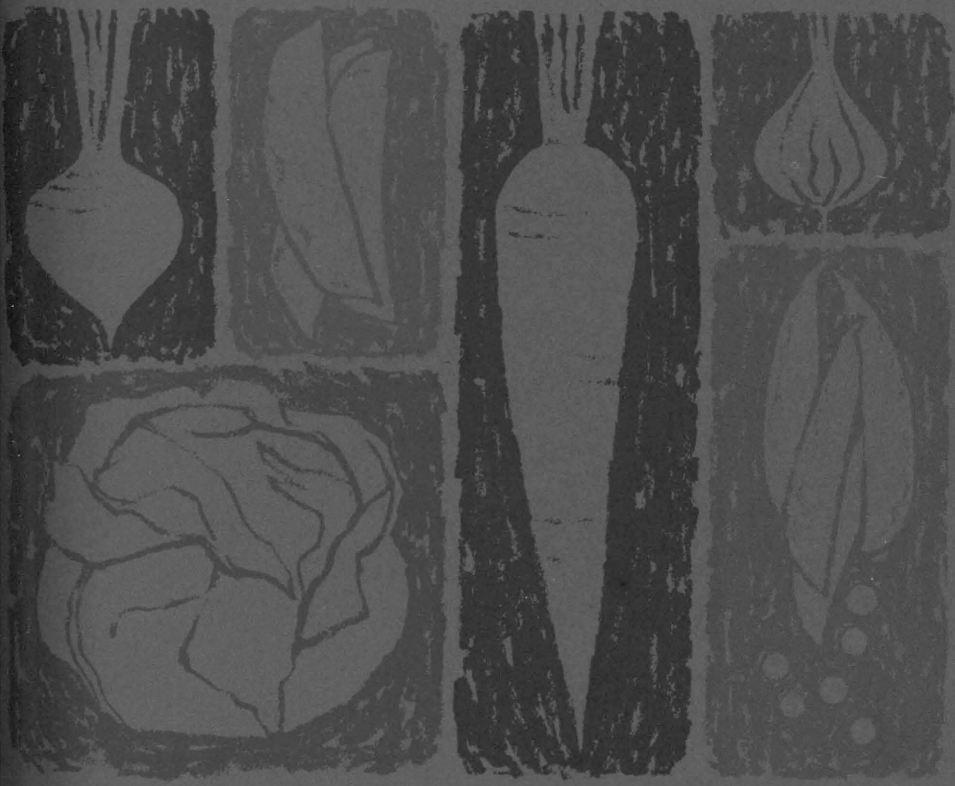


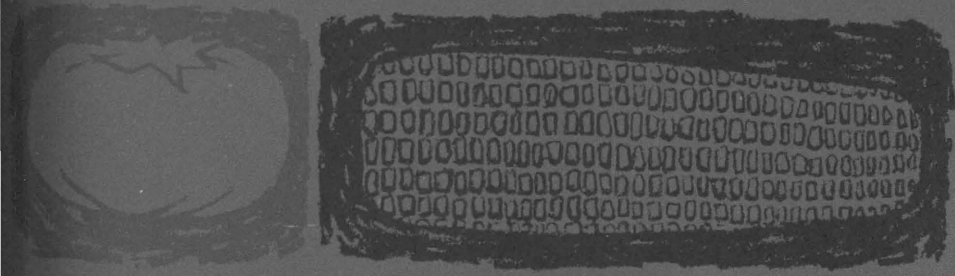
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ILLINOIS VEGETABLE GARDEN GUIDE



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Illinois Vegetable Garden Guide

By J. S. VANDEMARK, M. C. SHURTLEFF, and W. H. LUCKMANN¹

VEGETABLES FROM THE HOME GARDEN are fresher, may have better nutrient values, and are often less costly than those sold in stores. In addition to providing wholesome, low-cost food, vegetable gardening is an interesting hobby, one in which the whole family can take part. Some of the other advantages of gardening are that it provides healthful outdoor exercise, offers productive activity for handicapped or disabled persons, and is an excellent way to teach children about growth and reproduction.

To get the most out of your garden you should make plans early in the year and follow proper steps during the gardening season. The purpose of this guide is to help you plan and maintain a garden under Illinois growing conditions so that you will have an abundant supply of high-quality vegetables at harvest and (if you freeze, can, or store your vegetables) throughout the year.

PART I — TEN STEPS TO A SUCCESSFUL GARDEN

Step 1 — Make Good Use of Your Location

The success of the garden depends greatly on location. Even though you are probably limited in choice of location, you should consider the following:

Good soil. A loose, fertile, level, well-drained soil is best. If possible, avoid heavy clays and very sandy soils, unless adequate organic material is added.

Sunlight. Sunlight is necessary to produce healthy high-quality vegetables. Do not plant near buildings, trees, or shrubs that may shade your garden. If you have a shady garden spot, grow only leafy vegetables. They will do better than root or fruit crops.

No nearby trees or shrubs. Trees and shrubs compete with garden crops for plant food and moisture. Especially avoid walnut trees, because their nuts produce a toxin that is injurious to certain vegetables, especially tomatoes.

Water supply. When possible, have a water supply near your garden site. This is particularly important during the period of start-

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ing seeds or transplanting crops. This will be of great importance in establishing rotations, summer gardens, and during periods of long droughts. Quality and yields will be improved with proper use of water.

Nearness to your home. Your garden should be near your house so that whenever you have a few spare minutes you can do some work in the garden. Also, you will take better advantage of your vegetables if they are near the kitchen.

Part of landscape plan. When planning your garden, consider its relation to the trees, shrubs, and flowers around your home. The garden should fit in well with the overall design of your landscape.

It may not be possible to meet all these requirements, but the more you can include the better your chances for a successful garden.

Step 2 — Plan Your Garden Layout

After choosing a garden site, the next step is to plan the arrangement of crops in the garden. First consider each of the points listed below. Then sketch a map of your garden area showing the location of each vegetable, the spacing between rows, and the approximate dates for each planting. Two sample garden plans and a suggested planting schedule are shown on pages 3 to 5.

Size of garden. The size of your garden depends on the space available, the quantity of vegetables you will need, and the amount of work and time you desire to spend. Make the garden just large enough so that it will be interesting and fun for the whole family. Don't make it so large that it will become a burden and not receive proper care. It is unwise to plan on growing all the vegetables that your family will use during the year; only the most ardent gardeners come close to achieving such a goal.

Kinds of vegetables. The crops you choose should be ones that you and your family enjoy. Make sure, though, that they can be grown successfully in your area.

Some crops utilize space better than others. These vegetables can be produced efficiently in a small garden:

Beans	Leaf lettuce	Spinach
Beets	Onions	Swiss chard
Broccoli	Peas (followed by	Tomatoes
Cabbage	other crops)	Turnips
Carrots	Radishes	

Another consideration in selecting crops is whether they taste noticeably better when they are fresh from the garden. Sweet corn

SMALL GARDEN — INTENSIVE CULTURE: 30 BY 25 FEET

Planting	Row No. and width	
		← 30 feet →
1 st	1-12"	Early peas (Snap beans late)
	2-12"	Second early peas (Lettuce and kohlrabi late)
	3-12"	Spinach (Spinach late)
	4-12"	Leaf lettuce (Spinach late) Turnips (Spinach late) Kohlrabi (Spinach late)
	5-12"	Onion sets (Radishes late)
	6-12"	Onion seed planted with radishes (Turnips late)
2 ^d	7-24"	Early cabbage plants
	8-24"	Carrots planted with radishes
	9-18"	New Zealand spinach Beets planted with radishes
	10-30"	Tomato seed
	11-24"	Snap beans
3 ^d	12-24"	Tomato plants
	13-24"	Snap beans
4 th	14-18"	Lima beans
	15-24"	Summer squash or peppers Cucumbers or eggplant
	18"	(Border strip)

Crops in parentheses can be planted in the indicated rows after the early crops are harvested.

LARGE GARDEN — INTENSIVE CULTURE: 120 BY 100 FEET

Providing a reasonably complete and continuous assortment of vegetables for fresh use throughout the season, for canning, and for storage. For additional plantings in late summer and fall, see page 5. Distance between rows may be adjusted to equipment used.

Planting	Row No. and width	120 feet		
1 st	1-4'	Asparagus	Rhubarb	Perennial onions
	2-4'	Onion seed planted with radishes		
	3-1½'	Onion sets	Spinach	
	4-3'	Early potatoes		
	5-3'	Early potatoes		
	6-3'	Early potatoes		
	7-3'	Early potatoes		
	8-3'	Leaf lettuce	Early turnips	Kohlrabi
	9-1½'	Peas		
	10-1½'	Peas		
	2 ^d	11-2'	Early cabbage seed		Head lettuce plants
12-2'		Early cabbage plants		
13-2'		Beets	Carrots	
14-1½'		Parsnips planted with radishes		New Zealand spinach
15-3'		Tomato seed		
3 ^d	16-3'	Early sweet corn	Main-crop sweet corn	Main-crop sweet corn
	17-3'	Early sweet corn	Main-crop sweet corn	Main-crop sweet corn
	18-3'	Early sweet corn	Main-crop sweet corn	Main-crop sweet corn
	19-3'	Snap beans		
4 th	20-1½'	Snap beans		
	21-1½'	Carrots		Beets
	22-2'	Peppers	Eggplant	Bush lima beans
	23-3'	Tomato plants		
	24-5'	Muskmelons		
	25-5'	Squash	Cucumbers	
	26-8'	Watermelons		
	27-8'	Winter squash		
	28-8'	Sweet potatoes		
Special*	29-4'	Late cabbage seed		
	4'	(Border strip)		

* The special planting of late cabbage is for fresh use in late fall, sauerkraut, or winter storage. Sow June 1 in northern Illinois, June 15 in central Illinois, and July 1 in southern Illinois.

SUGGESTED PLANTING SCHEDULE**Spring and Summer****1st planting***Southern Illinois*, March 10-20 · *Central*, March 25-April 5 · *Northern*, April 10-20

Asparagus	Onion sets	Rhubarb
Early cabbage (seed)	Perennial onions	Spinach
Kohlrabi	Peas	Tomatoes (seed)
Leaf lettuce	Early potatoes	(southern
Mustard	Radishes	Illinois only)
Onion seed		Early turnips

2d planting*Southern Illinois*, March 25-April 5 · *Central*, April 10-20 · *Northern*, April 25-May 5

Beets	Head lettuce (plants)	Parsnips
Broccoli	New Zealand spinach	Radishes
Early cabbage (plants)	Parsley	Salsify
Carrots		Swiss chard
		Tomatoes (seed)

3d planting*Southern Illinois*, April 10-20 · *Central*, April 25-May 5 · *Northern*, May 10-20

Snap beans	Sweet corn
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4th planting*Southern Illinois*, April 25-May 5 · *Central*, May 10-20 · *Northern*, May 15-31

Beets	Lima beans	Squash
Carrots	Muskmelons	Sweet potatoes
Cucumbers	Peppers	Tomatoes
Eggplant	Snap beans	(plants)
		Watermelons

Late Summer or Fall**5th planting***Southern Illinois*, July 24-August 3 · *Central*, July 10-20 · *Northern*, June 28-July 8

Beets	Late cauliflower (plants)*	Italian broccoli
Cabbage (plants)*	Chinese cabbage	Snap beans
Carrots	Endive	Summer squash

* Seed for these plants should be sowed outdoors 30 days ahead of these dates. Direct-seeded plants may be thinned and those removed transplanted.

6th planting*Southern Illinois*, August 15-24 · *Central*, August 1-10 · *Northern*, July 17-26

Cos lettuce	Kohlrabi	Winter radishes
Head lettuce	Late turnips	Snap beans

7th planting*Southern Illinois*, Sept. 8-17 · *Central*, Aug. 25-Sept. 5 · *Northern*, Aug. 11-20

Leaf lettuce	Spinach
Mustard	Spring radishes

With the above arrangement, late summer or fall plantings can be made on the areas from which the early crops have been harvested. See Table 5 for specific planting dates for individual vegetables.

is an outstanding example of this. Although it requires more space than the vegetables listed above, it is often chosen because of its high quality when fresh from the garden. Other highly perishable crops that taste best immediately after harvest are peas and asparagus.

Amount of vegetables. The amount of each vegetable to grow will depend on the needs and desires of your family. Here are suggested amounts of vegetables and fruits (both home-grown and purchased) for a family of four for one year:

<i>Food</i>	<i>Daily serving per person</i>	<i>Pounds per year for a family of 4</i>
Potatoes and sweet potatoes.....	1-2	500
Tomatoes and citrus fruits.....	1	620
Leafy, green, or yellow vegetables.....	1-2	660
Other vegetables and fruits.....	2 or more	640

This list can guide you in determining how much your family requires. When you've determined your family's annual requirements, then decide how much will be home-grown and refer to Table 1 to see how many feet of row to allot for each vegetable to obtain the necessary amounts.

Growing seasons and growth characteristics. The various vegetables should be grouped in your garden according to their growing seasons and growth characteristics. Perennial crops, such as asparagus, rhubarb, and berries, which will be in one location for more than one season, should be planted along one side of your garden. Arrange early plantings on one side, probably near the perennials. Group early- or quick-maturing vegetables together so that after harvesting the space may be used for later plantings. To avoid shading, plant tall crops to the north or west of lower crops.

Spacing between rows. Proper spacing between rows is important to allow for growth of plants, ease of cultivation, and efficient use of space. Recommended spacings are given in Table 5. If you have farm equipment and plenty of space, make your rows long and wide enough apart so that you can use your farm tractor and cultivator, thus avoiding much hand-weeding.

Successive plantings are desirable if you wish to have a continuous fresh supply of certain vegetables. Don't plant too much of a crop at any one time. Two or three small plantings of leaf lettuce and radishes may be made a week to 10 days apart in early spring, with an additional one made in the fall. Onion sets for green onions may be planted bi-weekly until you have used up all your sets. At least two plantings of

Table 1. — Yields of Home-Grown Vegetables

Vegetable	Approximate yield per 100 ft. of row	Approximate amount of fresh vegetable needed for 1 quart	
		Canned	Frozen
	<i>lb.</i>	<i>lb.</i>	
Asparagus.....	50	4	2-3
Beans, lima (pods).....	20	4-5	4-5
Beans, snap.....	60	1½-2	1½-2
Beets.....	60	2½-3	2½-3
Broccoli.....	60	...	2
Cabbage.....	200	...	...
Carrots.....	75	2½-3	2½-3
Chard.....	50	...	3
Cucumbers.....	100	...	...
Eggplant.....	60	...	...
Lettuce, head.....	90 heads	...	...
Lettuce, leaf.....	50	...	...
Muskmelons.....	150	...	...
Onions.....	100	...	...
Parsnips.....	100	...	...
Peas (pods).....	30	4-5	4-5
Peppers.....	60	...	1½
Potatoes, early.....	60	...	...
Potatoes, late.....	75	...	...
Pumpkins.....	300	...	...
Radishes.....	100 bunches	...	...
Rhubarb.....	100	1	1½
Spinach.....	50	2-3	2-3
Squash, summer.....	160	2½-3	2-3
Squash, winter.....	400	2	3
Sweet corn, early.....	75 ears	4-5	4-5
Sweet corn, main-crop.....	85 ears	4-5	4-5
Sweet potatoes.....	80	2½-3	2-3
Tomatoes.....	500	3	...
Turnips.....	50	...	...
Watermelons.....	20 fruit	...	...

carrots, beets, and cabbage should be made — one early in the spring for summer use, another later on for fall storage. Several plantings of sweet corn and beans should be made throughout the season.

Certain later crops can be planted in the same spot in the garden from which earlier ones have been harvested. Any of the early-harvested crops, such as leaf lettuce, spinach, radishes, green onions, and peas, can be followed by beans, beets, carrots, cabbage, sweet corn, late spinach, late leaf lettuce, and turnips. See page 5 for a suggested planting schedule.

Intercropping. To intensify production in a small garden, early-maturing crops can be planted between rows of later or long-season crops. This is called intercropping. Peas, radishes, green onions, spinach, or lettuce may be planted between rows where tomatoes, peppers, cabbage, or corn are to be grown. Radish seed may be mixed with beet, carrot, onion, parsnip, or salsify seed and sown in the same row. The radishes will mature before the other crops need more room. To do a good job of intercropping you need a good supply of moisture and fertilizer.

Rotating crops from year to year is necessary to prevent diseases that overwinter in the soil. Do not grow the same vegetable or related vegetables in or near the same location more often than once in three years. Rotate crops from one side of the garden to the other.

Erosion. If your garden is on a hill, plant the rows across the slope rather than up and down. This will prevent water from flowing down the hill, thus helping reduce erosion.

Step 3 — Grow Recommended Varieties

Selecting proper varieties for your garden is important. By careful selection you can grow vegetables that are disease-resistant and good yielders of high-quality, nutritious produce. Use the varieties recommended in Table 2 and that are known to do well in your area. It is a good idea to try one or two new varieties each year. Plant them next to your old favorites to see which ones are best.

The varieties recommended in Table 2 are all of high quality and are generally good for freezing or canning.

Step 4 — Obtain Good Seed, Plants, Equipment, and Supplies

Take inventory early of your needs for plant materials, supplies, and equipment and order the items you need or buy them locally from stores.

Seed. Buy clean, viable, disease-free seed. Most seed from reliable seed companies will meet these specifications. Consult the catalogues of several companies so that you can have a wide selection of varieties and types of vegetables.

Seed should be treated to kill disease organisms on the surface of the seed and to prevent seed decay and damping-off. You can treat seed yourself (write for Report 915 "Vegetable Seed Treatment," Department of Plant Pathology, University of Illinois, Urbana) but you'll save time and effort if you buy seed that is already treated. Information on the kind of treatment the seed has received will appear on the seed package.

It is best not to use seed more than one year old. If you do, sow the seed thicker than usual to insure a good stand of plants. It usually does not pay to save your own seed unless you have a variety not available from any other source.

The information in Table 2 should help you determine which varieties and how much seed to order. Order your seed early so that you do not have to accept substitute varieties.

Plants. Some vegetables do best when they are started indoors and then transplanted into a garden. The plants should be healthy, stocky, medium-sized, disease-free, and insect-free, with good roots. Avoid using plants that are tender, yellow, spindly, or too large. Do not use plants with spots on the leaves, brown lesions on the stems, or knots on the roots.

Obtain plants in containers (pots, bands, flats, boxes, etc.) so that the root systems are intact. Your plants should not be disturbed any more than necessary.

Although you can grow your own plants from seed it is usually easier to buy them from a nursery or greenhouse in your area or even order them from a seed catalogue. Sometimes it is difficult to obtain plants of new varieties, but you may be able to get a commercial plant grower to start the varieties that you wish to use.

Growing your own plants has these advantages: (1) you can use varieties not normally available; (2) you can have plants available when you want them; and (3) you can derive satisfaction from starting plants yourself. The main disadvantage is that the plants must be grown under carefully controlled lighting and temperature conditions.

Because starting plants indoors involves some specialized techniques, it is not discussed here. Information on starting and growing good plants may be obtained from University of Illinois Circular 884, *Growing Vegetable Transplants*.

Equipment. Have all your equipment and tools ready before you begin to work the soil. A hoe, spade, garden rake, trowel, measuring stick, and planting line are essential for all gardens. A wheel hoe or hand cultivator is practically a necessity for larger gardens that are intensely cultivated. A seed drill is also desirable for larger gardens.

Keep all tools clean and well-sharpened. Each time you use them, clean them thoroughly and rub them with an oily rag before putting them away.

Every gardener needs a good duster or sprayer to control garden pests. The type of applicator you use is a matter of taste; either kind

Table 2. — Seed and Plant Buying Chart

Variety recommended for use in Illinois	Days to harvest	Resistant to	Amount for 100 ft. of row	Variety recommended for use in Illinois	Days to harvest	Resistant to	Amount for 100 ft. of row
ASPARAGUS (plants) 75-100				CUCUMBERS (cont.)			
Mary Washington.....	..	Rust		Slicing (cont.)			
Waltham Washington.....	..	Rust		Marketer.....	64	.....
Tetra.....	..	.....		Challenger.....	65	Mosaic	
SNAP BEANS (seed) ¾ pound				EGGPLANT (plants) 50-75			
Bush, green				Black Magic.....	72	.....
Contender.....	50	Mosaic		Black Beauty.....	80	.....
Executive.....	56	Mosaic		KOHLRABI (seed) ¼ ounce			
Tendergreen types.....	50	Mosaic		Early White Vienna.....	55	.....
Bush, yellow				LEAF LETTUCE (seed) 1 packet			
Cherokee Wax.....	50	.....		Grand Rapids.....	45	.....
Kinghorn Wax.....	54	.....		Simpson.....	45	.....
Pole, green				Salad Bowl.....	45	.....
Kentucky Wonder.....	65	.....		Slobolt.....	45	.....
LIMA BEANS (seed) ½ pound				Summer Bibb (slow bolting)...	62	.....
Henderson Bush.....	65	.....		HEAD LETTUCE (plants) 100			
Clark's Bush.....	67	.....		White Boston.....	70-75	.....
Fordhook 242.....	75	.....		Imperial 456 (summer).....	76	.....
Thaxter.....	75	.....		MUSKMELONS (seed) ½ ounce			
BEETS (seed) 1 ounce				Burpee Hybrid ^b	85	.....
Crosby Egyptian (spring).....	52	.....		Delicious 51.....	85	Fusarium wilt	
Early Wonder (spring).....	52	.....		Goldstar ^b	87	.....
Ruby Queen (main crop).....	53	.....		Harper Hybrid ^b	86	.....
Detroit Dark Red (main crop)	58	.....		Harvest Queen.....	90	Fusarium wilt	
BROCCOLI 50-75 plants or 1 packet seed				Hearts of Gold.....	90	.....
Early Spartan.....	60	.....		Hybrid 16.....	70	.....
Calabrese.....	70	.....		Minnesota Honey.....	87	.....
Waltham 29.....	70	.....		Pride of Wisconsin.....	90	.....
BRUSSELS SPROUTS				Supermarket ^b	88	.....
				MUSTARD (seed) 1 packet			

C-C Cross	55	plants or 1 packet seed
Emerald Cross	63	Yellows
Resistant Golden Acre	64	Yellows
Greenback	78	Yellows
Marion Market	78	Yellows
Resistant Danish	105	Yellows
Badger Baldhead	100	Yellows
Vanguard II (Savoy)	72	
Chieftain (Savoy)	85	
Red Acre (Red)	76	
Red Danish (Red)	95	

CARROTS (seed) ¼ ounce

Nantes	68	
Goldspike	87	
Gold Pak	77	

CAULIFLOWER (for northern Ill. only) 50-75 plants or 1 packet seed

Early Snowball	54	
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CELERY (plants) 200

Golden Self Blanching	100	
Utah strains	125	

SWISS CHARD (seed) 1 ounce

Fordhook Giant	57	
Ruby	60	

CHINESE CABBAGE 1 packet

Michihili	70	
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COLLARDS 1 packet

Green Glaze	75	
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CUCUMBERS (seed) ½ ounce

Pickling		
Spartan Dawn ^a	51	Mosaic and scab
Slicing		
Ashley	59	Downy mildew
Burpee Hybrid	60	

Emerald	55	
ONIONS		
Sets		
Ebenezer	90	
Golden Globe	90	

2-3 pounds

Seed ¼ ounce

*Early Harvest (hybrid)	90	
Early Yellow Globe	95	
*Empire	100	
Downings Yellow Globe	110	
Southport Red Globe	110	
Brown Beauty (hybrid sweet spanish)	110	
*Sweet Spanish	115	

Seedlings (transplants) 400

*Starred items for seedlings

Bunching		
Evergreen	60	

PARSLEY (seed) 1 packet

Moss Curled	70	
Paramount	80	

PARSNIPS (seed) 1 packet

Hollow Crown	125	
All American	125	
Model	125	

PEAS 1 pound

Early		
Wisconsin Early Sweet	60	Fusarium wilt
Little Marvel	62	
Dark Podded Thomas		
Laxton	63	Fusarium wilt
Medium to late (for northern Ill. only)		
Pride	64	Fusarium wilt
Early Perfection	67	Fusarium wilt
Wando	71	Fusarium wilt

^a All female hybrid; 10 percent regular seed must be added for pollination.

^b F₁ hybrids.

Table 2. — continued

Variety recommended for use in Illinois	Days to harvest	Resistant to	Amount for 100 ft. of row	Variety recommended for use in Illinois	Days to harvest	Resistant to	Amount for 100 ft. of row
PEPPERS				SQUASH (cont.)			
50-75 plants or 1 packet seed				Fall			
Sweet Stuffing				Table Queen (Acorn).....	90	.....
Illinois #6.....	60	Mosaic		Butternut.....	95	.....
Vinedale.....	62	.....		Buttercup.....	100	.....
Allbig.....	65			Winter			
Yolo Wonder.....	76	Mosaic		Delicious.....	100	.....
Sweet Salad				Banana.....	105	.....
Sunnybrook.....	73	.....		Hubbard.....	110	.....
Hot				Sweet Meat.....	110	.....
Hungarian Wax.....	65	.....		SWEET CORN (seed)			
Long Red Cayenne.....	70	.....		1-2 ounces			
Red Chili.....	84	.....		Early			
POPCORN				Golden Beauty.....	68	Bacterial wilt	
Illinois Hulless (white).....	90	.....		Gold Crest.....	68	.....
Purdue 20 (yellow).....	100	.....		Spring Gold.....	68	.....
Purdue 202 (yellow).....	100	.....		Barbecue.....	75	Bacterial wilt	
Ipop 6 (yellow).....	100	.....		Main crop			
POTATOES (seed)				F-M Cross.....	78	Bacterial wilt	
10-12 pounds				Gold Cup.....	80	.....
Early				Duet.....	80	Bacterial wilt	
Irish Cobbler.....	100	.....		Honey and Cream (bi-color)	80	.....
Medium to late (for northern Ill. only)				Seneca Chief.....	80	Bacterial wilt	
Norland.....	105	.....		N.K. 199.....	82	Bacterial wilt	
Red Pontiac.....	110	.....		Golden Cross Bantam.....	82	Bacterial wilt	
Katahdin.....	120	.....		Jubilee.....	83	.....
Kennebec.....	120	Late blight		Tender Most.....	83	Bacterial wilt	
Ontario.....	120	Late blight and scab		Victory Golden.....	83	.....
Sebago.....	120	.....		Wampum.....	89	Helminthosporium	
PUMPKINS (seed)				SWEET POTATOES (plants)			
1 ounce				100			
Small Sugar (New England Pie).....	110	.....		Acadian.....	..	Soil rot	
				All-Gold.....	..	Wilt and internal rot	
				Centennial.....	..	Wilt	
				Gold Rush.....	..	.....

Spring (seed)		1 ounce
Cherry Belle.....	22	.....
Early Scarlet Globe.....	22	.....
Burpee White.....	23	.....
Champion.....	23	.....
Comet.....	23	.....
Red Prince.....	23	Fusarium wilt
Icicle.....	25	.....

RHUBARB (plants) 30-50

MacDonald.....
Valentine.....
Victoria.....

SALSIFY (seed) ½ ounce

Sandwich Island.....	150
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SPINACH (seed) 1 ounce

Spring		
Giant Nobel.....	43
Bloomsdale Long Standing..	44
America.....	45

Summer		
New Zealand.....	65	.....

Fall		
Virginia Savoy.....	35	Yellows
Early Hybrid 7.....	37	Yellows, downy mildew
Old Dominion.....	41	Yellows

SQUASH (seed) 1 ounce

Summer		
Early Prolific Straightneck..	50	.....
Zucchini.....	60	.....

Moreton Hybrid.....	70	seed
Urbana.....	75	.....
Cardinal.....	75	.....
Glamour.....	76	Cracking
Tecumseh.....	78	Fusarium wilt
Big Boy-Wonder Boy.....	78	.....

Main crop		
KC 135.....	78	Cracking
Improved Garden State....	78	.....
KC 146.....	80	Fusarium wilt, cracking

Rutgers.....	80	.....
Manalucie.....	83	Fusarium wilt
Jubilee (yellow).....	83	.....

Special purpose		
Roma (paste).....	76	Fusarium wilt
Caro-red (high Vitamin A)..	80	.....

TURNIPS (seed) ¼ ounce

Seven Top (for greens).....	42	.....
Purple Top White Globe (main crop).....	55	.....

WATERMELONS (seed) ½ ounce

Sugar Baby.....	85	.....
Hybrid 103 (Summer Festival)	85	.....
Charleston Gray.....	90	Fusarium wilt
Princeton.....	90	Fusarium wilt
Congo (W.R.).....	90	Fusarium wilt

WATERMELONS (seedless)

Tri-X 313.....	90	.....
Tri-X 333.....	90	.....

is effective if used properly. Be sure that the duster or sprayer has enough force to drive the pesticide into the center of the plant.

Plunger-type dusters, which range in capacity from 1 to 3 pounds, are the most practical applicators for the small garden. They are usually equipped with attachments for dusting the underside of leaves. Crank-type dusters, which hold up to 15 pounds, can be used satisfactorily in small and large gardens.

Compressed-air sprayers, which are usually made of galvanized steel and range in capacity from 1 to 5 gallons, are the most satisfactory sprayers for use in the garden. Empty and rinse the sprayer with clean water after each use and hang it up to drain and dry. Do not use the same sprayer for applying both pesticides and weed killers.

Another important tool is a lawn sprinkler or perforated plastic or canvas hose. Several types of rotating and oscillating sprinklers are on the market. Be sure that the hose is long enough to deliver water to all parts of the garden.

If you have a large garden, you may wish to buy or rent a small garden tractor. Garden tractors save labor in preparing the soil and cultivating crops.

Supplies. Obtain fertilizers, insecticides, and fungicides early so that you will have them when you need them. Other supplies you may need include mulching material, stakes, plant protectors, and pots. As you read this guide, make a list of the miscellaneous supplies that are required for the vegetables you are going to plant and have them ready before you begin gardening.

After completing Step 5 you will know how much fertilizer, lime, and starter fertilizer you will need.

Insecticides and fungicides are available as dusts, granules, and sprays. Some of the common insecticides that you will probably need during the season are malathion, sevin, and methoxychlor.

Some of the common fungicides you will use in your disease-control programs are maneb, zineb, and ziram.

Further information on these pesticides is given in Part II, pages 28 to 34.

All insecticides and fungicides should be treated as poison. Follow all directions and heed all precautions on the labels. Store them out of the reach of children and animals, in a locked place, preferably outside the house.

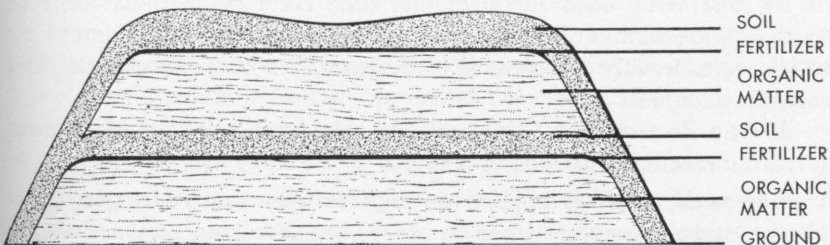
Step 5 — Prepare and Care for the Soil Properly

The soil provides food and water to plants. If these materials are not available or if the soil is in poor physical condition (hard and crusty when dry and sticky when wet) the plants will not grow and develop properly. To promote good growth and development of your plants, prepare the soil before planting by adding organic matter, applying fertilizers, correcting acidity, and plowing the seedbed properly. Take care of the soil during the growing season by applying starter fertilizer and by sidedressing with fertilizer.

Improve soil tilth. A soil that is in good tilth, or physical condition, is loose and easy to work, and has proper water-holding capacity, drainage, and aeration. You can improve your soil tilth by adding organic matter, either by spreading manure, compost, or similar matter on the soil and working it in before planting or by turning under a green-manure crop.

Stable manure is a common form of organic matter used in gardens. It can also fulfill part of the fertilizer requirements of the soil. Because stable manure is low in phosphorus add 1 to 1½ pounds of superphosphate to each bushel of manure. Use 500 to 1,000 pounds of horse or cattle manure per 1,000 square feet. Poultry, sheep, and goat manure should be used at half this rate. These materials have very high concentrations of fertilizer chemicals and must be used cautiously.

Compost can be made from leaves, straw, grass clippings, manure, and any other disease-free waste vegetable matter. To make compost, pile these materials in layers as they accumulate during the season. Add about 1 pound of a lime-fertilizer mixture to each 10 pounds of dry refuse; add about ¼ pound to each 10 pounds of green material. The mixture can be made from 5 pounds of 10-10-10 fertilizer plus



The number of layers in a compost pile will depend on the amount of material that accumulates. Turn and mix the pile occasionally. (Fig. 1)

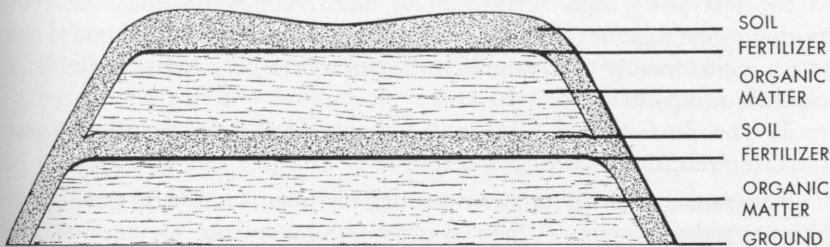
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2 pounds of fine limestone. This fertilizer treatment will hasten decay and improve the fertility of the compost. Spread soil over the material to hold it in place (Fig. 1). Water the pile to keep it damp and occasionally turn and mix the soil and decaying material. The pile will be ready to spread over garden soil in 6 to 12 months.

Green-manure crop. By growing a green-manure or cover crop, such as rye or oats, during the fall and spring and plowing it under, you can improve your soil tilth. Here is a suggested schedule for planting and plowing under green-manure crops:

<i>Crop</i>	<i>Pounds of seed to sow per 1,000 square feet</i>	<i>Best time to plant</i>	<i>Plow</i>
Rye.....	3	Sept. 1-30	Early spring
Rye grass.....	½	Sept. 1-15	Early spring
Oats.....	1-1½	Late Aug.	Late fall

The seed can be broadcast over worked-up unplanted areas and between rows of late vegetables. Stir the seed into the soil with a rake, hand cultivator, or harrow. If the fall is dry, a good watering will help produce a better cover crop.

Fertilize the soil. Fertilizer applications should be made before planting. Later in the season additional applications may be necessary.

Have your soil tested, especially if it is your first year in your present location. A soil test will indicate the amount and availability of nutrients in your soil. Gather small amounts of soil from about eight well-scattered spots in your garden, mix them together, dry at room temperature, wrap in a sturdy ½-pint container, mark the container "For Vegetable Garden" with your name and address, and send the package to the Soil Testing Laboratory, Floriculture Building, University of Illinois, Urbana, Illinois. A nominal fee of one dollar per sample will be charged. In a few weeks you will receive the results of the test along with fertilizer and lime recommendations for your garden. One sample per garden is usually enough to send, but if the soil is considerably different in different parts of your garden, send separate samples.

If you do not have your soil tested, you can follow the general fertilizer recommendations in Table 3.

The main elements applied through fertilizers are nitrogen, phosphorus, and potassium. When considered as fertilizer, they are usually referred to as nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O), respectively. A fertilizer marked 3-12-12 contains 3-percent nitrogen, 12-percent phosphoric acid, and 12-percent potash.

Table 3. — Fertilizer Recommendations for Vegetables

Previous fertilizer treatment	Fertilizer to apply		Approximate amount of nutrients ^a			
	Analysis	Rate		N	P ₂ O ₅	K ₂ O
		lb. per 1000 sq. ft.	lb. per acre				lb. per 1000 sq. ft.
Little or none.....	3-12-12	40	1750	1.2	4.8	4.8
Some.....	5-10-10	25	1100	1.2	2.5	2.5
Heavy.....	10-10-10	12	520	1.2	1.2	1.2

^a N = nitrogen. P₂O₅ = Phosphoric acid. K₂O = Potash.

Trace or minor elements are very rarely needed in Illinois soils. Before adding any elements such as boron, copper, manganese, iron, magnesium, molybdenum, sodium, sulfur, or zinc, check with your farm adviser or the Department of Horticulture, University of Illinois. These materials in excess are harmful to most garden plants.

Some of the materials used for fertilizers are listed in Table 4. One or more of these materials can be used to supply part or all of the nutrients needed in your garden, but generally it is easier and cheaper to use commercial chemical fertilizers. Although organic matter benefits the soil in many ways, it is inadvisable to try to use it as a substitute for fertilizer; organic matter is generally expensive, available in only limited amounts, and an unbalanced source of plant nutrients. If you wish to use organic materials for fertilizing, you will have to supplement them with other fertilizers.

Work fertilizer into the soil. Spread the fertilizer over the garden area and disc or rake it into the top 4 inches of soil before planting each crop. Or you can apply the fertilizer to the soil just before spading or plowing in the spring or fall.

Use starter fertilizer when transplanting to give your plants a faster start. Starter fertilizer is an all-soluble fertilizer high in phosphorus, for example 10-52-17 or 10-50-10. Mix the fertilizer with water (about 2 tablespoons per gallon of water). When you transplant, place about 1 cup of the solution around the roots of each plant. If a regular starter solution is not available, mix 1 cup of 0-45-0 or similar fertilizer in 12 quarts of water and use 1 cup of solution for each plant.

Sidedress fertilizer later in the season. Often the soil needs more fertilizer, especially nitrogen, later in the season. Sidedressing—applying fertilizer in a band along one side of the row about 4 inches from the crops—should be made for leafy crops, greens, and root crops when the plants are half-grown and for tomatoes, peppers, beans, sweet corn, cucumbers, etc., when they begin to set fruit.

Table 4. — Approximate Composition of Fertilizer Materials

Material	Nitrogen (N)	Phosphoric acid (P ₂ O ₅)	Potash (K ₂ O)
		<i>percent</i>	
Chemical			
Ureaform.....	30.0-40.0	...	...
Ammonium nitrate.....	33.5	...	...
Ammonium sulfate.....	20.5	...	...
Nitrate of soda.....	16.0	...	...
Urea.....	42.0-46.0	...	...
Superphosphate.....	...	16.0-20.0	...
Muriate of potash.....	...	...	48.0-62.0
Triple superphosphate.....	...	46.0	...
Organic			
Bonemeal, steamed.....	2.0	22.0	...
Garbage tannage.....	1.5	2.0	.7
Sewerage sludge.....	2.0	1.4	.8
Sewerage sludge, activated.....	6.0	3.0	.1
Tannage, animal.....	9.0	6.0	...
Tannage, processed.....	7.0	1.0	.1
Horse manure, fresh.....	.6	.3	.5
Cow manure, fresh.....	.5	.2	.5
Cow manure, dried.....	1.3	.9	.8
Hen manure, fresh.....	1.1	0.9	.5
Hen manure, dried, with litter.....	2.8	2.8	1.5
Wood ashes.....	...	.8	5.0
Cottonseed meal.....	6.0	3.0	1.0

Use 2½ pounds of ammonium nitrate, 2 pounds of urea, or 5 pounds of nitrate of soda per 1,000 square feet. Avoid getting dry fertilizer on plant leaves as it will injure them. Hoe the fertilizer into the soil surface. In dry weather, water the soil to make the fertilizer more quickly available to plant roots.

Fertilizers can also be sprayed on the leaves but only small amounts of nutrients can be applied this way without injury to the plants. This method is not practical under most conditions in Illinois.

Correct soil acidity. A slightly acid soil is best for growing most vegetables. If the soil test indicates that your soil is more acid than it should be, apply the recommended amount of lime. Add lime only if it is needed and avoid overliming.

Some soils are too alkaline. This can be corrected by adding sulfur or aluminum sulfate to the soil. A soil test will indicate whether your soil is too alkaline.

Work the lime or sulfur into the soil at the same time that you apply fertilizer.

Plow and prepare the seedbed properly. Plowing or spading can be done in either the spring or the fall. With fall plowing the soil can be worked and planted earlier in the spring, but not as much cover crop can be grown as with spring plowing.

Do not plow or spade the soil when it is too wet. A good test is to squeeze a handful of soil in your hand. It should crumble and not feel sticky.

You may apply fertilizer just before plowing or spading. Turn the ground over to a depth of about 8 inches. If fertilizer is added to the soil after plowing, rake or harrow the plowed area to work the fertilizer into the soil.

Just before planting prepare the seedbed for planting by working the soil with a rake or harrow. A freshly prepared seedbed will prevent weeds from coming up before the vegetables.

For small-seeded crops a smooth and finely pulverized surface insures easier planting, better germination, and a more even stand. Heavy soils low in organic matter should not be worked to too fine a consistency because they tend to get hard and crusty, preventing emergence of seedlings. Many Illinois soils should not be overworked.

Step 6 — Plant Your Vegetables Right

Much of the success of your garden depends on when and how your vegetables are planted.

When to plant. How early you can plant depends on the hardiness of the vegetables and the climate in your area. Certain vegetables can withstand frost while others cannot. In Table 5 vegetables are classified as hardy, half-hardy, tender, or very tender. This information along with the date of the average last 32° freeze in your area (see Fig. 2) will help you to determine safe planting dates.

Planting by the moon is a favorite topic for discussion among many gardeners. There is no scientific evidence to support planting by the moon; planting studies have shown no relation between the different phases of the moon and good production of crops.

How to plant. There are no magic tricks or difficult techniques in starting seeds or in setting plants. But there are some simple steps you should follow to insure success.

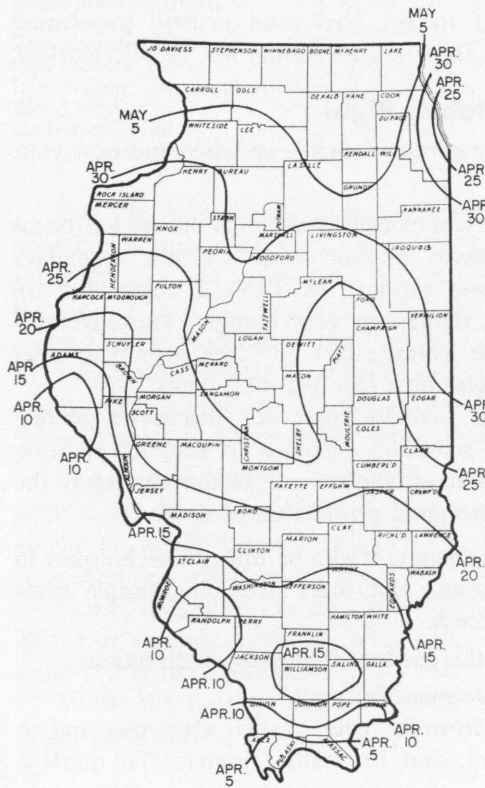
Seeds. In starting seeds in the garden, follow these directions:

1. Use disease-free seed. See page 28.
2. Mark out straight rows to make your garden attractive and to make cultivation, insect control, and harvesting easier. To mark a

row, drive two stakes into the ground at either edge of the garden and draw a string taut between them. Shallow furrows, suitable for small seed, can be made by drawing a hoe handle along the line indicated by the string (Fig. 3). For deeper furrows, use a wheel hoe or the corner of the hoe blade (Fig. 4). Use correct spacing between rows (see Table 5).

3. Hill or drill the seed. "Hilling" is placing several seeds in one spot at definite intervals in the row. Sweet corn, squash, melons, and cucumbers are often planted this way. Hilling allows easier control of weeds between the hills of plants. "Drilling," which is the way most seeds are sown, is spacing the seeds by hand or with a drill more or less evenly down the row.

4. Space seeds properly in the row. The number of seeds to sow per foot or hill is suggested in Table 5. Space the seeds uniformly. Small seeds sometimes can be handled better if they are mixed with dry, pulverized soil and then spread.



Average dates of last 32° freeze in the spring. There is a 50-percent chance that a freeze will occur after the dates shown. For similar information on other freeze levels and on probabilities other than 50 percent, send for Illinois Station Bulletin 650, "Freeze Probabilities in Illinois." (Fig. 2)

5. Plant at proper depth. A general rule to follow is to place the seed at a depth about four times the diameter of the seed. Cover small seeds such as carrots and lettuce with about $\frac{1}{4}$ to $\frac{1}{2}$ inch of soil. Place large seeds such as corn, beans, and peas 1 to 2 inches deep. In sandy soils or in dry weather, plant the seeds somewhat deeper.

6. Cover seeds and firm soil. Pack soil around the seeds by gently tamping the soil with your hands or an upright hoe. This prevents rainwater from washing away the seeds.

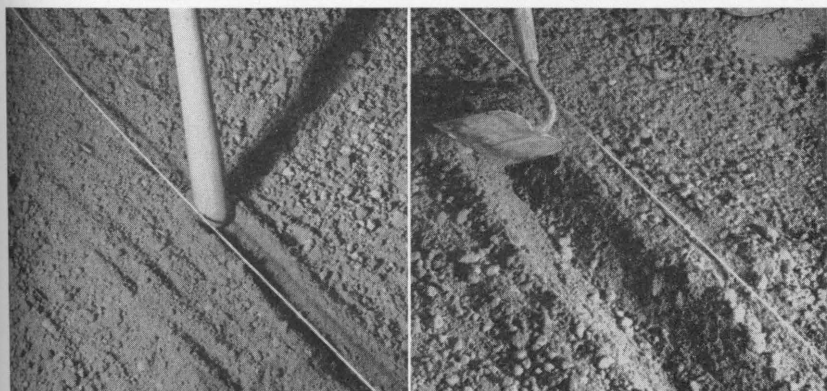
7. Thin to a desirable number of plants (see Table 5) when they are young. Remove the weakest plants. Do not wait too long before thinning or injury will result from crowding.

Transplants. Some vegetables, such as broccoli, cabbage, eggplant, pepper, sweet potato, and tomato, are usually started in the garden by means of transplants. You can buy these plants or grow them yourself indoors. Follow these directions when setting plants into the garden:

1. Transplant on a cloudy day or in the evening.

2. Handle plants with care. About an hour before transplanting, thoroughly water plants and soil in the containers (pots, bands, flats, etc.). Roots of plants in flats should be blocked out with a knife to get as much soil as possible with each root. Carefully remove plants from their containers, disturbing the roots as little as possible. Try to keep a ball of soil around the roots (Fig. 5). Keep the roots moist at all times when they are out of the soil.

3. Dig a hole large enough so that the transplanted plant sets slightly deeper than it grew in the container or seedbed. If you must



To make a shallow furrow, draw a hoe or rake handle across a taut planting line. For deeper furrows, use the edge of a hoe blade. (Figs. 3 and 4)

Table 5. — Planting Chart

Vegetable	Hardiness*	Recommended planting period for central Illinois ^b		Time required to grow plants from seed before setting in field ^c	Spacing in row			
		For overall use	For storage		Seed to sow per foot	Distance between plants when thinned or transplanted	Distance between rows	Planting depth
				weeks	inches		inches	inches
Asparagus	Hardy	Mar. 15–Apr. 15	.....	...	.....	12–18	36–60	6–8
Beans, bush, lima	Very tender	May 10–June 15	.....	...	3–4	Do not thin	18–30	1–2
Beans, bush, snap	Tender	Apr. 25–July 15	.....	...	6	Do not thin	18–24	1–2
Beets	Half-hardy	Apr. 10–July 15	July 10	...	10	2–4	12–18	1½–1
Broccoli	Half-hardy	Apr. 10–May 1	.....	4–6	.....	18–24	30–36	(d)
		July 1–15						
Cabbage	Half-hardy	Apr. 10–July 15	June 10	4–6	.....	9–18	18–30	(d)
Carrots	Half-hardy	Apr. 10–July 15	May 15	...	15–20	1–3	12–18	(d)
Cauliflower	Half-hardy	July 10–20	.....	4–6	.....	18–24	24–36	(d)
Celery	Half-hardy	Apr. 20–June 15	June 1	10–12	.....	6–8	24–36	(d)
Chard	Half-hardy	Apr. 10–June 1	.....	...	8–10	4–8	18–24	1½–1
Chinese cabbage	Half-hardy	July 10–30	July 15	...	4–6	12–15	24	1½
Cucumbers	Very tender	May 10–June 15	.....	4	3 in row 4–5 per hill	12, single plants 36, hills (3 plants per hill)	48–72	1
Eggplant	Very tender	May 10–June 15	.....	8–10	.....	18–24	30–36	(d)
Endive	Half-hardy	Apr. 1–May 1	July 10	...	4–6	9–12	18–24	1½
		July 1–Aug. 15						
Garlic, from cloves	Hardy	Mar. 25–Apr. 15	Apr. 1–10	...	.....	3	12–18	1½
Horseradish, from sets	Hardy	Mar. 25–May 1	Apr. 1–15	...	.....	24	30–36	2
Kale	Hardy	Apr. 1–30	July 10	...	4–6	8–12	18–24	1½
		July 1–Aug. 1						
Kohlrabi	Hardy	Mar. 25–Apr. 5	Aug. 1	...	6–8	3–6	18–24	1½
		Aug. 1–10						
Leeks	Hardy	Mar. 25–Apr. 15	Apr. 1	...	10–15	2–4	12–18	1½
Lettuce, head	Half-hardy	Mar. 25–Apr. 10	.....	4–6	4–8	12–15	18–24	1½*
		Aug. 1–15						
Lettuce, leaf	Half-hardy	Mar. 25–May 15	.....	...	10	2–4	12–18	1½
		Aug. 15–Sept. 15						
Muskmelons	Very tender	May 10–June 15	.....	4	3 in row 4–5 per hill	12, single plants 36, hills (3 plants per hill)	48–72	1
Mustard	Half-hardy	Apr. 1–May 10	.....	...	20	1–2	12–18	1½
		Aug. 15–Sept. 15						
New Zealand spinach	Tender	Apr. 25–June 15	.....	...	4–6	12	24–30	1
Okra	Very tender	May 10–June 15	.....	...	3	12–15	36	1
Onions, from seed	Hardy	Mar. 25–Apr. 15	Apr. 1	...	10–15	2–4	12–18	1½–1
Onions, from plants or sets	Hardy	Mar. 25–May 1	Apr. 1	...	.....	1–4	12–18	1–4

Vegetable	Hardiness ^a	Recommended planting period for central Illinois ^b		Time required to grow plants from seed before setting in field ^c	Spacing in row		Distance between rows	Planting depth
		For overall use	For storage		Seed to sow per foot	Distance between plants when thinned or transplanted		
				<i>weeks</i>		<i>inches</i>	<i>inches</i>	<i>inches</i>
Parsley.....	Half-hardy	Apr. 10-May 1	.....	...	10-15	4-6	12-18	1/2
Parsnips.....	Half-hardy	Apr. 10-May 1	Apr. 15	...	15-20	3-4	18-24	1/2-1
Peas.....	Half-hardy	Apr. 10-May 1	.....	...	10-12	Do not thin	18-24	2
Peppers.....	Very tender	May 10-June 1	.....	8-10	.....	18-24	18-24	(d)
Potatoes.....	Half-hardy	Apr. 1-15	June 1	...	1	10-12	24-36	4
Pumpkins.....	Very tender	June 1-10	June 10	...	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120	1
Radishes, spring.....	Half-hardy	Apr. 5-June 1	.....	...	10-15	1	12-18	1/2
Radishes, winter.....	Half-hardy	Aug. 20-30	.....	...	10-15	2-4	12-18	1/2
Rhubarb.....	Hardy	Aug. 1-15	Aug. 10	...	.....	24-36	36-48	(d)
Rutabaga.....	Half-hardy	Mar. 25-May 15	.....	...	4-6	6-8	18-24	1/2
Salsify.....	Half-hardy	May 1-July 1	June 15	...	.....	4-6	18-24	1/2
Soybeans, edible.....	Hardy	Apr. 10-May 1	April 15	...	10-12	2-4	18-24	1/2
Spinach.....	Tender	May 15-June 15	.....	...	8-10	Do not thin	24-30	1 1/2
Squash, summer.....	Hardy	Mar. 25-Apr. 15	.....	...	12-15	2-4	12-18	1/2
Squash, winter.....	Very tender	Aug. 15-30	.....	...	2-3 in row 4-5 per hill	18-24, single plants 48, hills (3 plants per hill)	36-48	1
Sweet corn.....	Very tender	May 10-June 1	June 1	...	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120	1
Sweet potatoes.....	Tender	May 1-July 9	.....	...	1-2 in row 4-6 per hill	9-12, single plants 36, hills (3 plants per hill)	24-48	1-2
Tomatoes.....	Very tender	May 10-June 1	May 15	6	.....	12-18	36-48	(d)
Turnips.....	Very tender	May 10-June 1	May 15	5-7	.....	18-36	36-60	(d)
Watermelons.....	Hardy	Mar. 25-Apr. 15	Aug. 1	...	6-8	2-4	12-18	1/2
		Aug. 1-15	.....	...	15-20 (greens)	.....	.....	.....
		May 10-June 1	.....	4	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120	1

^a This classification is used to determine earliest safe date to plant vegetables. **Hardy** vegetables can be planted as soon as the ground can be prepared. **Half-hardy** vegetables can be planted as early as 2 to 3 weeks before the average date of the last 32° freeze in the spring. **Tender** vegetables should be planted from the time of the last average 32° freeze to one week later. **Very tender** crops should be planted 2 to 3 weeks after the last average 32° freeze. See Fig. 2 for average dates of last 32° freeze in Illinois.

^b For **southern Illinois** March-June plantings can be made approximately 2 weeks earlier and July-Sept. plantings 2 weeks later than for central Illinois. For **northern Illinois** March-June plantings should be about 2 weeks later and July-Sept. plantings about 2 weeks earlier than for central Illinois.

^c This period will vary depending on temperature and other conditions under which plants are grown.

^d Use plants. See page 21 for discussion on planting depths for plants.

^e Plants may be used.



For a good transplant, make sure there is plenty of soil around the roots. (Fig. 5)

use tall, spindly plants, set them on an angle in the trench.

4. Use a starter solution to get your plants off to a fast start (see page 17).

5. Cover the roots with soil and firm the soil tightly around the plant.

6. Protect plants from heat, wind, or cold if necessary. Plant protectors (sometimes called hot caps) made of paper or plastic are available to lessen trouble from frost in the spring. Homemade devices can be made from baskets, boxes, or jars. Do not leave the protector over the plants longer than necessary. If it gets warm during the daytime remove the protector or open it so that the plants receive ventilation. In hot weather protectors may be used to shade plants.

Step 7 — Keep Down Weeds

It is important to control weeds in your garden, for they compete with your vegetables for water and nutrients. Also weeds often harbor insects and diseases. The best time to attack weeds is before or just as they appear on the soil surface. If allowed to grow too large, weeds will shade your vegetables, causing your crop to grow poorly.

Three methods generally used for weed control in vegetables are cultivation, mulching, and chemicals.

Cultivation by hoe or cultivator is the method most commonly used in gardens. The main purpose of cultivation is weed control, although on some Illinois soils cultivation may be needed early in the season to loosen the soil and provide better aeration for the roots.

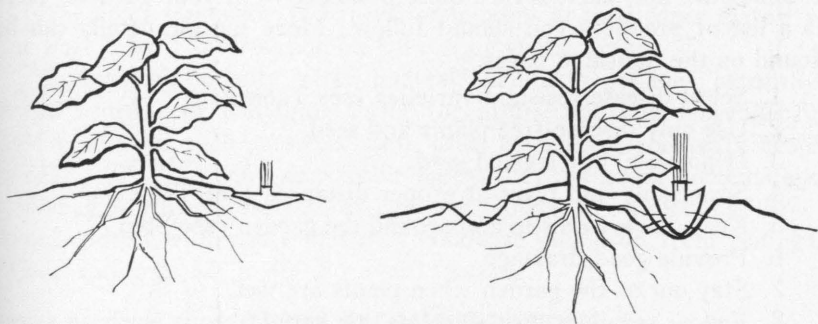
Begin cultivation as soon as weeds begin to sprout. For extra protection you may cultivate even before you notice any weeds. Repeat cultivations as weeds appear. Remember, it is much easier and more efficient to kill weeds when they are $\frac{1}{2}$ inch high than when they are 5 or 6 inches tall. Do not work the soil if it is too wet.

Roots of many vegetables are near the soil surface and can be damaged easily by a hoe or cultivator if care is not taken when cultivating (Fig. 6). Shallow cultivation is desirable near plants and later in the season.

Mulching is covering the soil around your vegetables with protective material. Most vegetables benefit from mulching. Tomatoes, cucumbers, melons, beans, and potatoes are some of the crops which it is most practical to mulch. Besides controlling weeds, the mulch will conserve moisture, regulate the soil temperature, and keep the fruits clean.

Materials that can be used for mulches include leaves, grass cuttings, peat moss, sawdust, ground corncobs, straw, hay, shavings, aluminum foil, paper, and black plastic.

Organic mulches, such as sawdust, leaves, straw, or corncobs,



The correct way to cultivate (left) is to just scrape the surface of the soil. If you cultivate deeply (right) you may damage the roots of your vegetables. (Fig. 6)

should be placed on the soil after the plant is well established; usually this is just after the first cultivation. Spread the material evenly over the soil between the rows and around the plants. The thickness of the mulch depends on the material and its cost. Mulches like leaves or straw are usually applied 3 or 4 inches deep. A mulch of peat moss, sawdust, shavings, or wood chips is seldom more than 2 inches thick.

Some organic mulches may cause a nitrogen deficiency to develop in your crops, because organisms that decompose the organic matter compete with the vegetables for the nitrogen in the soil. To prevent a lack of nitrogen, extra nitrogen should be added with the mulching material or when the mulch is plowed under. On a soil adequately

fertilized each year you need not add extra nitrogen until you turn the mulch under.

If you do not apply nitrogen with mulch, be on the alert for a nitrogen deficiency. Light green or yellowish leaves are a sign that the plant needs extra nitrogen. You may use a plant-tissue testing kit to determine when supplemental nitrogen is needed.

Chemical weed control is used to a limited extent commercially but is not recommended for the home garden. Since your garden will have many different types of vegetables in many different stages of growth, it is rather dangerous to use weed killers. Drift from weed killers used near the garden may also damage your crop.

Step 8 — Control Pests

Insects and diseases can cause much damage to your crops if precautions are not taken before these pests arrive in your garden. Here is a list of practices you should follow. More specific details can be found on the indicated pages.

1. Select disease-resistant varieties (see Table 2).
2. Use only disease-free plants and seed.
3. If possible, buy treated seed.
4. Sow thinly and plant at proper distances (see Table 5).
5. Keep down weeds in and around the garden (see Step 7).
6. Provide good drainage.
7. Stay out of the garden when plants are wet.
8. Follow spray or dust schedule for certain crops, such as sweet corn and tomatoes (see Tables 6 and 7). On most crops you may use an all-purpose garden pesticide.
9. Rotate crops.

Step 9 — Water Properly

Water is very important for producing high-quality crops. Although rainfall is a good source of water, there are usually some dry periods during the growing season when you will have to water your garden. It is important to do it properly.

When to water. Water plants once a week during dry periods (when less than an inch of rain falls during a week). Water early enough in the day so that moisture on the plants will dry off before dew appears; this will help prevent disease.

How to water. Soak the soil thoroughly to a depth of at least 6 inches rather than sprinkling the garden lightly at frequent intervals. The water should get down into the root zone of the plant. About 1 inch of water a week, including rainfall, is desirable for vegetables. To measure the amount you are applying, place 4 or 5 cans in the area being irrigated. They will collect approximately the same amount of water as the soil.

The most common ways of applying water are with sprinklers or perforated watering hoses. Adjust them so that they give even distribution over the garden area. On heavier soils and where the garden is nearly level or has a uniform slope, you can practice furrow irrigation — running the water down small furrows between the rows.

Step 10 — Harvest at Peak Quality

The quality of your vegetables cannot be improved after harvest. It is therefore important to harvest your crops at the proper maturity. See Part III for information on harvesting specific crops.

To maintain quality after harvest, handle vegetables carefully. Avoid bruising or damaging them, for injury will encourage decay. Cool vegetables such as sweet corn, peas, asparagus, and leafy crops to below 40° F. as soon as possible unless they are eaten immediately.

When storing vegetables for later use, follow the directions below. Avoid contact with water that may condense and drop from ceilings. "Cool" indicates 32° to 40° F.; avoid freezing.

STORAGE RECOMMENDATIONS

Item	Temp.	Humid.	Item	Temp.	Humid.
Asparagus.....	32-35° F.	85-90%	Parsnips.....	32-35° F.	90-95%
Beans, dry.....	32-50° F.	Approx. 40%	Peas.....	32-35° F.	85-90%
Beans, snap.....	45-50° F.	85-90%	Peppers.....	40-50° F.	85-90%
Broccoli.....	32-35° F.	90-95%	Potatoes.....	35-40° F.	85-90%
Brussels Sprouts.....	32-35° F.	90-95%	Pumpkins.....	55-65° F.	40-70%
Cabbage.....	32-35° F.	90-95%	Radishes.....	32-35° F.	90-95%
Carrots.....	32-35° F.	90-95%	Rhubarb.....	32-35° F.	90-95%
Cauliflower.....	32-35° F.	85-90%	Spinach.....	32-35° F.	90-95%
Celery.....	32-35° F.	90-95%	Squash, summer.....	40-50° F.	90-95%
Corn.....	32-35° F.	85-90%	Squash, hard shell.....	55-65° F.	40-70%
Cucumbers.....	40-50° F.	85-90%	Sweet Potatoes..	55-60° F.	70-90%
Eggplant.....	40-50° F.	85-90%	Tomatoes, unripe.....	60-70° F.	85-90%
Letuce (leafy veg.)...	32-35° F.	90-95%	Tomatoes, ripe..	40-50° F.	85-90%
Melons, ripe....	40-50° F.	85-90%	Turnips, Rutabagas....	32-35° F.	90-95%
Onions, dry.....	35-50° F.	40-70%			
Onions, green...	32-35° F.	90-95%			

PART II — GARDEN PROBLEMS AND THEIR CONTROL

Many of the problems that occur in vegetable gardens can be controlled if proper preventive steps are taken. This section is designed to help you prevent common garden problems or, if they have already occurred, to correct them.

Insect Control

Very few gardens escape attack from some of the insects listed in Table 6. Most insects can be controlled by the use of insecticides and cultural practices. Destroy insect breeding places, such as weeds, crop wastes, and neglected fence rows. Rotate crops.

Table 6 lists insecticides that can be used if necessary. They are especially suitable for use by the home gardener. The listed materials will give good control of insects and they are the least toxic to humans.

For some pests, other products than those listed are also acceptable. A general-purpose dust containing several insecticides, such as sevin or malathion, is ideal for the home garden. Prepared mixtures containing both insecticide and fungicide are available at local pesticide or hardware stores. These products are effective and easy to use.

For detailed information on insect control, send for Circular 671, "How to Know the Common Vegetable Insects," Circular 809, "Tomato Diseases and Insect Pests," and the Natural History Entomology series on vegetables, revised annually for vegetable crops.

If you wish to have an insect identified, you may send a specimen to 280 Natural Resources Building, Urbana, Illinois.

Disease Prevention and Control

Diseases often cause serious vegetable losses. Some cause the seed to decay or seedlings to die before emergence. Others attack roots and stems or may cause leaf spots and fruit rots. Vegetable diseases may be carried on the seed or in the soil or be spread by insects. See Report on Plant Diseases Nos. 915 and 916 for the control of seed-borne diseases, seed decay and seedling blights (damping off). This may be had by writing to 241 Davenport Hall, University of Illinois, Urbana, Illinois.

Resistant varieties. Disease-resistant varieties have been developed for a number of vegetables. Such varieties are moderately to highly resistant to one or more specific diseases (see Table 2). Any gardener who has had vegetable losses due to a disease should, if possible, use a variety resistant to that disease.

Sanitation. Some diseases can be controlled by using only disease-free seed and plants, by keeping down weeds in and around the garden, and by removing and destroying old plants as soon as the crop has been harvested. Do not cultivate when plants are wet.

Rotation. Disease organisms in the garden soil can be reduced by not growing a given vegetable more than one year in succession in the same location. Rotate related crops from one side of the garden to the other.

Insect control. Insects may carry disease organisms over winter. They also spread these organisms from wild to cultivated plants and from diseased to healthy plants in the garden. Diligent insect control will reduce such damage.

Fungicide sprays or dusts. Many leaf and fruit diseases can be prevented by applying the right fungicide at the right time. To obtain effective control (1) *all* aboveground plant surfaces must be covered with the fungicide, (2) applications should start before the disease appears, and (3) applications at 5- to 10-day intervals must be repeated during humid or wet weather when conditions are favorable for disease development. Dusts and sprays are equally effective in the home garden if complete coverage is obtained and applications are made at the proper time. The fungicides recommended in Table 7 are available alone or in combination with other pesticides.



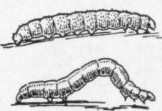




The name of the fungicide can be found on the package label under "active ingredients." Follow the dosage recommendations and all safety precautions given on the label.

Root-Knot Nematodes

All vegetables are attacked by small wormlike animals called nematodes. Root-knot nematodes burrow into the roots of plants and cause small, knotlike or rounded swellings, or galls, in older, larger roots. Plants with severe root galling grow slowly, look unthrifty, tend to wilt in dry, hot weather, and may die prematurely. Galls are swellings within the root in contrast to beneficial bacterial nodules, which are attached loosely on the roots of peas and beans.

If you suspect that nematodes are damaging your crops, send diseased plants to 241 Davenport Hall, University of Illinois, Urbana, Illinois. If nematodes are present, control recommendations will be sent. Write for Report on Plant Diseases No. 1100 which gives full instructions on how to collect and mail specimens for nematode analysis.

Table 6. — Common Vegetable Insects and Their Control

Insect	Crop	Dust Formula	Spray Formula	Remarks
 Aphid	Cabbage Cucumbers Melons Peas Potatoes Tomatoes	5-percent malathion	1½ Tsp. 50-percent emulsifiable malathion or 1 Tsp. 64-percent emulsifiable dibrom in 1 gal. water	Apply on foliage when aphids appear. Repeat weekly as needed.
 Blister beetle	Potatoes Corn Tomatoes Beans	5-percent sevin	2 Tb. wettable sevin in 1 gal. water	
 Cabbage worms	Broccoli Cabbage Cauliflower Greens	5-percent malathion or 4-percent dibrom	1½ Tsp. 50-percent emulsifiable malathion or 1 Tsp. 64-percent emulsifiable dibrom in 1 gal. water	Thorough treatment is necessary. Repeat weekly as needed. Begin treat- ment when worms are small.
 Corn earworm ($\frac{2}{3}$ nat. size)	Sweet corn Tomatoes	5-percent sevin	Inject $\frac{1}{2}$ medicine dropperful of mineral oil into silk channel as silks start to dry or 2 Tb. wettable sevin	Dust or spray silks with sevin every other day for 10 days. Dust or spray tomatoes with sevin 3 to 4 times at 10-day in- tervals; begin when first fruits are small.
 European corn borer	Sweet corn	5-percent sevin or 5-percent sevin granules	2 Tb. wettable sevin in 1 gal. water	Apply sevin four times at 5-day intervals beginning with egg hatching near mid- June. Avoid early spring plantings. On late corn dust as for corn earworm.
 Striped cucumber beetle	Cucumbers Melons Squash	5-percent sevin	2 Tb. wettable sevin	Treat as soon as beetles appear. Repeat when necessary.
 Cutworm	Most garden crops			At transplanting, wrap stems of seedling cabbage, pepper, and tomato plants with newspaper or foil to prevent dam- age by cutworms.

Insects are about natural size except where otherwise indicated. Where two drawings are shown, the smaller one is natural size. One pound of dust or 3 gallons of spray should be sufficient to treat 350 feet of row. Tb. = tablespoon. Tsp. = teaspoon.

(Table is concluded on next page)

Table 6. — concluded









Insect	Crop	Dust Formula	Spray Formula	Remarks
 Flea beetle	Most garden crops	Use sevin dusts and sprays listed for blister beetle		Apply as soon as injury is first noticed. Thorough application is necessary.
 Grasshopper	Most garden crops	5-percent sevin	2 Tb. wettable sevin or sevin in 1 gal. water	Treat infested areas while grasshoppers are still small.
 Hornworm ($\frac{1}{2}$ nat. size)	Tomatoes	Use sevin dust and sprays listed for corn earworm		Ordinarily hand-picking is more practical in the home garden.
 Leafhopper	Beans Carrots Potatoes Cucumbers Muskmelons Potatoes	Use sevin dust and sprays listed for blister beetle or 5-percent methoxychlor dust		Spray or dust once a week for 3 to 4 weeks, beginning when plants are small. Apply to underside of foliage.
 Mexican bean beetle	Beans	5-percent sevin	1 Tb. wettable sevin	Apply insecticide to underside of foliage. Also effective against leafhoppers on beans.
 Potato beetle	Potatoes Eggplant Tomatoes	Use sevin dust and sprays listed for blister beetle		Apply when beetles or grubs first appear and repeat as necessary.
 Squash bug	Squash			Adults and brown egg masses can be hand-picked. Trap adults under shingles beneath plants. Kill young bugs soon after they hatch.
 Squash vine borer	Squash	5-percent sevin	1 Tb. wettable sevin	Dust or spray once a week for 3 to 4 weeks beginning in late June when first eggs hatch. Treat crowns of plants and runners thoroughly.

Table 7. — Common Vegetable Diseases and Their Control^a

Crop	Disease	Control measure	
Asparagus	Rust	Apply fungicide containing zineb ^b after harvest. Make 5 applications at 10-day intervals.	
Beans	Mosaic	Plant resistant varieties (see Table 2).	
	Leaf and pod diseases	No fungicide recommended. Do not cultivate, weed, or harvest beans when plants are wet. Plant certified, western-grown seed.	
Beets, Swiss Chard, Spinach	Leaf diseases	Apply fungicide containing maneb ^c or zineb ^b at 10-day intervals. Start when plants are 6 to 8 inches high.	
Cabbage, Broccoli, Brussels Sprouts, Cauliflower, Chinese Cabbage, Kale, Collards, Kohlrabi, Mustards, Rutabaga, Radish, Turnip	Yellows	Plant resistant cabbage varieties (see Table 2).	
	Blackleg	Buy only hot-water-treated seed.	
	Black rot	Buy only hot-water-treated seed.	
	Clubroot	Apply one cup of transplanting solution containing pentachloronitrobenzene (Terraclor, PCNB) around the roots of each plant. The solution is made by mixing 3 level tablespoonsful of 50-percent wettable Terraclor in 1 gallon of water.	
	Carrots and Parsnips	Leaf diseases	Apply fungicide containing maneb ^c or zineb ^b when spots first appear.
		Yellows	Control leafhoppers, which transmit the virus (see Table 6). Destroy first infected plants.
	Cucumbers, Pumpkins, Squash, Gourds	Bacterial wilt	Control cucumber beetles, which spread the bacteria from plant to plant (see Table 6).
Scab		Plant resistant cucumber varieties (see Table 2). Buy hot-water-treated seed.	
Mosaic		Plant resistant varieties (see Table 2).	
Leaf and fruit diseases		Apply fungicide containing zineb ^b , or maneb ^c at 7- to 10-day intervals. Begin after vines start to spread. If control is needed before vines start to spread, use ziram ^d or captan ^e .	
Eggplants	Fruit rot	Apply fungicide containing maneb ^c , zineb ^b , or ziram ^d at 7- to 10-day intervals. Begin when the first fruits are 2 inches in diameter.	
	Wilt	No control measures known.	
Muskmelons (cantaloupes), Honeydew Melons, and Watermelons	Fusarium wilt	Plant resistant varieties (see Table 2).	
	Bacterial wilt	See Cucumbers.	
	Leaf and fruit diseases	See Cucumbers.	
Onions, Garlic, and Chives	Leaf diseases	Apply fungicide containing maneb ^c or zineb ^b at weekly intervals. Begin when leaf spots are first noticed. Add 1 tablespoonful of powdered household detergent or 1 teaspoonful of liquid detergent to each gallon of spray solution.	
	Smut	Plant disease-free onion sets. Smut only attacks onions grown from seed.	

(Table is concluded on next page)

Table 7. — concluded

Crop	Disease	Control measure
Peas	Fusarium wilt	Plant resistant varieties (see Table 2).
	Root rots	No practical control measures known.
Potatoes	Tuber diseases	Buy certified seed potatoes. Plant uncut tubers. Grow varieties resistant to scab and late-blight (see Table 2).
	Leaf diseases	Apply fungicide containing maneb ^a or zineb ^b at 5- to 10-day intervals. Start when plants are 10 inches high.
Tomatoes, Peppers	Fusarium wilt	Plant immune or resistant varieties (see Table 2).
	Leaf and fruit diseases	Apply fungicide containing maneb ^a or zineb ^b at 5- to 10-day intervals. Begin when the first fruits are 1 inch in diameter.

^a For additional information on disease symptoms and control measures, write for Circulars 802, "Vegetable Diseases" and 809, "Tomato Diseases and Insect Pests." If you wish to have a disease identified, send diseased plants to 241 Davenport Hall, University of Illinois, Urbana, Illinois.

^b Zineb fungicides such as Dithane Z-78, Stauffer Zineb, Ortho Zineb 75 wettable, Chipman Zineb, Niagara Zineb, Penco Zineb, Parzate C, etc., contain zinc ethylene-bisdithiocarbamate.

^c Maneb fungicides such as Manzate, Maneb No. 3, and Dithane M-22 contain manganese ethylene-bisdithiocarbamate.

^d Ziram fungicides such as Zerlate Ziram Fungicide, Karbam White, Corozate, Orchard Brand Ziram, Ortho Ziram, Stauffer Ziram, etc., contain zinc dimethyldithiocarbamate.

^e Captan fungicides such as Orthocide 50W, Captan Garden Spray, Captan 80 Spray-Dip, Orthocide Garden Fungicide, and Captan 50W contain N-(trichloromethylthio)-4-cyclohexene-1, 2-dicarboximide.

Nutrient Deficiencies

This subject will not be discussed in detail nor illustrated here for if recommended fertilizer practices are followed there is little likelihood that deficiency symptoms will appear. Trace-element deficiencies have been found only on some muck soils in northern Illinois.

Blossom Drop

Extreme weather conditions sometimes cause fruits to fail to set on tomatoes, beans, and peppers, resulting in a dropping of the affected flowers. Night temperatures below 55° F. in the spring and hot, drying winds in the summer are the chief causes of blossom drop in Illinois, although insects, diseases, and weed killers may sometimes be a factor.

Fruit set can be increased in the spring when night temperatures are below 55° F. by spraying the open flower cluster with one of the fruit-setting chemicals now available. Be sure to follow directions on the container. The use of these chemicals has not proved practical for high-temperature periods.

Injury From 2,4-D

In recent years much damage has been caused in some home gardens and yards by the careless use of 2,4-D and related weed-control chemicals. Often 2,4-D drifts in from nearby fields recently sprayed with the chemical. Tomatoes, melons, sweet potatoes, and beans are some of the vegetables susceptible to 2,4-D. Roses, dogwood, redbud, and many other ornamentals are also susceptible. See Figs. 7 and 8 for typical symptoms of 2,4-D injury.

If you must use 2,4-D or similar weed killers, follow these precautions:

1. Use the granular or amine form of 2,4-D.
2. Spray only when wind is quiet or blowing away from susceptible crops.
3. Keep pressure very low and nozzle directed downward.
4. Do not apply insecticides or fungicides with a sprayer that has been used for weed killers. It is exceedingly difficult to remove all of the residue from a sprayer contaminated with 2,4-D.

For more information on 2,4-D injury, send for Circular 808, "Prevent 2,4-D Injury to Crops and Ornamental Plants." Write to College of Agriculture, 112 Mumford Hall, Urbana, Illinois.



Mist from 2,4-D causes wavy edges and drawn-out tips on leaflets (left) and heart-shaped fruit on tomatoes (top, right). Direct spraying with 2,4-D causes cracks in tomatoes (bottom, right). (Figs. 7 and 8)

PART III — TIPS ON GROWING SPECIFIC VEGETABLES

Specific suggestions and practices for producing good yields of high-quality vegetables are given on the following pages. Material that is covered elsewhere in this guide is not duplicated in this section, unless additional comments are necessary. For information on the following subjects, see the indicated pages:

Resistant varieties	page 12
Planting dates	page 24
Spacings between plants and rows.....	page 24
Fertilizer treatments	page 18
Disease control	page 35
Insect control	page 31
Storage recommendations.....	page 30

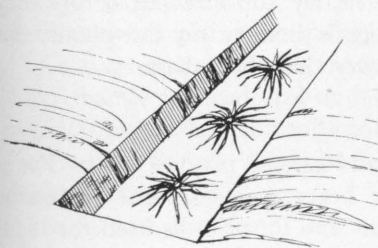
Asparagus

Since asparagus plants will occupy the same place for fifteen years or more, the soil should be properly prepared and well fertilized before planting. Plants should be located where they will not be disturbed.

The roots or crowns used for planting are started from seed in the nursery the preceding spring. The larger crowns (8 to 15 per pound) are more productive and should be used if available.

Plant the crowns as soon as the soil can be worked in the spring. Set the crowns 12 to 18 inches apart in a wide furrow, about 6 to 8 inches deep. Cover them with about 2 inches of soil and gradually cover with the rest of the soil during the remainder of the season (Fig. 9). Asparagus roots may spread out laterally for 6 feet or more. Unless adequate space is allowed between rows, asparagus roots will compete with those of other crops for food and water.

The main insect enemy is the asparagus beetle, which can be controlled with sevin.



Asparagus crowns set in a furrow. Spread the roots so that the crowns lie flat. Cover them with 2 inches of soil and gradually fill in the furrow with soil during the season. (Fig. 9)

Do not harvest asparagus until the third year it is in your garden and then harvest only during the first four weeks of the season. During the following years harvest up to the first eight weeks of the season and let the tops grow the rest of the year. Asparagus spears are ready for harvest when they are 6 to 8 inches long. Cut off the spear at the base with a knife or snap it off by grasping the spear near the tip. All of the snapped spear is edible, but the butt of the cut spear has to be trimmed off before cooking.

The asparagus tops can be removed or worked into the soil in early spring. The soil where asparagus is grown should be fertilized the same as the rest of the garden each year.

Beans (Snap and Lima)

Beans are warm-season vegetables, but during excessively hot weather they may drop their blossoms and pods. Since beans are sensitive to frost, they should be planted when all danger of frost is past and when the soil is warm. Seeds of many bean varieties tend to crack and germinate poorly when exposed to very moist conditions. Therefore do not soak bean seed or irrigate immediately after planting.

For a continuous supply of snap beans, make plantings every 10 days until the first part of August.

The bush type of beans, which are most commonly grown, should be planted in rows. Pole varieties, which must be supported by poles or trellises, should be planted in hills 3 feet apart each way.

Navy beans, red kidney beans, and edible soybeans are grown much like limas and snap beans.

To control bean diseases, do not handle or work among bean plants when the foliage is wet from dew or rain.

The Mexican bean beetle, the bean leaf beetle, and the potato leaf-hopper should be controlled.

Harvest snap beans when the pods are young and succulent and before the seeds are mature. Lima beans harvested for green limas should be picked when the seeds are nearly full size but before they turn white. For dry beans, let the pods mature on the plants, but harvest them before the pods get so dry that they shatter.

Beets

The beet is a fairly hardy plant and can be planted early. For a continuous supply of young, tender beets make several successive sowings at 3-week intervals. Both roots and tops can be used for food.

The beet "seed" is actually a fruit which will produce more than one plant. To grow satisfactory beets, thin the plants to 3 inches apart.

Thinning sometimes can be delayed until the plant tops are large enough to use as greens.

For good quality, harvest beets when they are 1½ inches or less in diameter. Beets will keep for several months if packed in moist sand and placed in a basement or garage. Do not allow them to freeze. Before storing, trim off all but ¼ inch of the tops.

Broccoli

Broccoli is grown much the same as cabbage and cauliflower. It is best as a spring or fall crop in Illinois but will produce well in summer if irrigated.

For the early spring crop the plants should be started indoors and transplanted into the garden early in the season. Later plantings can be started from seed sown directly in the garden. Thin the plants to 18 inches.

The edible part of broccoli, the head, is a cluster of green flower buds, which should be cut with 4 to 5 inches of stalk before the buds open. After the main head is cut, small side clusters continue to develop throughout the season. For large, quality heads later in the season, make more than one planting.

Pests of broccoli are the same as those of cabbage. To avoid certain diseases do not plant where cabbage, cauliflower, and related crops have grown in the preceding 3 or 4 years.

Cabbage

Cabbage, a fairly hardy crop, is easy to raise and can be grown from spring to fall. Early plantings should be started from plants but cabbage for later harvests may be started by sowing the seed directly in the garden. The plants can be thinned to 9 to 18 inches depending on the size head desired. The closer the spacing the smaller the heads. Water may be needed during dry periods to produce satisfactory heads.

Shallow cultivation of this crop is important since many of the cabbage roots are near the soil surface. A sidedressing of nitrogen fertilizer when plants are half-grown is advisable.

Cabbage is available in many varieties and hybrids. The varieties differ mainly in head size and days to maturity, ranging from 50 to over 100 days. Plant several varieties of different maturities to lengthen your harvest period. Always select varieties that are resistant to yellows disease.

Important diseases of cabbage and related crops are yellows, club-root, blackleg, and black rot. Rotation of crops in the cabbage family

is an important disease-control measure. Insects that are common on these crops are imported cabbage worms, cabbage loopers, aphids, and cutworms.

Harvest cabbage heads when they are firm and before they split. Certain varieties, such as Bonanza, will hold longer than others. The Baldhead or Danish types make good heads for storage. Store cabbage in a pit, trench, or outdoor cellar.

Carrots

For good root development carrots should be grown in deep, loose soil. In heavy, compact soil the roots are likely to be poorly shaped and forked. Because carrot seed is slow to germinate, give special care to the seedbed to speed up germination and to improve the stand. Work the seedbed finely before seeding, and in dry weather before the plants are up, sprinkle the seedbed with water each evening.

When the carrot tops are 2 to 3 inches high thin out the plants so that they stand 2 inches apart.

A drycleaning fluid called Stoddard Solvent can be sprayed over the carrot row to kill weeds. It should be applied at the rate of 1 quart (undiluted) per 100 feet of row. Apply this material when the carrots have at least two true leaves, with roots no larger than a pencil. Late application will give the carrots an undesirable flavor.

Carrots can be used before they attain full size. For fresh use harvest them before they exceed 1 inch in diameter. The larger roots are used for canning and storing. Carrots for storage should be handled like beets.

Cauliflower

Cauliflower is a cool-season crop, grown much the same as cabbage and broccoli. It should be planted so that harvest will occur during the fall, since cauliflower does not develop well in the heat of summer. During dry periods irrigation is necessary.

As soon as the heads or buttons of cauliflower are an inch or two in diameter, the outer leaves should be tied together to protect the head from sun, rain, hail, and dirt. Tying up the leaves keeps the head white. Purple cauliflower does not need to be tied.

Because cauliflower matures quickly, inspect the tied heads frequently to see if they are ready for harvest. Cut off the head when it is still compact but before the "curd" opens and becomes "ricey."

Diseases and insects that attack cauliflower are the same as those of cabbage.

Celery

Celery is a difficult crop to grow and requires relatively cool and moist conditions for good growth. For these reasons celery is not recommended for most Illinois gardens.

Chard

Swiss chard is planted in the spring about the same time as beets. A single planting will produce greens throughout the season. Sow the seed in rows and thin to 4 to 8 inches.

If you harvest only the outer leaves, the plant will continue to produce greens throughout the season. A few plants will supply an average family.

Corn (see Sweet Corn)

Cucumbers

Cucumbers and other vine crops are usually started by planting seed directly in the field, but for an earlier crop you may start them in peat pots, bands, or berry boxes about 3 to 4 weeks before setting in the field. Plant 2 or 3 seeds in each container and when the plants come up, thin them to one per container. Because cucumber roots can be easily injured during transplanting, place the whole container, with the bottom removed, in the soil. Plants should not be set in the field until danger of frost is past.

Cucumbers respond well to mulching. Yields can be increased and quality improved by using mulches now on the market or any of the other mulching materials suggested on page 25.

Many diseases can cause considerable damage in cucumbers and other vine crops if not properly controlled. See Table 7 for disease-control methods. Insects that should be controlled are cucumber beetles and aphids.

Cucumbers may be harvested at almost any stage of development but before they turn yellow. Do not leave overmature cucumbers on the vine as they will reduce later yields.

Eggplant

Eggplants are grown much like tomatoes but they are spaced closer together and are not staked.

Fruit rot is sometimes a problem but it can be controlled by growing resistant varieties. Wilt, for which there are no good controls, can cause some trouble. Flea beetles are usually very abundant on eggplant.

Harvest the fruits while they are still glossy.

Kohlrabi

Sow kohlrabi seed directly in the garden and thin the plants to 3 to 6 inches. Kohlrabi has about the same cultural requirements as cabbage but does best in the spring or fall. Irrigation is important for growing tender kohlrabi.

The edible portion of kohlrabi is the enlarged stem at the base of the plant. Harvest kohlrabi when the swollen stem is 2 to 3 inches in diameter so that it does not become tough and woody. Kohlrabi can be stored in the late fall for use during the winter.

Lettuce

Leaf lettuce is the easiest kind of lettuce to grow in the garden. It can be grown during most of the season and does not require exacting cultural practices, while head lettuce is very sensitive to heat and requires more care. Leaf lettuce is direct-seeded, but head lettuce is started from plants for the spring crop and direct-seeded for the fall crop.

Select varieties of lettuce that are tolerant to heat and ripburn, and that do not go to seed easily.

Bibb lettuce has become popular in recent years. It can be grown successfully during the cooler parts of the growing season. Other types of lettuce that are grown in Illinois are butterhead and cos, or romaine.

Irrigation may be necessary to produce good-quality lettuce.

Harvest leaf lettuce when the leaves are large enough to use. Sometimes only a few of the lower leaves are harvested, allowing the center leaves to continue growing for later use. Head lettuce can be used before or when the heads are firm.

Muskmelons (Cantaloupes)

Most of the cultural practices for muskmelons are the same as for cucumbers. Muskmelons do exceptionally well on sandy-type soils.

Fusarium wilt is a disease problem in parts of Illinois; for control, grow resistant varieties. The same insects that attack cucumbers also attack muskmelons.

Harvest muskmelons when they are easily separated from the stem.

Onions

The easiest and surest way to grow good onions, either green or dry, is to use sets. Sets are small onions, less than an inch in diameter, that were grown from seed the previous year. Onion plants are some-

times used, especially for growing the mild Sweet Spanish type. Bermuda onions, which are normally grown in the south, do not produce satisfactory yields in Illinois.

For green onions, place the sets upright about 1 inch apart in a furrow about 3 to 4 inches deep. For dry onions, place the sets upright about 3 to 4 inches apart in a furrow 1 to 2 inches deep. Cover the sets with soil. The larger sets are preferable for green onions while medium-sized sets are best for dry onions.

For good yields of mature dry onions, plant sets, plants, or seed as early in the spring as the soil can be prepared.

Smut, downy mildew, neck rot, and pink root are some of the diseases found in onions. Insects that cause the most trouble are thrips and cutworms.

You can harvest green bunching onions 4 to 6 weeks after planting sets. Dry onions will be ready in 3 to 4 months, about late August or early September.

Dry onions are ready to harvest when the necks are thoroughly dry or about 95 percent of the tops have bent over. Pull the onions and place them under cover to dry. Drying will take from 2 to 4 weeks. Then cut off the tops about an inch above the bulb, place the onions in a well-ventilated container, such as a slatted crate or mesh bag, and store in a cool, dry place. The best conditions for storage are a temperature of about 32° F. and a relative humidity of 70 to 75 percent.

Parsnips

Parsnips are grown like other root crops, such as carrots and beets, except that parsnips require a longer growing season, and ridging to keep soil over their shoulders.

You can dig up the roots late in the fall or leave them in the ground, since winter freezing will not hurt them. The roots are 10 to 12 inches long, so be careful when digging them up.

Peas

The pea is a cool-season vegetable which should be planted early in the spring. Several varieties of different maturities can be planted at the same time to provide a supply of peas over a longer period.

Several diseases appear in peas but they should not give you trouble if you treat seed, rotate your pea crop, and use resistant varieties. The pea aphid is the most troublesome insect.

Since peas are at peak quality a relatively short time, check frequently for their maturity. Pick the pods when they are green and

nearly fully developed and before the peas start to harden. The peas should be used or refrigerated as soon as possible after harvest.

Peppers

Many of the cultural practices for peppers are the same as for tomatoes. Hot, dry weather often causes young buds, blossoms, and immature fruits to drop. Mosaic is often a problem and can be controlled by growing resistant varieties.

Harvest the pepper fruits when they are firm.

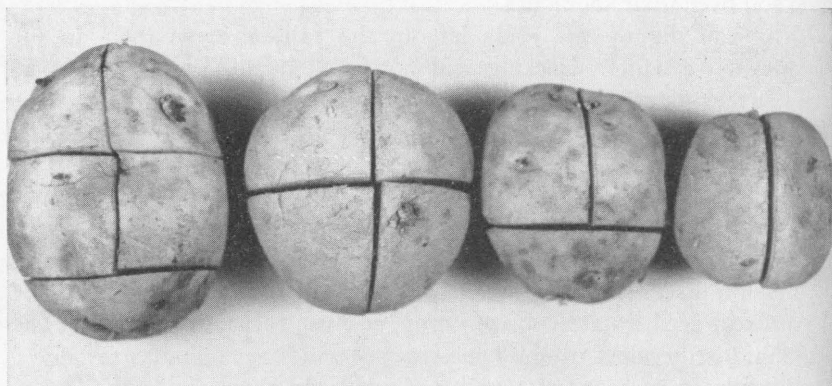
Potatoes

Potatoes grow best in a long, cool season, which is rarely found in Illinois, but if recommended practices are followed, satisfactory yields can be obtained.

The crop must be planted as early as the soil can be worked in the spring or it must be planted late (about May 15 to June 15) so that tubers can develop in the cool fall season. Generally the early crop is more successful than the late crop.

Always use certified seed potatoes, which are free of disease. Cut these potatoes into blocks weighing about $1\frac{1}{2}$ ounces each (Fig. 10). Make sure that each seed piece has at least one eye. Plant immediately.

Close spacing (30 inches between rows and 12 inches between plants) is recommended for early potatoes so that the plants will shade the soil and prevent excessively high soil temperature during the time the tubers develop. Mulching the potatoes with about 8 inches of straw when the plants are 6 inches high will also lower the soil temperature



Each potato block to be used for seed should have at least one eye and should weigh about $1\frac{1}{2}$ ounces. (Fig. 10)

as well as control weeds, conserve moisture, and improve the keeping quality of the potatoes.

Many diseases and several insects cause trouble in potatoes. By using certified seed potatoes and resistant varieties and by spraying or dusting at 10- to 14-day intervals with zineb or maneb and sevin, most insects and diseases can be controlled.

Harvest the potatoes after the vines have died. Before storing, hold potatoes for a week or two at 65° to 70° F. in a place where the air is not too dry, to heal cuts and bruises. Then store them where the temperature will be 35° to 40° F. At lower temperatures potatoes will become sweet and at higher temperatures they will sprout. To prevent sprouting, treat potatoes after cuts are healed with one of the sprout inhibitors now on the market.

Pumpkins

Pumpkins require a great deal of space and are recommended only for larger gardens. However, to conserve space they can be planted where early corn is growing; the early corn will mature before the pumpkins need much room.

Diseases and cultural practices are much the same as for cucumbers and muskmelons except that pumpkin plants are spaced farther apart. The main insect enemies of pumpkins are the same as those of squash.

Allow fruits to mature on the vine but harvest them with the stems attached before the first severe freeze. Pumpkins for storage should be handled with great care to avoid cuts and bruises that permit the entrance of decay organisms. Store in a dry room where temperatures are about 55° to 65° F.

Radishes

Radishes are generally a spring crop in Illinois because they do best in cool weather; however, some varieties can be planted for summer use and winter storage.

Pull radishes when they become of usable size, before they become pithy and too hot.

Rhubarb

Rhubarb is started by planting a division of a root from an older, healthy plant. Each root division should have a strong bud. Plant early in the spring in a well-drained area and place the root so that the bud is just below the soil surface.

Rhubarb should not be harvested the first year and should be harvested for only a few weeks the second year, but after that it can be harvested for 8 to 10 weeks. If seed stalks appear, cut them off.

When the rhubarb stalks become small and spindly start a new planting by dividing and planting roots from the old plants. If crown rot is a problem, use roots from disease-free plants and plant them where rhubarb has not been grown in well-drained soil.

Spinach

Spinach should be grown in the early spring or late fall because the long, hot days of summer cause it to bolt to seed, making it unusable. Select recommended varieties for each of these plantings. New Zealand spinach, which is not a true spinach, can be grown during the summer.

The plants may be harvested any time the leaves are large enough to use. Some plants may be thinned out for early use and the rest allowed to attain full size.

Squash

Squash has about the same cultural requirements and problems as pumpkins, cucumbers, and muskmelons.

Squash varieties are divided into three classes — summer, fall, and winter. The summer squashes are used while they are young and tender, when the rind can be easily penetrated by a thumbnail. The fall and winter varieties have a hard rind, are harvested when mature, and are good for storage.

Store winter squash the same as pumpkins.

Common insects on this crop and pumpkins are cucumber beetles, squash bugs, and squash vine borers, which can be controlled with sevin.

Sweet Corn

If you want a constant supply of sweet corn throughout the summer until frost occurs, include an early (67 to 72 days to maturity) and a main-crop (78 to 83 days to maturity) variety in the first planting and then follow with a succession of plantings of a main-crop variety. Suggested schedules for planting sweet corn so as to have harvest peaks every ten days are given in Table 8. Actually you will be able to harvest high-quality corn from each planting for five or more days.

Two kinds of schedules are shown in Table 8. The first gives normal planting dates. The weakness of this system is that temperatures that are above or below normal between any two planting dates will cause the harvest peaks from those plantings to be more or less than the expected ten days apart. The second schedule is based on

**Table 8. — Sweet Corn Planting Schedules for Harvest Peaks
10 Days Apart^a**

Planting	Variety	Time to plant		Expected harvest peak
		System 1: Normal planting date	System 2: Leaf stage of seedlings in previous planting	
Northern Illinois				
1	Early.....	May 4	(make first plantings about May 4)	Aug. 3
	Main crop.....	May 4		Aug. 11
2	Main crop.....	May 27	4 out of 20 show 4 leaves	Aug. 21
3	Main crop.....	June 10	2 out of 20 show 4 leaves	Aug. 31
4	Main crop.....	June 20	18 out of 20 show 3 leaves	Sept. 10
5	Main crop.....	June 28	10 out of 20 show 3 leaves	Sept. 20
6	Main crop.....	July 3	2 out of 20 show 3 leaves	Sept. 30
Central Illinois				
1	Early.....	May 1	(make first plantings about May 1)	July 22
	Main crop.....	May 1		July 30
2	Main crop.....	May 22	19 out of 20 show 4 leaves	Aug. 9
3	Main crop.....	June 6	16 out of 20 show 4 leaves	Aug. 19
4	Main crop.....	June 18	8 out of 20 show 4 leaves	Aug. 29
5	Main crop.....	June 26	2 out of 20 show 4 leaves	Sept. 8
6	Main crop.....	July 3	16 out of 20 show 3 leaves	Sept. 18
7	Main crop.....	July 9	18 out of 20 show 2 leaves	Sept. 28
Southern Illinois				
1	Early.....	Apr. 20	(make first plantings about Apr. 20)	July 6
	Main crop.....	Apr. 20		July 14
2	Main crop.....	May 13	4 out of 20 show 5 leaves	July 24
3	Main crop.....	May 28	4 out of 20 show 5 leaves	Aug. 3
4	Main crop.....	June 10	2 out of 20 show 5 leaves	Aug. 13
5	Main crop.....	June 21	19 out of 20 show 4 leaves	Aug. 23
6	Main crop.....	June 30	18 out of 20 show 4 leaves	Sept. 2
7	Main crop.....	July 8	10 out of 20 show 4 leaves	Sept. 12
8	Main crop.....	July 16	2 out of 20 show 4 leaves	Sept. 22
9	Main crop.....	July 21	14 out of 20 show 3 leaves	Oct. 2

^a In a season when temperatures are above normal the harvest peaks will come sooner than indicated. In a cool year they will come later. However, the number of days between harvests should remain reasonably constant, especially if System 2 is used.

the leaf stage of seedlings in the previous planting. This system is more accurate than the first because it automatically corrects for above- or below-normal temperatures that may occur between plantings. Each leaf emerges from inside the whorl of the previous leaf and should be counted as soon as it can be seen.

Plant three or more rows of sweet corn side by side to insure good pollination and development of ears.

Keep weeds under control by shallow cultivation. Removal of "suckers" or side shoots is not recommended.

The main diseases of sweet corn are smut and Stewart's disease (bacterial wilt). Damage from Stewart's disease can be reduced by using varieties partially resistant to this disease and by controlling flea beetles (which carry the bacteria that cause the disease) when the plants first come through the soil.

Corn borers, corn earworms, and flea beetles are the chief insects to be controlled in sweet corn. Follow the spray or dust schedules outlined in Table 6. Proper timing in applying insecticides is important if you want worm-free corn.

For sweet, plump kernels harvest sweet corn when it is in the milk stage; that is, when the juice in the kernel appears milky when you puncture the kernel with your thumbnail. Sweet corn remains in the milk stage for a relatively short period. As harvest approaches, check the corn frequently to make sure that the kernels do not become over-mature and doughy. Other signs that indicate that the corn is almost ready for harvest are drying of the silks, fullness of the tip kernels, and firmness of the unhusked ear.

Eat, can, or freeze the corn immediately after picking or refrigerate it until used. At high temperatures the sugar in sweet corn quickly decreases and the starch increases.

Sweet Potatoes

Because the sweet potato is a warm-season crop that requires a long growing season, it should be planted in the garden shortly after the last frost.

Plants or "slips" are used to start this vegetable in the garden. Always try to get certified plants or certified roots for producing plants. To grow your own plants, place sweet potatoes (roots) about 1 inch apart in a hotbed and cover them with about 2 inches of sand or light soil. Add an additional inch or two of soil when shoots begin to appear. Don't let the soil dry out and keep it at a temperature of 70° to 80° F. Plants will be ready to pull in about 6 weeks. Sweet potato plants are set out the same as other transplanted vegetables.

A number of serious diseases attack sweet potatoes. Treating sweet potatoes used for growing plants, rotating crops, and using resistant varieties will help prevent diseases. Be sure to use disease-free hotbed soil.

Dig sweet potatoes just before the first frost in the fall or just after the frost has slightly injured the vines. Cut frosted vines from the potatoes to prevent decay from starting in the dead vines and passing to the roots. Use a spading fork to dig the potatoes but take great care not to bruise or injure the roots. Let the roots lie exposed for 2 or 3 hours to dry thoroughly; then place them in a warm room

to cure. The proper curing temperature is 85° F. in a moist atmosphere (about 85 percent relative humidity). After curing, which takes at least 10 to 14 days, store the sweet potatoes at 55° to 60° F. Never expose sweet potatoes to temperatures below 50° F. because chilling injury will occur. Handle sweet potatoes as little as possible.

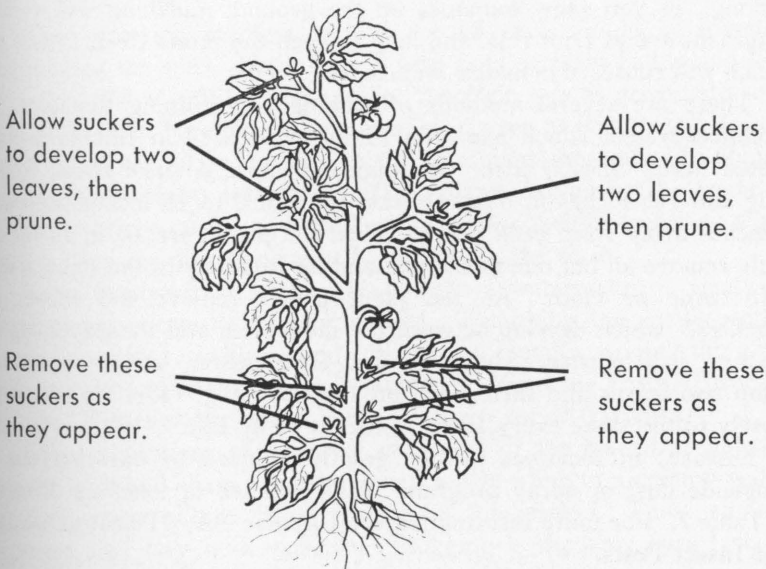
Tomatoes

Tomatoes are a good vegetable to grow in the garden because they are easy to grow and an excellent source of vitamin C.

Although tomatoes can be direct-seeded into the garden, most gardeners use plants either grown by themselves or purchased from a reliable plant dealer. Many varieties are available, but the ones recommended in Table 2 have been found to do well in most parts of Illinois. To have tomatoes throughout the season, grow both early and main-crop varieties.

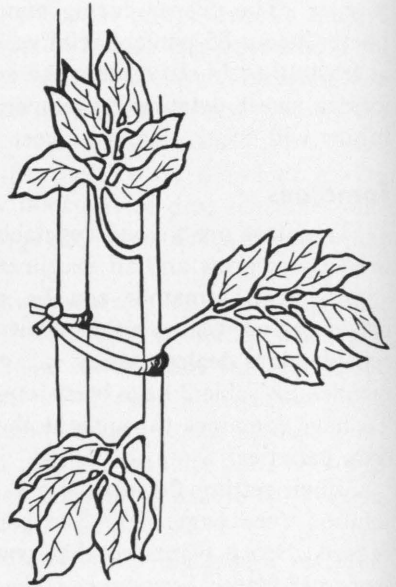
When setting the plants into the garden be sure to use a starter solution (see page 17). See page 21 for proper transplanting procedure. Space plants so that you have about 9 to 12 square feet of space per plant. Sometimes staked plants may be spaced more closely.

Tomatoes can be grown successfully either on the ground or staked, but plants grown on the ground require less work, produce more per



Remove all tomato suckers that develop below the first cluster of fruit. Above the first fruit cluster, let the suckers grow two leaves before pruning. (Fig. 11)

To stake a tomato plant, tie the string tightly around the stake and loosely around the plant. Tie the knot just below a branch so that the plant cannot slide down. (Fig. 12)



plant, and are less susceptible to blossom-end rot. The advantages of staking are cleaner fruits, no loss from soil rot and, sometimes, easier picking. If you grow tomatoes on the ground, mulching will reduce anthracnose and fruit rots, and help to keep the fruits clean. Also, the mulch will conserve moisture and control weeds.

There are several methods of staking and pruning tomatoes. A modified system which has been found to do well in Illinois is suggested here: Shortly after transplanting, drive a stake about 6 feet long and $1\frac{1}{2}$ inches in diameter into the soil 8 to 10 inches deep and 3 inches away from each plant. When the plants are 12 to 15 inches high, remove all but one main stem and tie it loosely to the stake, using soft twine or cloth. As the plant grows remove the shoots or "suckers," which develop between the main stem and the leaves, up to the first fruit cluster. Above the first fruit cluster, let the shoots develop two leaves and then pinch off the tips (Fig. 11). Tie the plant loosely to the stake every 10 to 12 inches (Fig. 12).

Diseases in tomatoes can be greatly reduced by carrying out a fungicide dust or spray program. Apply maneb or zineb as directed in Table 7. For more information see Circular 809, "Tomato Diseases and Insect Pests."

Harvest the fruits when they are pink except during periods when the daily mean temperature is above 75° F. At such high temperatures

pick the fruits just as they are turning color and keep them at 68° for further coloring. These fruits will be firmer and have better flavor than those ripened on the vine when temperatures are high. Fruits exposed to direct sunlight will reach a temperature 20 degrees higher than that of shaded fruits.

In the fall just before the first frost pick the large green fruits as well as the riper fruits. Ripen these fruits at about 60° to 70° F. in the dark. By sorting them out every 2 or 3 days you will have a gradual supply for about a month.

Turnips

Turnips are grown both for greens and for the fleshy roots. Because this vegetable is a cool-season crop it should be planted early in the spring or in August for fall harvest.

Most of the insects and diseases affecting cabbage are also injurious to turnips.

Turnips are harvested the same way as beets. The greens may be pulled or cut at the soil surface.

Watermelons

The cultural practices for watermelons are the same as for muskmelons and cucumbers except that hills of watermelons should be spaced farther apart.

When growing seedless melons special care should be given to germinating the seed. Place seed in peat pots or plant bands and keep the soil at 85° F. until plants are up. Another way to germinate seeds is to place them between moist paper in an oven at 85° F. and as soon as sprouts show, place the seed in soil in a plant container. In about 4 weeks set the plants into the garden without disturbing the roots. A common variety must be planted with seedless melons to act as a pollinator. Specific directions usually come with the seed.

There is no sure way of telling when a watermelon is ready for harvest; experience is usually needed. Thumping the melon with a finger is one way. If the sound emitted is a metallic ringing the melon is immature and if the sound is muffled or dead the fruit is probably mature. However, the sound is not the same for all varieties.

Other indications of maturity are dying of the tendril accompanying the fruit and change in color, from a pale white to a creamy yellow, of the portion of the melon resting on the ground. These signs of ripeness also vary with varieties. Plugging is the only sure test, but it will ruin the melon if it is not ripe.