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UNIVERSITY OF KENTUCKY

COLLEGE OF AGRICULTURE

Extension Division

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CIRCULAR NO. 67

(REVISED)

THE HOME VEGETABLE GARDEN

Lexington, Ky.

January, 1927.

Published in connection with the agricultural extension work carried on by cooperation of the College of Agriculture, University of Kentucky, with the U. S. Department of Agriculture, and distributed in furtherance of the work provided for in the Act of Congress of May 8, 1914.

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The Home Vegetable Garden

By the DEPARTMENT OF HORTICULTURE

The purpose of the home vegetable garden is to furnish an ample supply of fresh vegetables thruout the growing season, with a surplus of those crops desired for canning, drying and storing for use during the winter months. To accomplish this aim some forethought and planning are necessary. Success depends very largely upon thoro preparation of the soil; planting at the proper time and at the correct depth and distance; giving the right kind and amount of tillage; supplying or making available the desired plant food; preventing or controlling outbreaks of insects and diseases; and, particularly where the area is limited, upon utilizing the garden space economically.

The Soil and Its Preparation

Practically any well-drained soil can be made to produce good vegetables. Sandy loams are desirable, in that they warm up early in the spring, are easily worked and produce smoother root crops than the heavy types of land. Any soil must have an abundance of plant food, applied either in the form of manure or fertilizer or both, in order to produce the maximum amount of first-grade vegetables. A heavy soil can be made more mellow and the water-retaining capacity of light soils can be greatly increased by the addition of stable manure. Twenty-five to thirty tons per acre should be applied in the fall, before the ground is worked. Well-rotted manure may be scattered in the spring or mixt in the row. Cow manure, used exclusively, has a tendency to cause the soil to become compact and hard. Sheep and chicken manures are valuable concentrated forms that should be used somewhat sparingly and with care. For Ken-

tucky soils, outside of the Bluegrass region, thirty pounds of acid phosphate should be used to each ton of stable manure, to supply the deficiency of phosphorus. Where sufficient manure is not available, one to two thousand pounds per acre of a commercial fertilizer carrying four per cent nitrogen, eight per cent phosphoric acid, and six to eight per cent potash may be used. Potash can be supplied by using unleached wood ashes or tobacco stems. Ground limestone, at the rate of two to three tons per acre or one ton of lump lime, applied every three or four years, will make available the plant food in the soil and will prove beneficial for plant growth. The portion of the garden that is to be planted immediately to Irish potatoes should not be limed, because lime has a tendency to increase the amount of scab.

The amounts of fertilizer to use commonly are stated in pounds per acre. In applying fertilizers to small areas the gardener is quite apt to add more than the rate intended. In the following table is given the quantity for one hundred square feet, a space ten by ten feet, when the rate is from one hundred pounds to a ton per acre.

TABLE I

Reducing Acre Recommendations for Fertilizer Applications to Small Areas

Amount per Acre	Equivalent for 100 Square Ft.
100 pounds	3⅔ ounces
200 pounds	7⅓ ounces
300 pounds	11 ounces
400 pounds	14¾ ounces
500 pounds	18⅓ ounces
600 pounds	22 ounces
700 pounds	25¾ ounces
800 pounds	29½ ounces
900 pounds	33 ounces
1,000 pounds	36¾ ounces
2,000 pounds (1 ton)	73½ ounces

Thoro preparation of the soil before seeding is absolutely essential and means a great saving of labor in the later care of the garden. In the fall the ground is plowed or spaded to a depth of six or eight inches, but not so as to bring any appreciable amount of the subsoil to the surface. Fall plowing is also

a means of controlling several of our garden insect enemies. The land should be left rough thru the winter and next spring it can be fitted before the unbroken soil is dry enough to plow. Thoro disking, first with the plow furrows and then across them, followed by the spike-tooth drag, and then once or twice by a drag or planker will put a soil into the fine condition necessary for the proper germination of small seeds. In the small garden the work of levelling, breaking the lumps and fining the soil is accomplished with the rake.

The Garden Plan

Too much stress cannot be laid upon the value of a well-arranged planting plan for the garden. This should be made some time before spring opens and it should be followed as closely as possible thruout the season. A practical garden will have three main divisions. (1) A group of perennial vegetables, as rhubarb or pieplant; (2) a division in which the vegetables, as melons and parsnips, occupy the ground all season; and (3) a division containing vegetables like radishes and lettuce, which occupy the ground for only part of the season. The perennial vegetables occupy the land for several years and should be placed along one side of the garden area. There they will not be in the way of plowing. By grouping together the early-maturing vegetables, they will leave a solid block of ground, when harvested, in which late vegetables may be planted. Also, as an aid in cultivation, vegetables of similar habits of growth, as, for example, cucumbers, melons and winter squash should be planted in the same or adjacent rows. Rows are preferred to separate beds of vegetables. Long rows make cultivation easy and should be used wherever conditions permit. One of the advantages of a plan is that the crops can be rotated, thereby eliminating the ordinary practis of raising the same vegetables on the same plot for several years in succession. Constant single-cropping runs down the soil and favors injurious insects and diseases. The garden plans on pages 6 and 8 should prove satisfactory as guides for a farm and a city garden. The city garden is planned for hand cultivation and does not contain vegetables

PLAN FOR A FARMER'S GARDEN — 100 × 200 Ft.
HOT BED
COLD FRAME
SEED BED
PLANTING DATES
MARCH 15
APR. 1
APR. 20
MAY 1
MAY 15
JUNE 1
ASPARAGUS
RHUBARB
POTATO ONIONS
LETTUCE
RADISH
SPINACH
ONION SEED FOR BIG ONIONS
EARLY POTATOES
ONION SEED FOR BIG ONIONS
EARLY POTATOES
EARLY PEAS (SMOOTH SEED)
EARLY BEETS
PEAS (WRINKLED SEED)
EARLY CABBAGE
SUMMER CABBAGE
LEEKS
PARSNIPS
EARLY CARROTS
EARLY SWEET CORN
BUSH STRING BEANS
OKRA
TOMATOES
CANTALOUP
CANTALOUP
CANTALOUP
SWEET POTATOES
SWEET POTATOES
SWEET CORN
SWEET CORN
LATE CARROTS
LATE TOMATOES
KOHL-RABI
ONION SETS FOR BUNCH ONIONS
EARLY TURNIPS
EARLY PEAS (WRINKLED SEED)
CAULIFLOWER
SWISS CHARD
SALSIFY
LETTUCE
BUSH STRING BEANS
PEPPERS
SUMMER SQUASH
SUMMER SQUASH
SUMMER SQUASH
EGGPLANT
BUSH LIMA BEANS
BUSH STRING BEANS
WINTER SQUASH
WINTER SQUASH
WINTER SQUASH
BUSH LIMA BEANS
CUCUMBER
CUCUMBER
CUCUMBER
PARSLEY
RADISH
FOLLOWED BY ONE ROW OF CELERY JULY 15
FOLLOWED BY ONE ROW OF CELERY JULY 15
FOLLOWED BY SPINACH AUG. 1
FOLLOWED BY KALE AUG. 1
FOLLOWED BY LATE CABBAGE JULY 15
FOLLOWED BY LATE POTATOES JULY 15
FOLLOWED BY LATE POTATOES JULY 15
FOLLOWED BY FALL TURNIPS AUG. 1
FOLLOWED BY FALL BEETS JULY 15
FOLLOWED BY BRUSSELS SPROUTS JULY 15
FOLLOWED BY FALL LETTUCE AUG. 1
FOLLOWED BY BRUSSELS SPROUTS JUNE 15

such as squash and melons that give small yields for the space occupied. The farm garden is to be cultivated with horse labor. It may be necessary to make some changes to meet the specific needs of individual gardens, but the principles of the plans should remain the same.

Maturity of Vegetables. The following grouping of vegetables is given to aid in planning the garden.

Crops Occupying the Ground All Season

Beans, pole snap,
Beans, pole lima,
Cucumbers,
Eggplant,
Leeks,
Melons.
Okra,
Parsley,
Parsnips,
Peppers,
Salsify,
Squash,
Sweetpotatoes,
Swiss chard.

Early Crops Which May Be Followed by Others

Beans, bush snap,
Beans, bush lima,
Beets,
Cabbage, early,
Carrots,
Cauliflower,
Corn, early,
Kale,
Kohlrabi,
Lettuce,
Onions,
Peas,
Potatoes, early Irish,
Radishes,
Spinach,
Turnips,

Late Crops Which May Follow Others

Beans, bush snap,
Beans, bush lima,
Beets,
Brussels sprouts,
Cabbage, late,
Cauliflower, fall,
Carrots, late,
Corn, late,
Celery,
Kale, fall,
Lettuce, fall,
Peas, late,
Potatoes, fall Irish,
Radishes,
Spinach, fall,
Tomatoes, late,
Turnips, fall.

Succession Crops. Succession crops are those that are grown on the same land in one season, one occupying the soil a portion of the season and another following it. They should be included in all garden plans for they are essential to furnishing a continuous supply of vegetables and to preventing parts of the garden lying idle during much of the season. The following are some examples of satisfactory successions:

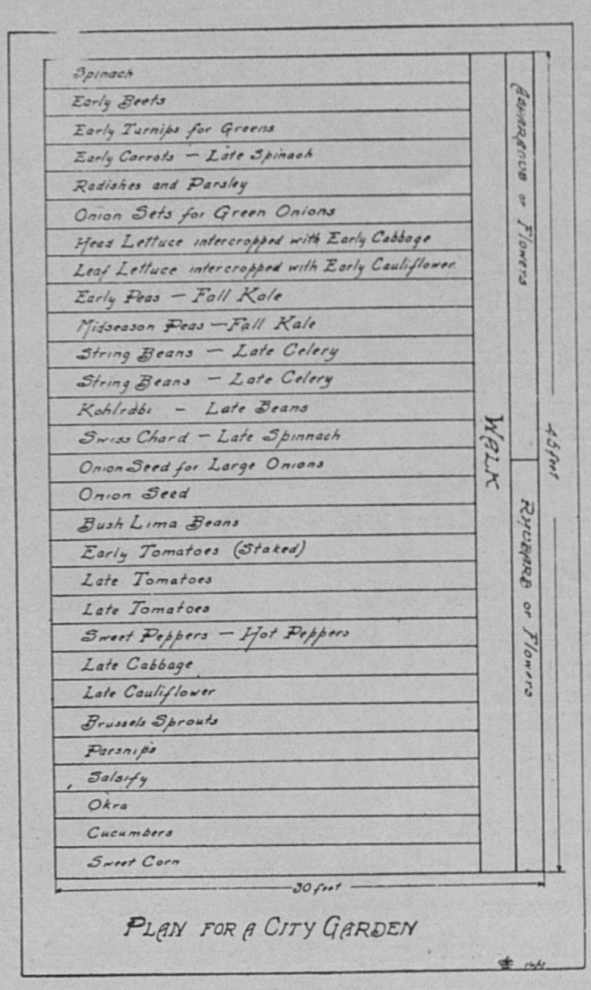
Spring peas followed by fall beets or celery.

Radishes followed by lettuce and lettuce followed by late turnips.

Early cabbage followed by fall Irish potatoes, fall beets or fall turnips.

Early potatoes followed by late cabbage, late beans, fall spinach or fall kale.

Other combinations may be secured by referring to the grouping of vegetables previously given and to Tables II and III.



PLAN FOR A CITY GARDEN

Companion Cropping. Companion cropping is the growing of two or more vegetables on the same area at the same time. One crop must be harvested before the other needs the entire

space. The main or later-maturing vegetable is planted approximately the same distance as it would be when grown alone. The sole object of companion cropping is to utilize space to the limit and it is profitable only in gardens of limited area. Farm gardens, or others with plenty of available land, do not warrant the expense of hand weeding and hoeing needed among companion crops. The vegetables for companion cropping are selected with reference to the size, manner of growth, kinds and amounts of plant food they absorb from the soil, and the length of time required for maturity.

Radishes or lettuce may be grown in the row between cabbage plants and also in the space between the cabbage rows, as they are harvested before the cabbage begins to crowd.

Companion cropping—onions, cabbage and lettuce.

Early beets, spinach, or kohlrabi may be substituted for the radishes or lettuce.

The same combination may be made with cauliflower.

Lettuce, spinach, early beets, kohlrabi, radishes, or early turnips can be planted between tomato, melon, squash or cucumber plants and also between the rows.

Watermelons and running squash may be planted in the corn rows.

Pole beans are often sown in hills of corn and later climb up the stalks. This combination should be used only with those varieties of sweet corn that have large stalks, otherwise the corn is smothered and stunted by the bean growth.

Seed

In purchasing garden seeds, the best seeds that money can buy usually will be found to be the cheapest. An extra expense put into good seed will repay the purchaser many times in the yield and quality secured at harvest. It is a common practis among farmers to wait until the time to plant the vegetables before they buy their seeds; then buy them wherever they can. As a matter of fact, better seed usually will be secured by ordering directly from the seed house. The garden should be planned and the seeds ordered in advance of the time the first planting should be made. Vegetable seed is considered good when it is fresh, free from foreign seeds, true to name and possesses strong vitality. Seedsmen advertise certain novelties as new creations which appear to have superior qualities, but it is best for the gardener to plant standard, well-proved varieties, for the most part, and leave the novelties alone.

The quantity of seed required to plant one hundred feet of row, the depth and time of sowing are given in Table II. An effort has been made to place varieties in this list that have proved satisfactory. Table II gives the time of planting in a different form from Table III.

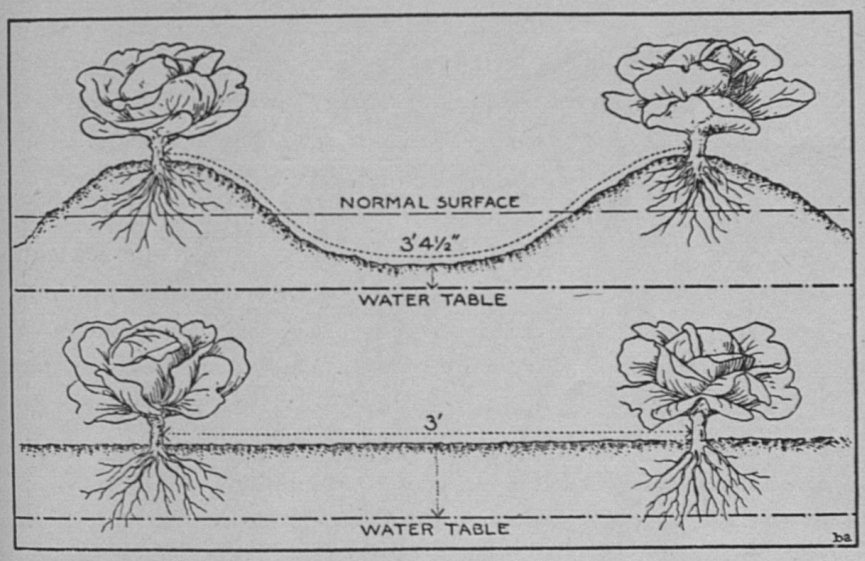
Hotbeds and Cold Frames

In order to secure early crops of some vegetables, the seeds must be sown in a hotbed or cold frame and the plants grown to good size before transplanting to the garden. These structures can also be used for growing some crops to maturity,

before they can be grown in the open in the spring and after the weather becomes too cold in the autumn, thus lengthening the season in which fresh vegetables are supplied for the home table. For complete information on the construction and management of hotbeds and cold frames the reader is referred to Kentucky Extension Circular No. 120.

Cultivation

Cultivation is necessary to keep down weeds and to conserve soil moisture. As soon as rows of vegetables can be seen or immediately after transplanting, cultivation should begin. Thruout the entire season level, shallow cultivation should be practist, except for a very few crops, as specifically noted in the cul-



Level cultivation is preferred to ridging (from Cornell Reading Course).

tural directions. This system of cultivation serves to keep the soil in good physical condition creating a dust mulch which conserves moisture. Hilling causes a greater loss of soil moisture and should generally be practist only in years of excessive rainfall. All weeds and grass should be kept out of the row; to do this will require either hand pulling or getting them out

with a hoe. Thinning is as important and as necessary to the successful development of the best quality of vegetables as is keeping the ground free from weeds. Plant growth is stimulated by constant cultivation. It is better to cultivate the ground frequently with a fine-tooth harrow than to make an effort to destroy the weeds by fewer cultivations with a large plow. Weeds are most easily killed while they are small and before they get well started.

Care taken to make the garden rows straight will be well repaid, especially in the larger gardens where much of the cultivation is done with wheel hoes, horse cultivators, or perhaps garden tractors. With straight rows the cultivating tool may be run closer to the row, thus leaving a narrower strip of ground to be weeded by hand.

TABLE II

To Be Used in Conjunction with Cultural Directions and Table III

VEGETABLE	VARIETIES E. Early M. Midseason L. Late Y. Yellows resistant	Seeds for 100 ft. of row.	Depth to sow seed. Inches	Distance between rows Inches		Distance between plants in row. Inches	Time of planting in open ground.	Time of harvest
				Horse culture	Hand culture			
Asparagus	Washington	35 to 50 roots	5-7 (roots)	48-72	36-48	24-36	March	2 Yrs.
Beans, bush	Stringless Green Pod, Bountiful, Refugee Wax, Burpee's Kidney Wax, Full Measure	1 qt.	1-2	30	18-24	3	Apl. 20-Aug. 1.	40-65 Days.
Beans, pole	Kentucky Wonder, Lazy Wife	1 pt.	1-2	48	24-30	36-48	Apl. 20-July 1.	50-75 Days.
Beans, bush lima	Henderson's Bush Lima, Fordhook Bush Lima	1 qt.	1-2	36	18-24	5-6	May 10-July 15.	55-80 Days.
Beans, pole lime	Early Leviathan, King of the Garden, Sieva	1 pt.	1-2	48	36	36-48	May 10-July 1.	55-80 Days.
Beets	Eclipse, Crosby's Egyptian, Detroit Dark Red	2 ozs.	½-1	30	12-18	3-4	Mch. 25-July 20.	60-80 Days.
Brussels sprouts	Long Island, Improved	½ oz.	½	30	18	18	June 15*.	120 Days.
Cabbage	Jersey Wakefield (E), Golden Acre (E), Copenhagen Market (E), Flat Dutch (L), Succession (L), Louisville Drumhead (L), All Seasons (Y), Iacope (Y)	½ oz.	½	36	24	18-24	Apl. 1-Aug. 1*.	90-120 Days.
Cantaloup	Rocky Ford, Netted Gem, Tip Top	½ oz.	1-2	72	60	48-72	May 1-June 1.	120-140 Days.

*Time of transplanting to garden.

TABLE NO. II—Continued.

VEGETABLE H. Heading type	VARIETIES	Seeds for 100 ft. of row.	Depth to sow seed. Inches	Distance between rows Inches		Distance between plants in row. Inches	Time of planting in open ground.	Time of harvest.
				Horse culture	Hand culture			
Carrots	Early Scarlet Horn, Oxheart, Chantenay, Danvers	1 oz.	½	30	12-18	3-4	Mch. 25-June 15.	75-110 Days.
Cauliflower	Early Snowball, Dwarf Erfurt	¼ oz.	½	36	24	24	Apl. 1-Aug. 1*.	100-130 Days.
Celery	Winter Queen, Giant Pascal, White Plume	1/3 oz.	⅛	72	36	6	July 20*.	120-150 Days.
Corn, sweet	Golden Bantam, Adams Early, Country Gentleman, Stowell's Evergreen	½ pt.	2	36-42	30	12	Apl. 20-July 15	70-100 Days.
Cucumber	White Spine, Davis Perfect	½ oz.	1-2	48-60	48	24-48	May 1-July 1.	60-80 Days.
Eggplant	New York Purple, Black Beauty	¼ oz.	½	36	24	18-24	May 15-30*.	130-160 Days.
Kale	Dwarf Siberian, Dwarf Curled Scotch	1/3 oz.	½	30	24	8-10	Mch. 15-30; Sept. 1.	90-120 Days.
Kohlrabi	White Vienna	¼ oz.	½	30	12-18	8	Mch. 15-30-July 20-30.	60-80 Days.
Leeks	American Flag	½ oz.	½	30	18	4-6	Mch. 15-Apl. 15.	120-180 Days.
Lettuce	Grand Rapids, May King (H), New York (H), Hanson (H)	¼ oz.	¼	30	15	6-12	Mch. 15-Aug. 20.	60-90 Days.

*Time of transplanting to garden.

Lettuce	Grand Rapids, May King (H), New York (H), Hanson (H)	¼ oz.	¼	30	15	6-12	Mch. 15-Aug. 20.	60-90 Days.

*Time of transplanting to garden.

TABLE NO. II—Continued.

VEGETABLE	VARIETIES E. Early M. Midseason L. Late	Seeds for 100 ft. of row.	Depth to sow seed. Inches	Distance between rows Inches		Distance between plants in row. Inches	Time of planting in open ground.	Time of harvest.
				Horse culture	Hand culture			
Okra	White Velvet	2 ozs.	1	42	30	24	May 1-30.	90-130 Days.
Onion, seed	Yellow Danvers, Prizetaker, Bermuda	½ oz.	½	30	12	2-3	Mch. 15-30	140-160 Days.
Onion, sets	White Queen, Yellow Potato	1-2 qts.	1-2	30	12	2-3	Mch. 15-30; Sept.	90-120 Days.
Parsley	Moss Curled	½ oz.	½	30	15	6	Mch. 25-July 1.	80-110 Days.
Parsnips	Hollow Crown	½ oz.	½-1	30	12-18	3	Mch. 25-Apl. 15.	120-160 Days.
Peas, garden	Alaska (E), Gradus (M), Thomas Laxton (M), Notts Excelsior (M), Alderman (L)	1-2 pts.	2-4	30-36	24	2-3	Mch. 15-May 5.	45-80 Days.
Peppers	Ruby King, Chinese Giant	¼ oz.	½	36	24	18-24	May 1-30*.	140-150 Days.
Potato, Irish	Irish Cobbler (E), Bliss Triumph (E), Green Mountain (L), Carman No. 3 (L)	½ pk.	4	30-36	24	12-18	Mch. 15-30, July 15, Aug. 10.	90-140 Days.
Radish	Scarlet Globe (E), French Breakfast (E), White Icicle (M), White Vienna (L), Chartiers (L)	1 oz.	½	30	12	1-2	Mch. 15-Sept. 15.	25-40 Days.

*Time of transplanting to garden.

TABLE NO. II—Continued.

VEGETABLE	VARIETIES E. Early M. Midseason L. Late W. Wilt resistant	Seeds for 100 ft. of row.	Depth to sow seed. Inches	Distance between rows Inches		Distance between plants in row. Inches	Time of planting in open ground.	Time of harvest.
				Horse culture	Hand culture			
Rhubarb	Victoria, Linnaeus	35 to 50 roots	3 (roots)	48–60	36	24–36	March	2 Yrs.
Salsify	Sandwich Island	1 oz.	1	30	12-18	2–3	Mch. 25–Apl. 15.	120-180 Days.
Spinach	Victoria, Bloomsdale, New Zealand	1 oz.	½–1	30–36	15	2–5	Mch. 15-30; Aug. 10-30.	50–70 Days.
Squash, Summer	White Bush, Summer Crookneck, Des Moines	1 oz.	1-2	48	36	48	May 1–July.	60–80 Days.
Squash, Winter	Hubbard, Delicious, Essex Hybrid	1 oz.	1–2	96	60	72–96	May – June 1.	120–140 Days.
Sweetpotatoes	Nancy Hall, Yellow Jersey	3 lbs.	3 (plants)	42–48	36	15	May 15–30*.	150–170 Days.
Swiss Chard	Lucullus	1 oz.	½–1	30	15–18	4–6	Mch. 25–July.	60–80 Days.
Tomatoes	Earliana (E), Sunrise (E), Clark's Jewel (M), Bonny Best (M), Ponderosa (L), Greater Baltimore (L), Norton (WL), Marglobe (WM)	⅛ oz.	½	72	36–48	24–48	May 1–June 10*.	125–150 Days.
Turnips	Purple Top Milan, White Egg	½ oz.	½	30	12-18	3	Mar. 15–30; July 20–30.	60-80 Days.
Watermelons	Tom Watson, Kleckley Sweets	1–2 ozs.	1–2	96–120	84	36–96	May 1–June 1.	120–140 Days.

*Time of transplanting to garden.

TABLE III

Vegetable Plantings Grouped in Semi-Monthly Periods

To be used in conjunction with cultural directions and Table II

15-Day Periods Beginning	VEGETABLES	
March 15	Asparagus Kale Kohlrabi Leeks Lettuce, leaf, Onions, seed and sets,	Peas (smooth seed) Potatoes, Irish Radishes Rhubarb Spinach Turnips
April 1	Beets Cabbage (plants started Febuary 1) Carrots Cauliflower (plants started Feb. 1) Lettuce, head (plants started Feb. 1) Lettuce, leaf, Parsley	Parsnips Peas (wrinkled seed) Radishes Salsify Swiss Chard
April 20	Beans, string, Corn, sweet, Lettuce	Peas Radishes
May 1	Beans, string, Cantaloup Corn, sweet, Cucumber Lettuce, summer varieties, Okra Peas	Pepper (plants started Feb. 15) Radishes Squash Tomatoes (plants started March 1-10) Watermelon
May 15	Beans, lima, Beans, string, Corn, sweet, Eggplant (plants started Mch. 1) Lettuce, summer varieties,	Radishes, summer varieties, Sweetpotatoes (plants started April 1)
June 1	Beans, lima, Beans, string, Carrots, late,	Corn, sweet, Tomatoes (plants started March 25)
June 15	Beans, string, Brussels sprouts (plants started April 15)	Corn, sweet,
July 15	Beans, string, Beets Cabbage (plants started June 1)	Celery (plants started May 1) Corn, sweet, Potatoes, Irish,
August 1	Beans, string, Kohlrabi Lettuce Turnips	
August 15	Lettuce Kale Spinach Turnips	
Sept. 1	Potato-onion sets Radishes Turnips	

CULTURAL DIRECTIONS

The dates for seed sowing and other garden operations given thruout this publication are for the vicinity of Lexington and they necessarily must be modified for other sections of the state. The records of the Government Weather Bureau, as reported in Circular 19 of the Experiment Station, show that in Lexington, on the average, the last killing frost in spring occurs in only one year in ten after April 29, and the first killing frost in fall only one year in ten before October 9.

In the state as a whole, the time of late frosts in spring and early frosts in fall is modified chiefly by the two influences, latitude and elevation. Thus the frost-free season becomes longer as one proceeds from Lexington toward the Ohio river, particularly toward Louisville and westward to the "Purchase" section. It is longer also in the counties along the Tennessee border. Planting dates for tender vegetables average from 5 to 7 days later at Lexington than in western and southern Kentucky, and from 3 to 5 days earlier than in the high lands of northeastern Kentucky.

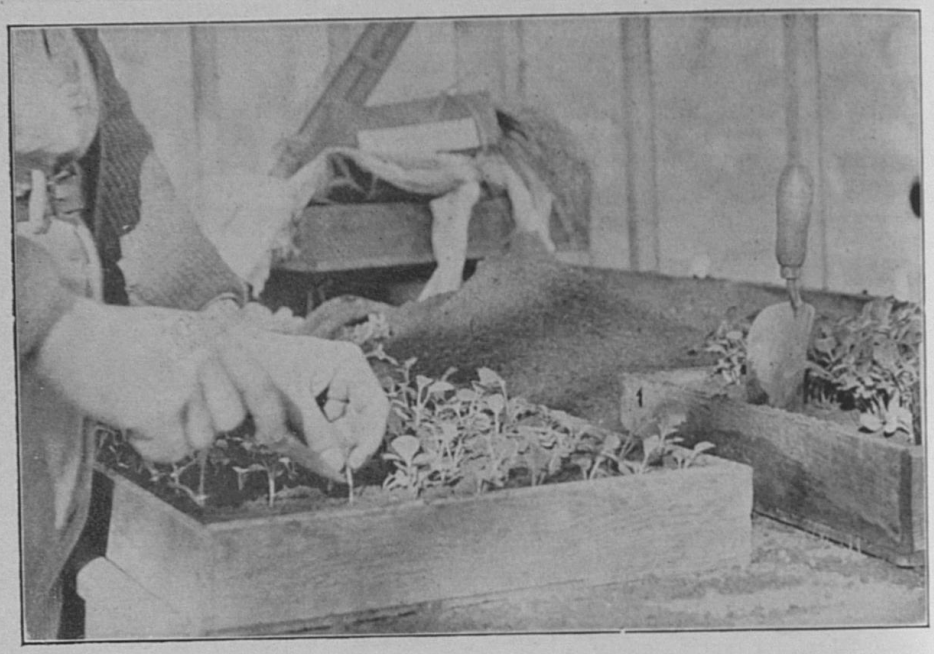
Asparagus. Every garden should have some asparagus, because it is a valuable addition to the spring diet and it is one of the very earliest vegetables. The ground should be made very rich with well-rotted manure. The few roots needed for the home garden should be purchased instead of trying to raise the plants from seed. In early spring these roots, 1 year old, are planted two to three feet apart in the row, covering them with about five or six inches of soil. Cuttings should not be made until the third season. If green asparagus is desired, level cultivation is practist, but for the white asparagus the rows should be ridged after the second year. After the bed has become well established all the shoots should be removed during the cutting season. After the harvest season, the tops are allowed to grow, and cultivation between the rows is given as long as possible. In the late fall the tops are cut off and burned.

Beans. Beans are easily killed by frost. They should be planted so that the plants will not be up until danger from that source is past. Snap or string beans may be sown about the 20th of April. Successive plantings should be made until August. Lima or butterbeans are more tender than snaps, and should not be seeded until after the first week in May. They require warm soil, and if planted before the land has warmed up, the seedlings are checked in their growth. Such setbacks may be a cause of the unproductiveness which is sometimes found in butterbeans. The small-seeded limas will yield better in unfavorable locations than the large-seeded varieties. Bean seed should not be covered over two inches deep and in heavy soils one to one and a half inches is sufficient. Pole varieties are planted in hills three to four feet apart in the row and they need to be staked or trellised. Eight to ten seeds are sown per hill, thinning later to three or four plants. Beans should not be cultivated when they are wet because of scattering and spreading the pod spot (anthracnose).

Beets. Beet seed may be planted any time after the middle of March. Since the beet germinates slowly it is a good plan to scatter a few radish seed in the rows. The radish comes thru the soil early and marks the row for early cultivation. Of course the radishes are removed after the beet seedlings appear. When the beets are about two inches high they should be thinned to three to four inches apart. Beets for fall and winter use are sown in the middle of July.

Brussels Sprouts. This vegetable is a member of the cabbage group. It is different from cabbage in that instead of a single head being produced a number of small heads are borne in the axils of the leaves. These small heads are called "sprouts" and when they are an inch or more in diameter, they are removed from the plant and cooked similarly to cauliflower. It is naturally a fall vegetable and the seed should be planted in April and the young plants transferred to the field about the middle of June. The culture is similar to that of cabbage. The "sprouts" are not injured by fall frosts but, instead, their quality is improved.

Cabbage. Cabbage seed should be sown in the hotbed the latter part of January or the first of February. When two and a half or three inches high the seedlings should be transplanted to one and a half to two inches apart. The last of March the plants are set in the garden. Seed for the late crop should be sown by the first of June and the plants transplanted to the field the last of July. Early varieties are set eighteen inches apart in the row and late ones twenty-four.



First transplanting of cabbage. The seedlings are removed from the box at the right and set 1½ inches apart in the box at the left.

Cantaloup. Cantaloups or muskmelons are very susceptible to frost injury and therefore the seeds are not planted until the first week in May. Eight or ten seeds are sown in hills four and a half feet apart and later the plants are thinned to three or four. A forkful of well-rotted manure should be placed under each hill to stimulate the plant growth. Cantaloups are best left on the vine until fully ripe. A cracking around the stem is probably the best indication of ripening, since some melons do not get yellow when ripe.

Carrots. Early carrots are planted in the spring as soon as the ground can be worked and the late crop for winter use is sown about the middle of June. The seed is sown thinly in shallow furrows and, later, the seedlings are thinned to three inches apart. A few radish seeds sown with the carrots will mark the row before the latter come thru. The early crop is harvested as soon as large enough to use, and generally before it has matured. The later crop is left in the ground until just before the ground freezes, when it is dug and stored.

Cauliflower. This crop is similar to the cabbage in culture, except that it is more particular in its requirements, thus making it more difficult to grow. Success in raising cauliflower depends upon securing a steady, unchecked growth. Hot weather or drought causes the heads to "break" or to fail to reach a good size. It is grown only in the cool parts of the year. Seed for the spring crop is sown the first of February and the plants grown the same as cabbage. They are set in the garden about the first of April. The fall crop is started June first and the plants transferred to the field by the first of August. The spring crop is more likely to be successful than is the fall planting. Altho cauliflower seed is very expensive, only the best should be purchased. Poor seed is one cause of failure to head properly. After the head begins to form, the outer leaves should be brought together and tied in a bunch at their tips. A canopy is thus formed over the head to protect it from the sun and rain. This is necessary in order to get a sweet, tender, snow white product.

Celery. Late celery does best in most sections of Kentucky. Cool nights and plenty of moisture are required for celery and the early crop is a failure because of our hot summer weather. About the first of May, the seed is sown in flats or in a seed bed. Celery seed is slow to germinate. It should be sown only on soil in most perfect condition and then the seed should just barely be covered. It is preferable to cover the seed with a piece of cheesecloth until after germination. Thoro moistening and plenty of ventilation must be given. The seedlings are transplanted to two inches apart when they reach one and a half

to two inches in height. About July 20th, when the soil is moist, the plants should be set six inches apart, in the garden, in trenches four to six inches deep. It is better to wait for favorable transplanting conditions, unless water can be applied after setting, than to put the plants out during dry weather. The loss of moisture from the plant, when transplanted, can be reduced by clipping off part of the leaves. Thoro cultivation is necessary to conserve all the moisture possible. The first month after planting in the garden, cultivation toward the row is given, so that the trenches are gradually filled. About the first of October more dirt is thrown to the plants. This ridging is continued from time to time until only the tops of the stalks are exposed. Before freezing weather sets in, the entire top of the row is covered over with straw. If the celery were wanted for use earlier than this, the row might be covered any time after the middle of October. Four to six weeks is required to properly blanch celery with dirt. Blanching by means of paper, tile or boards can be done but these will not give the high quality secured in the dirt-blanched stalks. If celery is to be stored for some time, it is not necessary to blanch it in the field.

Corn, Sweet. Sweet corn is well adapted to this state. It is sown about April 20 and thereafter at two or three weeks' intervals until July, in order to furnish a continuous supply for the table. It is cultivated the same as field corn. Sweet corn is sweetest when cooked very soon after being pulled from the stalk.

Cucumber. This vegetable is grown in the same manner as cantaloups, with the exception that the hills are closer together, Four to five feet between rows and two to four feet between the hills in a row should be allowed. Cultivate as long as the vines will permit. Cucumbers should be picked green and even if not needed for consumption, all that are beginning to turn yellow should be removed. Allowing cucumbers to ripen will reduce the yield.

Eggplant. The eggplant requires a rich, warm soil and a long growing season. It culture is somewhat similar to that of the tomato. The seed is sown in the hotbed about March 1

and later transplanted into pots or small boxes. The plants are set in the field in the middle of May. Rotted manure under the plants may be the means of success with this crop because it demands rich ground. Twelve to fifteen plants should furnish an ample supply for the average family.

Banking celery for winter protection.

Kale. This is one of the vegetables important as a source of greens, being grown in the spring and fall. Seeds are sown from August 15th to September 1st for the fall crop. Kale will live over winter in our climate, but in the northern portion of the state it must be given some protection against the cold weather. A spring sowing may be made about March 15th.

Kohlrabi. Kohlrabi is also known as turnip-rooted cabbage. It has a thickened stem, shaped like a turnip, just above ground, that being the edible portion. Its flavor partakes of both the cabbage and the turnip and it is prepared for the table the same as turnips. The crop is seeded in the open ground in the middle of March or the seed may be sown in the hotbed the first of February and the plants transferred to the garden about April 1st. The latter method gives an earlier crop. A sowing made the last of July or the first of August will give a supply for autumn

use. The fleshy stems should be eaten when one-and-a-half to two inches in diameter, for they often become tough and stringy with age.

Leeks. This is an onion-like plant with a somewhat milder flavor than the onion. It does not have a bulb, but the edible portion is the lower part of the stem to render it mild, it should be grown underground. In the latter half of March the seed is sown in the bottom of a furrow five to six inches deep, but it is covered with only half an inch of soil. As the leeks grow, the trench is filled to the ground level. Another method is to ridge the soil up about the plants as they grow instead of digging a trench. Leeks are hardy and can stay in the ground all winter.

Lettuce. Lettuce is a comparatively hardy plant and, since it is our most important salad crop, it should be produced the year around. The seed may be sown in the open as soon as the ground can be worked, about the middle of March, and in order to secure a succession, several plantings should be made at ten or fifteen-day intervals. A sowing made the middle of August should furnish a supply until cold weather sets in: Lettuce is very easily transplanted. By sowing in a hotbed or cold frame in early February and transplanting to the garden about April 1st, an earlier crop can be obtained. Lettuce, to be the best, must make a quick growth without any serious check. The average farmer should not try to raise head lettuce unless he has had some previous experience and has the time to care for it.

Okra. The young, tender seed-pods of okra, or gumbo, as it is commonly named, are used in soup and are also cooked as a separate vegetable. About May 5th the seed is sown in rows three and a half feet apart. It is well to soak the seed in water for twenty-four hours before planting to hasten germination. The plants should stand two feet apart in the row. If none of the pods are allowed to ripen, the plants will bear until frost.

Onions. For early, green onions in the spring, potato onion sets are planted in September. White Queen sets are planted in the latter half of March but they will not be so early as the

potato onions. Dry onions can be grown from seed sown in the field about March 20, or from sets. The latter are probably more often used. The seed may also be sown in the hotbed in January and then transplanted to the field. Frequent shallow cultivations should be given during the growing season and, especially with the onion seedlings, some hand weeding will be necessary. The onion is easily overcome by weeds. As soon as the tops begin to die the crop may be harvested. The bulbs are pulled and allowed to lie in the field for a few days to dry. Then the tops are clipped or twisted off and the onions are stored in a warm, dry place.

Parsley. This is a garnishing and flavoring plant. The seed is sown the last of March or the first of April. Parsley seed is very slow to germinate, usually requiring two to three weeks to make its appearance above ground. The plants are thinned to stand six inches apart. The leaves are cut as soon as they are large enough and cuttings may be made thruout the season. A ten-foot row or a space one yard square should supply the wants of an average family.

Parsnip. Because of their long, large taproots, parsnips need a deep, mellow soil. Stiff or lumpy ground will cause the roots to divide and to become forked. The seed is sown early in the spring, some radishes being used with it for marking the rows, since the parsnip is slow in germinating. The crop occupies the land all season and is not harvested until after freezing has occurred, because that improves the flavor of the roots. They may be left in the ground all winter but, for convenience, it is advisable to dig them in the late fall and store where they are accessible.

Peas. There are two types of peas, (1) the smooth, round-seeded kinds and (2) the wrinkled-seeded sorts. The former can be planted as early as it is possible to work the ground, about March 15th. The wrinkled-seeded varieties are not so hardy and should not be planted until a week or ten days later. Succession planting should be made, until the last of April. The dwarf varieties are convenient because no staking or supporting is

needed. They do not yield so heavily nor bear over so long a period of time as do the tall-growing sorts and for those reasons the latter should be used for the main crop. It is a good practis to plant those varieties that need supporting in double rows about six inches apart and to place wire netting or brush for a trellis between the two rows. Deep planting for the late varieties prolongs their bearing period.

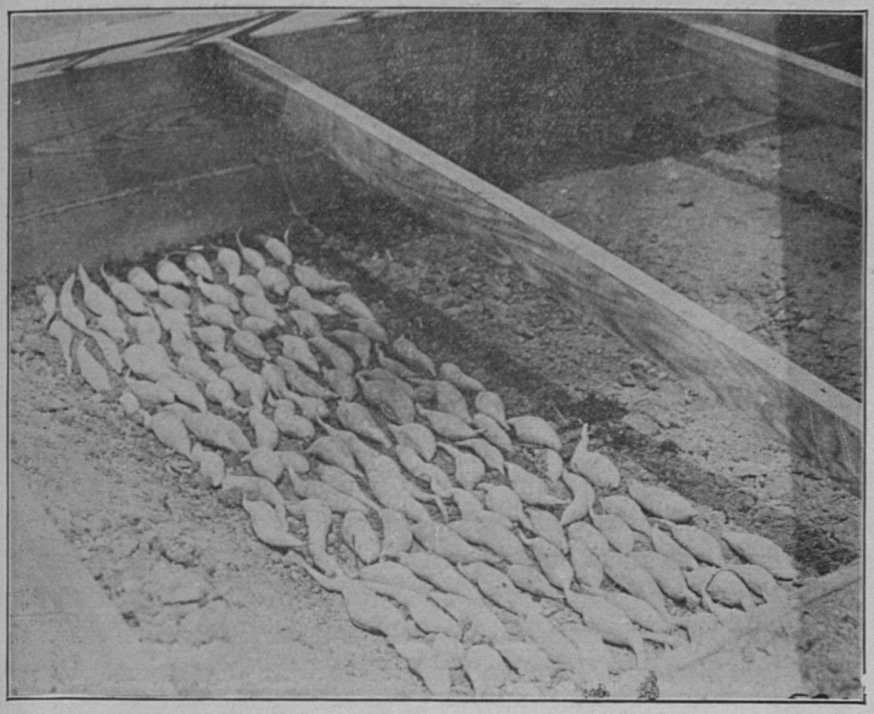
Pepper. The pepper plant is tender and should not be set in the field until all danger of frost is past. The requirements are much like those of eggplant and tomatoes. Plant the seed in the hotbed about February 15th and transplant to the field in the first week of May. Set the plants eighteen to twenty-four inches apart in the rows. Thowing up dirt around the base of the plant, when loaded with fruits, helps to support it.

Potatoes. The first crop of potatoes is planted the last of March and harvested in June and July. The second or late crop is planted the last of July or the first of August and is dug in October. Use only early varieties for the first crop and late varieties for the late crop. Cut the seed to one-and a half-ounce pieces and drop them fifteen inches apart in furrows four inches deep. For more complete directions, the reader is referred to Kentucky Experiment Station Circular No. 34, or Kentucky Extension Circular 202.

Radish. The radish is quick-maturing and quite hardy so that, by planting it in a cold frame or hotbed, it may be had all the year. The small, round and olive-shaped varieties are the quickest-maturing and should be used in the early spring and late fall. They and some of the longer types are suited for later spring demands. Only the summer radishes, of which White Vienna and Chartiers are good varieties, should be grown in the hot weather, for the others get too pithy.

Rhubarb. A rhubarb or pieplant bed should last five to eight years before renewing and therefore it should be placed along one side of the garden, so as not to interfere with the plowing each year. Roots for planting may be bought from a seedhouse or they can be secured by digging up an old plant and dividing the roots so that each piece contains at least one

eye. In the early spring they are planted three by four feet, covering each root with three inches of soil. No leaf-stalks should be used until the third season. Rhubarb needs rich soil and an annual application of stable manure should be given. Six or eight plants will supply the average family.



Sweetpotatoes bedded for slips.

Salsify. This is the oyster plant or vegetable oyster, so called because the flavor has a strong resemblance to that of oysters. Salsify is a long-season vegetable that is not injured by freezing. Its culture is practically identical with that of parsnips.

Spinach. Spinach is our leading crop grown for greens. It quickly goes to seed in warm weather and therefore, it is grown in the spring and the autumn. The spring sowing is made in the last half of March. The fall seeding is done about

August 20, and the plants can be carried over winter by mulching with straw. Spinach is a quick-maturing crop. The entire plant should be cut, the largest plants being used first and thus giving the smaller ones a chance to make more growth. New Zealand spinach is the only kind that will grow thru the summer. It is not a true spinach and only the young terminal growths are used. New Zealand spinach may be cut thruout the growing season.

Squash. Squashes are divided into summer and winter varieties. The former are used any time before the shell hardens, while the winter sorts are not used until ripe. Only the winter squash can be stored. Summer squashes include the patty-pan and the summer crookneck types. They have a bush habit of growth which permits their being planted four by four feet. The winter varieties have a running habit of growth and are planted about eight by eight feet. The squash is planted and cared for like the cantaloup and cucumber.

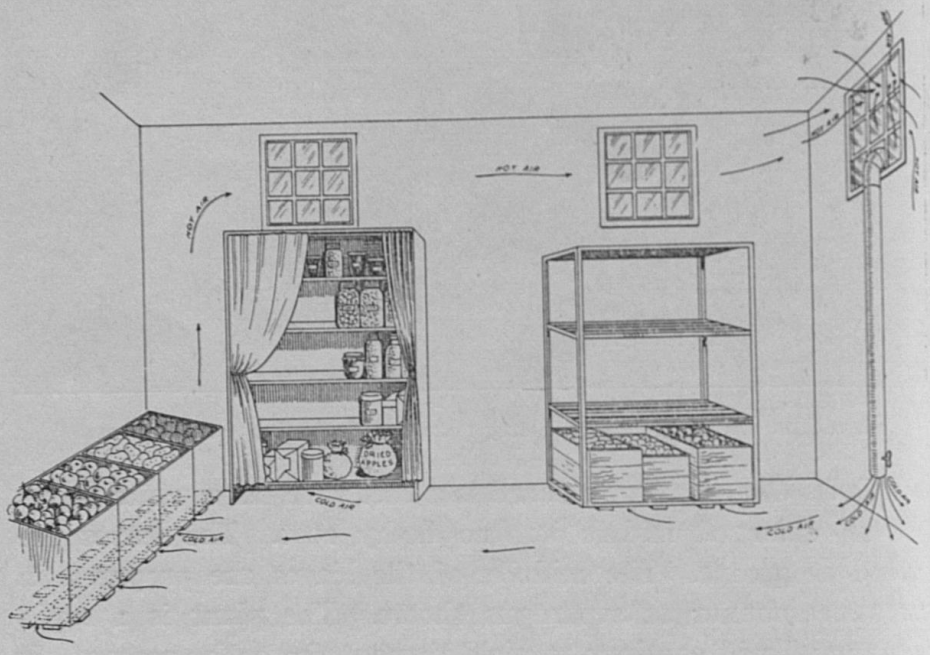
Sweetpotatoes. Sweetpotato roots are placed on the soil of a hotbed about the first of April covered with two inches of dirt or sand, and then thoroly moistened. The roots should not touch each other. In a few weeks slips or young plants will arise from the roots and when five inches tall, should be gently pulled from the parent roots. Any time after May 15th the slips may be transferred to the field and set fifteen inches apart, on ridges that are three and a half to four feet apart. Water causes rotting in sweet potato hills and to insure drainage the crop is grown upon rather broad flat ridges. A yellowing of the leaves and a hardening of the main stem indicate maturity and that the roots may be dug. They should be harvested, preferably, before hard frosts occur. If the vines have been frosted and the roots are to be left in the ground for a while, cut the vines from the roots; otherwise, rot would enter the roots thru the frosted stems. The roots are dug when the soil is dry and on a bright day, if possible. The roots are allowed to dry for a few hours on the ground after digging and are then carried to the storage room. Use the utmost care to avoid all bruising of the potatoes.

Sweetpotato slips before being removed from the parent root.

Swiss Chard. Swiss chard is a beet with large white leaves and an enlarged midrib but no fleshy root. The leaves are cooked as greens. The midribs of the leaves are prepared in the same manner as asparagus shoots. The plant is a rapid grower and will continue to yield thruout the entire season. It is one of our few vegetables furnishing greens in the summer. Chard is planted at the same time as beets, in the early spring, and in the same manner. The seedlings should eventually be thinned to six inches apart.

Tomatoes. Tomatoes do well in all parts of Kentucky and should be found in every garden. The seed is started in the hotbed about March 1st and the plants set in the field any time after May 1st. By making a succession of plantings or by using early and late varieties it is possible to have tomatoes from the very earliest until frost. If the seed is sown in flats and transplanted once or twice before setting in the field, the plants

may be in bloom when set. Tomatoes may be set two feet apart in rows three to four feet apart, in the home garden, provided the plants are staked and pruned. In staking, a five-foot stake is driven into the ground about six inches from the plant and the stems tied to the stake every six to ten inches. In pruning, the plant should be trained to one or two stems and all suckers should be removed as soon as they appear. For fuller directions the reader is referred to a circular on tomatoes published by



A good arrangement for storage in a cool cellar. (Copyright 1918 National War Garden Commission)

the Extension Division of the College of Agriculture which may be had upon request.

Turnips. Turnips are sown about March 20 for spring use and thruout August for fall and winter use. It is not economical to broadcast the seed in the home garden and they should be planted in rows eighteen to thirty inches apart. The late crop should be dug and stored before the ground freezes.

Watermelons. Watermelons are more sensitive to cold than cantaloups. They also require more space, eight by eight or

eight by ten feet being good distances between hills, on average soils. Sometimes the seed is sown three to four feet apart in rows spaced eight or ten feet. In general the cultural directions for cantaloups apply equally well to watermelons. The best way to tell when a watermelon is ripe is to thump it. Ripeness is indicated by a dead sound.

Home Storage of Vegetables

Good results in storage depend upon (1) ventilation, (2) regulation of temperature, (3) sufficient moisture, and (4) upon the quality of the vegetables stored. Only sound, unbruised vegetables can be kept for any length of time. In a house heated by a furnace, vegetables can be stored successfully in the cellar in a room partitioned off in the corner farthest from the heating plant. One and preferably two sides of this room should be outside walls. At least one window is necessary for regulating the temperature and admitting fresh air. The arrangement suggested in the illustration provides a circulation of air. The stovepipe fitted into the place for one of the lower window panes admits cold air. The damper in the pipe allows some regulation of the amount admitted. A wooden flue may be substituted for the stovepipe. The warm air passes out of the room thru a hole caused by removing one of the upper panes of glass. These openings should be covered with wire to prevent the entrance of rats and mice and in the cold weather they should be stopped up entirely and only opened as occasion demands. A dirt floor is best. A concrete floor should be covered with a couple of inches of sand and sprinkled from time to time, just to supply enuf moisture to the atmosphere to keep the vegetables from wilting. All crates and boxes holding vegetables should be raised a couple of inches off the floor, in order to permit proper circulation of air and, for the same reason, they should stand away from the walls.

For outdoor storage the mound-shaped pit may be used. A mound or conical pile of the vegetables is placed on a layer of straw or leaves. Then the pile is covered with a layer of straw or leaves several inches thick and upon this are put three to

four inches of soil. As the weather gets colder, other layers of straw and dirt should be added and, over the outside layer, it is often customary to put on a covering of manure. To furnish ventilation, a triangular flue, made by nailing three boards together and boring several holes in the bottom portion of the boards, is placed in the center of the vegetable mound when that is being made. The top of the flue should extend above the outermost layer of soil. An inverted V cap should be nailed on top of the flue, to keep out the rain. In cold weather the flue openings must be stopped up with rags or some other material. A shallow trench should be dug around the base of the hill to carry away surplus water and keep the vegetables dry. Several small mounds should be made instead of a few very large ones because, after being once opened, it is almost impossible to fully protect the contents of a pit. For this reason those vegetables not required for immediate use should be removed from an opened pit to the cellar or some other protected place.

TABLE V

Storage of Vegetables

Vegetable	Method of Handling and Storing
Beets	Leave in sun after digging, to dry. Remove tops an inch from roots. Store in outdoor pits or in the cellar in boxes of moist earth or in piles covered with damp soil. Best temperature is about 35 degrees.
Cabbage	Pull with roots and outer leaves. Place on cellar floor, head downward, and cover with moist earth, or store in outdoor pits with heads down. Temperature of about 35 degrees is best.
Carrots	Same as beets.
Celery	Stored in field by banking with earth and strawy manure. Dig with roots and set upright in moist soil on cellar floor or in a box in the cellar. In the cellar, water should be added as needed, but do not wet leaves and stems. Green or partially blanched celery keeps best in storage. Stems must be protected from light in order to blanch them. Best temperature is about 35 degrees.
Onions	Pull and air in shade for a few days to cure. Remove tops and store in shallow baskets or trays where air circulates freely. Onions require plenty of cool, dry air, Temperature just above freezing is best. Attic or unused room is better place for storage than cellar.
Parsnips	Parsnips are not injured by freezing. Can be left in the ground over winter, but cold weather makes it inconvenient to dig them when wanted. Better to dig at least part of the crop and store the same as beets.
Potatoes, Irish,	Store in the cellar in an open bin or put into outdoor pit. Best temperature is about 35 degrees.
Salsify	Salsify is not injured by freezing. Handled the same as parsnips.
Squash	Remove from field before hard frosts. Do not bruise or break off the stems from the squashes. Store in furnace room or beside a warm chimney. Requires warm, dry conditions with plenty of air. Best temperature is 55 to 60 degrees.
Sweetpotatoes	Dig just before or immediately after first frost. For three weeks keep the temperature at 75 to 80 degrees and give plenty of fresh air. After curing, store the same as squash Bruising the roots is certain to result in rotten potatoes.
Turnips	Same as beets.

Control of Insect Pests

Insects which attack garden plants may be controlled by direct and by indirect methods. Direct methods include such as the application of poison sprays and dusts, poisoned bait and handpicking. Indirect methods, consisting of crop rotation, fall plowing, clean culture, destroying crop refuse, burning weeds, planting trap crops, etc., should be practist along with the more direct means of pest control.

Different Kinds of Insects. A knowledge of the structure of the mouth parts of insects is essential in order to determine the kind of spray or dust poisons to be used. Insects are divided into two groups: (1) insects provided with biting mouth-parts, represented by the caterpillars, larvae of moths and butterflies, grasshoppers and leaf-beetles, which obtain their food by chewing and swallowing portions of the plant tissues; (2) insects provided with piercing and sucking mouth-parts, represented py the aphids or plant lice, leaf-hoppers and the true bugs (squash bug), which pierce the plant tissues and suck the plant juices.

Close examination of the injured plant usually will indicate the kind of insect at work. If parts of the plant have been eaten or cut off near the ground, a biting insect has been at work. They may be controlled by the application of some arsenical compound, such as arsenate of lead or Paris green. This is sprayed or dusted on the plant and acts as a stomach poison. When the plant curls, wilts, or becomes dwarfed, the injury is very likely due to sucking insects. A wilting or yellowing of the plant may also occur in the absence of insects, in which case the trouble is due to some fungous disease or to a condition in the soil, or other causes. Sucking insects are killed by spray solutions penetrating the breathing pores and eating away the body tissues and it is *absolutely necessary to hit the insect with the spray.* An angled nozzle should be used, in order to reach many sucking insects which feed on the under side of the leaves. The substances most commonly used are tobacco, soap solutions, and kerosene emulsion.

Lead Arsenate. Lead arsenate is used for biting insects. It can be purchased in either paste or powder form and is used as a spray in the proportion of 3 pounds of paste or 1½ pounds of powder in 50 gallons of water. If small quantities of spray are desired, one level tablespoonful of paste or two heaping tablespoonfuls of powder are mixt with one gallon of water. When using arsenate of lead in the spray form on such plants as cabbage, cauliflower or kohlrabi, which have glossy foliage, enuf soap should be added to make a suds, to act as a spreader. The powdered arsenate of lead may be dusted on the plants at full strength or mixt with air-slaked lime. The dust application should be made late in the evening or in early morning, while the dew is on the plants, which will aid the powder in sticking.

Calcium Arsenate. Calcium arsenate is used for biting insects. It comes only in powder form. It is used at the same proportions as arsenate of lead powder in making up dusts or sprays. Because it does not burn tender foliage its use is recommended for the Mexican bean beetle (p. 37) and cucumber beetle (p 38).

Magnesium Arsenate. Magnesium arsenate is a powder. It may be used in place of arsenate of lead in the mixtures given above, but it is especially valuable in spraying for the Mexican bean beetle, since it will not burn the tender bean foliage.

Paris Green. Paris green may be used in proportions of one pound to one hundred and twenty-five gallons of water or one level teaspoonful to one gallon of water. To prevent burning, which often occurs, good slaked lime should be added at the rate of three pounds to one hundred and twenty-five gallons of water. When dusted on the plants, ten parts of air-slaked lime should be added to one part of Paris green.

It is often necessary to use these arsenical compounds in stronger doses when plants are infested with leaf beetles, and especially is this true when the "old fashioned" potato beetles are present. It is well to remember that many caterpillars and larvae of insects are more easily poisoned before they have

reached their full growth and an application at their first appearance is very important for complete eradication. This means frequent examination of the plants and immediate application of the poison. In mixing either arsenate of lead or Paris green the quantity to be used should be placed in a small amount of water first and thoroly stirred in and then poured into the full amount of water to be used.

Tobacco. Tobacco may be used for sucking insects as a dust or in some form of a decoction. To make a decoction, one pound of stems is soaked over night in two gallons of hot water and used without the addition of any more water. Nicotine sulfate (40 per cent) may be purchased and used according to directions on the package. In the use of any tobacco solution, soap should be added to act as a spreader. In fifty gallons add two to four pounds of laundry soap; or to one gallon add a piece the size of a 1½ inch cube, or enuf to make a good suds.

Kerosene Emulsion. In the preparation of kerosene emulsion, one-half pound of laundry soap is dissolved in one gallon of hot water and then two gallons of kerosene are added. These ingredients are thoroly mixed by churning the solution or by using a spray pump to drive the liquid thru the sprayer back into the vessel several times until it becomes a white, creamy emulsion. One part of this stock solution is diluted with ten parts of water, at the time it is to be used.

Soap. Ordinary laundry soaps or fish-oil soap may be used on tender-foliaged plants infested with plant lice, at the rate of one pound of soap to four or five gallons of water.

Bordeaux Mixture. Bordeaux mixture, altho used primarily for the control of fungous diseases, often will repel flea-beetles. It is made by dissolving four pounds of bluestone (copper sulfate) in twenty-five gallons of water and slaking four pounds of good stone lime in twenty-five gallons. These two solutions are then poured simultaneously thru a strainer into the spray tank. A small quantity of about five gallons may be made up by using six and one-half ounces each of bluestone and lime.

Insects and Remedies

Plants	Insects	Nature of Injury	Remedy
Asparagus	Asparagus beetles	Eat young leaves and stems.	Spray with arsenate of lead after cutting season.
Beets	Flea beetles	Eat small holes in leaves.	Spray with arsenate of lead. Keep down such weeds as lamb's quarters and chick-weed.
Beans	Bean leaf beetles	Eat large holes in leaves.	Spray with arsenate of lead.
	Aphids or plant lice	Suck leaves and cause leaf curl.	Spray with nicotine sulfate, especially underside of leaves. Add soap.
	Bean weevils	Eat out interior of seeds and make round holes. Work in stored seeds.	Fumigate with carbon bisulfid in a tight box, 8 liquid ounces to 100 cu. ft. of space after seeds are gathered. Fumes explosive. Keep away from fire.
	Mexican bean beetles	Both the larvae and adults feed on the leaves; sometimes on the beans. They eat out characteristically angular holes generally between the veins.	Dust or spray with nozzles adjusted to put material on undersides of leaves. The dust is made of: Calcium arsenate and Sulfur, each one pound; Hydrated lime, four pounds. The spray is: Magnesium arsenate one tablespoonful, water one gallon, or magnesium arsenate one pound, water fifty gallons.
Cabbage	Cabbage worms	Eat large holes in leaves.	Spray with arsenate of lead with soap added. Dust with hellebore when heading.
	Aphids or plant lice	Suck sap from leaves and cause curling.	Spray with nicotine sulfate with soap.
	Thrips	Suck sap from leaves and cause curling.	Spray with nicotine sulfate with soap.
	Harlequin cabbage-bugs	Suck sap from leaves and cause wilting.	Spray with kerosene emulsion when bugs are young.
	Cutworms	Cut off stem of the plant near the ground.	Wrap paper around stems of plants when set out. Scatter poisoned bait around plants.
Corn	Corn ear-worms	Eat young grains.	Kill worms by pinching silk end after grain is set. Reduce next year's crop of insects by fall plowing.
Celery	Celery caterpillars	Feed on leaves.	Hand picking and spraying with arsenate of lead.

Insects and Remedies—Continued

Plants	Insects	Nature of Injury	Remedy
Cucumbers Melons Squash	Cucumber beetles	Eat holes in leaves and base of stem. Larvae bore into stem.	Dust around and on plant with arsenate of lead powder, tobacco dust and air-slaked lime (equal parts) in combination. Better still, calcium arsenate one pound, landplaster twenty pounds.
	Vine borer	Worm tunnels the stem.	Remove borer. Destroy wormy plants and burn remnants of season's crops. Rotate crops.
	Aphids or plant lice	Suck sap, cause plant to wilt.	Spray with nicotine sulfate, and soap, particularly on under side of leaves.
	Squash bug	Sucks sap, causes wilting, spreads disease.	Place small boards in patch. Bugs hide under these and can be collected early in morning. Spray young bugs with kerosene emulsion.
Eggplant	Fleabeetles Colorado potato beetles	Eat holes in leaves. Eat leaves.	Spray with arsenate of lead and Bordeaux mixture. See potatoes.
Onions	Onion thrips	Cause "silver top" and poorly developed bulbs.	Spray with nicotine sulfate and soap. Kerosene emulsion.
Peas	Aphids or plant lice Weevils	Suck sap, cause leaves to curl. Eat out interior of seeds and make holes in them.	Same as Beans. See Beans.
Potatoes	Colorado potato beetle	Eats leaves.	When plants first come up, dust with Paris green. Later give several sprays with arsenate of lead. Collect in pan containing water and kerosene.
	"Old fashioned" potato beetle	Eats leaves.	Spray same as for other beetles, with stronger solution.
	Flea beetle	Eats small holes in leaves.	Spray with arsenate of lead and Bordeaux mixture.
	Grub and wire worms	Eat holes and make tunnels in potatoes.	Avoid planting potatoes in ground previously grown to sod and weeds.
	Aphids or plant lice	Suck sap from plant. Cause leaves to curl.	Spray with nicotine sulfate. Make several sprayings 3 to 4 days apart. Keep weeds down.
Tomatoes	Tomato worms	Eat leaves and bore into fruits.	Pick worms and destroy; spray with arsenate of lead.
	Cutworms	Same as cabbage.	Same as cabbage.
	Aphids or plant lice	Suck sap from leaves and cause curling.	Spray with nicotine sulfate (40 per cent), 1 teaspoonful to 1 gallon of water, with soap.

Poisoned Bait. Poisoned bait may be scattered around the bases of plants where the ground is infested with cutworms. Use it late in the evening, since the worms work during the night. The formula is as follows:

Bran	1 quart
Paris green	1 teaspoonful
Molasses	1 tablespoonful
Lemon	small piece

The bran and Paris green are mixed thoroly and then the molasses and finely ground lemon are added. When thoroly mixt add water until the mixture is of such a consistency that it will fall in fine flakes when scattered. Keep chickens away from this poisoned bait.

Control of Plant Diseases

The term "plant diseases" may mean any change in the normal growth or development of the plant due either to parasitic fungi or bacteria, to conditions in the soil, or to sudden changes in weather. These agencies cause the plant to become dwarfed, the leaves to wilt, turn brown, and drop off, and the fruit to develop unevenly and to become covered with decayed spots. Heavy clay soils with poor drainage often cause the plants to turn yellow. A long dry period immediately following extremely hot weather, after the plants have started, leads to wilting and sunburn; especially is this true with such plants as cucumbers and melons.

Many of these diseases remain in the soil and are carried over from one season to another in remnants of the year's crop. It is always advisable to rotate the garden crops and to practis clean culture. Many insects carry diseases from one plant to another and the control of these will often prevent the diseases.

Corrosive Sublimate. Corrosive sublimate or bichloride of mercury may be used to disinfect seed Irish potatoes and sweetpotatoes. It is used at the rate of one part of corrosive sublimate to one thousand parts of water, meaning one ounce in seven and one-half gallons of water, or in small quantities, a seven and one-half grain tablet in one pint of water. Irish potatoes are soaked for one hour and sweetpotatoes for eight minutes. The solution should not be mixt in a metal container.

Diseases and Remedies

Plants	Diseases	Nature of Injury	Remedy
Asparagus	Asparagus rust	Blister-like spots on skin of stem, with brown color underneath.	Burn rusted bushes in autumn. Plant rust-resistant varieties, Palmetto, Argenteuil.
Beets	Beet leaf-spot	Round, brown spots on leaves.	Several sprayings of Bordeaux mixture, 10 days apart. Crop rotation.
Beans	Anthracnose	Sunken, dark red spots with well-defined margins. Attacks stem, leaves, pods and seeds.	Select seeds from unspotted pods. Avoid cultivation when plants are wet.
	Blight	Water-soaked areas on leaves which become dry and brittle. Irregular brown spots on pods. Spots run together and seeds shrivel.	Same as for Anthracnose.
Cabbage Cauliflower	Cabbage Black Rot	Yellowing and wilting of leaves. Imperfect heads and bare stems. Advanced stage marked by dark ring at margin of stalk.	Avoid planting on diseased ground for several years. Select seed from healthy plants grown in uninfected fields. Disinfect seed by dipping in corrosive sublimate solution (p. 39).
	"Yellows"	Just at or before heading the stem rots off at the ground line. The leaves turn yellow and the plant dries up.	If disease has once appeared use yellows-resistant varieties.
	Mildew	Whitish mold on under side of leaves. Attacks young plants.	Spray underside of plants in seed bed with Bordeaux mixture.
	Club-root	Large swelling on roots. Young plants stunted.	Burn diseased plants. Disinfect seed bed. Crop rotation. Lime the infested soil, 75 bu. to acre, every few years.
Celery	Blight or leaf spot	Brown spots on leaves.	Spray young plants in seed bed with Bordeaux mixture. Repeat sprayings at 10-day intervals after plants are set out.
Cucumbers Melons	Anthracnose	Circular brown and dead spots on leaves.	Spray with Bordeaux mixture.
	Wilt	Sudden wilting of plants.	Pull up and burn leaves. Control cucumber beetles.
Onions	Blight, downy mildew	Withering and drying of tops.	Spray with Bordeaux mixture.

Diseases and Remedies—Continued.

Plants	Diseases	Nature of Injury	Remedy
Peas	Mildew	Gray mold on leaves and stems.	Spray with Bordeaux mixture.
Potatoes	Early blight	Roundish, brown spots with concentric rings. Leaves finally shrivel and die.	Spray with Bordeaux mixture, starting when plants are 6 to 8 inches high. Repeat spraying.
	Late blight	Dark brown water-soaked spots on leaves. Appears late in season. Attacks tubers, stems and leaves.	Select seed from fields not affected. Spray with Bordeaux.
	Potato scab	Scabby roughened spots and areas on tubers.	Avoid planting in alkaline soil. Soak tubers before cutting in corrosive sublimate 1 to 1,000 for ½ hr. and spread out to dry.
	Black scurf, stem rot, or little potato	Small black flakes on seed potatoes, like dirt that won't wash wash off. Girdles stem of plant. Causes potatoes on branches above ground. Only little potatoes in hills.	Treat seed before cutting with corrosive sublimate for ½ hr.
Sweet-potatoes	Black rot or stem rot	Stem becomes spotted and rots off. Black sunken spots on potatoes.	Select healthy potatoes for seed. Soak seed in corrosive sublimate for 5 to 10 minutes. Bed in fresh, clean soil.
Tomato	Leaf spot or early blight	Leaves spotted, turn yellow and black and fall off, starting with bottom stems.	Spray with Bordeaux mixture when plants are set out. Repeat every 2 weeks. Change ground.
	Wilt	Sudden wilting and dying of plants.	Use wilt-resistant varieties.
	Blossom rot of fruit	Decayed, sunken spots on blossom end of fruit.	No effective control known. A heavy watering after a dry period often seems to stop this.

Small seeds, also, may be treated with a one to one thousand solution. For cucumber seeds the time is five minutes; for tomatoes, ten minutes, and for cabbage, thirty minutes. The seed should then be washed for the same length of time it was soaked. If not planted immediately, the seed should be spread out so as to dry quickly, but without heat. *Corrosive sublimate is a deadly poison and should not be left where children may get it.*

Bordeaux Mixture. Bordeaux mixture is the standard spray for fungous diseases on plants. It may be combined with arsenate of lead and nicotine sulfate to control chewing and sucking insects, at the same time. No soap is used when nicotine sulfate 40 per cent is combined with Bordeaux mixture.

Final Recommendations for Insect and Disease Control

Practise crop rotation and clean culture.

Use clean seed and disinfect seed.

Keep a constant lookout for appearance of diseases and insects.

Use proper materials for control.

Apply materials in time. Remember much of our pest control is preventive and not curative.

Spray before instead of after a rain.

Spray thoroly to cover all parts of the plant.

Spray more often in damp weather.