

# The Home Vegetable Garden

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## Shade-Tolerant

- *Leafy Greens*
  - Lettuce
  - Endive
  - Spinach
  - Beet greens
  - Swiss Chard
  - Kale
  - Cabbage
  - Chinese greens
- *Fruiting Crop*
  - Beans

## Full Sun

- *Fruiting crops*
  - Tomatoes
  - Peas
  - Cucumbers
  - Melons
  - Peppers
  - Corn
  - Eggplant
  - Pumpkins
- *Roots and Modified Stems*
  - Potatoes
  - Parsnips
  - Carrots
  - Beets
  - Radishes
  - Turnip
  - Rutabaga
  - Asparagus
  - Garlic
  - Chives
  - Onions
  - Rhubarb
  - Celery

Home vegetable gardening, a source of fresh produce, can provide an educational experience for the children, as well as the adult members of the family. A successful vegetable gardener can enjoy a potential saving on food costs.

There are many factors that can determine the success or failure of a garden. Two important ones are willingness to work hard and good horticultural information. Knowing where to get the necessary information, when you need it, is important.

A few places where you can get help are:

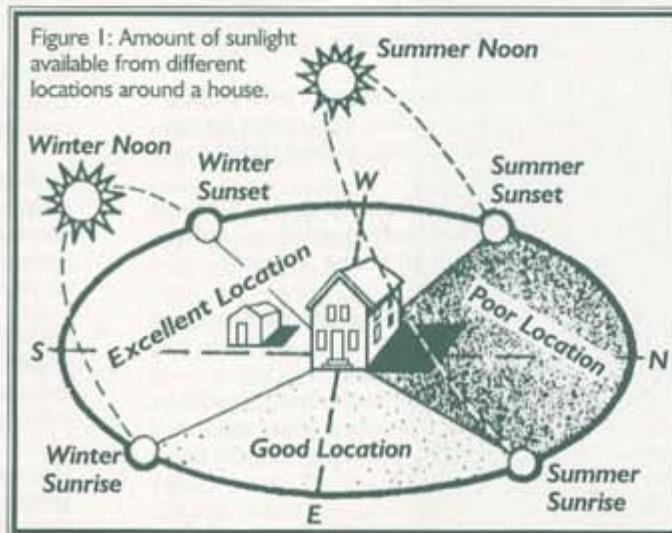
- the Connecticut Cooperative Extension System,
- garden centers,
- seed companies,
- knowledgeable gardening neighbors and
- the electronic media.

The information can be obtained in different forms: phone calls; lectures; workshops; office visits; information materials, such as bulletins, circulars, fact sheets and newsletters; and person-to-person discussions.

## Choosing a Garden Site

Many gardeners do not have much choice when it comes to a garden site selection. However, when a choice for garden sites exists, factors such as sunlight, soil, sources of water, and competition from trees and shrubs should be considered.

Adequate sunlight is one of the more important factors for good plant growth and development. The intensity, quality and duration of light are all important. Most vegetable plants grow best in full sunlight. Therefore, it is advisable to keep the garden away from the shade of trees and buildings.



As a general rule, south or southwest locations are good spots for a garden. Figure 1 shows the amount of sunlight available from different locations around your house. Trees and other shading structures have been omitted to simplify the drawing. However, it is easy to visualize the effect trees or shrubs will have on the site. Few people are lucky enough to have the perfect garden site, so just select the best possible plot available.



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There are no shade-loving vegetables or fruits. All respond to shade by growing slower, taller and/or maturing later, if at all. Where shade cannot be avoided, arrange plants according to their shade tolerance. When there is insufficient sunlight, plants are pale green or yellowish and leggy. Using extra fertilizer will not correct the problem and may actually reduce yield.

### SOILS

Soil is the medium in which plant roots grow. Choosing a garden site with a fertile, deep, rock free, and well-drained soil with good structure is important. Avoid steep slopes where erosion may be a problem. Areas where weeds will not grow will probably not grow vegetables unless the soil is modified and/or fertilized. The garden should be free of low spots where water might accumulate after a heavy rain. Avoid locations close to streets where winter road salt may be a problem.

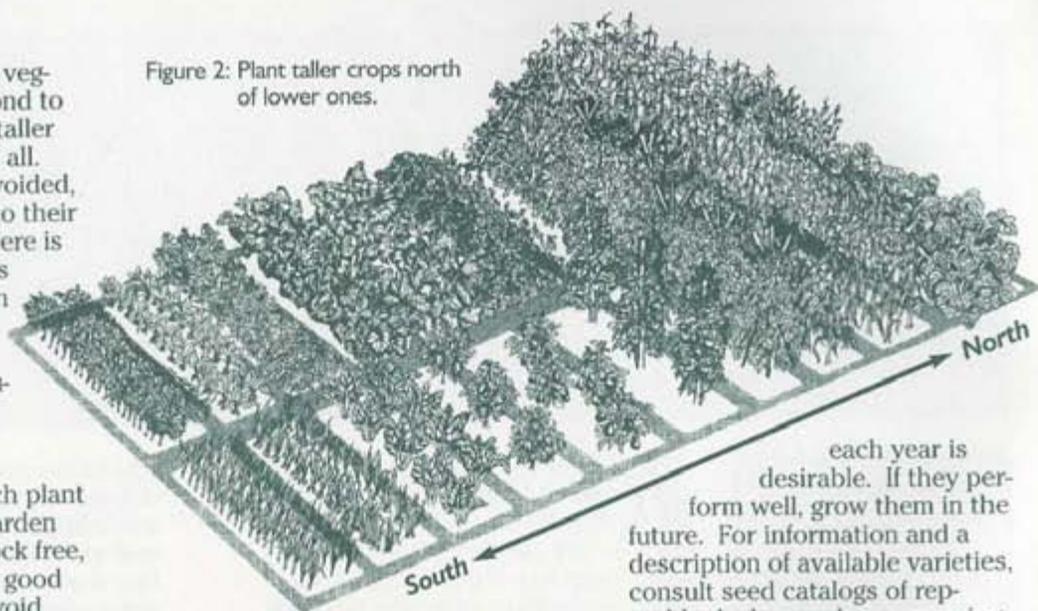
Trees and shrubs near your garden can be a problem. Avoid them if possible because they compete against the garden crops for moisture, light and plant nutrients. They also restrict air flow which is an important factor in disease control.

The selected site should be close to a source of water. This is important when transplanting and when there is not enough rain during the growing season. The site should also be near the house so that the garden can be observed frequently for animal, insect, disease and weed problems.

### Planning Your Garden

Developing a garden plan is the next step after selecting the site. It is true that no one plan or arrangement for a garden can suit all conditions. However, each gardener's plan must be tailored to existing conditions. Here are some suggestions for planning a garden:

Figure 2: Plant taller crops north of lower ones.



### GARDEN PLANS

- Determine the size of the area available for planting.
- Determine how much time can be spent in the garden.
- Decide what to grow by choosing vegetables preferred by the family.
- Group the vegetables for different planting periods or blocks.

Here are five examples.

**Long Season Vegetables:** eggplant, tomatoes, cucumber, corn, celery, squash, pepper

**Early Vegetables:** cabbage, spinach, lettuce, chard, onions, beets, broccoli, radishes, cauliflower, turnips

**Tall Crops:** corn, pole beans, lima beans, vine crops grown on a trellis, staked tomatoes

**Short Term Crops:** lettuce and other leafy vegetables, radishes, bush beans, spinach

**Perennial Crops:** rhubarb, asparagus

- Hand cultivation requires less distance between rows while machine cultivation requires more space.
- Plant mainly the time-tested varieties of proven performance. Trying one or two new varieties

each year is desirable. If they perform well, grow them in the future. For information and a description of available varieties, consult seed catalogs of reputable dealers and crop-growing guides available from the Cooperative Extension System.

- If the garden has a slope, lay out the rows across the slope. This reduces runoff and erosion during periods of heavy rains.

- A large amount of vegetables can be grown in a small space by using double rows rather than conventional single rows (Figure 3). Double rows save space, reduce weeding once they are up, and are easy to irrigate, especially if a soaker hose or drip irrigation is used.

- Wide rows can save space and reduce the number of walkways in the garden. Vegetables, such as collards, carrots, radishes, kale, and head and leaf lettuce, can be grown in wide rows.

- Interplanting—fast maturing crops can be planted between or among late maturing crops, i.e. spring lettuce between tomatoes or peppers (Figure 4).

### GARDEN PLANNING CONSIDERATIONS

1. Grow annual crops, such as cabbage, tomatoes or peppers, at one side of the garden so that transplanting, harvesting and preparation of the soil will not disturb the perennial crops such as asparagus or rhubarb.

2. If you lay out your garden rows east-west, plant low crops in the southern part of your garden where they can receive full sunlight. Plant tall-growing plants, such as corn or staked tomatoes, to the north of your garden where they will not cast shade on lower growing plants. (Figure 2).

3. Succession planting— plan early spring plantings of early maturing plants such as radishes, lettuce and spinach so that, after harvest, this area can be replanted with crops that mature later in the season. For example, bush beans may follow the lettuce.

4. Where space is limited, either avoid planting crops that will require a lot of space, such as melons and cucumbers, or use trellises to keep them off the ground (Figure 5).

Advantages of trellising are:

- cleaner produce,
- some disease control due to better air circulation and
- less space used.

Build a support system (using pipes, poles, wiremesh fencing or strong pieces of wood) at the north side of the garden, or plant close to a fence and tie the vines to the fence as they grow.

### Soil Preparation

It is a good practice to till the soil as deep as is practical. A six- to eight-inch depth is sufficient for most vegetables. To find out if the garden soil is dry enough to till, pick up a handful of soil and squeeze it. If the soil stays in a ball and is sticky, or if water oozes out, it is too wet to work. Wait a few days and check the soil again. If the soil crumbles and does not feel sticky, it is ready to till. A soil that sticks to the tool is usually too wet to work.

After tilling, the soil is then prepared for planting by raking or harrowing and breaking up the big clods. It is desirable that the

surface soil be made fairly smooth, while the subsurface must be firm and without clods. The first is essential in order to get the seed or plant root adequately covered. The second provides for a continuous flow of capillary water from the subsoil. If fertilizer is used, it can be mixed into the soil when it is tilled or broadcast on the soil surface after tilling.

### TOOLS

Some important gardening tools are a spade, spading fork, rake, hoe, trowel and guideline (Figure 6).

- **Spade** - a multi-purpose tool, but the most common use is to turn over the soil.
- **Spading Fork** - used to break up the soil.
- **Rake** - used to smooth the soil, break up the clumps and take out rocks and big clods.
- **Hoe** - used to cut the weeds and keep soil loose during the growing season.
- **Trowel** - used to dig the transplant hole.
- **Guideline** - used for marking straight rows.

### LIME

Liming is the addition to the soil of any calcium, or calcium and magnesium-containing compound that is capable of reducing acidity and adjusting the soil pH. Soil pH is the term used to indicate soil acidity or alkalinity. It is measured on a scale of 0 to 14, with values below 7 considered acidic (sour) and values above 7 alkaline (sweet). The

pH of a soil strongly influences the availability of the mineral elements needed for plant growth.

Most vegetable plants grow best when the soil pH is in the range of 6.0 to 7.0. Within this range, most of the nutrient elements are readily available to the plants. However, when the pH of a soil is 5.0 or below, aluminum and manganese availability may become toxic to some



Figure 3:  
Double rows.

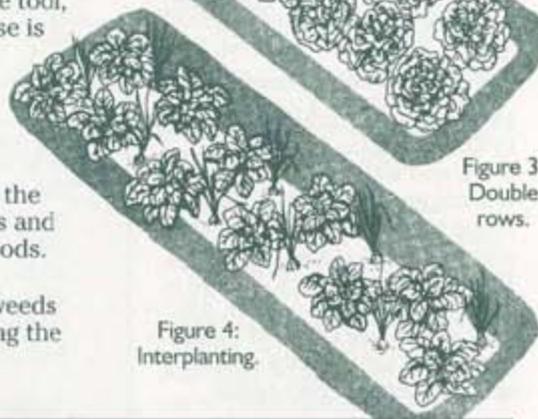


Figure 4:  
Interplanting.



Figure 5: Staked cucumber plant.

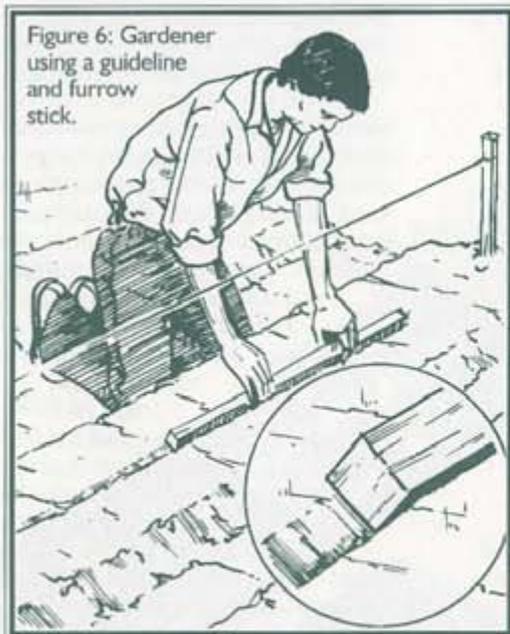


Figure 6: Gardener using a guideline and furrow stick.

The most satisfactory means of determining when to apply lime is by a **soil test**.<sup>\*</sup> The frequency of lime application will depend upon the amount of calcium removed by the crops; the amount, kind, and particle size of lime applied; the type and rate of fertilizer applied; and the soil texture. On sandy soils, frequent but light applications are preferable. With fine textured or organic soils, larger amounts may be applied less often.

The particle size of the liming materials is also important. The finely-ground materials react more quickly, but its effect is maintained over a shorter period than materials containing appreciable amounts of coarse particles. Calcium moves very slowly in the soil, therefore, apply lime just prior to tilling.

Tables 1 to 3 are computer print-outs of soil textures and lime recommendations which are based on soil test results and the kind of vegetables grown.

#### FERTILIZER

A fertilizer can be a combination of natural and/or synthetic materials containing nitrogen, phosphorus and potassium compounds along with other compounds. Because the growth of plants removes nutrients from the soil, nutrients should be replenished regularly to keep the plants growing vigorously. The amount of fertilizer to use depends on the natural fertility of the soil, the amounts of organic matter and fertilizer used in recent years, the crops being grown, the texture of the soil and

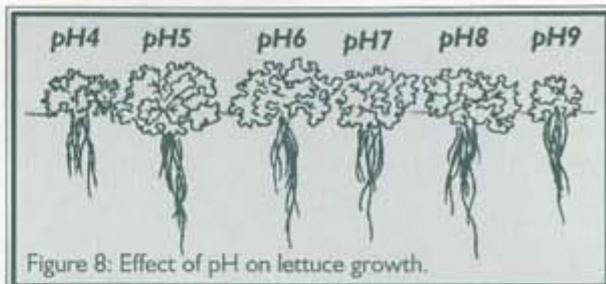


Figure 8: Effect of pH on lettuce growth.

the level of rainfall. Leafy crops, such as cabbage, sweet corn, lettuce, kale and spinach, require more nitrogen than other garden crops. Tuber and rootcrops, including carrots, beets, potatoes, turnips and parsnips, need a larger amount of potash than other vegetables.

#### COMMERCIAL OR SYNTHETIC FERTILIZER

There are many brands of fertilizer available on the market. All brands list a series of numbers, such as 5-10-10 or 5-10-5. These numbers represent the percentage by weight of elemental nitrogen (N); phosphorus (P), expressed as the oxide, P<sub>2</sub>O<sub>5</sub>; and potassium (K), expressed as potash, K<sub>2</sub>O. This group of numbers is referred to as the **fertilizer grade**. They are always in this order.

Vegetable garden fertilizer recommendations usually call for a complete fertilizer containing nitrogen, phosphate and potassium. Most common garden fertilizers weigh approximately eight ounces per cupful.

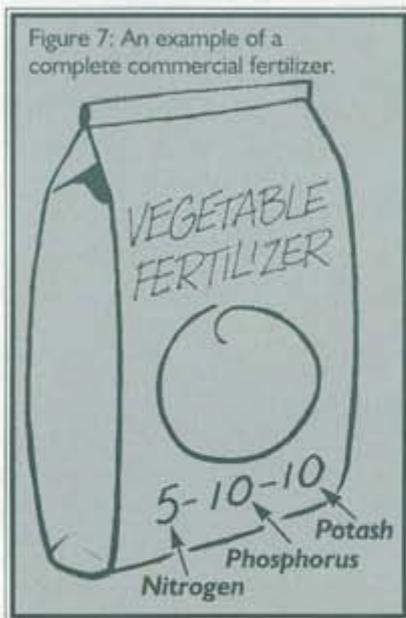
A soil test will determine the kind and amount of fertilizer to use in the garden for the different types of vegetables to be grown. The soil test will also give the soil's pH.

#### FERTILIZER PLACEMENT

Nutrient elements that move or react slowly in the soil should be incorporated in the upper six to eight inches of the soil prior to

plants. Liming reduces soil acidity and increases the calcium level, and will also raise the magnesium level if Dolomitic limestone is used. Wood ashes can also be used to raise the pH. However, wood ashes contain a high percentage of potash. Heavy continuous use can lead to a very high pH, a salt toxicity problem and an excess of potassium.

Figure 7: An example of a complete commercial fertilizer.



<sup>\*</sup>A soil test kit may be purchased from the Department of Plant Science, 1376 Storrs Road, U-67, University of Connecticut, Storrs, CT 06269-4067, or from your local Cooperative Extension Center. For answers to questions about soil testing, call 860-486-3437.

Table 1: Limestone\* recommendations for vegetables, other than potatoes, grown in home gardens.

pH range	Textural class code			
	1, 2 and 3	4 and 5	6 and 7	8
	Limestone, lbs. per 1000 sq. ft.			
6.4 and above	0	0	0	0
5.9 - 6.3	15	40	50	60
5.4 - 5.8	30	70	90	115
4.9 - 5.3	45	90	125	165
4.4 - 4.8	55	110	150	210
less than 4.4	70	125	200	250

\*If the limestone recommendation exceeds 100 lbs. per 1000 sq. ft., it is recommended that half the lime be applied in the spring and half in the fall.

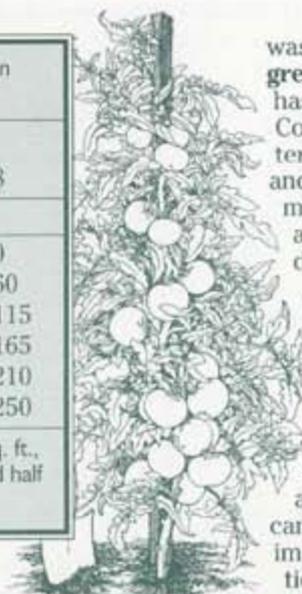


Table 2: Fertilizer recommendations for home vegetable gardens—herbs, tomatoes, melons, pumpkins, cucumbers and winter squash.

Soil test results		Fertilizer recommendation, lbs. per 1000 sq. ft.
P	K	
VL - VH	VL - M	40 lbs. of 5-10-10 or 20 lbs. of 10-20-20 or the equivalent from other sources.
VL - L	MH - VH	40 lbs. of 5-10-5 or 20 lbs. of 10-20-10 or the equivalent from other sources.
H - VH	H - VH	20 lbs. of 10-6-4 or 14 lbs. of 15-8-12 or 14 lbs. of 16-8-12 or 14 lbs. of 15-10-10 or the equivalent from other sources.
M - VM	MH	20 lbs. of 10-10-10 or 14 lbs. of 15-15-15 or the equivalent from other sources.
	or	
M - MH	MH - VH	

Table 3: Limestone\* recommendations for potatoes in home gardens.

pH range	Limestone, lbs. per 1000 sq. ft.
5.2 and above	0
4.9 - 5.1	20
4.6 - 4.8	50
less than 4.6	75

planting. These include calcium, found in limestone; phosphorus; and the organic or slow-release forms of nitrogen. Fertilizers

that can move and react quickly in the soil can be used as a sidedressing. Nitrogen fertilizers in the nitrate or ammonium forms are the most common.

### Manure and Compost

There are two common types of manure. **Animal manure**, a

waste product of animals, and **green manure**, a cover crop that has been tilled into the soil. Common cover crops are: winter rye, rye grass, buckwheat and the legumes. Green plant material will tie up nitrogen for a short period of time until it decomposes.

Compost, decayed organic material, is used as a source of plant nutrients and a soil conditioner. It can also be used as a mulch.

Both manure and compost are organic materials which can be extremely important for improving the physical condition (structure) and productivity of the soil. They also increase the nutrient and waterholding capacity of sandy soils, and improve aeration of clay and silt-type soils.

### MAKING A COMPOST PILE

Compost is made from decomposed leaves, lawn clippings, straw, weeds or any clean vegetable material from the kitchen. When making a compost pile, avoid using any diseased plant residue. Do not use meat scrapes or animal fats, etc. in the compost pile. These may attract vermin.

When building a compost pile, arrange plant materials into alternating layers of organic materials and soil. Spread out a layer of plant refuse about six inches deep and add one inch of soil or manure. The soil is used to hasten decomposition. Adding one pint of a 5-10-5 or 5-10-10 fertilizer per square yard will hasten the decomposition process of the pile. The layering is repeated until the desired height is reached, usually four to six feet. Allow to stand for several months with periodic mixing. Water the pile to maintain moisture. Making the top of the pile concave to catch rain water will aid in maintaining a moist pile (Figure 10 on page 8).

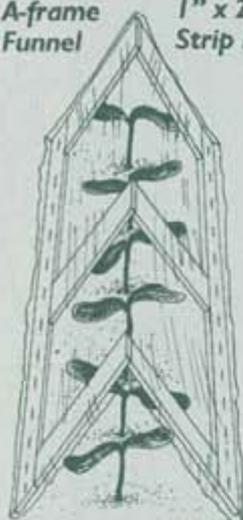
Table 4: VEGETABLE PLANTING GUIDE FOR HOME GARDENERS

Crops	Distances between rows <sup>2</sup> (inches)	Seed or plants for 100 ft. of row	Depth to plant (inches)	Distances between plants (inches)	In hotbed, seedbox	Transplant to garden	In the open (seed)	Time to Harvest (days approx.)
Asparagus	48-60	—	6-8	15-18 (roots)	—	April	—	—
Bean, green bush	24-30	1/2-1 lb.	1-1 1/2	3-4	—	—	May 15 - July 15	50-65
Bean, wax, snap bush	24-30	1/2-1 lb.	1-1 1/2	3-4	—	—	May 15 - July 15	60
Bean, green, snap pole	30-36	1/2-1 lb.	1-1 1/2	4-6 per pole	—	—	May 15 - June 5	65
Bean, bush lima	30-36	1/2-1 lb.	1-1 1/2	4-6	—	—	May 15 - June 5	75
Bean, large lima, seeded pole	30-36	1 lb.	1-1 1/2	4-6 per pole	—	—	May 15 - June 5	12-14 wks.
Bean, bush lima, small seeded	24-30	1/2-1 lb.	1-1 1/2	6	—	—	May 15 - June 5	65
Bean, shell	24-30	1/2-1 lb.	1-1 1/2	4	—	—	May 15 - June 1	60
Beets	12-18	1 oz.	1/2-1	2-3	—	—	April - August	65
Broccoli <sup>1</sup>	24	50 plants	1/2	18-24	March	April - May	—	90
Brussel Sprouts, Waltham 29 Fall only	24	50 plants	1/2	18-24	April 15	June - July	May	95
Cabbage, early <sup>1</sup>	24-30	50 plants	1/2	12-18	March 1	April - May	—	70
Cabbage, late	24-30	50 plants	1/2	18	May 15	June - July	—	110
Cabbage, red	24-30	50 plants	1/2	18	March	April - May	—	70
Cantaloupe	48-60	1 packet	1/2	24-36	—	—	May 15	80-100
Carrot	12-18	1/2 oz.	1/4-1/2	1-3	—	—	April - June	65
Cauliflower <sup>1</sup>	24-30	50 plants	1/2	18-24	March	April - July	—	75-100
Celery <sup>1</sup>	20-24	200	—	6	March	May	May	140
Corn, sweet	36	1/2 lb.	1-1 1/2	6-8	—	—	May - June	75
Cucumber	48 <sup>3</sup>	1 packet	1	48	—	—	May - June	54
Eggplant	24-30	1 packet	1/2-1	18-24	March - April	June	May - June	75
Kale	12-18	1 packet	1/2	10-12	—	—	April on	70-85
Kohlrabi	18	1/2 oz.	1/2	6-10	—	—	April	65
Lettuce, head <sup>1</sup>	12-18	1 packet	1/4	12-15	March	April - July	April on	60-80
Lettuce, leaf <sup>1</sup>	12-18	1 packet	1/4	12-15	—	—	April on	60-70
Onions, plants <sup>1</sup>	12-18	300 plants	—	4	—	April	—	125
Onions, sets	12-18	1-2 lbs.	—	3-4	—	April	—	125
Parsley	18	1 packet	1/4	6-8	—	—	April - May	120
Parsnip	12-18	1/2 oz.	1/4-1/2	3-4	—	—	April - May	150
Peas, early	24-30	1 lb.	1	2-3	—	—	March - April	58
Peas, late	24-30	1 lb.	1	2-3	—	—	March - April	63
Pepper	24-30	60 plants	1/4-1/2	18-20	March	May - June	—	90
Potatoes	18-30	4-5 lbs.	3	6-8	—	—	May	80-100
Pumpkin	96	1 oz.	1	96	—	—	May	90-100
Radish	12	1 packet	1/2	1-2	—	—	April on	24
Rutabaga	18-24	1/2 oz.	1/2	6	—	—	July	85
Rhubarb	36	use plants	—	36	—	April - May	—	—
Spinach	12	1 oz.	1/2	2-4	—	—	April - July	36
Squash, summer, yellow	36 <sup>3</sup>	1 packet	1	24	—	—	May - June	50
Squash, summer, green	36	1 packet	1	24	—	—	May - June	65
Squash, winter	60 <sup>3</sup>	1 packet	1	60	—	—	May - June	110
	84	1 packet	1	84	—	—	May - June	110
Swiss Chard	12-18	1 oz.	1/2	4-8	—	—	April	55
Tomatoes, red	48	1 packet	1/4	36	March	May	—	70-80
Tomatoes, yellow <sup>1</sup>	48	1 packet	1/4	36	March	May - June	—	70-80
Turnip, late	24-30	—	1/4-1/2	4	—	—	July	—
Watermelon, icebox	72-84	—	—	24-36	April 15	May 15	May 10	70-85
Watermelon, large								

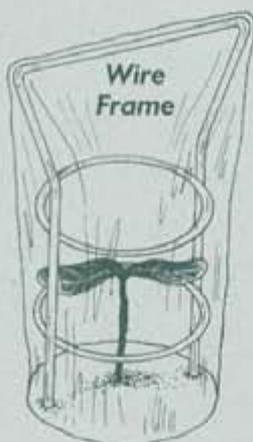
<sup>1</sup>Early crop should be transplanted; later ones planted directly in the garden.<sup>2</sup>Distances are for hand-cultivated gardens.<sup>3</sup>Planted in hills (several plants in cluster).

Figure 9: Stretch the garden season with hotcaps.

A-frame  
Funnel



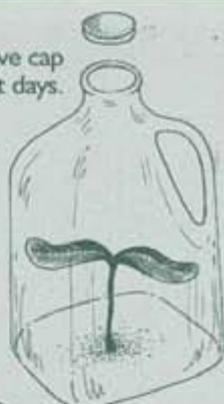
1" x 2" Wood  
Strip Frame



Wire  
Frame

2- to 4-Mil Clear Plastic,  
Stabled to Wood

Remove cap  
on hot days.



Plastic Milk  
Carton



2- or 3-Liter  
Soda Bottle

Hoop Type Funnel



Large  
Stone

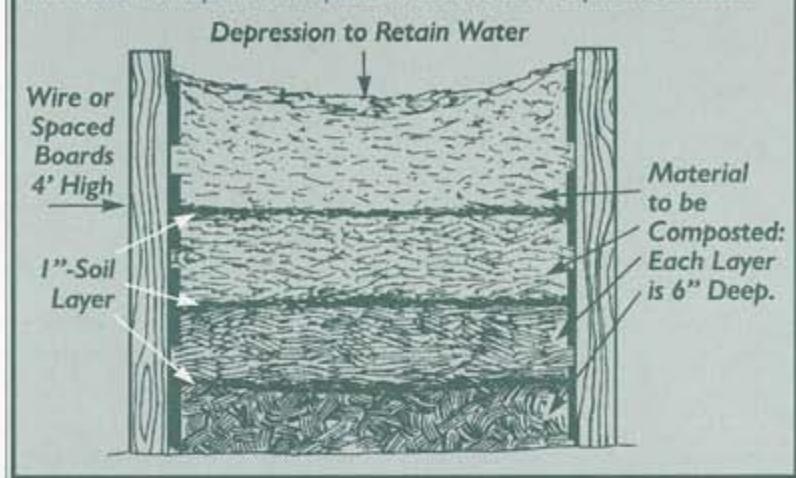
15" - 18" Wide

15" - 18" High Hoops, 3' - 5' Apart

### Approximate Yields per 50 feet of Row

Asparagus- 25 lbs.	Lettuce (head)- 100 lbs.
Beans (bush snap)- 25 quarts	Muskmelon- 40 to 60 fruits
Beans (pole snap)- 2 bushels	Mustard- 1 bushel
Beans (bush lima)- 7 quarts	Okra- 15 quarts
Beans (pole lima)- 10 quarts	Onions- 1 bushel
Beans (shell)- 7 quarts shelled	Parsley- 25 lbs.
Beans (field)- 4 quarts shelled	Parsnip- 1 1/2 bushels
Beets- 1 to 1 1/4 bushels	Peas- 1 bushel
Chinese cabbage- 150 lbs.	Pumpkin- 150 lbs.
Carrots- 1 to 1 1/4 bushels	Radishes- 50 bunches
Chard- 4 bushels	Rutabaga- 1 bushel
Corn (sweet)- 75 ears	Salsify- 1 bushel
Popcorn- 12 to 15 lbs.	Spinach- 1 bushel
Cucumbers- 75 lbs.	Spinach (New Zealand)- 1 bushel
Endive- 50 lbs.	Squash (summer)- 60 to 75 lbs.
Kale- 125 lbs.	Squash (winter)- 150 lbs.
Kohlrabi- 30 lbs.	Tomatoes- 150 to 175 lbs.
Leeks- 100 plants	Turnips- 1 bushel
Lettuce (leaf)- 30 to 50 lbs.	Watermelon- 200 lbs.
Lettuce (oakleaf)- 30 to 50 lbs.	

Figure 10: A compost bin. Shredding the material and turning the pile during the summer will speed decomposition. Do not turn the pile in the winter.



### Seeds and Plants

Vegetables are planted as seeds or transplants. For an early garden, it is essential for certain crops, such as cauliflower, eggplant, peppers, tomatoes, early cabbage and early head lettuce, to be started indoors, in hotbeds or in cold frames. Timing is important for growing seeds indoors. It takes six to 12 weeks to grow an ideal-sized transplant to set out in the garden. The vegetable planting guide (Table 4) gives the proper planting time both indoors and outdoors for various vegetables. When growing vegetables indoors, use a pasteurized growing medium to avoid weed, insect and disease problems.

Sowing seeds too early and then trying to hold back the seedling may result in short, hard, yellow seedlings that grow slowly, or tall, spindly plants that topple over. Neither do well when planted outdoors. The ideal seedling is six to ten inches tall with dark green foliage and a sturdy stem.

There is a wide variety of germinating and growing materials available, such as peat cubes, peat pots, flats, hotbeds and cold frames. Figure 12 shows a cold frame that can be used to start vegetables.

### PLANTING

When direct seeding or transplanting in the garden, it is important to retill the soil with a rake or hoe. This will help to control germinated weeds and loosens the soil, giving the desired plants a chance for a good start.

#### DIRECT SEEDING

Seeds can be planted in single or double rows, beds or hills. Seeds can also be broadcast. Most gardeners prefer to plant vegetables in single rows because less thinning of seedlings is required, and cultivation is easier. When direct seeding, plant more than needed in order to make up for poor seed germination. If all the seeds germinate, thin out the extra seedlings to obtain the desired spacing. Thinning is the selective removal of seedlings to allow more room for the remaining plants. It reduces competition among the plants.

For row planting, stretch a string close to the ground between two stakes for the length of the row to be made. Use the edge of a hoe or its handle, make a shallow furrow at the correct depth for the seed. As a general rule, plant seeds at a depth two to four times the diameter of the seeds. Drop seeds into the furrow, placing them according to the depth recommended in the vegetable planting guide (Table 4). Cover

the seeds carefully with loose soil. Firm the soil gently to provide good seed to soil contact.

### TRANSPLANTING

Whether you grow your own transplants or buy them, choose young, strong, vigorous transplants with four to six true leaves. Make sure they are insect and disease free. Never choose tall spindly and/or yellowish plants. They usually do not respond well to transplanting.

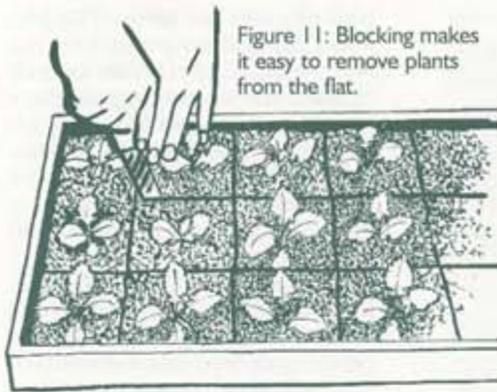
If you grow your own transplants, make sure they are hardened off for a week or two before planting outdoors. To do this, place them outdoors in a protected area away from direct sunlight and wind for the first few days. A cold frame may be used for this purpose. Gradually increase the length of time in the full sun until they are in the sun for the entire day. Keeping the soil a little on the dry side will also help in hardening the tissue. Protect transplants from night frost.

When transplanting, smooth the soil surface and mark the planting area. Make sure the soil is moist. Dig holes slightly larger than the root ball and set the transplants. After planting, water the transplants to settle the soil.

The best time for transplanting is on a cloudy day or in the late afternoon. Use hotcaps, plastic row covers or other available material to protect plants from the cold weather (Figure 9). However, on bright, sunny days, covers should be removed or opened for ventilation to prevent heat buildup which can kill the plants.

### Weed Control

A weed is any undesirable plant. Weeds compete for space, light, soil moisture and plant nutrients needed by vegetable plants. Destroy weeds as soon as they start growing.



Effective methods of controlling weeds include the use of mulches, shallow cultivation, and rarely, herbicides. Since home gardens are small in size, mulching and shallow cultivation are good means to control weeds. The use of herbicides in the home garden is not recommended due to the wide variety of plants growing in a small space and the limited kinds of vegetables labeled for each herbicide.

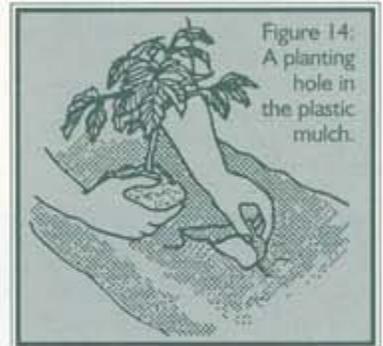
#### MULCH

Mulch is a cover on top of the soil around the vegetables. There are different kinds of mulching materials and each

type of mulch has its good and bad points.

Black plastic mulch is the material most often used by home gardeners. It suppresses weed growth by not allowing light to pass through, it conserves water by reducing evaporation and it warms the soil. A disadvantage of plastic film is that water will not pass through it. Therefore, it is important that it is laid down only over moist soil. If drip or trickle irrigation is used, then the soil need not be moist because the irrigation system is placed under the plastic. Plastic film is put down before planting. To plant, cut two slits to form an X and plant the crop through the hole.

Organic mulch is another way to control weeds. Most organic mulch materials consist of plant refuse such as leaves, straw, corn cobs, pine needles or newspaper. Organic mulch stops



weeds from germinating by preventing sunlight from coming through. Organic mulches are applied after the crop is tall enough so as not to be buried by the mulch. When applying, the soil should be weed free. A dense organic material, such as sawdust, should be at least two inches deep; a loose mulch, such as straw, should be a minimum of six inches deep to give good weed control. For warm season crops, such as tomato, pepper, eggplant and the vine crops, wait until the soil warms to 70°F before applying the mulch. Organic mulches tend to keep the soil cool.

#### CULTIVATION

Shallow cultivation keeps the weeds down and allows the plants to get all the water and nutrients available. Cultivation should be shallow— not more than one half inch below the surface of the soil. Deep cultivation will injure the roots and as well

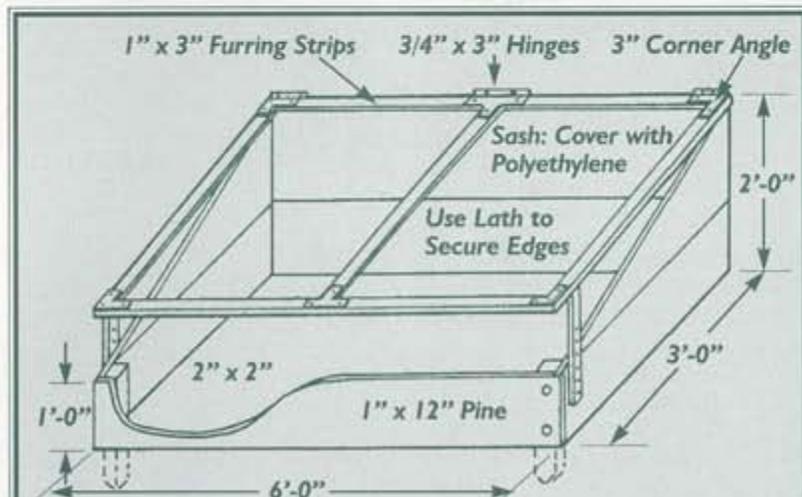
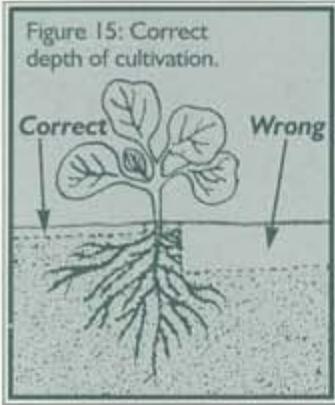


Figure 12: The plans for this cold frame and other growing structures can be found in "Solar Greenhouses for the Home" (NRAES-2), available from the Department of Natural Resources Management and Engineering, 1376 Storrs Road, U-87, University of Connecticut, Storrs, CT 06269-4087; and "Starting Annuals and Vegetables from Seed" (75-9), available from Agricultural Publications, 1376 Storrs Road, U-35, University of Connecticut, Storrs, CT 06269-4035.



as move weed seeds to the surface. The best time to cultivate is shortly after a rain or irrigation. It is easier to pull out the weeds after the plants have dried off and the soil is still moist. Also, handling wet plants can spread diseases in the garden. Avoid walking on wet soil— it causes compaction.

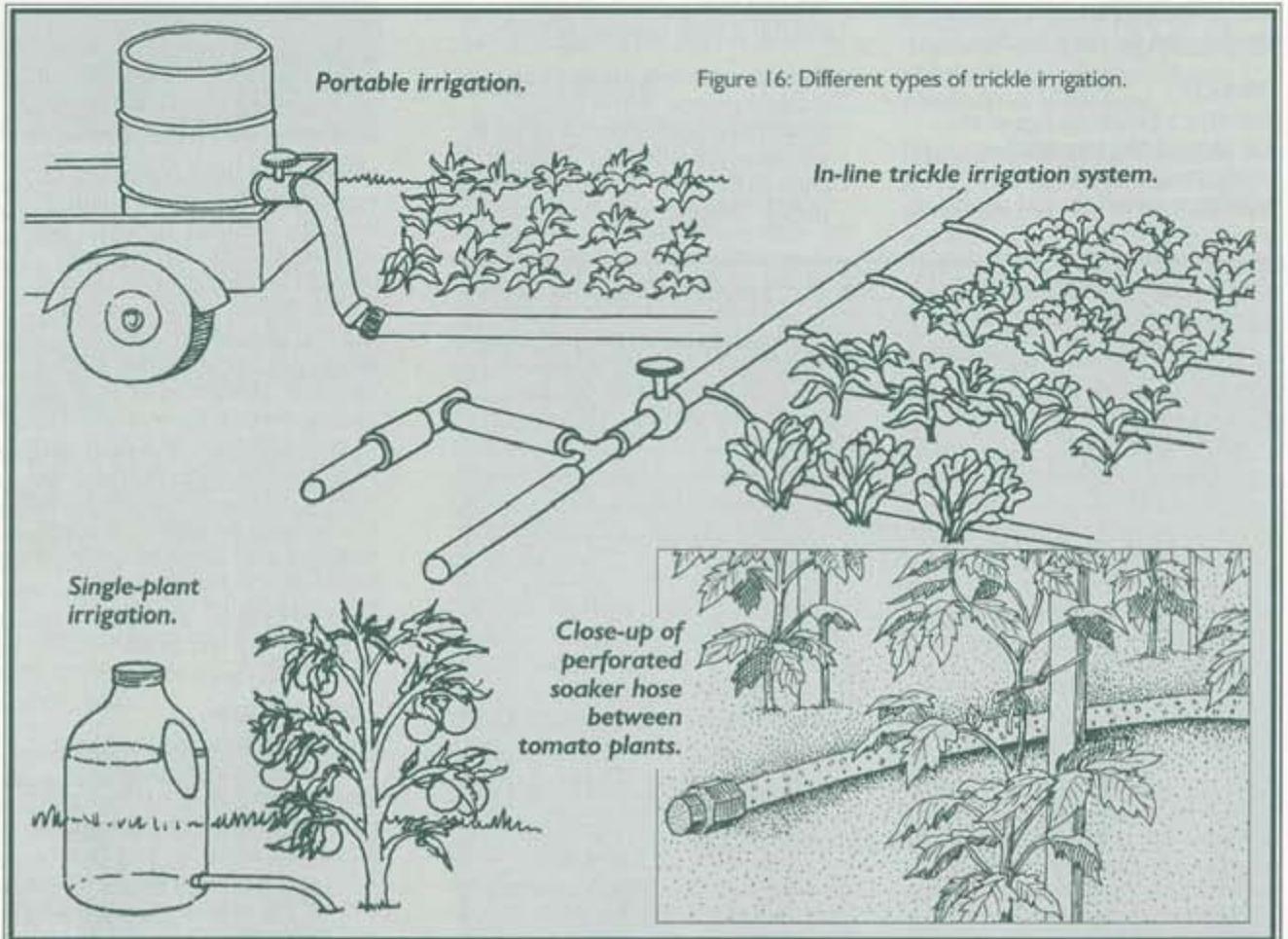
### Watering/Irrigation

For best plant growth, adequate soil moisture must be maintained during the growing season. The growth of many plants is proportional to the amount of water present. Very low or very high levels of soil moisture may restrict plant growth. Water is required by plants in all phases of their growth. It is important to have a sufficient water supply after transplanting and during the blooming, fruiting and ripening periods.

Water availability depends upon the type, texture and structure of the soil; the stage of crop growth and maturity of plants; the relative humidity; the wind; and soil and air temperatures. All these factors affect when and how often to water plants. Most vegetable plants require about an

inch of water per week. This is about 625 gallons per 1000 square feet. This should be applied in one watering which should moisten the soil to a depth of six to 12 inches. Plants given too much water may develop root rot because of lack of oxygen in the soil. On the other hand, frequent light watering favors the development of a shallow, drought-intolerant root system. A shallow root system is prone to injury from cultivation and because of its restricted area, it will not have a large volume of soil from which to gather mineral nutrients. The root system will also be more susceptible to stresses caused by high soil temperatures and drought, especially in the absence of sufficient soil moisture.

It takes time to know the watering needs of each plant of a given



crop. Keep in mind this general advice: **water slow enough so that no water runs off.** Give the water enough time to soak into the ground. The best time to water is early morning. This will reduce evaporation, and the leaves will be dry by evening, helping to prevent diseases.

Watering can be done by sprinkler can, garden hose, overhead sprinkler, soaker hose or drip irrigation. Hand watering can be done by any watering device that is available. This method is not advised for large areas. It is best for individual plants. Use a hose that is long enough to reach all points in the garden. To maintain pressure and volume flow for distances over 100 feet, hoses should have an inside diameter of at least 5/8 inch. Walk only in pathways to avoid soil compaction. The average garden hose delivers three to five gallons per minute which means it may take 12 to 20 minutes to apply one inch of water to 100 square feet. It is usually better to attach a sprinkler device.

#### SPRINKLER IRRIGATION

Sprinklers come in many shapes and sizes to match the wide variety of irrigation needs. Once the system is set up, the entire garden can be watered by opening a valve. Avoid using sprinklers during hot, sunny or windy days because the water may evaporate before it reaches the

ground. The preferred time is early morning, before it becomes hot and/or windy.

#### SOAKER HOSE

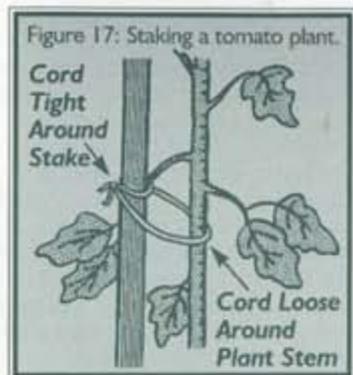
A soaker hose has many, tiny holes which allow water to ooze gradually from it and irrigate only the soil near the plants. It uses less water than a sprinkler, which needlessly waters walkways and loses more water by evaporation. A soaker hose system can be installed under mulches.

#### DRIP OR TRICKLE IRRIGATION

Trickle irrigation, a recent introduction, consists of water-conducting plastic tubes that deliver water, through emitters, very slowly and directly to the root zone of the individual plants. This system saves water compared to overhead sprinkler or hand watering.

#### Advantages:

- Plants can be individually supplied with the amount of water they require.
- Waste of water between rows and by percolation is limited.
- Fertilization can be efficiently combined with irrigation by the addition of soluble fertilizers to the system.
- Trickle irrigation has been used on slopes as high as 50% without erosion problems.
- Fewer weeds germinate because water is provided



- only to the crop.
- It has a uniform watering pattern.
  - Leaching of nutrient elements is minimized.
  - It can be installed under mulches.

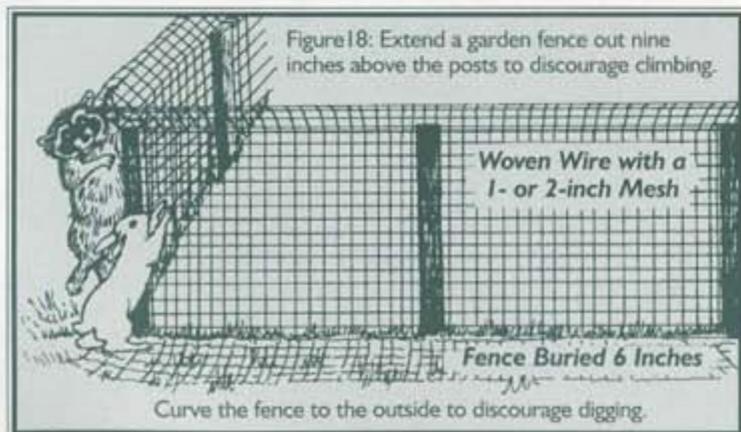
#### Disadvantages

- Salts may accumulate on the soil surface area because leaching of salts is minimal.
- Most require a filtration unit to remove sediment and debris to avoid clogging.
- It is more expensive than most sprinkler systems.

#### Insects, Diseases and Other Pests

Vegetable plants are subject to pests and diseases. Their damage in the home vegetable garden varies with the type of plants, location, the weather season, cultural practices and presence of pests and disease organisms. The probability of insect and disease outbreak will be reduced by taking some preventive measures such as: planting disease-free seeds and transplants; selecting disease-resistant varieties; removing and destroying all diseased plants; properly controlling weeds; using crop rotation where it is possible; keeping the garden and nearby area free of debris; and removing certain plants that harbor insects or diseases over the winter.

Despite good cultural practices, diseases and insects at times may appear. Chemical control is another method to cut down



insect and disease problems. However, chemical control measures for insects and diseases of vegetables are constantly changing. The local Cooperative Extension Center can provide the latest recommendations. Good insect and disease control can be achieved with chemicals, if the correct product is used, at the correct amount, in the correct way, at the correct time. Chemical control should be used only after other methods have failed.

Animal pests such as rabbits, woodchucks, squirrels, opossum, mice, moles, deer and racoon are

a big problem in home vegetable gardens. Controlling them is rather difficult. However, using a wire fence to keep the larger animals out and using poison baits to reduce the mice and vole pop-

ulations may help to control some of them.

**When using poison baits, follow label instructions, and keep away from children and domestic pets.**

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**BROOKLYN** Cooperative Extension Center  
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Brooklyn, CT 06234-1729 860-774-9600

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Figure 19: Use these maps to identify average dates for last spring frost and first fall frost in your area. These are average dates, and frost may occur earlier or later than shown. Length of season and planting dates are important considerations when selecting vegetable varieties and designing a good garden. These spring and last fall frost dates are average, over a long period of time. In many parts of Connecticut, planting of frost-tender plants may be delayed until mid- to late May. Local frost pockets can move the dates later in the spring and earlier in the fall.

