

FEBRUARY, 1918.

CIRCULAR No. 64.

AGRICULTURAL EXPERIMENT STATION.

KANSAS STATE AGRICULTURAL COLLEGE.

DEPARTMENT OF HORTICULTURE.

The Home Vegetable Garden.

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More vegetables must be grown this year than ever before to supplement the daily food supply. Every available plot of ground should be drafted for vegetable gardening purposes. By utilizing vacant lots and back yards to the best advantage the vegetable supply may be increased 50 percent. One should plan for a succession of crops, and wherever practicable make use of companion crops. Better results will be obtained through the use of hotbeds, cold frames, seed boxes and outdoor seed beds. Suggestions as to the kind of soil, time to plant, desirable varieties, and many other points are considered in this circular.

LOCATION.

For convenience, a spot near the house should be selected. The slope should be gradual in order to facilitate irrigation. For best success the vegetable garden should be located on a south or southeastern slope, but if such a slope is not available, plant anywhere, for vegetables will grow in almost any location.

SOIL.

Commercial growers prefer a light, sandy loam, as it warms up quickly in the spring and insures early vegetables. For late vegetables a heavier soil is more suitable. Vegetables may be grown on any well-drained soil that has been put in fine tilth.

FERTILIZERS.

Barnyard manure gives the best results of all the fertilizers, for it improves the texture as well as the composition of the soil. Fifteen to twenty loads to the acre are not too much.

The garden of ordinary size planted in the back yard of a city or town lot is usually 50 by 75 feet. Apply one and one-half to two loads of well-rotted manure to such a plot. Plow it under and thoroughly incorporate it with the soil before sowing the seed.

The elements of plant food most commonly deficient in soils are nitrogen, phosphorus and potash. Barnyard manure supplies all these elements. If manure is not to be had, commercial fertilizers may be used profitably. Many soils are deficient in only one or two of these elements, generally nitrogen, or nitrogen and phosphorus.

Nitrate of soda, containing about 15.5 percent of nitrogen, is a quick-acting fertilizer. It dissolves rapidly after being put in the soil and has a strong affinity for water. Dried blood, tankage and leguminous crops are other good nitrogenous fertilizers.

Phosphorus is used by plants in the form of phosphoric acid. The principal sources are raw rock phosphates found in Florida, Tennessee and South Carolina. This product is treated with sulphuric acid and sold as superphosphates. It contains about 15 percent phosphorus.

Another source of phosphorus, not always available, is Thomas slag, a by-product of steel manufacturing. Bone contains about 22 percent of phosphoric acid and about 4 percent of nitrogen.

The other element which it is sometimes necessary to add to the soil is potash. This is secured from muriate of potash, sulphate of potash, and unleached hardwood ashes. The principal source is wood ashes. For ordinary garden crops the following amount of fertilizers should give splendid results if applied to an area 50 by 75 feet; Nitrate of soda, 4 pounds; sulphate of ammonia, 7 to 10 pounds; acid phosphate, 30 pounds; muriate of potash, 10 pounds. For poor soils subsequent dressings of 5 to 10 pounds of sodium nitrate may be made. Bone meal may be used in this formula instead of acid phosphate.

IRRIGATION.

Long-season crops, like celery, tomatoes and egg plant, will yield better if they can be irrigated. If the garden is located near the house the problem is not a difficult one. With a hoe or shovel cultivator ditches may be opened between the plant rows and filled from the pump or hydrant through the garden hose. After the water has soaked in, the ditches should be filled with loose soil. By this method the garden gets the benefit of both irrigation and cultivation.

HOTBED.

The heat for hotbeds is commonly supplied by the fermentation of horse manure. Material of practically the same age and from highly fed horses is the best. It should be mixed with about an equal bulk of litter or straw, as the manure will not heat well if too dense. It should be piled in a long, narrow, square-topped pile, slightly concave at the top in order to hold moisture, and allowed to ferment. If the weather is cold and fermentation is slow, the mixing of a little hen manure in one

part of the pile, or wetting with hot water, will start the heating. In order to secure uniform fermentation, the pile should be turned occasionally and all lumps broken up. When the pile is steaming throughout, it is ready for the hotbed. This process usually requires from 2 to 3 weeks.

Hotbed frames are sometimes set on top of the pile of fermenting manure, in which case the pile should extend for about a foot around the edges of the frame to hold the heat. It is best, however, to have a pit about 2 feet deep. If the bed is to be permanent the pit may be walled with stone or brick. Upon the bottom of the pit place a layer of straw, leaves or any coarse material 2 or 3 inches deep. Then place a layer of manure 18 to 20 inches deep, followed by a thin layer of 4 to 8 inches of loam, in which the plants are to be grown.

The hotbed should be placed on the south side of a building or other good windbreak, and care should be taken to have good drainage. Three feet by six feet is a convenient size for the sash, and as many of them may be used as desired. The frame should be higher at the back, a very good proportion being 12 to 15 inches at the back, and 8 to 10 inches at the front. The sash may be of glass, but many prefer muslin. Muslin is very much superior if the hotbed is to be used for sweet potato plants.

The hotbed may be made as early in the year as desired, but for common use, growing early tomatoes, lettuce, radishes, etc., early in March is generally the best time.

Care must be taken not to water the bed too much, as this will cool the manure and stop fermentation. The bed should be ventilated frequently, during the warmest part of the day.

COLD FRAMES.

A cold frame has no heat other than that derived from the sun. It consists of a frame of the desired size, with glass or muslin cover, so arranged that the bed may be ventilated. It may be placed near the buildings in a sheltered spot or in the open field as desired. Plants may be transplanted from it when settled weather arrives, or the frame may be taken up and the plants left standing where they were started.

PLANTS FOR HOTBEDS.

Seeds of celery, tomato, egg plant, cabbage and onion may be started in the hotbed. Lettuce and radish can be grown to completion under glass. Sweet potato slips are usually secured by starting the roots in the hotbed.

Vegetables grown in this manner are usually from 2 to 3 weeks earlier than those grown from seed planted in the open ground. More vigorous plants will be obtained if transplanted once or twice before setting in the field. Plants hardened in the cold frame withstand the hardships of the final transplanting much better than if they are taken directly to the field

from the hotbed. The seeds should be sowed in flats (shallow boxes) broadcast or in drills and transplanted when the young seedlings show from two to four leaves.

PREPARATION OF SOIL.

If the ground intended for garden was fall plowed, all that is necessary is to work it thoroughly and fine and firm it before planting the seed. If not sufficiently rich, and most ground is not, an application of well-rotted barnyard manure is recommended. When manure fresh from the stable or barn lot must be used following spring plowing, it should be thoroughly shaken out and piled for a time in a heap and handled over in order to make it as fine as possible, so that it may be thoroughly incorporated with the soil. It should be handled as soon as the heat is noticeable, and after one or two handlings and replings it may be satisfactorily worked into the soil. Coarse manure does not decompose readily and is likely to make the soil too open and porous for best success with garden crops. The gardener can afford to be extravagant with manures, because the soil must be in good condition if any degree of success is to be attained. Ground that is well manured in the fall and well plowed may receive another application of manure in the spring. Many gardens fail because sufficient time has not been given to the preparation of the soil. The soil should never be worked when wet. An experienced gardener knows that ground plowed in the fall may be worked much more quickly and easily in the spring than ground that has not been so handled. If the plowing must be done in the spring it should be done as early as possible to get the ground in good condition. The ground must be made firm and fine before planting.

SOWING THE SEED.

For successful germination of seed, four things are necessary; namely, (1) live seed, (2) air, (3) moisture, and (4) warmth.

It requires care and good judgment to sow seed properly. A great many failures may be traced to improper sowing.

Avoid cheap seeds. In the end they may prove the most costly. Buy from reliable seed houses and select standard varieties for your locality. Having secured good seed, the time of planting is next in importance. Beets, onions (seeds and sets), smooth-seeded peas, cabbage, parsnips, carrots, salsify, radish, spinach, turnips and potatoes may be planted as early as the ground can be put in the right condition. Vine crops, corn, tomatoes, peppers, beans and egg plants should not be planted until the soil has warmed considerably and all danger of late spring frost is past.

Seeds planted out of doors are usually covered deeper than if sown in the hotbed or greenhouse. No set rule can be laid down for the depth garden seeds should be planted. Small

seeds are covered with about 1 inch of soil, while some of the larger are planted from 2 to 4 inches below the surface. If the soil is dry at sowing time it is well to firm it over the seed, but otherwise it is usually not advisable. The soil should never be permitted to bake after the seeds have been planted. Stir it lightly after each rain, using an iron rake for this purpose. This will also retard the growth of weeds. Some species are very slow to germinate and should be planted with a species that is rapid in its germination. For example, use radish with parsnips. The radishes break the ground for the parsnips and help to mark the row so that cultivation may be started early.

SYSTEMS OF CROPPING.

In order to get the greatest yield from the plot the gardener should practice succession of crops and companion cropping.

COMPANION CROPPING.

Companion cropping is the growing of more than one kind of crop on the same space at the same time, as, for example, lettuce between cabbages. The seasons of maturing for companion crops must be different, so that the short-season crop will be out of the way before the slower-maturing crop requires all the space.

Plant onion sets, lettuce and radish with early cabbage; lettuce between tomato plants; pole beans with corn, squash with corn. Carrots, early turnips, radishes drilled in rows, and parsnips may be planted between staked peas.

SUCCESSION CROPPING.

Succession cropping refers to the practice of using the ground a second time after the first crop has been harvested. The ground should be carefully prepared for the second crop.

Space that has been used for early crops like lettuce and radish may be used for celery, tomatoes, egg plants and peppers. Many other successions may be worked out to suit special localities.

TRANSPLANTING.

Select the strongest plants for this operation. Dwarf, stocky plants are better able to withstand the rigors of transplanting than tall, spindling specimens. A good time to transplant to the field is just before a rain or when there are indications of several days of cloudy weather. If it becomes necessary to set plants out during hot, dry weather it should be done late in the evening. Nearly all plants derive some benefit if the tops are shortened before being transplanted to the open. Set the plants deep in the ground and press the soil firmly about the roots. Plants that are difficult to transplant, like cucumbers or melons, should be started in paper pots, and transplanted to the field if an early crop is desired.

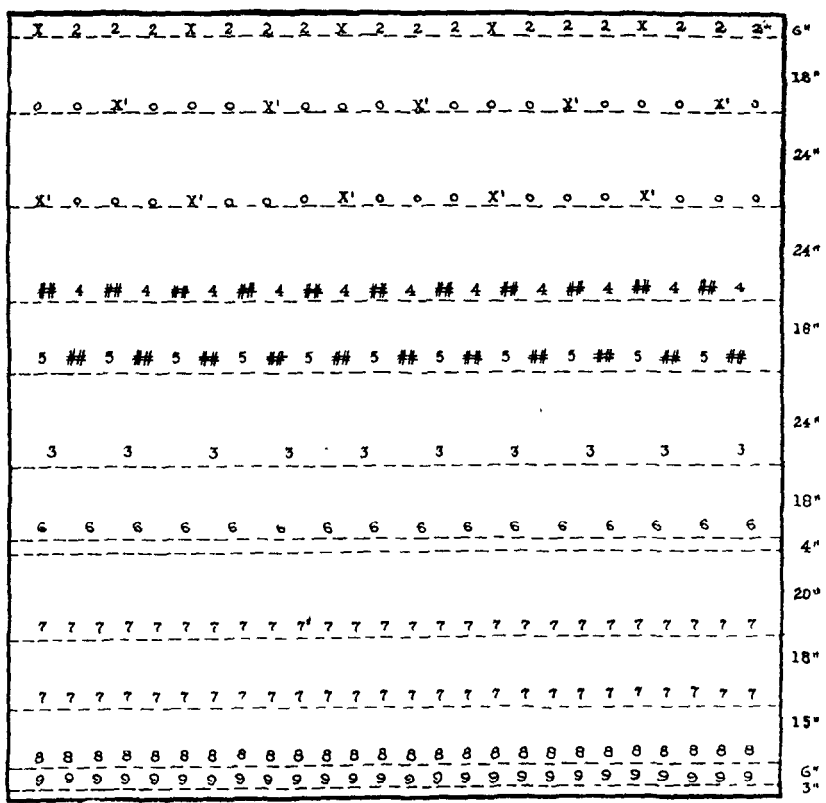


FIG 1.—Plan for rotation of vegetables. "A square rod garden," plan No 1

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|------------------------------|----------------------------|
| 2—Onion sets. | 7—Beans. |
| X—Cucumbers on trellis. | 8—Beets. |
| X'—Tree tomatoes on trellis. | 9—Parsley and pepper grass |
| O—Lettuce. | 5—Peppers. |
| #—Radishes. | 6—Early peas. |
| 4—Egg plant. | 3—Early cabbage. |

SUCCESSION CROPS.

Early peas (6) may be followed by cabbage, celery, tomatoes, beans or late beets
 Radishes (#) and onion sets (2) may be followed by cabbage, celery, egg plant or
 peppers.
 Lettuce (O) may be followed by beans, tomatoes, egg plant or peppers
 Early cabbage (3) may be followed by late beans for canning.

The proper time to transplant from hotbed to the open will depend largely upon the kind of plant, whether *or* not it has been well hardened, and how large a supply of plants is on hand. Different sections of the state will have different transplanting dates. In this section tender plants should not be set in the open ground before the first or second week in May.

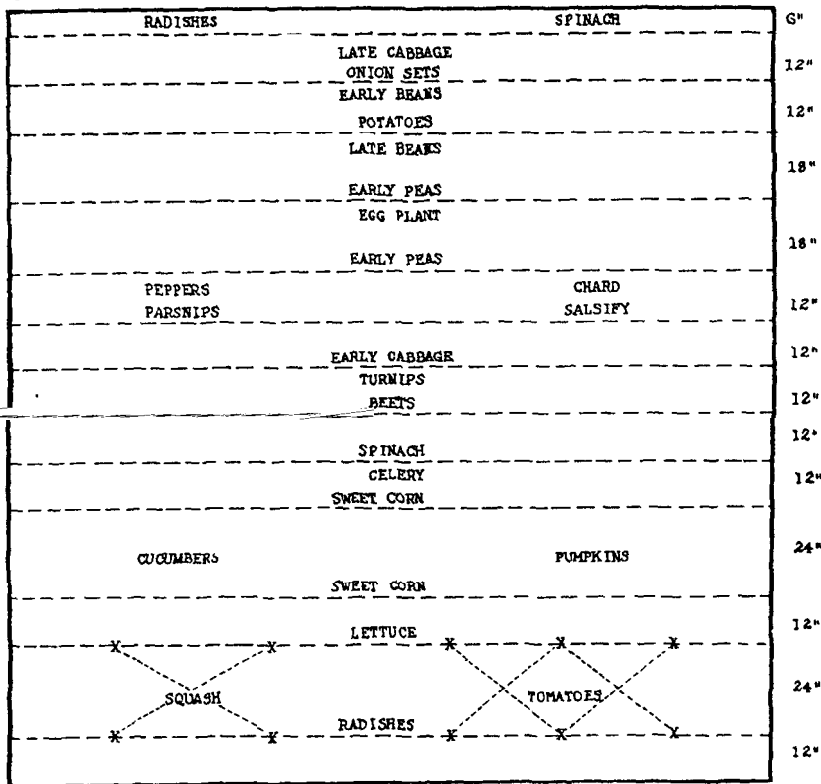


FIG 2 — Plan for rotation of vegetables. "A square rod garden." Plan No. 2

Above line--First crop
 Below line--Succession crop.

INSECTS AND CONTROL MEASURES.

Where small areas are sown to vegetables it should be fairly easy to control insect pests. A thorough knowledge of insects is desirable, although not absolutely necessary. Insects are divided in two general classes, namely, those with chewing mouth parts and those with sucking mouth parts. The most approved methods of control are by means of poisonous mixtures, either in the form of dry powders or sprays.

Insecticides are usually classified as internal or stomach poisons, and external or contact poisons. A very good stomach poison is prepared by combining 2 pounds of lead arsenate paste, or one-half pound of paris green, and 50 gallons of water.

One of the best contact sprays is Black Leaf Forty, which is a concentrated solution of nicotine sulphate, guaranteed to contain 40 percent nicotine by weight. Use as per directions on

the package. Kerosene emulsion, tobacco water and soap preparations are very good contact insecticides. Kerosene emulsion is prepared by dissolving one-half pound of whale oil soap or 1 quart of soft soap in 1 gallon of water. Pour this solution (away from the fire) into 2 gallons of kerosene. Agitate violently for about 4 or 5 minutes. If properly made it should be of the consistency of thick cream. This mixture will keep indefinitely and should be diluted with water only as required for spraying purposes. Dilute fifteen to twenty times for most insects.

Soap preparations made by dissolving 1 pound of common laundry soap in 6 gallons of water are very often effective in controlling aphids. Tobacco water is obtained by soaking a few handfuls of tobacco stems in water for 24 hours. Dilute the solution from eight to fifteen times with clear water and use as a spray.

Mechanical methods are very often practical for the small garden. Paper bands placed around the stems of plants, such as tomato and cabbage, when they are set, with the band extending an inch or two above and below the soil, will protect the plant against cutworms.

Poisoned baits may be used with success for such insects as the cutworms. Dip small bunches of clover in a solution of paris green and place these poisoned bunches at intervals over the plot a few days before plants are set out or a few days after seeds are sown. Poisoned bran mash is also used successfully in controlling the cutworm. The following proportions should be observed in making this mash:

- 1 oz. paris green
- 20 oz. bran.
- 5 oz. sirup.
- ¼ orange or lemon.

Mix the paris green and bran dry. Mix the sirup and the finely chopped pulp and peel of the fruit in a sufficient quantity of water to moisten the bran. Pour the liquid over the dry mixture, stirring with a wooden paddle to dampen it evenly. Distribute late in the day to prevent drying out.

Repellents, such as turpentine or crude carbolic acid mixed with a fine powder or screened ashes, may be dusted on the plants. Other well-known repellents are tobacco dust, air-slacked lime, road dust, and bordeaux mixture.

Apply the preparation at the proper time and use only a sufficient amount of various materials to control the pest. For further information write for a copy of the Kansas Agricultural Experiment Station circular on "Insects and Plant Diseases Attacking Garden Crops."

