THIRTEEN POPULAR VEGETABLES YOU CAN GROW

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
AGRICULTURAL EXTENSION SERVICE
4-H Club Circular 110 Columbia, Missouri January, 1953
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Jean Rupe, member of the Jolly Jills 4-H Club of Jackson County, and a member of the district vegetable judging team at the Missouri State Fair, 1952.
THIRTEEN POPULAR VEGETABLES YOU CAN GROW

Clyde R. Cunningham

The 4-H vegetable project gives you a chance to learn the fundamentals of production. You can learn much by studying and observing the many phases of production and marketing. The amount of cash needed for a vegetable project is probably as small as for any agricultural project.

Experience obtained in a 4-H vegetable project may be used wherever you are. Production principles learned may even be put into use by an industrial employee in a city. Most of us, wherever we are, will eat vegetables, and what you learn in vegetable judging will have much practical use.

This circular was prepared to help you as a 4-H project member in your 4-H vegetable activities. As you proceed through your 4-H program you will probably have questions not answered here. If so, feel free to call on your county or home agent for assistance. They will be glad to help you.

Study this circular and the 4-H Vegetable Production Leader’s Guide. These publications will help you as a project member to choose the project (Vegetable I, II, or III) that suits you best.

PLAN YOUR PROGRAM

Grow Vegetables the Right Way

Whatever you grow, do your best. Make your produce display your knowledge, ability and skill. High quality is one of the main aims of the grower. It makes his products most desirable from the standpoints of flavor, food value and attractiveness.

It requires just as much space, time, and nearly as much effort to grow half a crop of poor quality as it does to produce a maximum yield of high quality.

The grower who follows good practices and does his best will most often succeed and will rarely find a totally bad season.

Plan and Prepare Ahead

The grower who plans ahead and prepares for next year’s production has the greatest chance of success. Spring planting can most often be done earlier and easier on fall plowed soil. Successful vegetable growers plan several years ahead by growing legume crops and plowing them under to add organic matter and fertility for the vegetable crops which they will grow later.

We can learn faster by taking advantage of their experience. The most success will be achieved if you in 4-H club work, plan ahead and know what materials you will need and have them ready when you need them. Some of these materials are good seed and plants, the right kind of fertilizers, insecticides and fungicides.

Additional planning suggestions
Do It at the Right Time

Whatever the task whether planting, cultivating, spraying, mulching, or harvesting, do it when it needs doing. The grower who looks ahead and plans his operations knows what to do next. He obtains the necessary equipment and materials for doing the job at the right time. This gives him several advantages. It reduces the amount of labor, saves materials and gives better results.

For example, if you cultivate when the weeds are just coming through the ground, they are easily killed; but if you put it off until the weeds become well established, the job is much more difficult and it may take two or three cultivations to destroy them.

The same is true with insect control. One application of a dust or spray while the insects are small will do more good than two or three applications after the insects are larger and well established. The sooner you destroy the insects, the less damage they will do.

CHOOSE GOOD LOCATION

Most vegetables do best on a sandy loam soil. Heavier soils as the clay and gumbo types are often wet and cold too long to obtain good production. However, in light sandy soils it is harder to maintain the soil fertility and moisture.

Any soil in Missouri can efficiently produce vegetables if properly handled. This means from the standpoint of the addition of organic matter and fertilizers. A soil test is always a good guide in determining how much fertilizer and lime is needed to keep the proper nutrient balance.

The vegetables will also perform best when planted on well drained soil. This applies to soil texture as well as to slope of the ground. A very gentle slope is ideal so excess water will move off slowly without washing away the top soil.

PROVIDE FERTILE SOIL

Talk with your county agent and learn how to take a good soil sample. Have a sample tested and apply the fertilizers needed to bring the level of plant food elements close to these amounts. (See table, top of page 5.)

No doubt you will soon see more information about the total exchange capacity and per cent saturation for the various elements as they apply to the soil fertility level based on a soil test. This means that some soils can hold more fertilizers than others. A sandy loam can't hold as much as a clay loam. Consequently the total exchange capacity is lower for a sandy soil than for clay soil. The per cent saturation means that part of the exchange capacity of the soil is "filled" with calcium, another part with potash and the remainder with other elements and hydrogen. It would be desirable for you to ask your county agent to help you determine the milliequivalent of your soil and the per cent saturation of the various elements. It can be done from the proper soil test results.

If heavy applications of barnyard manure have not been made, use complete fertilizers with minor elements...
Materials | Pounds Per Acre Available | Per Cent Saturation
---|---|---
Organic matter 3% or higher |  |  |
Nitrogen (basically 75 to 80 lbs. per acre) |  |  |
Phosphorus \((P_2O_5)\) | 300-400 | 4 to 8 |
Potash \((K_2O)\) | 300-400 | 4 to 8 |
Calcium | 5,000 | 65 to 75 |
Magnesium | 1 | 500 | 8 to 10 |
Lime requirement |  | 2,000-4,000 |
Ph 6. to 6.7 |  |  |
Hydrogen |  | 15 to 20 |

added. Be careful and do not apply excessive amounts of minor element fertilizers. See your county agent for advice on how to use them.

**THREE METHODS OF FERTILIZING**

1. **Basic application:** Apply the fertilizers needed to raise the fertility level to that suggested above. The recommendations returned to you with the soil test results will serve as a guide. Buy the fertilizer you need and in the form that best serves the purpose at the lowest price. In some cases you may put on only lime; or your plot may need three or four materials; or it may have a fertility level high enough that the basic application will not be required.

The basic fertilizer application should be plowed under.

After the high level of fertility is once reached, heavy applications of fertilizer will not be needed every year. The fertility level can be maintained largely with the starter and side dressing applications.

2. **Starter application:** All vegetables seem to respond to a starter application of fertilizer. Use a complete fertilizer as a 10-10-10, 8-24-12 at the rate of 200 to 400 pounds per acre. This will be about a pint jar full to every 100 feet of row (standard field width). The single band method of application has advantages—this is placing the fertilizer in a furrow about 3 inches to the side of the row and 3 to 4 inches deep. The starter application can and should be a part of the entire fertilizer requirements. That's why the basic application and the starter application should be considered together.

3. **Side dressing:** After the basic and starter applications are made, side dressing will consist mainly of nitrogen fertilizer as determined by the vegetable, weather and soil conditions. (Side dressing of each crop will be a part of that discussion which will follow.)

As a rule, for most vegetable crops (except sweet potatoes), at least 100 pounds of actual nitrogen per acre should be available during the season. This is equal to 300 pounds of ammonium nitrate. It includes the nitrogen from organic matter, basic application, starter and side dressing.

Cultivate into the top soil a
straight nitrogen fertilizer such as ammonium nitrate or ammonium sulfate. Apply it as far away from the stem as the spread of the leaves. If there is enough soil moisture to dissolve the fertilizer, you will get good results. Apply fertilizer when the plants are dry.

**USE BEST SEEDS AND PLANTS**

Good seeds and plants of the right varieties are among the essentials for high production; yet they make up a comparatively small item of expense. Using the best seeds or plants may make the difference between average production and high yield.

Seeds from a dependable well-established firm will usually give the best performance.

You can grow your own plants or they may be purchased from a commercial plant grower. If you buy plants, try to get the right variety. Choose sturdy plants free from diseases. A good plant producer can supply you with good plants but he'll need to know what you want and when you want them.

Varieties are constantly changing. Obtain a recent copy of the Missouri planting calendar for the latest recommendations.

**CONTROL INSECTS AND DISEASES**

Generally the control of insects and diseases should be considered as a preventive rather than a cure.

Diseases affecting individual crops will be a part of the discussion for that crop.

Insecticides have been rapidly changing from year to year. See your county agent for the latest recommendations on insect control.

Generally, it is good planning to decide what equipment to use, get the materials, then spray or dust about once a week whether or not you see any insects. By following this plan you will not use much more material and best of all you prevent the damage.

Don't forget the fall clean-up program. Fall plowing will help control insects and diseases.

**HARVEST AT RIGHT STAGE**

After you have done everything else right, a lot can be lost by not harvesting at the right time. There is a time when each vegetable is at its peak of volume and quality. But often the quality is sacrificed for volume. If we understand the vegetable and know when it is at its best, then we will know when to harvest. If you have questions not answered under the discussion of a specific crop, feel free to call on your county agents.

**SUGGESTIONS FOR INDIVIDUAL CROPS**

Here we shall discuss special points in growing each crop not considered in the general discussion. However, the general discussion applies to all of the crops individually.

**TOMATOES**

Tomatoes are widely used the year around. They are in constant demand throughout the year because they can be used in many ways.

If good growing practices are followed, tomatoes are as nearly certain
Tomato plants growing foliage like this at the proper time will produce a good crop.

to produce a crop every year as any vegetable grown in Missouri. If grown on fertile soil high in organic matter, and harvested in the right stage, their quality is excellent. Tomatoes will produce lots of food from a small space with a minimum of labor and time spent in production. They are exceptionally well adapted to both commercial production and growing for home use.

Varieties—See latest Missouri planting calendar.

When to plant—Early in the season after the frost free date in your section of the state.

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<tr>
<th>Planting Distances (In feet)</th>
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<td>2 x 3</td>
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<tr>
<td>3 x 3</td>
<td>4840</td>
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<tr>
<td>2 x 4</td>
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<td>4 x 6</td>
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If plants are grown down, space the rows 6 feet apart with plants 3 feet apart in the row. For staked tomatoes use 36 to 42 inch rows and space plants 2 feet apart in the row.

An ounce of seed germinating 95% should produce approximately 2000 plants.

Pruning—See Circular 624, "Pruning Tomatoes."

Fertilizing—If the basic and starter applications have been made, make side dressings as follows:

(1) Make first application after fruit has set.

(2) Make a second application about two weeks later. One pound or one pint jar full to 100 feet of row often will be sufficient. If materials other than ammonium nitrate are used, vary the amount in relation to the percentage of
nitrogen. Ammonium nitrate is approximately 33% nitrogen. If a 20% nitrogen, as ammonium sulphate, is used, then apply about one-third more.

Further discussion of tomato production may be found in Circular 598, "Profitable Tomato Production," and Circular 593, "Tomato Disease Control."

Harvesting—If the tomatoes are for home use, leave them on the vine until fully red ripe. If the tomatoes are to be sold, consider the marketing procedures and harvest at the stage of ripeness required by the market.

A tomato has five stages of ripening. (1) green; (2) white green; (3) yellow; (4) pink; and (5) red. The color changes start at the blossom end and progress over the tomato to the stem end. This provides a gradual color change from one stage to the other and the tomato may be going through one or more stages at the same time.

**GREEN BUSH BEANS**

Green beans are one of the staple vegetables. Eaten by practically everyone, they are in demand the year around. When harvested in an early stage of development, before the beans develop in the pods, they are classed as a green vegetable, very high in vitamins and classed as a "protective" food. They are excellent for eating fresh, canning and freezing. They rank high in the list of vegetables from the standpoint of the amount of food that can be produced from a small area. Beans are well adapted to both commercial production and growing for home use.

Varieties—See latest copy of Missouri planting calendar.

The best bean seed is grown in the northern and western parts of the United States. The most reliable seed companies obtain their seed from these sources because they are more nearly free of disease than seed grown in other sections. Purchasing seed from reliable seed companies is one of the best disease control measures.

When to plant—In making small plantings, approximately one pound of seed is required to plant 100 feet of row. To plant one acre, if the seeds are drilled, will require approximately 60 pounds. If planted in rows, of
course, this amount will be less depending upon the width between rows.

Work the soil into a fine, mellow seedbed. The distance between rows will depend upon the method of cultivation used. Regardless of whether the beans are grown for the commercial market or for home use, it is most economical of labor to make the rows wide enough apart so cultivation may be done with regular field implements. This saves a tremendous amount of hand labor and does the job just as effectively.

Every season is different in some respects from every other. And the successful grower has learned that the best way to make fullest use of all good growing weather with such crops as beans is to make succession plantings.

The first planting may be made almost one month before the frost-free date. Planting should be made about every two weeks, up to and including August 15. These six plantings should provide a continuous supply of beans in the best eating stage throughout the season. Although you can expect some of these plantings to be more successful than others, this method of succession plantings is the best.

A number of insects attack beans. Because of the susceptibility of the foliage to spray injury, take care to use the proper insecticides to control the insects and not injure the foliage. Lead arsenate will damage bean foliage, and calcium arsenate frequently does considerable damage.

Insecticides have changed rapidly in the last few years. Ask your county agent for the latest recommendations on their use.

Use frequent, shallow, cultivation to destroy all weeds just as they are breaking through the ground. These cultivations must be shallow to avoid cutting off the feeder roots of the beans. If weeds are kept down while the bean plants are small, cultivation will not be necessary after the plants attain sufficient size to shade the ground.

Fertilizing—Green beans usually respond to a side dressing of nitrogen fertilizer. For best results apply it about one week after the bean pods begin to form. An application of one pound to each 100 feet of row is generally all that is needed since the crop passes through its harvest stage rather quickly.

Harvesting—One of the most common errors made in harvesting beans is to allow them to become too large before picking. For best quality, harvest before the bean develops any bulge in the pod. Then they are tender and brittle and contain the highest flavor. They are then truly a "protective" food.

After the beans have fully developed in the pod they have changed from a green "protective" food to a protein food. If allowed to reach this stage they lose their delicate flavor.

**IRISH POTATOES**

Irish potatoes are one of the main foods in every diet. They are, therefore, always in demand. Usually every farm family grows its own supply. Local demand for potatoes usually creates ready sale for any high quality surplus.
Irish potatoes are an important commercial crop.

If good production practices are followed on fertile soil, potatoes will compare favorably with any other vegetable in the quantity of food which can be produced on a given area. Potatoes make a quick growth and occupy the ground only about four months. After harvest, the area may be used for some other crop that same season.

As with other vegetable crops, you must grow potatoes on fertile soil to harvest a good crop. Follow a good rotation which includes growing and plowing under a legume green manure crop the year before the potatoes are planted. Fall plowing will put the soil in excellent condition for early planting. If you wait till spring to plow, planting may be delayed until the crop will be handicapped by a late start.

Variety—The Irish Cobbler is the outstanding variety for Missouri. It is a high quality potato and if properly grown on fertile soil should produce from 200 to 300 bushels per acre. In extremely good seasons, 400-bushel yields may be obtained.

One of the first rules for producing a good crop of Irish potatoes is to use only northern-grown certified (blue-tag) seed. Certification means that the potatoes were grown in fields relatively free of disease and are as disease free as can be obtained. The use of
certified seed is one of the best measures we have to control the many destructive potato diseases.

Early planting is essential for greatest yield. The Irish potato, a cool-season crop, does not make satisfactory growth when the season becomes extremely warm. The cool season is comparatively short in Missouri so potatoes must be planted early to have the longest possible cool growing season.

Records show that results of late plantings seldom justify the effort and expense; consequently only spring plantings are recommended. To be ready for early planting, fall plow the area to be used for potatoes. If plowed in the fall and left rough, the only spring preparation needed is a thorough disk ing and harrowing before you plant. In many seasons, you can plant two or three weeks earlier than if planting had to wait until the ground dried out enough for plowing.

Plant Irish potatoes as soon as danger of hard freezing weather is past. If the seed is planted about 4 inches below the surface and two furrows plowed on top of the row, additional protection from freezing will be provided.

Plant the rows wide enough apart to cultivate with field equipment. Space the seed pieces from 12 to 18 inches apart in the row. Most commercial growers plan on using about 1000 to 1100 pounds of seed for each acre.

If the seedbed is properly prepared before the potatoes are planted, a few shallow cultivations at the right time will effectively control weeds. The main purpose of cultivation is to keep down weeds. If you cultivate when the weeds are just sprouting and coming through the ground they are easily and quickly destroyed.

Be sure cultivation is shallow to avoid cutting off any of the feeder roots, many of which grow near the surface. This holds true for all cultivation including the "laying by" cultivation. Naturally, cutting off feeder roots reduces the efficiency of the potato vine in producing potatoes and thereby reduces yield.

Side dressing—Apply one application when the plants are beginning to show bloom. Use enough fertilizer to provide thirty pounds of actual nitrogen per acre. This would be equal to 100 pounds of ammonium nitrate. For a small area use one pound of ammonium nitrate to 100 feet of row.

Harvesting—Except when potatoes are to be sold on a special market, allow them to become fully mature before harvesting. When the vine is entirely dead, the potatoes have reached their maximum maturity and should be harvested. Harvest carefully to avoid bruising or in any way damaging the potatoes.

Since potato harvest in Missouri comes when the weather is hot and the sun bright, the ideal harvest time is early morning or late afternoon. Then the sun’s rays are not as penetrating or severe. If potatoes are exposed to direct rays of the sun during the heat of the day they are frequently injured and may soon decay.

Before storing, be sure they are properly cured.

Further discussion on potato pro-
duction and storage may be found in Circular 572, “Storing the Family Food Supply,” and Bulletin 464, “Growing Potatoes in Missouri.”

Copies of these may be obtained from your county agent.

SWEET POTATOES

Sweet potatoes fill the same purpose in the diet as Irish potatoes and either may be used in place of the other. Sweet potatoes are more popular in the South and Irish potatoes in the North. However, sweet potatoes are in demand on most markets the year around. Since only limited amounts of sweet potatoes are stored, prices of this vegetable rise gradually after December and continue to do so until the new crop is available late the next summer.

Sweet potatoes are excellent food and with good cultural practices rank high among vegetables from the standpoint of food produced per acre. They are a good crop for both commercial production and home use.

Varieties—The Porto Rican is probably the leading market sweet potato. However, some of the newer varieties look promising. When these new varieties are available in quantity and have proved to be dependable, they will be recommended. If you are interested in these new varieties, ask your county agent for suggestions.

The use of good seed is essential for controlling disease and obtaining maximum yields. Because some of the most destructive sweet potato diseases are carried within the potato, certified seed should be used.

There are a few growers in Missouri who are producing certified sweet potato seed. See your county extension agent for a list of these growers or for other possible sources of good seed.

Treat seed to destroy any disease which may be carried on the outside of the potato. This seed treatment is so inexpensive and easy to do that it should be a part of the regular procedure of growing sweet potatoes.

In many places sweet potato plants are not available. Therefore, it is usually necessary, particularly for a large planting, to produce your own plants. It will require approximately 10,000 to 12,000 plants for an acre, depending upon the distance of setting. The seed potatoes required to produce this number of plants will depend upon the size of the seed potatoes. From 3 to 4 bushels will produce ample plants to set an acre, from 2 to 3 pullings. You can make 4 or 5 pullings, which will reduce the amount of seed required. The objection to making so many pullings, however, is that the last pulling is likely to be three or more weeks later than the first. Late set plants are seriously handicapped and do not yield as well as those set early.

When to plant—Early setting is extremely important. The growing season in Missouri is none too long for sweet potatoes and, therefore, to obtain maximum yields they must be started early in the season. For every week of delay in setting the plants, the potential yield is markedly reduced. Set sweet potatoes in the field immediately after the frost-free date in your area.

To get plants for setting at the pro-
per time it is necessary to grow the plants in hotbeds. It will require approximately 30 days from the time the seed is placed in the bed until the first pulling of plants may be made. To properly bed a bushel of sweet potatoes will require approximately 20 square feet of hotbed space.

If manure-heated hotbeds are used, construct the beds and pile manure for heating about two weeks before bedding the seed. This means in order to have plants to set by May 10, start the hotbed by the last week in March.

Sweet potato plants are set in rows varying from 30 to 40 inches apart, depending on the type of implement used in cultivation. Usually the plants are spaced 12 to 18 inches apart in the row. Ridges, upon which the plants are set, should be prepared at least ten days before setting. Use low, wide ridges. They have all the advantages of the high, narrow ones and, in addition, do not dry out so rapidly.

Sweet potatoes are easily robbed of plant food and moisture by weeds. Therefore, keep all weeds down by frequent, shallow cultivation until the vines cover the ground and then one or two hoeings and weed pullings may be necessary in order to keep the crop entirely free from weeds.

During the growing season, pull any plants which show evidence of being diseased. Potatoes from these hills will be inferior in quality and will not store successfully. Also, allowing such plants to develop increases the danger of spreading disease.

Fertilizing—The sweet potato is one of the vegetable crops that is very sensitive to nitrogen-potassium balance in the soil. Try to keep the nitrogen low and the potassium high. Avoid planting in high organic matter soils such as old barnyard lots.

If the soil is rather fertile, do not use a starter application or side dressing. Often even under these conditions the vines will seem vigorous. Let them run; don’t cut them off. However, you can turn them back into the row and decrease the amount of space used.

If the soil in which sweet potatoes will be planted is rather low in fertility, apply 800 lbs. of 4-12-4 as plow down and 300 lbs. as starter; no nitrogen as side dressing. This will usually produce a satisfactory crop of sweet potatoes. If enough vine growth is produced to just cover the ground that is an indication of about the right amount of nitrogen.

Sweet potatoes should be harvested before the soil temperature drops to 50°F., but for maximum production allow them to grow as long as possible.

Harvesting must be done carefully to avoid bruising the sweet potatoes, for they are very tender and easily injured.

If they are to be stored, cure them as soon as harvested. For detailed information on curing and storing, see Circular 572, “Storing the Family Food Supply.”

SWEET CORN

Sweet corn is a much more seasonable vegetable than those already mentioned. Its use is comparatively limited even though it appeals to almost everyone.

As a commercial vegetable, sweet
Get your sweet corn off to a good start.

Corn is a good one to grow. All through the growing season there is demand for fresh roasting ears in the young, tender eating stage.

Most farm families who grow their own vegetables include sweet corn because of its delicious flavor. For home use, it is adapted to those places where there is considerable space. Since each planting produces only briefly, a considerable area is required in comparison with the nutritional value of the food produced.

Varieties—See the latest issue of the Missouri planting calendar.

Fertilizing—(Side Dressing)—Apply nitrogen when the plants are 8 to 10 inches tall. Use one pound of ammonium nitrate for each 100 feet of row.

Planting and Harvesting—The period in which sweet corn is in its best eating stage is extremely short. If the true delicious flavor is to be enjoyed, it must be harvested at exactly the right stage of development. This is just at the end of the period when the kernels are in the milk and just before they go into the dough stage. This is a period of only two or three days. It is obvious, that one planting of sweet corn will produce a product which is marketable over a period of only a few days. To have high quality sweet corn over an extended period, you must make at least five succession plantings through the season, starting with April 15, as indicated by the Missouri vegetable planting calendar. Where sweet corn is to be sold, a planting might be made every week, starting with this date in order to have a continuous supply in its best eating stage.

For highest quality, use sweet corn within a few hours after it is removed from the stalk. From the time it is picked, its flavor and quality deteriorate. Its delicious, sweet flavor is steadily reduced until it is finally gone. In this condition sweet corn has very little taste appeal.

It is important from a commercial standpoint that the corn be delivered to the customer just as soon as possible after being harvested. For home use, sweet corn should be removed from the stalk, taken immediately to the kitchen and prepared for serving.
CUCUMBERS

The main value of cucumbers in the diet is their crispness, flavor, and the variety they add to meals. When made into pickles they are used as appetizers. Despite their low nutritive value, they are in demand commercially and most families grow some for their own use.

One of the main differences in the production of most vine crops as compared to other vegetables is the caution needed in applying insecticides. Practically all vine crops must be pollinated and the most efficient method is with insects. This means that the bees must take pollen from the male to the female flower or no cucumbers will set. Spray or dust for insect control late in the afternoon so that pollinating insects will not be killed.

The production of cucumbers is more completely discussed in Circular 608, "Growing Cucumbers for Pickling." You may obtain a copy from your county agent for a source of information for your cucumber project.

OTHER VINE CROPS

Cantaloupes, Squashes, Pumpkins, and Watermelons.—These are other vine crops grown for both commercial and home use. Of these, cantaloupes rank highest from a nutritional standpoint.

Cultural practices recommended for these vine crops are the same as for cucumbers. The item of outstanding importance is insect control. The same insects work on all vine crops with the addition of the squash bug which is very destructive to both squashes and pumpkins.

Vine crops make good 4-H projects.

Varieties—The variety grown will depend upon the use to be made of it. For example, Hale's Best cantaloupe is one of the leading varieties for commercial use. It is adapted to shipping and has good quality. Purdue 44, Hearts of Gold and Iroquois varieties are very popular for home use.

There are several kinds of squashes, some of them summer varieties and others adapted to storing for winter use. There are different varieties in each of these groups and the varieties to grow will depend upon the desire of the family or the market where they will be sold.

Watermelons also include varieties especially adapted to various purposes. Your extension agent will be
glad to help you choose the variety to grow.

The more dependable varieties for Missouri conditions are listed in the Missouri planting calendar. Also listed is the recommended time and distance to plant.

Fertilizing—Vine crops such as watermelons, cantaloupes, pumpkins, and squashes do not respond as favorably as most vegetable crops to side dressings of nitrogen fertilizer.

Cantaloupe, pumpkin, and squash perform best on a fertile soil which can be provided by proper fertilizer application.

Watermelons do not require a high level of soil fertility. A medium fertility seems to be high enough for adequate production. The nitrogen for watermelon production should be applied at planting time.

Practically all vine crops have a high moisture requirement. This naturally means they will need lots of moisture for best production.

Harvesting—For best quality, cantaloupes and watermelons must be harvested in a thoroughly ripe stage. Vine ripened melons have excellent quality and those which are harvested green are worthless. When a cantaloupe is vine-ripe the stem comes loose from the melon naturally, and definitely indicates the stage of ripeness.

A number of different tests for ripeness in watermelons have been given, but the best one is the outside appearance of the rind. When a watermelon is thoroughly ripe it loses the smooth, shiny appearance and its surface becomes rough or uneven.

Summer squashes should be harvested before the rind becomes tough, or hard. Allow squashes and pumpkins for winter storage to fully mature, but harvest before frost. For more details regarding harvesting and storing squashes and pumpkins see Circular 572, "Storing the Family Food Supply."

CABBAGE

Cabbage is important in present-day diets and is used raw and brined. It supplies desirable bulk and is particularly high in vitamin C as raw and brined cabbage. It is in demand commercially the year around and practically every family that grows any vegetables for home use includes cabbage.

You'll be proud of cabbage like this. It has good quality because the plant was well grown, fertilized and protected against insects.
Most of the cabbage grown in Missouri is grown as a spring crop. Weather conditions are much more favorable for its development at that time. It is possible to grow a fall crop of cabbage in Missouri but the hazards from both weather and insects are greater than for the spring crop. For winter storage use only fall cabbage.

Cabbage will produce a considerable amount of food from a small area. It matures rapidly enough so the early crop may be harvested and another vegetable grown that season on the same ground.

Fertile soil gives greater yields.

Varieties—See the latest issue of the Missouri planting calendar.

When to plant—Fall plowing should always precede planting the spring crop of cabbage because early planting is necessary for success. Soil, plowed the previous fall, can be worked into a fine seedbed much earlier than if left until the ground dries out enough for spring plowing.

Set plants in the field just as soon as the danger of hard freeze is past. This will usually be about the time Irish potatoes are planted.

Plant the rows far enough apart to use field equipment for cultivation. The smaller varieties can be planted closer than the larger headed varieties. However, a desirable planting distance in the row is 1 to 1½ feet.

The disease known as cabbage yellows is one of the greatest hazards in growing cabbage in Missouri. It is more prevalent in individual family gardens because of the common use of infected plants.

Be sure that the plants used are produced either at home or by a reliable plant grower. Use only well grown, properly hardened, disease-free plants.

Where cabbage yellows is already in the soil, only a disease-resistant variety should be used.

Fertilizing—In home garden production, the use of nitrogen as a side dressing is generally not advisable if the soil is fertile. Nitrogen will make the plants grow faster; in waiting for a long period of use some of the heads burst and will be lost.

However, in commercial production there is an advantage in side dressing with nitrogen. Make the first application 2 weeks after transplanting and a second application about two weeks later. One pound of ammonium nitrate for each 100 feet of row should be sufficient.

Harvesting—Cabbage will have its best quality when the head has just reached the solid stage. It will be crisp, of a high moisture content, and of good flavor.

ONIONS

Onions are used in a variety of ways. Their biggest use is for seasoning food. The yearly production of onions is from one to two billion pounds. The per capita consumption of fresh onions is from 20 to 23 pounds.

This crop is not difficult to grow. It can be planted as sets, plants or seed. Here, both sets and plants do well.

This crop is well adapted to 4-H work since is can be successfully grown and is a desirable product for teaching vegetable judging.
Because of its wide use and large volume the onion crop has a definite place in home gardens and under specific conditions may be considered for commercial production.

Varieties—The variety grown will depend upon the intended use. Usually the Sweet Spanish and Southport Globe are dependable and of good quality. It is often difficult to obtain a true variety since onion sets and plants usually are sold as “onions.” It is always good planning to ask the dealer to obtain the variety you want.

Bermuda onions give satisfaction for either green onions or early storage onions. Some of the hybrid onions look very promising. It would be a good idea to watch their performance.

When to plant—Onions do best in rather cool weather. If sets are used, plant at the same time as Irish potatoes. If plants are used, plant at about the time cabbage plants are transplanted. Additional suggestions for varieties, dates of planting, and spacing may be obtained in the Missouri Planting Calendar which is Extension Folder No. 5.

Fertilizing—Green onions will not require fertilizer other than the starter application on a soil of high fertility. For storage onions that will grow to maturity, apply a side dressing of nitrogen about two weeks after bulb formation starts. One pound of ammonium nitrate for each 100 feet of row generally will provide adequate production.

Harvesting (for storage)—Onions are mature and ready for harvest when the tops have died of their own accord. Onions should be cured after pulling. This is best done in a shady, well ventilated place. You can get them cured quicker by spreading them out one layer deep. However, mesh bags or slatted crates are efficient storage containers. After the onion tops dry, remove them unless you use them to braid for hanging in storage.

Onions may be stored in either common or cold storage. A low relative humidity of 70 to 75 per cent is desirable. The most favorable temperature is 32°F. Onions freeze at an average temperature of 30.1°F., but are not greatly injured by slight freezing if allowed to thaw slowly. Under favorable conditions, onions may be stored 6 to 8 months.

In common storage, try to keep the humidity from 70 to 75 per cent. Keep onions cool but above heavy freezing.

PEANUTS

The peanut is a pea rather than a nut and belongs to the same group of plants as do beans and common garden peas, differing only in that it matures its fruit or pod beneath the surface of the soil. The small yellow flowers are borne at the joints where the leaves are attached to the stems, and as soon as pollination takes place the flower fades and the “peg,” as it is commonly called, grows into the soil where the pod develops. On heavy or dry soil, the center of the plant should be covered with soil soon after the first bloom appears to assure covering the pegs. If this is not done, the crop should be grown on soil where a loose surface can be maintained.
Peanuts require a season of 100 to 140 days without frost, moderate rainfall during the growing period, an abundance of sunshine and a relatively high temperature.

This crop appears to be well adapted to a 4-H project by reason of its wide adaptability to various areas of the state. It is a high food value crop and could be pleasantly used by the family during the winter evenings in the roasted form and after 4-H Club meetings as a part of the refreshments.

Varieties—The two varieties best adapted to a 4-H project are Valencia and Tennessee Red. However, most any variety could be used including Jumbo and Spanish.

When to plant—Peanuts are a warm season crop and the seed should not be planted until danger of frost is past and the soil reasonably warm. This is about the time you plant tomatoes or other warm season crops.

The distance of planting may be based on the varieties. Small upright growing varieties as Spanish and Valencia may be planted closer than Virginia runner or Jumbo.

For a 4-H project planting, plan to plant in rows wide enough for mechanical cultivation with plants spaced 3 to 4 inches apart in the row.

Fertilizing—If a high level of soil fertility has been maintained, the peanuts generally will not need additional fertilizer. If the soil is rather low in fertility, apply 300 to 400 pounds of fertilizer when the seed bed is prepared. Best results are generally obtained with fertilizer low in nitrogen, high in phosphorus and medium in potash.

Peanuts respond to organic matter in the soil. This may be supplied either in the form of well rotted manure or soil improving green manure crops as cowpeas, soybeans, small grain and sudan.

Harvesting—Harvest peanuts before the vines are killed by frost. When to harvest the crop may be determined in two ways: (1) by a slight yellowing of the foliage and (2) by an examination of the pods. If the peas are full-grown and the inside of the shells has begun to color and show darkened veins, they are ready for harvest.

Peanuts should be loosened from the soil. For a 4-H project planting, a spading fork or a four or five tined manure fork would serve as a satisfactory tool.

There is but one way for you to cure peanuts so that the pods will remain bright and clean. Put them in small stacks around poles to which two crosspieces have been nailed at right angles to each other a few inches from the ground.

Use poles 3 to 4 inches in diameter, sharpened at both ends and set in a hole about 12 inches deep made with a post hole digger. From 15 to 30 staking poles will be required for an acre.

In starting to build the stack hang a few vines over each of the cross pieces, thus forming a foundation. Lay the vines in a circle around the pole with the roots toward the center. The stack should not be more than 36 inches in diameter. As the stack nears completion, drawn it gradually to a point and crowd a few vines down.
over the sharpened top of the stake. Place a little dry grass, weeds, or a single thickness of sack material over the top. Be sure there is ventilation through the stack.

Weather conditions will determine how quickly the curing will take place. Generally peanuts should remain in the stacks 3 to 6 weeks before being picked from the vines.

SUGGESTIONS FOR DEMONSTRATIONS

Cutting Irish Potato Seed

For seed, cut potato as shown by the straight lines. Do not peel.

I. Material needed
   a. Peck of Potatoes.
   b. Sharp knife.
   c. Table large enough to work on and hold the cut and uncut potatoes.

II. Types of materials (kind of potatoes and treatment)
   a. Choose a good variety (Irish Cobbler).
   b. Get good seed (Blue Tag N. Dak. Certified).
   c. Don't use home-grown seed.
   d. If not certified, treat (corrosive sublimate).

III. How to do (Cutting seed potatoes)
   a. 2-ounce seed pieces give best results.
   b. Each seed piece cut with at least one good eye.
   c. Cut a couple of days before planting.
   d. Leave spread out until immediately before planting.

A SUGGESTED DEMONSTRATION OUTLINE

Transplanting Plants

I. Materials needed
   a. String for laying off rows.
   b. Yard stick or rule.
   c. At least two stakes to mark off rows.
   d. Hoe. Garden plow, if available.
   e. Plants.
   f. Fertilizer.
g. Pint jar.
h. Bucket—for water.
i. Bucket—for plants.

II. Types of Material
   a. Healthy, sturdy plants (tomatoes, stem size of a pencil and 6 or 8 inches tall).
   b. A complete fertilizer as 8-24-12.

III. How to do it
   a. Decide where first row will be, set stakes at ends 3 inches to side of row.
   b. Lay off furrow and spread fertilizer in it after measuring amount needed in pint jar.
   c. Make second furrow beside string where row will be. Lay off row and cover fertilizer.
   d. Measure distance apart plants will be in rows.
   e. Dig holes at spacing and to depth desired.
   f. Have plants in bucket with enough water to keep roots moist.
   g. Place plant in hole, spread root system, pull in enough soil to fill hole two-thirds full. Don’t tamp or press soil.
   h. Pour enough water around plant until hole is full.
   i. Let water soak down around roots.
   j. Pull in enough loose soil to finish filling the hole.

SUGGESTED VEGETABLE DEMONSTRATIONS

1. How to take a soil sample.
2. Transplanting a plant.
3. Side dressing fertilizer.
4. How to clean and adjust a hand sprayer.
5. Tying and pruning tomatoes.
6. Cutting Irish potatoes seed.
7. Spraying for corn ear worm control.
8. Harvesting, grading and packing tomatoes.
9. Spraying for disease control.
10. Dusting for insect control.
11. Bedding sweet potatoes.
12. Treating seed for disease control.
13. Treating products for storage
    (a) Prevent sprouting in Irish potatoes.
    (b) Control pests, stored beans or pop corn.
15. Trimming head lettuce, cabbage and cauliflower.
VEGETABLE JUDGING

Use in Project Meeting

I. Keep It Practical

The main objective of vegetable judging is to teach quality. This should be helpful both from the standpoint of production and use.

Judge the vegetables on the basis of their eye appeal or appearance, how long they will remain in good condition for storage or fresh use, and how much waste will there be. If you went to the store to buy some vegetables, which would be the best buy. If you were producing vegetables, which would be sold or used fresh.

If the crop may be stored, factors relative to storage should be considered. If it is used mainly as a fresh product, it should be judged accordingly.

When you understand the score cord, you will have a basic background for judging. Additional knowledge needed is the specific characteristics of that particular crop, as to variety:

Sprouting in Irish potatoes is an indication of low condition.
Dry sprouts on sweet potatoes may not suggest low condition.
Onions usually break down first in the necks.
Learn to identify the more common varieties.
Care should be taken in identifying the classes. If the judge sets up a class of Irish Cobbler potatoes and instructs the members accordingly, then it is a class of Irish “Cobbler” potatoes and not just Irish Potatoes. If an Early Ohio potato is put in the best plate of such a named class, as above, that plate must, or should, be placed at the bottom of the class. It may also depend on the rules as to whether it even places.

Generally the first indication is a good one to follow.
Which looks the best?—but justify that this first impression is right.

II. Study Score Card in the 4-H Leader Guide

Know what quality, condition, uniformity of size, shape and color means and which is most important as determined by the numerical rating.

III. Keep Judging Simple—Make It Easy

a. Use vegetables suggested by State 4-H Club office.
b. Start with two potatoes.
c. Consider only one factor, as quality. Place the two potatoes by quality only. Tell why. When this can be done, use three potatoes. Then, two plates of two each. Build on to four plates with the number of desired specimens in each plate.
d. When the members become acquainted with quality, start the same procedure with condition and establish this factor.
e. The other parts of the score card can be handled the same way.
f. As one starts through this procedure, it will be noticed that the specimens or plates will not place by one factor alone. Then another one will need to be considered to determine its placing.
g. A leader can set up classes to make them show anything that is desired to stress different factors—"make them place any way you want to."

IV. Reasons:
A contestant should examine every specimen in every class with the exception of beans or similar crops. However, most good vegetable judges will lay out the plate so all good and bad points can be observed. These points should be remembered so the contestant can tell the judge why the class placed as it did.

Generally it appears that the judging comes more easily than does the giving of reasons.
The same procedure may be used in giving reasons for vegetables as for other 4-H judging.

REFERENCE MATERIAL

USDA Farmers Bulletin 1934—Tomato Diseases.
University of Missouri College of Agriculture Bul. 548—Potato Growing in Missouri.
University of Missouri College of Agriculture Extension Cir. 524—The Family Vegetable Supply.
University of Missouri College of Agriculture Extension Cir. 572—Storing the Family Food Supply.
University of Missouri College of Agriculture Extension Cir. 593—Tomato Disease Control.
University of Missouri College of Agriculture Extension Cir. 598—Profitable Tomato Production.
University of Missouri College of Agriculture Extension Cir. 608—Growing Cucumbers for Pickling.
University of Missouri College of Agriculture Extension Folder 5—Missouri Garden Planting Calendar.
4-H RECORD

VEGETABLE PRODUCTION

To Be Used with 4-H Circular 110

Name ___________________________ Age ___________________________

Address ___________________________ County ___________________________

Name of 4-H Club ___________________________

Name of Club Leader ___________________________

Project Leader ___________________________

Jr. Project Chairman ___________________________

Club meetings attended during year ______ Project meetings held ______

Number attended ______ Number of units in completed project ______

Number of vegetable demonstrations given at:
  Club meetings _____, Project meetings _____, County meetings _____
  District meeting _____, State meeting _____

Number of times participated in Judging work in:
  Project meetings _____, County _____, District _____, State _____
  Interstate ______.

Number of exhibits made in:
  Community _____, County _____, District _____, State _____, Interstate _____

Participated in:
  County Achievement _____, District Round-up _____, State Contest
  Program _____, National Contests _____, County Fair or Show _____,
  District Fair _____, State Fair _____, Interstate Show _____, Marketing
  days _____, County Camp _____, District Camp _____, State Camp
  _____, National Camp _____, National Club Congress _____, News
  stories published _____, Radio programs participated in _____
Project Requirement

Vegetable I - Vegetables for Home Use.

Produce one from the list below in sufficient quantity to supply the family as nearly as possible the year around.

List of Vegetables

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Size of Plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>50 plants</td>
</tr>
<tr>
<td>Bush beans</td>
<td>1/10 acre</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1/4 acre</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>1/2 acre</td>
</tr>
<tr>
<td>Cabbage</td>
<td>200 plants</td>
</tr>
<tr>
<td>Sweet corn</td>
<td></td>
</tr>
<tr>
<td>Onions</td>
<td></td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td></td>
</tr>
<tr>
<td>Vine crops (cucumber, melon, squash and pumpkin)</td>
<td></td>
</tr>
</tbody>
</table>

Vegetable II - Vegetables for Market.

Produce for market one of the following vegetables on the scale indicated.

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Size of Plot</th>
<th>Vegetable</th>
<th>Size of Plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>50 plants</td>
<td>Sweet potatoes</td>
<td>200 plants</td>
</tr>
<tr>
<td>Bush beans</td>
<td>1/10 acre</td>
<td>Cucumbers</td>
<td>1/2 acre</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1/4 acre</td>
<td>Melons</td>
<td>1/2 acre</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>1/2 acre</td>
<td>Onions</td>
<td>1000 plants</td>
</tr>
<tr>
<td>Cabbage</td>
<td>200 plants</td>
<td>Peanuts</td>
<td>200 feet of row</td>
</tr>
<tr>
<td>Sweet corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vegetable III - The Family Vegetable Supply

Grow at least twenty vegetables in quantities sufficient to supply the family throughout the year.

Note: The club member will indicate his choice of project in the proper goal paragraph below.

Project Record

My Goal

I have selected Vegetable I for my project.

I shall try to provide our family with at the best eating stage throughout the season and to store some for winter use.
Plan for Growing Crop

Number in family ........................................
Feet of row space needed ................................
Number of plants needed or ................................
Amount of seed needed ...................................

I Have Selected Vegetable II for My Project

I shall try to produce _________________________ bushels of
I shall grade my product and market it when it is at the best eating stage.

I Have Selected Vegetable III for My Project

I shall grow the entire vegetable supply of 20 or more vegetables for our family of _______________ persons.

WHAT I WILL DO

I will try to

Prepare the soil properly
Use well drained fertile soil ............................
Fall plow if possible ...................................
Plow under organic matter in form needed ...........
Apply fertilizer based on soil test ....................
Follow county agent’s recommendations for
1. Basic application
2. Starter application
3. Side dressing of nitrogen
Work the seedbed until fine and free of lumps ..... 

Plant according to Recommendations
Use seed from reliable sources .......................... 
Use a variety recommended for Missouri* .......... 
Grow my own or obtain healthy, well-grown plants from a reliable grower ....................
Transplant according to recommendations ............
Space rows and plants in rows according to recommendations* ................................
Follow recommendations for time of planting* ....
Start home grown tomato plants 60 days ahead of time for setting ............................
Start cabbage plants 50 days ahead of setting ......
Bed seed sweet potatoes 30 days in advances of time for setting ............................
Set plants late in the afternoon or on a cloudy day.
Make succession plantings as recommended* ....

* See Missouri Vegetable Planting Calendar.
Cultivate and Control Insects
Keep weeds down with shallow and frequent cultivation.
Use field implements.
Dust or spray as often as is necessary to keep insects under control.
Spray as often as necessary to keep diseases under control.

Use field implements as often as necessary to keep insects under control.

Harvest at Right Time
Pick tomatoes when red ripe for home use.
Pick green beans before the bean develops in the pod.
Dig Irish potatoes as soon as vines are dead.
Gather sweet corn when it reaches full color.
Dig sweet potatoes before temperature drops to 50°F.
Cut cabbage when heads are solid.
Gather peas before they are full grown in the pod.
Pick cucumbers at the size desired for pickling or fresh slicing.
Pull other vine crop when ripe.
Dig root crops when soil is dry.

Store Properly
Store dry seed as beans and pop corn in dust proof and insect proof container.
Store sweet potatoes in a dry, well ventilated place.
Store mature potatoes and root crops that are free from dirt and injury in a dark storage cellar, pit or mound where it is cool and moist.

Summary*
I grew a total of bushels of value
$ . Actual sales amounted to $ . My expenses were $ for seed, $ for fertilizer, $ for spray material. My total expenses were $ .

Signature of member

Approved by Leader

*Members doing Vegetable III will give the number of vegetables grown in the second blank of the summary.