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## SEED SOWING AND SPRING TRANSPLANTING IN THE VEGETABLE GARDEN

By

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**Arrangement of Vegetables.** To save both space and labor, and to improve the appearance of the garden, plant the various vegetables according to a systematic plan. This involves the consideration of two factors: first, the grouping of those vegetables according to their season of planting; and second, the growing together of those crops which require the same length of time to mature. Extension Bulletin 287, previously published, shows the suggested planting plan for the vegetable garden, in which these two considerations are carried into actual practice. Those vegetables maturing quickly are in a place by themselves, while the crops which require a long growing season are also grouped together. In this way the latter will remain undisturbed until maturity, while the former will be quickly harvested and the ground reseeded or replanted to another crop. Squash, cucumbers, and tomatoes, as well as egg plants, peppers, and lima beans, will therefore occupy space near each other; while lettuce, spinach, radish, early cabbage, early peas, early beets, etc., will be planted so that upon their removal the soil may be quickly put into proper condition and be ready to produce another crop. Part of the home garden, therefore, will be producing a constant succession of crops. In this way there is a tendency toward maximum production and an economical use of the soil.

**Soil Preparation and Soil Fertilization.** These factors, of very great importance in the work previous to seed sowing, have been treated in Bulletin 287. It is sufficient here to emphasize the necessity of very thorough work in making a finely prepared seed bed, which will produce a rapid germination of seeds and hold moisture well during the growing period. The application of well rotted manure, incorporated into the soil by light plowing or thorough disking, is one of the best means of fertilization. Other methods are discussed in publications that may be obtained from the Oregon Agricultural College.

**Time of Sowing.** As some vegetables are hardy, some half hardy, and others tender to frost, it will be impracticable to making sowings all at one time. Many hardy vegetables, such as peas, spinach, radish,

turnips, and lettuce, can be seeded in the spring just as soon as the ground has been well prepared. This will usually be from the middle of March to the middle of April. Except for climatic conditions, the kind of soil found in the home garden will be the governing factor, as regards the best time for early seeding. Tender seeds, such as those of the cucumber, sweet corn, and winter squash, should not be sown until the ground is well warmed, ordinarily from May 10 to May 20. It is necessary with some vegetables that there be successional sowing in order that the crop may be continuously produced during the summer season, as, for instance, in growing head lettuce and string beans.

In most cases there are four definite planting periods in the garden. The first is the period for planting the seed of early hardy vegetables; the second, for planting the seed of tender vegetables, after the disappearance of frost; the third, for the seeding of vegetables in late summer for fall and winter use; and the fourth, for the fall planting of seeds for fall, winter, and spring marketing.

**Amount of Seed to be Sown.** The table on page 4 specifies the amount of seed necessary for a 100-foot row of each vegetable. The amount of seed to be purchased can be determined after the garden plan has been made up. In general, the sowing of the seed should be in accordance with the distance it is desired to have the plants apart, or in other words, enough seed to have a good stand of plants and yet avoid much thinning. If the seed is more than one year old, thicker seeding should be made. A liberal seeding should be made for plants such as sweet corn, cucumbers, squash, etc., which are planted in the hill, in order that there may be plenty of plants, from which to select the vigorous ones that are to survive. Large vegetable seeds such as peas, beans, and sweet corn, can be soaked over night and in this way a quicker germination after sowing will result.

**Method of Seeding.** The rows in the garden can be most easily marked by a tight garden line along side of which the furrow of proper depth for the vegetable seed should be made. A light, pointed hoe will make a very satisfactory furrow. Covering may be done with garden rake, drawing the fine soil over the seed and slightly firming the ground with the tines of the rake. Freshly stirred ground which is to be planted should be tramped as little as possible, especially in the early spring when the soil is liable to be somewhat wet. Suggestions concerning the depth of covering the various vegetable seeds are to be found in a table on another page.

Where there is a garden of more extensive area than one might find in the rear of the city house, it would be advisable to use a seeding machine of some standard make, so that a larger area could be covered in less time, and the seed distributed evenly in such a way as to cause a ready germination. With the added appliances which can be attached to these machines they will be found most useful and economical, not only in seeding but also in cultivating.

In seeding some vegetables, such as carrots and parsnips, the germination can be hastened and a more uniform stand of plants obtained by including a few radish seed which will germinate quickly, thereby making it possible for the weaker carrot and parsnip seedlings to break through the crust of earth.

**Thinning of Plants in the Garden.** Many home gardeners make a mistake in not leaving enough room between plants for best development. Thinning may often be made unnecessary by careful and more uniform sowing of seeds. Thinning should be done before the plants have begun to crowd each other and have become slender and weak. The inferior plants should be eliminated, leaving the best plants, as far as possible, standing at the proper distance in the rows. In some cases the thinnings can be used for transplanting elsewhere in the garden, for instance in handling lettuce, onions, and beets. It is best, in some cases, not to thin entirely at one time, owing to a possible loss of some of the plants in the hills through insect attack, as for example in growing sweet corn, melons, cucumbers, and squash. Head lettuce plants should be left spaced from 8 to 10 inches; radish approximately 1 inch between the roots; spinach usually need not be thinned at all; while beets, carrots, onions, and parsnips should be left standing no closer than 2 to 3 inches. Sweet corn, cucumbers, winter squash and pumpkins should be thinned so as to leave no fewer than three vigorous plants to the hill. In the latter instances the plants should stand so as to be evenly spaced and should not crowd each other.

**Spring Transplanting of Vegetable Plants.** Some vegetables are necessarily grown under glass in the spring in order that the plants may be ready for field setting at the proper time. Seedlings of early cabbage, head lettuce, cauliflower, tomatoes, peppers, egg plants, and celery are grown in propagating green houses, or hotbeds, and later hardened in cold frames before being set outside in the garden. Most home gardeners, especially those living in the city, do not have the facilities for growing their own plants, and must therefore purchase directly from a grower or a seed dealer.

In either case it should be the aim of the gardener to obtain the best possible grade of plants. They should be of a suitable size for transplanting, stocky and vigorous in growth, and the "flat" or plant box containing the plants should be properly labeled with the name of the variety. For the best results the plants should be true to the name of the variety and be grown from the best strain of seed. The price of the plants is a secondary consideration, in contrast to their quality. The higher-priced plants that are stronger and stockier give far more satisfaction than those plants that can be bought for a lower price, but which ordinarily do not have the vitality or vigor necessary to make a satisfactory crop. The home gardener should, therefore, appreciate the difference in value between these two grades and realize that transplanted plants with well-developed tops and roots are by far the better investment.

The following table shows the character of young vegetable plants for spring transplanting into the garden, and the distances and time of planting.

The following table will be of help in giving DETAILED NOTES AS TO THE MANNER OF GROWING EACH CROP:

Vegetable	Variety	Date of Seeding	Hills or Drills	Date of Transplanting	Distances of Planting		Amt. of seed per 100 ft. row	Depth of planting	When maturing
					Rows	Pl'nts			
Beans, snap....	Stringless Green Pod....	May 1....			inches	inches			
	Kidney Wax, Refugee....	July 1....	D .....	Successive Seedings .....	30.....	3.....	1 lb.....	1-2.....	.....July 20 frost
Beans, pole....	Kentucky Wonder, Oregon Pole Lima	May 15-25	H .....		36.....	24-30.....	1 lb.....	2.....	.....Aug. 1
Beets, early....	Early Model .....	Apr. 10-20	D .....		18.....	2-3.....	2 oz.....	½-1.....	.....July 1
Cabbage, early....	Early Jersey Wakefield..	Feb. 1-15	Hotbed ..	March 25-April 10.....	24-30.....	15-18.....	1 pkt.....	½.....	.....June 30-Aug. 10
Carrots, early....	Chantenay .....	Apr. 10-25	D .....		18.....	2-3.....	½-1 oz.....	½.....	.....July 10
Carrots, late....	Chantenay .....	June 1-15	D .....		18.....	2-3.....	½-1 oz.....	½.....	.....Sept. 20
Cauliflower early .....	Snowball, Dry Weather..	Feb. 20..							
		March 1..	Hotbed ..	After frost .....	24-30..	20-24..	1 pkt.....	½.....	.....July 10-Aug. 10
Chard, Swiss....	Lucullus .....	Mar. 10-25	D .....		12-15..	4-6.....	2 oz.....	1.....	.....June 20
Corn, Sweet....	Portland Market, Golden Bantam .....	May 1....							
		June 15..	H .....	Three successive seedings	36.....	24.....	1 pt.....	1½-2.....	.....July 25 frost
Cucumbers .....	Davis Perfect .....	May 10..							
		June 10..	H .....		72.....	72.....	½ oz.....	1.....	.....Aug. 1 frost
Kohl-rabi .....	White or Purple Vienna..	April 1-10	D .....		12-14..	3.....	1 pk.....	½.....	.....June 10
Lettuce, head....	May King, Big Boston....	Feb. 1-15	Hotbed ..	March 25-April 10.....	12.....	8-10.....	½ oz.....	½.....	.....May 25-June 10
Onions, seed....	Yellow Danvers, Australian Brown	April 1-20	D .....		14-16..	2-3.....	1 oz.....	½.....	.....Sept. 10-Oct.10
Onions, sets....	Danvers, Australian Brown .....	Mar. 20..							
		April 10..	D .....	March 25-30.....	12.....	2.....	2 lbs. sets	1.....	.....June 1
Parsnip .....	Hollow Crown .....	April 25..							
		May 10..	D .....		18-20..	3-4.....	½-1 oz.....	½-1.....	.....Sept. 20
Peas .....	Early Morn, American Wonder, Laxtonian, Telephone	Mar. 10..							
		May 1....	D .....	Successive Plantings.....	24-30..	2-3.....	1 lb.....	1½-2.....	.....June 10
Pumpkin .....	Winter Luxury .....	See Winter squash							
Radish .....	Scarlet Globe, White Icicle .....	Mar. 10..	D .....	Successive seedings.....	10-12..	1-1½.....	1 oz.....	½-1.....	.....in succession
Salsify .....	Mam. Sanadwich Island..	See Parsnip							.....Sept. 30
Spinach .....	Victoria, Longstanding..	Mar. 10..							
Squash .....		April 15..	D .....		10-12..	2-4.....	1 oz.....	1.....	.....May 15
Summer .....	Summer Crookneck.....	May 10..	H .....		36.....	36.....	½ oz.....	1.....	.....July 20
Squash .....									
winter .....	Delicious, Hubbard .....	May 10-20	H .....		96.....	96.....	½ oz.....	1.....	.....Sept. 20
Turnip .....	White Egg, White Globe..	Mar. 10..							
		April 15..	D .....		10-12..	2-3.....	½ oz.....	½.....	.....June 1

NOTE 1. See another table for details regarding celery, egg plant, peppers and tomatoes.

NOTE 2. Directions for growing late cabbage, cauliflower, broccoli, Brussels sprouts, Scotch kale, etc., are given in bulletin "The Fall and Winter Garden," to be issued about April 20.

NOTE 3. Dates of planting are variable according to locations, elevations, etc., but indicate whether crops are hardy, half hardy or tender. These dates are for Willamette Valley conditions.

Planting Table

Vegetable	Horticultural Variety	Height of plants Inches	Distance between plants in "flat" Inches	Date of Setting in the garden	Distance between		When Maturing
					rows Inches	Plants Inches	
Cabbage	Early Jersey Wakefield Copenhagen Market	5-7	1½-2	March 25- April 15	24-30	16-18	June 30- Aug. 10
Head Lettuce	May King Big Boston	3 pairs of leaves	2	March 25- April 15	12	8-10	May 25- June 15
Cauliflower	Snowball	5-7	1½-2	after frost	24-30	18-20	July 10-
Tomatoes	Earliana Bonny Best Jewel	8-12	3-4	May 10 May 30	36-48	24-36	Aug. 10 July 20- frost
Peppers	Neapolitan Chinese Giant	6-9	3-4	June 10 June 20	36	15-18	Aug. 1- frost
Eggplant	See Peppers					18	Aug. 20 frost

In the above table special attention is called to the following factors: (1) All plants purchased or home grown should, as far as possible, be spaced apart in the "flat," as is indicated in the above tabulation, in order that they may be vigorous and well developed. The distances given are not arbitrary but represent average spacings. (2) Cauliflower plants are susceptible to check through frost and should not be field set as early as the cabbage plants; otherwise small, "button" heads are liable to be developed. (3) Plants of peppers and egg plants should not be field set until the season is warm and settled. Especial care should be used in transplanting egg plant to the garden.

**Hardening of Plants.** All vegetable plants should be gradually hardened before being set out into the garden. They should not be taken directly from the greenhouse or hotbed and put into the field, but should be submitted gradually to the decreased temperature. This is done by placing the plants in a cold frame in which the ventilation can be so arranged that the plants are gradually hardened. Less water should be given the plants when they are in the hardening stage. All plants offered for sale by the grower direct or from the seed establishments should be properly hardened so that they will not suffer a check when they are put in the field.

**Removal of Plants in Transplanting.** Young vegetable plants should be well soaked down before being removed to the garden, in order that the soil will adhere to the roots and that the plants may be taken up with the least disturbance. This watering should be done four to six hours before the time of transplanting, so that the soil will be moist but not sticky.

**Plants in Individual Plots.** Some vegetable plants such as tomatoes, egg plants, and possibly cucumbers are transplanted most easily if grown in individual paper pots, bands, or collars. In this way there is little

disturbance in transferring them to the field or garden. Plants grown in these pots usually cost more than "transplants." In most cases they are worth the extra price.

**Spring Cultivation.** The cultivation of the soil is important in many ways, chiefly in keeping the moisture in the ground from being lost by evaporation, preventing the soil from becoming baked and hard, getting rid of injurious weeds, and making available the food that the plants need by stirring the soil. It is very important to have a loose layer of 2 to 3 inches of soil at the surface during the growing season. One of the best tools with which to cultivate the soil is the shove or push hoe, which can be used to good advantage, especially when the garden is in its early condition. With this tool one can cover quite a large area of land in a short time. In some cases the wheel hoe can be used to very good advantage. Level cultivation should be given all garden crops. Do not hill up any vegetables, not even celery, which should be banked by using boards. No cultivation should be done when the dew is on the leaves of the plants. It is especially important that cultivation be done soon after a rain, especially on the heavier soils such as those containing silt or clay, which will soon form a hard crust if not cultivated at the proper time.

Cultivation is often abused in that the gardener does not appreciate the location of the roots of the young vegetable. It is not necessary to have a deeper mulch than 3 inches, so that there is no necessity for deep cultivation during the growing period. It is important that weeds be taken out before they become too large in order that no damage may occur to the plants surrounding them.

#### Injurious Insects In the Early Garden

To help in the control of garden insects the following suggestions are included, being contributed by Professor A. L. Lovett, Department of Entomology.

**Cutworms.** These slick caterpillars feed on practically all garden crops. They eat the crops off right at the surface of the ground. Plants that are transplanted to the garden, such as cabbage, cauliflower, lettuce, tomatoes, etc., can be defended from these worms by a stiff paper collar around the plants, or a poison mash consisting of coarse bran 15 pounds, paris green  $\frac{1}{4}$  pound, salt  $\frac{1}{4}$  pound, cheap sirup, 1 quart, mixed with only enough warm water to make a coarse crumbly mash. A small amount of this poison bait should be put around each plant, preferably during the latter part of the day as the insects feed at night.

**Slugs.** These slimy, crawling creatures which affect many garden crops may be prevented from doing considerable damage by a combination of the bran mash used for cutworms and a poison dust scattered lightly over the plants. This dust will consist of 40 percent tobacco dust, 10 percent powdered arsenate of lead, and 50 percent flowers of sulfur, or sifted wood ashes, usually called the "3 in 1" dust. This material should be mixed thoroughly and placed in a cheesecloth bag through which it can be dusted upon the plants in the early morning when the dew is on the leaves. It will be necessary to repeat the dusting after each rain. The use of traps of boards, pieces of sacking, etc., placed about the plants under which the slugs will congregate at night, is of value. Here they may be found and destroyed.

**Green Cabbage Worm.** This is the common worm that is found on all members of the cabbage family. If only a few plants are being grown in the garden these worms may be hand picked. The "3 in 1" dust, which has been suggested for slugs, can be used in dusting the cabbage, cauliflower, and such plants.

**Green Flies or Aphis.** These small sucking insects that multiply so rapidly are usually found on the under side of the leaves of cabbage, cauliflower, squash, melons, etc. They must be controlled before they appear in large numbers and before they roll up the leaves of the plants. Where a spray pump is available a liquid spray is probably more effective for aphis than is the "3 in 1" dust, although the dust is of considerable value before the lice become very numerous. The liquid spray used is Black Leaf Forty, 2 ounces to 12½ gallons of water, with ¼ of a pound of fish or whale-oil soap added to spread the solution evenly.

**Maggots** of various kinds attack the roots of cabbage, radish, turnips, onion, etc. They are quite difficult to combat successfully. Screening the cabbage and cauliflower seed beds to keep out the parent fly is advisable. Use a frame about the border of the bed; over this stretch wires to hold up the coverings. For a screen obtain a coarse cheesecloth, about 16 threads to the inch. Stretch this over the frame and make it fly proof about the edges. Late radish and turnip beds may be similarly treated. When cabbage plants are reset in the permanent planting, tarred felt discs, 2½ inches in diameter, made of one-ply tarred roofing paper, cut with a slit running to the center, may be slipped about the stem of the plant. These afford perfect protection. They are especially valuable for the transplanting of the early cabbage and cauliflower plants.

Where the screens or tarred discs are not used, one of the following dusts may be applied. (1) Black Leaf Forty, 1 ounce; water, 1 gallon; add sulfur, stirring it into the solution until a gritty powder is formed. (2) Pyrethrum, White Hellebore, or tobacco dust, 1 part; sulfur, 5 parts; mix thoroughly. A small amount should be worked into the soil around cabbage plants about transplanting time and may be used in the radish and turnip seed furrow. The treatment should be repeated when the plants are one-third grown.

Some growers report favorable results from the use of the following solution, saturating the surface soil adjacent to the plant, at eight-day intervals. Crude carbolic acid, 1 pint; whale-oil or fish-oil soap, 1 pound; water, 1 gallon. Dissolve the soap in boiling water, remove from the fire and add the crude carbolic acid; stir vigorously until an emulsion is formed. For use, dilute 1 part of this stock solution with 40 parts of water.

**Twelve Spotted Cucumber Beetle.** This is a serious pest attacking the foliage of squash, cucumber, beans, etc. The young plants should be dusted with the "3 in 1" dust recommended for cabbage worm.

For fuller suggestions or details concerning troubles of this character write to Professor A. L. Lovett, Department of Entomology, Oregon Agricultural College, Corvallis, Oregon.

#### **Specific Work in the Early Vegetable Garden** (Arranged according to semi-monthly date)

1. March 25 to April 20.

**Field Setting of Plants.** Early Cabbage, head lettuce, onion plants for dry onions harvested in the fall, first transplantings of early cauliflower.

**Seeding.** Early peas, spinach or Swiss chard, turnips or kohlrabi, early beets and carrots, onion seed for dry onions, radishes, head lettuce.

**Harvesting.** Rhubarb, broccoli, green onions, mustard greens, Scotch kale, roots.

2. April 15 to 30.

**Field Setting of Plants.** Cauliflower, and other young plants not yet handled as in previous date.

**Seeding.** Second planting of peas, head lettuce, and other vegetables not completed under 1.

**Harvesting.** Asparagus, rhubarb, green onions, frame lettuce, radishes.

3. May 1 to 15.

**Field Setting.** Tomatoes.

**Seeding.** Sweet corn, beans, peas, summer squash, head lettuce, parsnip, salsify, and those crops not completed during latter April; also seeding in beds, late cabbage, broccoli, sprouts, Scotch kale, fall cauliflower.

**Harvesting.** Asparagus, rhubarb, onions, frame lettuce, radishes.

4. May 15 to 30.

**Field Setting.** Tomatoes.

**Seeding.** Cucumbers, melons, lima beans, pumpkins, squash, sweet corn, head lettuce, pole string beans, and seed of vegetables for fall and winter marketing not completed in early May.

**Harvesting.** Asparagus, rhubarb, head lettuce, spinach, onions, radishes.

5. June 1 to 15.

**Transplanting.** Plants of pepper, egg plant, early celery, late tomatoes.

**Seeding.** Late beets, carrots, string beans, summer lettuce, late sweet corn.

**Harvesting.** Asparagus, rhubarb, green onions, spinach, head lettuce, radishes, turnips, kohlrabi, early peas.

### Publications on Vegetable Gardening

To be had without cost

Farmers' Bulletins obtainable gratis from the U. S. Dept. of Agri., Washington, D. C.—

Control of Insects and Diseases in the Home Vegetable Garden—856

Home Production of Onion Seeds and Sets—434

Saving Vegetable Seeds for the Home and the Market Garden—884

Asparagus—869

Cabbage—433

Beans—289

Celery—282

Onion Culture—354

Home Storage of Vegetables—879

Sweet Potato Culture—324

The Small Vegetable Garden—818

The Farm Garden in the North—937

Publications obtainable gratis from the Oregon Agricultural College, Corvallis.—

#### Bulletins

Insect Pests of Truck Crops—College 100

The Home Vegetable Garden—287

#### Pamphlets

Production and Marketing of Late Cabbage

Asparagus Culture

Broccoli Growing and Marketing

Celery Growing and Marketing

Cucumbers under Glass

Fertilizers for Truck Crops

Fertilizer Tests on Onion Land

Celery Diseases

Onion Diseases

Tomato Diseases

Bean and Pea Weevil

Rhubarb

Wireworm Control