse sandy soil that dries rapidly is satisfactory if properly prepared with organic matter and water is available for irrigation. Because gardeners usually have to work with soil available on the property, modification of the soil and proper selection of suitable plants is essential.

General Information:

Organic Matter

Organic matter loosens and improves the structure and drainage of heavy clay soils and in medium and light sandy soils, helps to hold moisture and nutrients. Sources of organic matter are peat moss, compost, plant residues, leaf mold, manure, wood chips, sawdust and ground corn cobs. The last 3 materials tend to reduce the nitrogen available to plants when mixed into the soil; use 1 ½ times the normal rate of fertilizer before planting to supply additional nitrogen.

Soil Reaction Or pH

The term pH refers to the acidity or alkalinity of the soil. A pH of 7.0 is neutral, while soil with pH of 7.1 or above is alkaline or "sweet". Most plants grow best in soils with pH of 6.0 to 6.8. When the pH is below 6.0, ground agricultural limestone is added to raise the pH. Peat moss and many soluble fertilizers tend to lower the pH. If a soil is too alkaline, iron sulfate or sulfur are used to lower the pH. Moss or a green color on the soil are not definite indications that the soil is too acid, in fact many mosses prefer an alkaline soil. A pH test is recommended every 2 or 3 years.

Fertilizers

For good growth, ornamental plants need various elements especially nitrogen, phosphorus, and potassium; these are supplied in commercial complete fertilizers. Commercial fertilizers bear a label that gives the analysis such as 5-10-10, 10-10-10, etc. A 10-10-10 fertilizer, for example, contains 10% nitrogen (N), 10% phosphoric acid (P₂O₅) and 10% potash (K₂O). Dry fertilizers are used in soil preparation before planting and can be used in established gardens if applied carefully along plants or along the rows. Fertilizer on the leaves causes leaf injury. Fertilizer solutions are useful for fertilizing annual and perennial flower borders because of ease of application and uniform distribution among plants.

Minor or trace elements are usually not a problem in garden soils if one adds organic matter and uses complete fertilizers. Often, foliar chlorosis attributed to nutrition is due to root injury by too much fertilizer, soil pests, or inadequate aeration because of poor drainage of water.

In vegetable gardens where the plants have been well fertilized for several years, 1 or 2 pounds of 10-10-10 or 5-10-10 fertilizer may give the best results.

Often good results are obtained when half of the fertilizer is mixed in thoroughly while the soil is being prepared and the remainder applied as a side dressing during the growing season.

If a soil test shows adequate nitrogen but inadequate phosphorus and potassium, a commercial fertilizer of 0-20-20 or similar analysis should be applied at 2 or 3 pounds per 100 square feet

Fertilizers During The Growing Season

For annual or flowering plants, apply fertilizer in the spring after plants have started to grow and are 4 to 6 inches tall. A second application is made 4 to 6 weeks later. For some late flowering plants such as chrysanthemum and hardy asters, a third application is made a month later. If you find it difficult to apply dry fertilizers among plants, consider fertilizer solutions which can be applied right over the plants.

Commercial dry fertilizers: These are 10-10-10, 5-10-10, or similar analysis applied at 2 pounds of fertilizer per 100 square feet of area. Spread the fertilizer among the plants and then cultivate lightly to scratch it into the soil without injuring the roots. Don't allow the fertilizer to fall on the plant; it will cause leaf injury unless washed off immediately. In a flower border, it often is easier and safer to apply fertilizer solution.

If the plants are in rows such as in a vegetable garden, sprinkle fertilizer in bands along each side of the row about 2 to 4 inches away from the plants using 1 ½ pounds on each side of the row for each 100 feet of row. Then cultivate the fertilizer lightly into the soil.

Readily soluble high-analysis fertilizers: These are dry fertilizers which dissolve quickly in water making a fertilizer solution easily applied among plants.

Fertilizer solutions: Dissolve 1 ¼ ounces of 15-15-15, 15-30-15 or similar analysis OR 1 ounce of 20-20-20, 23-19-17 or similar analysis in 2 ½ gallons of water. If directions are given on the fertilizer container, follow them instead. Give the soil a good watering with the fertilizer solution, about 1 quart per square foot of soil area. Two waterings with these solutions are equivalent to about 1 of the aforementioned applications of dry fertilizers. A home postal scale is useful in weighing small amounts of fertilizer.

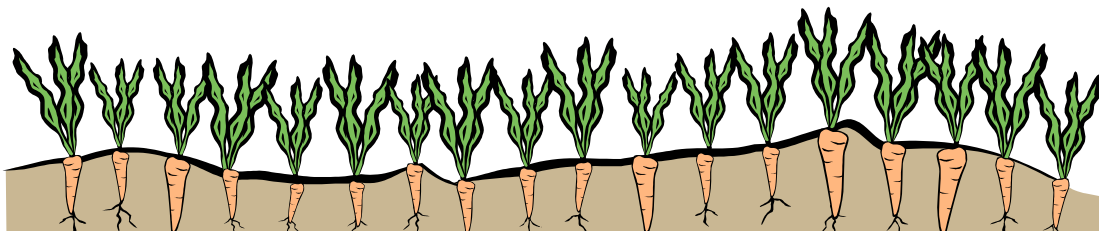
It's sometime easier to use volume measurement. Fertilizers vary somewhat in their weight per unit volume, but in general two level tablespoons of a 20-20-20 or similar fertilizers weigh about one ounce. Thus, you can use 3 tablespoons of a 20-20-20 or similar fertilizer in a 2 ½ gallon watering can, stir it well, and water the plants.

Fertilizer proportioners: For larger garden areas, it may not be convenient to apply liquid fertilizer with a 2 ½ gallon watering can. There is available a small brass proportioner which is attached to the faucet, and then the garden watering hose is attached. "A plastic tube is attached to the proportioner, and one end placed in a pail of concentrated fertilizer stock solution. When you turn on the water, fertilizer solution is sucked up through the small tube and mixes with the water as it goes out through the hose. You can figure that the concentrated fertilizer solution is diluted about 15 to 16 to 1. Therefore, a pound of 20-20-20 or similar soluble fertilizer dissolved in 2 ½ gallons of water will result in a stock solution coming out the end of the hose equivalent to 1 ounce in 2 ½ gallons of water.

Recommended Nitrogen Side Dressings

Crop	Amount of Side Dressing (Lbs of Ammonium Nitrate* per 100-foot row)	Times of Application
Tomato	1	1) 1 to 2 weeks before first tomato ripens 2) 2 weeks after picking first ripe tomato 3) 1 month later
Cucumber, Cantaloupe	1	1) 1 week after blossoming begins 2) 3 weeks later
Sweet Corn	1	1) When plants are 8"-10" tall 2) 1 week after tassles appear
Asparagus	2	Before growth begins in spring
Potato	1 ½	After tuber formation starts
Peas & Beans	1	After heavy bloom and set of pods
Peppers, Eggplants	1	After first fruit sets
Cabbage, Cauliflower, Broccoli	1	3 weeks after field transplanting
Spinach, kale, mustard & turnip greens	1	When plants are about one-third grown
Onions (mature)	1	1 to 2 weeks after bulb formation begins
Sweet potatoes, watermelons, carrots, beets, turnips, lettuce	None	Excessive amounts of nitrogen will reduce yields of lower quality or both.
Annual Flowers	1	4 to 6 weeks after planting

*Ammonium Nitrate analysis is 33-0-0. Other forms of Nitrogen may be used on an equivalent basis.



Specific Guidelines

Soil Preparation Before Planting

Organic Matter: For a new garden, or an area being rehabilitated, where there are no plants, spread organic matter such as peat moss, or compost, on the soil at the rate of 2 bushels per 100 square feet of area. You can use more peat moss or compost if you wish. Weathered sawdust and wood chips also are satisfactory.

For vegetable gardens, where control of weeds by cultivation is easier than in a mixed flower garden, farm manure can supply most of the nutrients needed by vegetable plants if the manure is supplemented with 1 pound of superphosphate per bushel of manure, which is enough for 50-75 square feet of garden area. Unless the manure is well rotted, apply and turn under by plowing, spading or rotary tilling. Poultry, sheep, or goat manure is used at no more than 1 bushel to 100 square feet of garden area.

For a vegetable garden, organic matter also can be supplied by sowing rye or ryegrass seed in late summer or early fall and then plowing or spading it into the soil early in the spring.

For an established flower garden, organic matter is added by mulching plants with peat moss or leaf compost which is cultivated into the soil in the fall, or spring, when the soil is not too wet.

Compost is prepared by putting leaves, grass clippings, straw and waste plant material (unless it is diseased) from the garden and kitchen in a pile where the materials gradually break down and then are applied to the garden before soil preparation. A cup of agricultural lime and a cup of 10-10-10 or 5-10-10 fertilizer with each bushel of material added to the pile hasten decay. Keep the material moist. A cylinder of woven wire, or snow fence lined with a sheet of plastic, is a good holder for compost. However, it takes a lot of plant material to make a small amount of compost.

Soil pH

The first step after soil test results are received is to amend the soil pH. Soil pH is a measure of how acidic or alkaline the soil is. A pH value of 7 indicates a neutral soil. A pH below 7 is an acid or "sour" soil while a pH above 7 means an alkaline or "sweet" soil. Soil pH greatly influences the availability of nutrients in the soil. Most garden soils should be slightly acidic with a pH between 6 and 7.

Soil pH is amended by applying either lime or sulfur. Lime raises a soil's pH while sulfur lowers it. It is best to apply lime or sulfur 3-4 months prior to planting crops. For maximum effectiveness, the amendment should be mixed into the upper 6" of soil after surface application.

The quantity of lime or sulfur needed to attain a proper pH will depend on your soil's texture and current pH. Use the charts below to help determine proper amounts.

For raising the pH, Use lime only when a soil pH test has been done and the soil is shown to be too acidic.



Lbs. of Lime/100 ft2 to raise pH to 6.5			
Soil Texture			
<u>Soil pH</u>	<u>Sand</u>	<u>Loam</u>	<u>Clay</u>
4.5	12.6	25.3	34.8
5.0	10.6	21.1	29.0
5.5	4.2	8.4	11.6
6.0	1.7	3.3	4.5

For lowering the pH:

If the pH is 7.5 to 8.0, one can lower the pH by applying 2 pounds of finely ground sulfur or 6 pounds of iron sulfate per 100 square feet of area and mixing it thoroughly into the soil before planting.

The application of sulfur should be done as far as possible in advance of planting. Unlike lime that dissolves and immediately begins raising the pH, sulfur is utilized by soil organisms which in turn begins the acidification process. Very little reaction takes place in the colder months and even during the warm periods the process is slow.

Lbs of Sulfur/100 ft2 to lower pH to 6.5			
Soil Texture			
<u>Soil Ph</u>	<u>Sand</u>	<u>Loam</u>	<u>Clay</u>
7.0	.5	1.0	1.4
7.5	1.0	2.0	2.7
8.0	1.7	3.4	4.7
8.5	3.0	5.0	6.0



Fertilizers Before Planting: Apply 10-10-10 or 5-10-10 complete fertilizer at the rate of 4 or 5 pounds per 100 square feet. If manure has been worked into the soil, apply only 2 pounds. After amending the pH, the next step is to establish a basic soil fertility level by applying a fertilizer according to the soil test results. This first application is usually heavy and will not be needed every year. Once a basic fertility level is achieved, it is maintained by using light annual fertilizer applications, applying seasonal side dressings, and maintaining high organic matter levels.

Complete liquid fertilizer: These are similar to readily soluble fertilizers except that they are liquid concentrates which are diluted with water, according to manufacturer’s directions, to make a fertilizer solution to be applied to the soil.

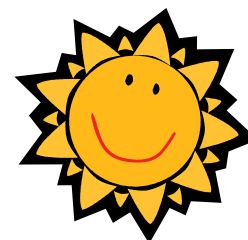
Slowly available fertilizers: Some relatively new fertilizers are manufacture by a special process so that the nutrients are released slowly. One fertilizer with an 18-6-12 analysis will supply nutrients for 8 to 9 months, making it possible to apply the fertilizer at time of planting, with the nutrients being released slowly into the warm soil all season long. Some formulations released for 3 to 4 months. Most research information relates to its use for greenhouse and nursery crops. Follow the manufacturer’s recommendations on the container for home gardens.

Foliar fertilization: This refers to application of fertilizer solutions to the foliage of growing plants and is sometimes called "Foliar feeding". Research has shown that small amounts of nutrients enter the leaves. Foliar applied nutrients may improve the appearance and growth of some plants especially when absorption through the roots has been inadequate. Not all plants are equally adaptable or responsive to foliar fertilization.

One can apply the fertilizer solutions to the foliage, and drippings from the leaves will provide nourishment through the soil and roots. Foliar applications, however, are only a supplement, not a substitute, for soil applications which are essential for good growth and flowering plants.

If you have limed and fertilized properly, yet your garden is not producing, perhaps other factors may be the cause of your problem:

- Is your garden receiving 4-6 hours of sunlight daily?
- Is the soil poorly drained?
- Have you used recommended vegetable varieties?
- Have you planted too early, too late?
- Have you controlled insects, diseases and weeds?



Addition Recommendations For Flowers

Flowering Bulbs

Spring Flowering bulbs – crocus, hyacinth, narcissus, tulips.

At time of planting – 2 lbs. 5-10-10/100 sq. ft.

Maintenance – when plants flower, apply: 2 lbs. 5-10-10/200 sq. ft.

In addition, apply 2 lbs. of bonemeal/100 sq.ft.

Summer flowering bulbs – amaryllis, canna, dahlia, glad, iris.

At time of planting – 1 lb. 5-10-10/100 sq. ft.

Maintenance – when plants flower, apply: 1 lb. 5-10-10/100 sq. ft.

Annuals

Fertilizer practices:

At time of planting, 4 lbs. 5-10-5 or 5-10-10/100 sq. ft.

Apply ½ in upper 6" at time of plowing.

Apply ½ prior in transplanting or seeding.

Maintenance – six weeks after planting use a water soluble fertilizer.

Perennials

Fertilizer practices:

At time of planting, 4lbs. 5-10-5 or 5-10-10/100 sq. ft.

Apply ½ in upper 6" at time of plowing.

Apply ½ prior to transplanting.

Maintenance:

Apply 2 lbs. of 5-10-5 or 5-10-10/100 sq. ft. in early spring.

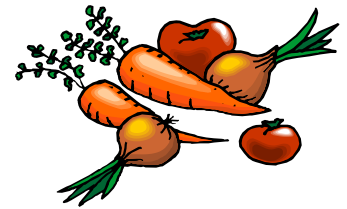
Apply 2 lbs. of 5-10-5 or 5-10-10 sq. ft. early June.

Apply 1 lb. of 5-10-5 or 5-10-10/100 sq. ft. mid-July (with longer growing season)

Growing Time For Transplants

The amount of time required from planting seed indoors to transplanting outdoors varies. Plants will need at least a week to harden off before planting outdoors. This consists of providing cooler temperatures and cutting down on the water and fertilizer.

<u>Vegetable</u>	<u>Start Seed Indoors</u>	<u>Transplant Seedlings Outdoors</u>
Onions	Early March	Late April - Early May
Broccoli	Late March - Early April	Late April - Early May
5-6 weeks		
Brussels Sprouts	Late March - Early April	Late April - Early May
5-6 weeks		
Cabbage	Late March - Early April	Late April - Early May
5-6 weeks		
Cauliflower	Late March - Early April	Late April - Early May
5-6 weeks		
Lettuce	Early April	Late April - Early May
4-5 weeks		
Cucumbers	Early Mid - Mid May	Late May --Early June
2-3 weeks		
Melons	Early Mid May	Late May --Early June
2-3 weeks		
Squash, Pumpkins	Early Mid May	Late May --Early June
2-3 weeks		
Tomatoes	Late March - Early April	Late May- Early June
5-6 weeks		
Peppers	Late March - Early April	Late May - Early June
5-8 weeks		
Eggplant	Late March - Early April	Late May - Early June
6-8 weeks		



Best Time To Plant Outside

Mid – Late April or early May: As soon as ground can be worked.

Cool Season Crops: Can tolerate a light frost. Grow best at 50 degrees or 65 degrees F.

Vegetable: Onions, lettuce, peas, spinach, garlic, cabbage, radishes turnips, rhubarb, parsley, endive, carrots broccoli, beets, cauliflower, Brussels sprouts, salsify and parsnips.

Late May: After soil has warmed and all danger of frost is past.

Warm Season Crops: Cannot tolerate frost, grows best at 60 degrees – 80 degrees F.

Vegetable: Snap beans, sweet corn, cucumbers, tomatoes, eggplant, peppers, pumpkins, swiss chard, winter squash, potatoes, muskmelons, watermelons, and lima beans.

Last Seeding And Transplanting Dates For Vegetables In New York

P.A. Minges, Dept. of Veg. Crops, Cornell University

Questions often arise on how late a vegetable can be planted in the garden in New York State and still reach maturity or useable size before a frost or cold weather stops growth. The last dates listed below for each crop are for Central and Northern New York State. Most years the crop will reach the harvestable stage if planted by the date indicated, but yields of crops requiring multiple harvesting (tomatoes, peppers, cucumbers, etc.) likely will be rather light unless the fall weather is warmer than normal, and first frosts are unusually late.

June 1-7

Beans, lima
Edible cowpeas*
Herbs, most
Muskmelons*
Okra
Popcorn
Edible Soybeans
Tomatoes (late)*
Watermelon*

June 20-27

Beans, pole, snap
Brussels sprouts
Cabbage (late)*
Celeriac
Celery
Eggplant*
Leeks
Peppers
Sweet corn (medium)
Tomatoes (early)*

July 5-8

Beans, snap
Cabbage (medium)*
Carrots
Cauliflower (late)*
Chinese cabbage
Cucumbers
Lettuce, Head
Lettuce, romaine
Onions, green
Parsley
Parsnip
Rutabagas
Squash, summer
Sweet corn (early)

July 21-24

Beets
Broccoli (late)*
Cabbage (early)*
Collards
Endive
Kale
Kohl-rabi
Lettuce, bibb
Mustard
Radishes, Chinese
Swiss Chard

August 1-3

Broccoli (early)*
Cauliflower (early)*
Lettuce, leaf
Spinach
Turnip

September 1-7

Radishes

September 1-30

Overwintered spinach

October 1-30

Overwintered garlic



*Indicates the crop normally is transplanted and the date is for setting transplants in the garden.

NOTES:

1. Success at these last dates will vary for the location and the year.
2. Onions should be seeded by April 30 or transplanted by May 15.
3. Many crops normally transplanted can be seeded directly in the garden. These include broccoli, cabbage, cauliflower, muskmelons and tomatoes. The last safe seeding is 2-3 weeks earlier than the transplant date shown above.
4. The early, medium, late in parenthesis, refer to the variety. Early maturing varieties can be seeded later than slower growing late varieties.

Vegetable Guide

Vegetable	Planting Distance		Cool Season 1	Warm Season 2	*Days To Maturity	Sun Shade
	Between Plants	Between Rows				
Asparagus	18"	5 - 6'	*	*	3 years	Sun
Beans (bush)	2 - 4"	18 - 24"		*	45 - 65	Sun
Beans (lima)	3 - 6"	30 - 36"		*	60 - 80	Sun
Beans (pole)	8 - 12"	24 - 36"		*	60 - 70	Sun
Beets	2 - 4"	12 - 18"	*		55 - 65	Lt. Shade
Broccoli/Cauliflower	18 - 14"	30 - 36:	*		60 - 80T t	Sun
Brussels Sprouts	24 - 30"	30 - 36"	*		80 - 90T	Sun
Cabbage	1 - 1 1/2"	30 - 36"	*		65 - 95T	Sun
Carrots	1 1/2 - 2"	12 - 18"	*		60 - 80	Lt. Shade
Cucumbers	1', hills 2-3'	4 - 6'		*	55 - 65	Sun
Eggplant	18 - 24"	30 - 36"		*	75 - 95T	Sun
Lettuce (leaf)	6 - 8"	12 - 18"	*		55 - 80	Lt. Shade
Lettuce (head)	12"	12 - 18"	*		45 - 60	Lt. Shade
Muskmelons	3 - 4"	5 - 6"		*	75 - 100	Sun
Onions and Garlic	3 - 4"	12 - 18"	*		95 - 120	Sun
Peas	2"	18 - 24"	*		65 - 85	Sun
Peppers	18"	18 - 24"		*	60 - 80T	Sun
Potato	8 - 10"	30 - 36"	*	*	90 - 105	Sun
Pumpkins	2 - 4"	6 - 8"		*	70 - 115	Sun
Radishes	1"	12 - 18"	*		20 - 50	Lt. Shade
Spinach	2-3"	12 - 18"	*		40 - 65	Lt. Shade
Squash (summer)	12 - 24"	4 - 6'		*	50 - 60	Sun
Squash (winter)	12 - 24"	6 - 8'		*	85 - 120	Sun
Sweet Corn	1'	30 - 36"		*	60 - 90	Sun
Tomatoes (staked)	2'	30 - 36"		*	55 - 90T	Sun
Tomatoes (un-staked)	2 - 3'	3 - 5'		*	55 - 90T	Sun
Turnips	2 - 3"	12 - 18"	*		45 - 60	Lt. /shade
Watermelon	4 - 6'	6 - 8"		*	80 - 100	Sun

1. Cool season plants can tolerate some frost and grow in cool soil, 50 – 65 degrees, plant between April 15 – May 1. A second crop can be sown in late July to early August for fall harvest.
2. Warm season plants cannot tolerate frost and grow best at 65 – 85 degrees, plant after May 20, in cooler areas, after May 30.
3. All vegetables grow best in FULL SUN, the leafy crops and root crops will tolerate some shade.

T T – number of days from setting out transplants to maturity.

* for more specific information on planting times consult the fact sheet "Growing Time For Vegetables."



Planning Your Vegetable Yields

Tomatoes	8 – 10 lbs/plant for staked	Onions	100 lbs / 100 ft. row
Beans	60 lbs/100 ft. of row	Beets	60 lbs/100 ft. row
Peas	15 lbs/100 ft. of row	Broccoli	1 lb/plant
Peppers	1 – 2 lbs/plant	Cauliflower	1 ½ lbs/plant
Sweet Corn	30 – 40 lbs/100 ft. row		

Sample Plan For A Vegetable Garden 25' X 30'

This is a general plan and many substitutes may be made. Each vegetable listed on the garden plan is followed by the planting date and the spacing within the row. Radishes, row 5 as well as lettuce, Row 4 can be sown at two week intervals for continuous supply. Row 6 is planned for bush beans, pole beans could also be planted and staked, spacing 18" – 24" within the row. The tomato spacing is for large plants, smaller cherry tomatoes can be spaced 2' x 2' (un-staked). Summer squash, Row 10, can be zucchini, yellow crookneck or bush type winter squashes. Cucumbers, Row 11, is spaced for large pickling or slicing cucumbers, a dwarf vine Patio Pick, can be planted in one-half this space. Sweet corn can be substituted for the summer squash and cucumbers – space the rows 3' apart and plant the seed in hills 3' apart, 3 plants per hill. This will yield about 5 dozen ears. The approximate cost for the seed and plants (cabbage, pepper, tomatoes purchased as plants) plus 1 lb. of onion sets for this garden plan is \$45.00 in 2008. Keep in mind that it is necessary to rearrange this plan each year to reduce the buildup of soil borne pathogens.

25 Feet

18"	Peas	4/15,	1 ½" spacing, followed by Carrots	6/30.	1 ½" spacing
18"	Peas	4/20,	1 ½" spacing, followed by Beets	7/5,	2" spacing
18"	Onions	4/15,	1" spacing for sets or transplants		
15"	Lettuce	4/15,	6-8" spacing: can be sown at 2 week intervals		
15"	Radishes	4/15,	1 ½" spacing	PARSLEY	CHIVES

24"	Beans	5/30,	1 ½" – 2 spacing-----		
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30"	Cabbage	4/15 early,	1 -1/2' spacing	5/30 late,	1 – 1'1/2 spacing
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30"	Peppers	5/30,	18" spacing		
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X	X	X	X	X	X
TOMATOES 5/30, 3-5' SPACING UN-STAKED,			2 -3' spacing STAKED		
X	X	X	X	X	X

X	X	X	X	X	X	X
Summer Squash		5/30,	12-24" Spacing			

4'	Cucumber	5/30	2 plants per hill, each hill	2-3' apart
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3'



Cornell Gardening Resources A Guide to the Nutrient Value of Organic Materials

Ecogardening Factsheet #8, Spring 1993

Many home gardeners want to grow fruits and vegetables with organic sources of fertilizer. Considering the many benefits of the addition of organic materials, this subject warrants attention. Manures and composted plant materials add organic matter. This aids in moisture retention, helps reduce compaction and can buffer extremes in pH. It also helps maintain the structure and nutrient holding capacity of the soil.

However, the nutrient level of organic materials is lower, rate of release is slower, and levels of minerals may vary and are not balanced. The information below will help you interpret differences in nutrient content and relative availability of organic materials.

Fruits and vegetables often have high nitrogen demands, and it can be difficult to provide sufficient nitrogen from an organic source throughout the growing season of the crop. In addition, availability of nitrogen late in the season can make perennial plants such as raspberries and apples susceptible to winter injury. It is a challenge to provide plants with a readily available organic nitrogen source early in the growing season, yet have it less available in late summer.

Composition of Manure from Samples Reported in Knott's Handbook for Vegetable Growers				
Fresh Manure with bedding or litter:	Moisture (%)	Nitrogen (%N)	Phosphorus (%P2O5)	Potassium (%K2O)
Cattle	86	11	4	10
Duck	61	22	29	10
Goose	67	22	11	10
Hen	73	22	22	10
Hog	87	11	6	9
Horse	80	13	5	13
Sheep	70	20	15	21
Turkey	74	26	14	10
Dried Commercial products:				
Cattle	10	42	42	61
Hen	13	31	31	40
Hog	10	45	45	20
Rabbit	16	26	26	32
Sheep	16	32	32	41
From: Lorenz, Oscar A. and Donald N. Maynard. 1980 Knott's Handbook for Vegetable Growers. Second edit. Pg. 75-76				

Guide to the Mineral Nutrient Value of Organic Materials Percent (%)				
Materials:	Nitrogen (%N)	Phosphorus (%P2O5)	Potassium (%K2O)	Relative Nutrient Availability
Bone Meal (raw)	2 to 6	15 to 27	0	Slow
Bone Meal (steamed)	0.7 to 4	10 to 34	0	Slow Med.
Cocoa Shell Meal	2.5	1	2.5	Slow
Compost (not fortified)	1.5 to 3.5	0.5 to 1	1 to 2	Slow
Cotton Seed Meal(dry)	6	2.5	1.7	Slow Med.
Dried Blood (dry)	12	1.5	0.57	Med. Rapid
Fish Meal (dry)	10	4	0	Slow
Manure(fresh)				
Cattle	0.25	0.15	0.25	Medium
Horse	0.3	0.15	0.5	Medium
Sheep	0.6	0.33	0.75	Medium
Swine	0.3	0.3	0.3	Medium
Poultry (50% _o water)	2	2	1	Med. Rapid
Milorganite (dry)	5	2 to 5	2	Medium
Mushroom Compost	.4 to .7	1	.5 to 1.5	Slow
Peat and Muck	1.5 to 3	.25 to .5	.5 to 1	Very Slow
Sawdust	4	2	4	Very Slow
Sewage Sludge (digested)	1 to 3	.5 to 4	0 to .5	Slow
Urea	42 to 45	0	0	Rapid
Wood Ashes*	0	1 to 2	3 to 7	Rapid
* Wood ashes may raise pH				

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Cornell Gardening Resources

The Use of Rowcovers in the Home Garden Ecogardening Factsheet #6, Spring 1993

Late frosts, low yields, a short growing season and insect damage are four common problems that home gardeners would rather do without. Fortunately, the development of rowcovers has added a new dimension to the eco-gardener's management strategy. Rowcovers are available in a variety of materials, including both plastics and fabrics. They can enhance yields of some crops, while producing an early harvest on others. They may offer a few degrees of frost protection, and when properly used, they can effectively block the feeding activity of some insects.

Extending the season

The use of protective coverings to produce a miniature greenhouse effect is certainly not a new idea. A popular practice among some European growers in the early 1900's was to place glass bell jars over individual plants. It was reported in 1910 that there were over 2 million of these jars being used in the Paris vicinity alone.

Less expensive paper materials were eventually developed which replaced the bell jars, and by the mid 1950's "hot caps" or "hot tents" were being used in several areas of the United States. Although these are still in use in home gardens today, many gardeners are enthusiastic about the advantages that rowcovers have to offer.

The ideal rowcover would be one which is inexpensive, prevents air temperatures from falling below freezing at night, increases growing degree-days, and avoids excessively high temperatures and humidity that can have a negative impact on growth and flower development. If you have already done some experimenting with rowcovers on your own, you probably have already found that no such ideal material exists at this time. In fact, there are no rowcovers that can offer more than a few degrees of frost protection. Their major benefit is associated with more rapid growth by increasing daytime temperatures, not with frost protection.

Cooler rowcover materials can be selected so that the risk of damaging high temperatures is minimized, but keep in mind that cooler materials will not increase growth and yield as quickly. You may want to use a cooler tunnel or hot caps on most of your plants, and a warmer but riskier product for earliest yields on a few plants. An approximate ranking of row cover types from warmest to coolest would be:

Hottest

Clear w/holes
White w/holes
Clear slitted

Spunbonded fabrics
Woven fabrics
White slitted



Cooler

Most plastic rowcovers are supported by wire hoops. After the crop is planted, 10 gauge hardened galvanized wire pieces (36 in. long for 4 ft. plastic, 48 in. for 5 ft. plastic) are bent in the shape of an arch and placed in the soil at 3-4 ft. intervals. Do not place hoops directly over the plants so that you can create slits for ventilation or irrigation if necessary. The height of the tunnel is determined by the height of the crop to be grown.

Floating rowcovers made of lightweight spunbonded or woven fabrics can be placed loosely over the plants without wire supports. The edges can be held down with soil or stones. These are easier to apply, and are the choice for small gardens. Fabric materials can be used again unless they have been damaged or ripped.

Proper ventilation is essential, particularly with the hottest materials. Growers drill holes in the rolls of plastic prior to application; home gardeners may do this or slit plastic after it has been rolled out. Allowing excessive heat buildup is the most costly and most common error with first-time rowcover users. As a general rule, if outside air temperatures approach 80 degrees F., additional ventilation should be considered. In years with unseasonably warm temperatures, covers do more harm than good.

Normally, rowcovers are removed from vegetable crops 3-4 weeks after transplanting, and from Junebearing strawberries at the beginning of bloom to allow bees to pollinate. You may want to allow plants to acclimate gradually by increasing the size of slits over a 3-7 day period prior to complete removal.

Insect Control

For insect control, rowcovers must go on before the insects are present. Also, rotate the location of crops that attract insectpests that overwinter in the soil. If you don't you may increase insect problems by trapping the insects with their food source. For row covers to be effective barriers to insects, they must be sealed at the sides and ends of the rows, (i.e., edges covered with soil) so that insects cannot crawl under them.

Specific Crop Responses

Heritage Red Raspberry: Rowcovers are applied after pruning plants to the ground in March, and are removed 2 months later. The response to rowcover may vary between years, but in general, the use of rowcover can help to enhance the early production of the crop. This is beneficial since the harvest of 'Heritage', a late season raspberry, is often prematurely terminated by frost.

Junebearing Strawberries: Rowcovers can enhance both early production and yield of strawberries. In gardens experiencing high winds, cold temperatures and inconsistent snowfalls, mulch the strawberries with straw in the late fall. Remove the straw after March 1, and cover the plants immediately with the rowcovers. Place rowcovers over the plants in the late winter. Remove the covers as soon as the plants begin to blossom in the spring, or the rowcovers may interfere with pollination. Use spunbonded materials; plastics may enhance earliness to the point of creating problems with late spring frost.

Rowcovers can also reduce injury by tarnished plant bug. Due to accelerated flowering, the insects are present after the susceptible stage of development.

Muskmelon: The most success using tunnels on vegetable crops has occurred with muskmelon. Ventilated clear plastic is often used. A 7-10 day jump on the season with an increase in yields can be attained. Melons are not particularly sensitive to the high temperatures which sometimes develop with the clear plastic tunnel. Remove tunnels when the plant begins to flower. (Also see vine crops)

Summer Squash: Similar to melons, it is one of the easiest and most responsive crops to grow under tunnels. (Also see vine crops)

Cucumber: More sensitive to high temperatures than melons, the cucumber can still show a very positive response to tunnels. When temperatures are cool, a clear tunnel with holes may be best, but ventilated white plastic or fabric tunnels, however, are safest. (Also see vine crops)

Pepper: Flower abortion and loss of early yields can occur under high temperatures, so adequate ventilation is critical. Early growth and early yield can be successfully obtained with ventilated white plastic.

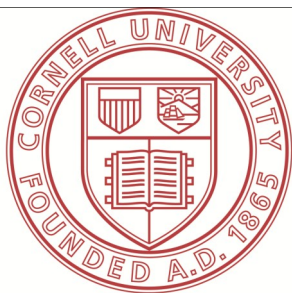
Tomato: In general, rowcovers are not recommended for this crop. Loss of early yields due to high temperature is the major problem; although vegetative growth and total yield may be enhanced, early fruit are frequently small or absent.

Cole Crops, Lettuce, Spinach, Celery: Rowcovers increase early production with these crops. Most are well-suited to floating rowcovers.

Spinach, Beets, and Chard: Rowcovers can help provide protection from leafminers. Place over the newly seeded crop and remove at harvest (spinach) or when plants outgrow them.

Vine Crops: Rowcovers can exclude striped cucumber beetle which can vector bacterial wilt. Rowcovers need to be removed at flowering time for pollination to occur.

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