

Circular 150

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# The Home Vegetable Garden



Connecticut  
Agricultural Experiment Station  
New Haven

## FOREWORD

The Station is receiving many requests from urban and suburban residents of Connecticut for up-to-date information on Gardens.

Certain fertilizers, insecticides, fungicides and seeds are affected by wartime shortages. All essential supplies must be used efficiently. The commercial growers, on whom falls the real burden of feeding the nation, should be taken care of first.

Labor on farms will be scarce. The Land Armies to be organized will offer an alternative opportunity for service. Human effort, as well as materials, should be put to the best use.

However the home garden, in experienced hands and under proper conditions, can make a real contribution. This circular brings together the best information now available, keeping in mind the conditions mentioned above. For example, it suggests how one may get along without spraying or dusting, by selecting fewer kinds of vegetables and planting them at the right time.

Besides providing tasty fresh vegetables, a garden is good for the soul. Especially during this trying period people would do well to occasionally forget the incessant staccato of war news and get out in the soil and dig.

# THE HOME VEGETABLE GARDEN

## LOCATION AND AREA

Vegetables, perhaps more than any other cultivated crop, require plenty of sunlight and ample nutrients. Most of them are annuals and need to make rapid growth to develop into tender and palatable harvests. Home gardeners who plan vegetable plots will therefore locate them on a sunny and fertile spot. Preferably the garden should be rectangular in shape, and on ground which is level or only slightly sloping. A location which remains damp during dry weather, due to poor drainage or to the seepage of water from springs, is unfit for vegetables unless measures can be taken to correct the condition.

Though no garden space is too small to grow some vegetables, a convenient size for the home garden is 1,000 square feet, equivalent to an area 25 feet wide and 40 feet long. This amount of ground is usually available on most country or suburban lots of over 50-foot frontage, without material sacrifice to the space requirements for the house, garage, driveway and lawn. Such a small garden plot will provide a fair amount of fresh vegetables to supplement market purchases. To meet the full summer vegetable needs of a family of five persons, the garden should be much larger, approximately 50x100 feet, or 5,000 square feet. Unless labor and materials are available to insure a successful garden of this size, it is advisable to concentrate on a smaller plot which is not so likely to suffer from neglect or yield over-production at the height of the season.

## THE SOIL

Fortunate is the person who has a fairly dark-colored loamy soil, because this is the type most desirable for a vegetable garden. Moderately sandy soils are also suitable. Coarse sandy and gravelly soils, however, are to be avoided because they do not yield enough produce in proportion to the time and materials necessary to bring them into good fertility. Topsoil should be at least 6 inches deep.

Besides being of a suitable texture and depth, soil for vegetables should have a favorable supply of organic matter. This is roughly indicated by the dark color of the soil. Improving the texture of a soil is a difficult matter, but it can be done by heavy applications of peat, swamp muck or stable manures. Excessively sandy or gravelly soils may be built up by good quality loam. All of these measures are expensive, and are justified only when no other land is available and the home owner expects to give serious attention to gardening for a number of years.

Land that has been in cultivation and is relatively free from weeds and grass is preferred for vegetable growing. An area of clean grass turf is suitable, but the sod should be turned under to the depth of at least 5 inches, preferably a few weeks before planting. Lawn areas

which have been heavily dosed with arsenate of lead for Japanese beetle are not suitable for growing vegetables. It definitely retards the growth of most vegetables, and is especially detrimental to peas and beans. Waste land or neglected meadows are often infested with quack grass, a weed that continues to grow up from long root stocks that are very difficult to eradicate.

Several steps are necessary in preparing soil for planting vegetables. Preliminary to spading or plowing, and as early in the spring as possible, barnyard manure, rotted compost or some other organic material is spread over the ground. If it is in the form of a fine well-rotted stable or chicken manure or commercial dried manure, these are applied, instead, after digging. A garden of less than 5,000 square feet can be spaded, but plowing is a great time-saver if there are 10 feet or more of space around the plot to accommodate the maneuvering of the plow. Next, the soil is harrowed or roughly raked to free it of clods, coarse roots or large stones. Commercial fertilizers and lime, if necessary, are next broadcast and raked into the top 3 or 4 inches. Finally, the soil is worked until it has a firm, smooth surface, making it ready for seed sowing.

**Manure**—Stable manure, when available, is a boon to the gardener for it improves both the texture and fertility of his soil. A suitable rate of treatment is one cubic yard (approximately 20 bushels) per 1,000 square feet, although larger amounts are often used with benefit. Poultry manure is a rich material that should be used much more sparingly. Most effective rates of treatment are from 4 to 8 bushels per 1,000 square feet, and should not exceed 10 bushels.

Commercial dried manures may also be used. They are too expensive for use on a large scale but, in small garden plots, they are convenient and easy to apply. Treatments range from 50 pounds per 1,000 square feet, in the case of dried poultry manure, to from 100 to 200 pounds per 1,000 square feet, in the case of dried cattle and sheep manures.

**The Compost Pile**—A good conservation practice in the small garden is to utilize vegetable wastes, grass clippings and leaves that would otherwise be burned or carted away. Such material is usually too coarse for direct application to the soil but can be made into a compost heap which will rot down and be ready for use in about a year. A compost pile is built by using alternate layers of soil and the material to be composted. A light sprinkling of limestone and of a fertilizer of the "lawn top-dressing" type, such as 10-5-5, over each layer will hasten decomposition. The pile is watered thoroughly during its construction and in dry weather. After several months, it is spaded, repiled and left standing for a few weeks until ready for application to the soil.

**Soil Conserving Crops**—The gardener who wishes to continue to grow good crops on the same plot of ground year after year must take all possible steps to maintain the organic matter of the soil. Unless manure can be applied frequently, it is advisable to seed the garden to

rye (2½ pounds per 1,000 square feet) or rye grass (one-half pound per 1,000 square feet) after the crops are removed in the fall. This so-called green manure, turned into the soil the following spring, serves to check organic matter losses. In addition, while growing it helps prevent erosion on sloping ground. Other green manure crops are millet, sudan grass and soy beans; they are sown in early summer and plowed or spaded during the fall. The use of the latter crops of course means that the ground cannot be planted to vegetables for a season, except spinach, radishes and lettuce, which can be harvested before July.

**Lime**—Most garden vegetables do poorly on strongly acid soils. Some kinds, such as lettuce, spinach, onions, cabbage and peas, are especially in need of a sweet soil. Tomatoes, peppers and a few others are less exacting. The need for lime can be estimated from simple soil acidity test kits obtainable at the larger seed stores or garden supply firms. For most soils not previously used for garden crops, an agricultural limestone treatment, at the rate of 50 to 100 pounds per 1,000 square feet, is likely to be beneficial.

**Fertilizers**—When several vegetable crops are to be grown in a small plot, as in home gardens, it is usually more practicable to use a uniform initial treatment. Suitable grades of commercial fertilizer for such conditions are 5-8-7<sup>1</sup> or 5-10-10, for light loam or sandy loam soils, and 5-10-5 or 4-12-4 for heavier soils. Suitable rates of treatment, on unmanured soils are from 35 to 50 pounds per 1,000 square feet. From two-thirds to one-half of these amounts are ample if manure is also applied. On rich "old garden" soils, the 7-7-7 grade is a good choice, to be applied at the rate of 25 to 30 pounds per 1,000 square feet. After spading or plowing, the fertilizer should be broadcast and raked or harrowed into the soil during the preparation of the ground for planting.

A light "side-dressing" application of a nitrogenous fertilizer during the growing season is often beneficial to hasten the development of crops that are not maturing as rapidly as desired. Nitrate of soda or sulfate of ammonia, at the rate of 4 to 5 pounds per 1,000 square feet, is usually an effective treatment. When these are not obtainable, a complete fertilizer relatively high in nitrogen, such as the 10-5-5 or 7-7-7, may also be used for this purpose, at somewhat heavier rates (8 to 12 pounds per 1,000 square feet). Light spreadings of poultry manure are also effective at this time.

Details as to the fertilizer requirements of individual vegetable crops, when treated separately, are treated in a publication of the University of Connecticut, Extension Bulletin 302, "Fertilizer Grades for Connecticut."

If there is considerable doubt as to the special fertilizer needs of the garden plot, a soil sample may be submitted to the College of Agriculture, University of Connecticut, at Storrs, to the Tobacco Substation at Windsor or to the Experiment Station at New Haven. In-

<sup>1</sup>The numbers designating a fertilizer grade indicate percentages of nitrogen, phosphoric acid and potash, in the order stated.

PLANTING TABLE FOR A HOME VEGETABLE GARDEN

Name of Vegetable	Good Varieties for Connecticut	Seed for 100 feet	Time to plant in open ground	Depth (inches) to plant	Inches between rows	Inches apart in rows	Days until harvest (from seed)
Beans, bush <sup>1</sup>	Bountiful (green) Brittle Wax (yellow) Stringless Green Pod	½ pound	5/1-8/15	1	24-30	3-4	45-60
Beans, lima <sup>1</sup>	Fordhook Bush	1 pound	5/15-6/15	1-1½	24-36	4-6	75
Beets <sup>1</sup>	Crosby Egyptian Detroit Dark Red	1 ounce	4/1-8/1	½-1	12-18	1½-3	50-70
Broccoli	Green Sprouting	¼ ounce	4/1-6/1	½	30-36	18-24	60-100
Cabbage <sup>1</sup>	Golden Acre (early) Danish Ballhead (late)	¼ ounce or 60-80 plants	4/1-6/1 6/1-8/1	½	18-24 24-36	12-18 12-18	70-120
Carrots <sup>1</sup>	Imperator Nantes	¼ ounce	4/15-7/15	¼-½	12	1-2	65-90
Chard, Swiss <sup>1</sup>	Lucullus Rhubarb Chard	¼ ounce	5/1-8/1	½	18-24	2-4	40-50
Corn, sweet <sup>1</sup>	Spanscross (extra early) Marcross (early) Carmelcross (mid-season) Golden Cross Bantam (late)	2 ounces	5/1-6/15	½-1	30-36	6-10 or in hills 24-36	70-90
Endive	Batavian Green Curled	½ ounce	4/1-8/1	½	10-20	10	90-100
Kale	Dwarf Green Scotch Dwarf Siberian	½ ounce	7/1-8/15	½	24-30	18	55-65

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Lettuce	May King (loose head) New York (head)	¼ ounce or 60-80 plants	4/1-7/15	¼-½	12-18	8-10	50-70
Onions	Ebenezer (for bulbs or scallions)	½ ounce or 1½ quarts of sets	4/1-5/1	½	12-18	2-4	150-200
Parsnip	Hollow Crown	½ ounce	4/15-5/15	¼-½	12-18	3-6	not until winter
Peas <sup>1</sup>	Laxton Progress (early) World's Record (early)	1 pound	3/15-5/1	1-2	24-36	2-3	60-75
Peppers <sup>1</sup>	Early Giant King of the North	1/8 ounce or 70-80 plants	6/1-6/15	½	18-24	15-18	80-100
Radish	Icicle (white) Scarlet Globe	1 ounce	4/1-6/1	½	12	½	24-30
Spinach <sup>1</sup>	Long Standing Savoy	1 ounce	3/15-5/15	½	12-18	2-4	40-50
Squash <sup>1</sup>	Early Prolific Yankee Hybrid Buttercup (baking) Des Moines (baking)	½ ounce	5/15-6/15	1-1½	36-48	36-48	50-65
Tomatoes <sup>1</sup>	Bonny Best Rutgers	1/8 ounce or 40-50 plants	5/15-7/1	¼-½	18-36	18-36	65-90
Turnips	Early White Egg Yellow Globe	1 ounce	7/15-8/1	½	12-18	4-6	40-60

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<sup>1</sup> See section on plant pests.

formation concerning soil testing is given in Circular 131 of this Station.

### PLANNING THE GARDEN

Long before seeds are purchased, the garden should be planned on paper. First a list of vegetables is made out based on family preferences. Long-season production, storage or canning qualities are given consideration. Using the planting chart which gives row distances the planner can indicate the number of rows, or section of row, he wishes to grow of each vegetable he has listed. Then the list is pared down to fit the amount of actual garden space available, and he is ready to map out his plot. This can be easily done on cross-section paper, each row of vegetable being indicated by a labelled line. The planting table assumes hand cultivation; for horse cultivation rows will need wider spacing.

If the garden is on a slope, rows should follow the contour lines to prevent soil erosion. Otherwise, rows may be planned to parallel either the length or width of the plot. The important thing is to arrange the crops so tall ones do not shade the others. Hence, low crops are not grown between tall ones. Lettuce, radishes, beets and other early-maturing vegetables, which are also low, may be grouped together so the ground can be cleared and planted to late crops of turnips, cabbage or beans.

The planting table in this circular has been limited to vegetables which are moderate in their demands on space and on the grower's skill and time. Pole beans are a long-season crop and are therefore not included, as there are plenty of good bush bean varieties which mature much more quickly. Winter squash, cucumbers and pumpkins take up too much space in a small home plot. Connecticut soil and climate do not favor the amateur's efforts in producing celery, brussels sprouts, cauliflower, lima beans and eggplants. Potatoes are not economically grown in the small plot because of the necessary expenditure for spray materials and fertilizers.

Only annuals are included in the planting table. Readers who wish to grow asparagus, rhubarb and other perennial vegetables, and fruit, will find information available from their State University. Similarly, we have not included some of the luxury vegetables—popcorn, parsley and melons.

In order to get the best results from a small plot, it is better to limit the planting to five or six vegetables which will produce something throughout the season with the minimum of care. Profitable ones, from the standpoint of amount of yield per space occupied, are bush string beans, tomatoes, carrots, beets, cabbage and spinach.

Assuming that a family of five is planning to grow a few vegetables on a piece of ground measuring 25x40 feet, two 25-foot rows, planted May first, and repeated at intervals of about two weeks to August 15, will provide enough string beans from July to frost. The same size family will have ample fruits, for table use and for some canning, from four rows of tomatoes. Plants of early varieties

may be set out as early as May 15, if protected from frost; late ones, about June 15. Everyone enjoys fresh sweet corn, though it takes up more space than the other vegetables mentioned in this paragraph. Six rows of as many successively ripening varieties of sweet corn, all planted on the same date, around May 20, should satisfy the family. Planted at one end of the garden, where they will not shade other crops, they may be succeeded by late turnips or spinach.

In the case of root crops, one 25-foot row each of beets and carrots will last almost a month if the largest ones are gradually thinned out for eating. Instead of being planted by itself, radish seed may be sown in combination with that of spinach, beets, or some other slow-germinating crop. In this way the radishes serve to mark the rows, as they come up quickly, and can be harvested long before the accompanying crop is ready.

Spinach is the first of the leafy vegetables to be planted in spring; two or three rows may be sown at weekly intervals, beginning as soon as the ground is workable. It can be harvested until around the Fourth of July, and then may be supplanted with chard which, unlike spinach, flourishes in the hot days of midsummer. A row or two of cabbage plants may be set out very early in the growing season to give a summer and fall supply.

**Seeds**—In no phase of gardening will be found more divergence of opinion than in selection of varieties. Gardeners who have not had enough experience with vegetable growing to establish their own preferences, will find two or three varieties listed with each vegetable in the table. These have been found most suitable to Connecticut conditions. Seed from reliable firms is cheapest in the end, and it is better not to take a chance on unknown sources merely because the prices are low. Experienced gardeners will usually be glad to supply information on seed sources, or lists can be obtained from County Farm Bureaus.

**Plants**—It is more satisfactory for the average gardener to set out plants of cabbage, pepper, head lettuce and tomato, than to attempt to grow them from seed, unless he has a hotbed in which to start them. About the only time it is practical to sow tomato seed directly in the ground is for a late crop to follow early tomatoes set out in May. Several seeds are planted where the plants are wanted, and then thinned to one plant in a place. In the case of onions, "sets" rather than seeds are recommended.

Only healthy vigorous plants are worth bothering with and, here again, a reliable source is the best insurance. Care should be taken to get plants of the recommended varieties.

### PLANTING THE GARDEN

As soon as the seed bed has been carefully prepared, the gardener can start sowing his early crops. Peas, lettuce and spinach are first on the list; then come beets, cabbage and onions, and others follow as indicated in the chart.

First he drives in stakes along one side of his plot to indicate the rows of vegetables he has planned on paper. Then, along each row to be planted, a heavy cord is stretched to guide hoe or tool handle in making a straight furrow. Most inexperienced gardeners plant seed too thickly. This necessitates later thinning if good results are to be obtained. Where reliable seeds are used the quantities given in the planting table may be safely followed. The seeds should not be covered too deeply. Especially early in spring, deeply set seeds are likely to rot. Again, the planting table is a safe guide.

Time to plant, depth to plant and distances between rows and between plants in a row are all given in the planting table. The garden plan should be followed closely and, if necessary, the gardener should keep this with him when he starts planting.

**Tools**—Cultivation of the small vegetable garden is largely a matter of hand labor and requires relatively simple equipment. A hoe or potato hook, a rake, a spading fork, a shovel and a trowel will suffice for the average gardener. A hand sprayer or duster will also be useful. At least 50 feet of heavy twine or cord will be of value in keeping the rows straight.

**Cultivation**—Cultivation should be shallow and frequent enough to control weeds. Weeds take plant food and exhaust the soil water. They are more easily kept under control if not permitted to get a good start. A hoe or potato hook used between the rows may be supplemented by some hand weeding. Soil moisture can be conserved by scattering lawn clippings between the rows. At the same time, this layer of grass clippings will help keep down the weeds and will add organic matter to the soil when it is hoed or dug in.

Brush or chicken wire put up for garden peas of the taller varieties and stakes for tomatoes will simplify cultivation, as well as saving space. Tomatoes are most easily trained to a single stalk by removing all side branches and tying to the stake about every 8 inches. Do not remove leaves.

#### PEST CONTROL

The average garden is usually visited by many insect pests and plant diseases. Some gardeners actually lose most of their production to pests. *Much of this damage can be avoided or prevented by careful planning and without the use of sprays and dusts.*

For example, certain crops have such serious pests or so many of them that only the most thorough treatment can produce a satisfactory crop. Late potatoes, for example, cannot be produced efficiently in small units. Large-scale production is adequate and there appears to be no particular need for the home gardener to grow potatoes. Likewise cucumbers, muskmelons and squash are heir to so many pests that they often make an unsatisfactory garden crop. Besides they occupy large areas. Garden peas are so affected by root rot in most garden soils of Connecticut that they cannot be expected to produce a normal crop. Pole beans bear for a long season but require more insecticides than bush beans which mature quickly.

*Adjustment of planting dates can avoid damage from several pests.* Cabbage and cauliflower planted after June 1 usually escape the cabbage maggot. Bush beans planted between June 1 and 25 escape serious injury by the Mexican bean beetle. Such sweet corn varieties as Carmelcross, and Golden Cross Bantam are not seriously damaged by the European corn borer if planted between May 20 and June 5. Usually corn of any variety maturing in August is not heavily infested. If pea seed, especially early varieties, is scratched into the frozen or recently thawed soil of early spring, the crop may mature early enough to escape much of the root rot. Spinach seed planted in the spring is much less subject to damping-off than if planted for a fall crop.

The following simplified pest control schedule is suggested for the home garden.

1. **Cabbage, cauliflower and broccoli.** The soil should be sweet to avoid *club root*. For the early crop planted before June 1, use a home-made paper disc, attaching tightly around the stem of each plant immediately after setting, and leaving intact until after June 1. One application of pyrethrum dust may be needed for *cabbage worms* about June 20.

Late crop (plants set in July): two pyrethrum dusts for *cabbage worms* about July 20 and August 5. A third treatment may be needed August 20.

2. Several plants like **peas, tomatoes, cabbage and eggplant** sometimes suffer with *wilt diseases* that are specific to each crop. Such diseases show as discolorations inside the stem. The germs causing these diseases lurk in the soil and they are difficult to eliminate. If wilt diseases become serious in the garden the crops had best be abandoned.

3. **Green bush beans** planted before June 1 will need pyrethrum dust to control the *Mexican bean beetle* about June 7 and 21. Late beans require treatment about August 9 and 20. **Lima and pole beans** may need all four treatments. Lima bean seed should be treated with Spergon.

4. **Eggplant, tomatoes and Irish Cobbler potatoes** (planted before May 15) require protection from the *potato flea beetle* late in May and early in June. Pyrethrum dust applied two or three times at weekly intervals should be effective.

5. **Spinach, broccoli, chard, cabbage, cauliflower, tomatoes and potatoes** may be attacked by *aphids* in some seasons. Pyrethrum dust will kill many of the aphids but one application will probably not kill all of them. Dusts containing rotenone are somewhat more effective. If a sprayer is already available, one teaspoonful of nicotine sulfate in one quart of water in which 2 tablespoonfuls of white soap flakes have been dissolved, is an excellent spray for aphids.

6. *Cutworms* can be prevented from damaging newly-set **cabbage, tomato** and other plants by placing a stiff paper

collar around the stem of the plant. It should extend one inch into the ground and at least one inch above the ground. The collar should be used at the same time the plants are set and left in place at least two weeks.

7. *Blossom-end rot* on **tomato** and **pepper** fruits can be avoided if irrigation is used during dry spells.

8. Since many diseases are seed borne, the control is a matter simply of purchasing seed from reputable seedsmen and stipulating that it be disease-free. The *pod spot disease* or *anthracnose* of **beans** and **peas** is not present on seed produced under irrigation in the West. One of the serious *celery leaf spots* can be controlled by planting only two-year-old seed. *Black leg* and *black rot* on **cabbage** and **cauliflower** can be easily controlled by planting only such seed that has been given the hot water treatment, well-known to seedsmen.

9. Poor emergence and thin stands of plants in the garden are often due to seedling diseases which can be combated by treating the seeds with protective chemicals, like red copper oxide, zinc oxide, Semesan or Spergon. Some progressive seedsmen sell only seeds that have been properly treated.

10. The use of fungicides as sprays or dusts on foliage for diseases in the home garden is hardly to be recommended. The *leaf blight diseases* of **tomatoes**, **eggplants**, **carrots** or **beets** require unremitting attention, and the results otherwise seldom or never repay the effort for the small gardener. He can thus dispense with his copper requirements, so that the copper can be used in battleships or shell cases where the need is greater.

Dusting should always be done when there is no wind, either early in the morning or late in the evening. A fine even cloud of dust is most efficient in covering the plants. Large quantities are not needed. The most efficient job of dusting produces a fine and almost invisible coating on both sides of all the leaves. In a home garden 25x40 feet two pounds of dust should be enough for the season to control the pests mentioned.

Pyrethrum dust, mentioned here, can be purchased from many concerns handling agricultural dusts. One of the most effective pyrethrum dusts is a proprietary material made by an impregnating process. Dusts containing rotenone are just as satisfactory as pyrethrum dusts for most of the pests mentioned. Either material can be used but the average gardener usually prefers pyrethrum because there is less discomfort if it is inhaled during application. Moreover, a war shortage of rotenone may develop.

If sprayers are available and preferred by the gardener, any proprietary material containing rotenone or pyrethrum, or both, should be satisfactory. The manufacturer's directions should be followed. Enough material for 10 gallons of spray should be sufficient for the season.

## REFERENCES

Additional information on vegetable gardening may be obtained from this Station, the Extension Service of the State University at Storrs, or from the United States Department of Agriculture, Washington, D. C. Among the books which the gardener may wish to consult are:

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