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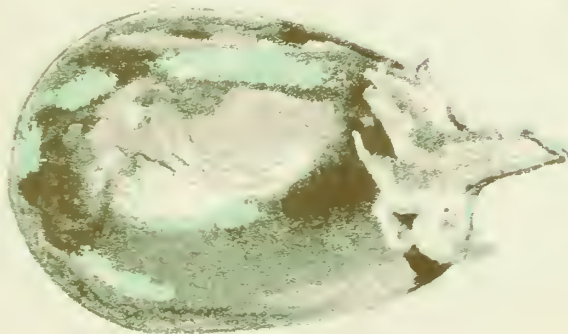
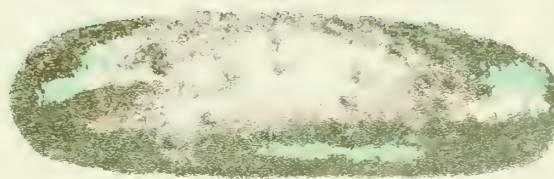
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Vegetable Gardening for Illinois



J.S. Vandemark and J.W. Courter are professors of horticulture, B.J. Jacobsen is assistant professor of plant pathology, and Roscoe Randell is associate professor of agricultural entomology in the College of Agriculture, University of Illinois at Urbana-Champaign.

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Vegetable Gardening for Illinois

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Cooperative Extension Service Circular 1150

Preface

Vegetable Gardening for Illinois was prepared in response to the need for a complete and accurate guide to growing vegetables successfully under Illinois conditions. Although written primarily for the Illinois home gardener, this book may be equally useful to teachers, students, market gardeners, and residents of other states with similar growing conditions.

The first one-third of **Vegetable Gardening for Illinois** deals with the various aspects of planning, preparing, planting, and caring for the garden, and starting plants at home. The remaining two-thirds of the book contains detailed information about 40 major vegetables (recommended varieties, when and how to plant, care, harvesting, disease and insect problems, and answers to the most commonly asked questions), 17 minor vegetables and 16 herbs, and storing and exhibiting vegetables.

Because chemical measures for controlling pests in the home garden are continually being developed and are subject to change, no specific recommendations are included in this book. Publications that offer this information are listed on page 132. The English system of weights and measures (inches, pounds, quarts, bushels, Fahrenheit temperatures, etc.) has been used throughout the book because most home gardeners have not yet adopted the metric system.

We wish to thank C.Y. Arnold, C.C. Doll, G.M. Fosler, H.J. Hopen, A.M. Rhodes, and H.J. Wetzell for reviewing sections of the manuscript and offering many helpful suggestions.

J.S. Vandemark

J.W. Courter

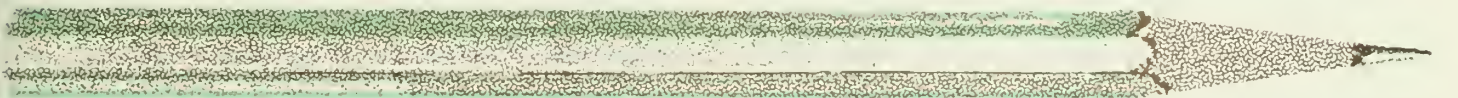
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Planning the Garden



Vegetable gardening is an interesting hobby in which the entire family can become involved. Vegetables grown in the home garden are fresher, may have better nutrient values, and usually cost less than vegetables sold in markets. Gardening also provides healthful outdoor exercise, offers productive activity for retired or partially disabled people, and is an excellent teaching tool.

Gardens range in size from a single potted plant, to small plantings around the doorway or patio, to minigardens (20 to 200 square feet), to large family gardens (750 square feet or more). The type of garden that you grow will depend upon the space available, the kind and quantity of vegetables you need, and the amount of time that you want to spend working in the garden. Make your garden large enough so that it will produce what is needed but will not become a burden.

Planning your garden can be an enjoyable task by the warmth of a fire on cold winter evenings. A well-planned garden is easier to plant and care for, and will probably be more productive than one that is not well planned.

Take full advantage of garden references — seed catalogs, books, magazines, garden writers, and extension publications — as you select your vegetables and make your plan. It pays to plan ahead. You cannot plant a large garden in the enthusiasm of springtime and leave on an extended summer vacation with expectations of a bountiful harvest when you return.

The table on page 3 shows the approximate yields of fresh vegetables per 30 feet of row, and the amounts of fresh vegetables needed for canning or freezing. From this table, you can determine how much to plant to satisfy your family's needs for fresh, canned, or frozen vegetables. It may be necessary to make several plantings of certain vegetables to assure a continuous supply.

Growing seasons and growth characteristics are important considerations in grouping the various vegetables in your garden. Perennial crops, such as asparagus, rhubarb, and berries, that will be in the same location for more than one season should be planted at the side of your garden. 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 shorter crops.

Correct spacing between rows is important to allow for proper growth of plants, ease of cultivation, and efficient use of space. If you have farm equipment and ample space, make your rows long enough and wide enough apart so that you can till your garden properly.

Successive plantings are desirable if you wish to have a continuous fresh supply of certain vegetables. 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 planting in the fall. Onion sets for green onions may be planted every two weeks until you have used up all of your sets. When space permits, there should be at least two plantings of beans, beets, broccoli, cabbage, and carrots — one early in the spring for summer use, another in the summer for fall storage. Make several plantings of sweet corn and beans.

Certain later crops can be planted in the same location in the garden from which earlier ones have been harvested. Any early harvested crops (leaf lettuce, spinach, radishes, green onions, peas) can be followed by beans, beets, carrots, cabbage, sweet corn, late spinach, late leaf lettuce, and turnips.

Intercropping (planting early maturing crops between the widely spaced rows of later or long-season crops) is a good way to intensify production in a small garden. For example, beans, radishes, green onions, spinach, or lettuce may be planted between rows where tomatoes, peppers, cabbage, or corn are to be grown.

Rotating crops from year to year helps to control 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. If your garden is on a slope, plant the rows across rather than up and down. This practice will decrease loss of soil and erosion of gulleys during rainstorms.

After reading pages 1 through 25 of this book, draw a sketch of your garden area showing the location of each vegetable, the spacing between rows, and the approximate dates for each planting. (See sample sketch on page 26.) Make notations of the amount of seed and the number of plants needed. The plan for a small, intensive garden (30 feet long by 25 feet wide) shown on page 5 may help you in planning your own garden.

Choosing the Best Location

The success of your garden depends to a great extent upon the site. Even though you are probably limited in your choice of location, you should keep the following points in mind.

Good Soil. A loose, fertile, well-drained soil is the most desirable for a garden. If possible, avoid heavy clays and extremely sandy soils unless adequate organic material is added. Raised beds may be the

Vegetable	Approximate pounds of yield per 30 feet of row	Pounds of fresh vegetable needed for 1 quart	
		Canned	Frozen
Asparagus	20	4	2-3
Bean, lima (pod)	10	4-5	4-5
Bean, snap	30	1½-2	1½-2
Beet	30	2½-3	2½-3
Broccoli	25	—	—
Cabbage	60	—	—
Carrot	30	2½-3	2½-3
Chard	50	—	3
Corn, sweet	30 (ears)	4-5	4-5
Cucumber, pickling	30	—	—
Cucumber, slicing	50	—	—
Eggplant	80	—	—
Lettuce, leaf	40	—	—
Muskmelon	75	—	—
Onion	50	—	—
Parsnip	40	—	—
Pea (pod)	15	4-5	4-5
Pepper	35	—	1½
Potato, irish (early)	30	—	—
Potato, irish (late)	45	—	—
Potato, sweet	50	2½-3	2-3
Pumpkin	125	—	—
Radish	30 (bunches)	—	—
Rhubarb	25	1	1½
Spinach	25	2-3	2-3
Squash, summer	75	2½-3	2-3
Squash, winter	125	2	3
Tomato	200	3	—
Turnip	50	—	—
Watermelon	125	—	—

best solution for a garden with poor drainage. You can elevate your garden by hauling good field topsoil or by obtaining bagged potting soil or organic compost. The existing site may also be improved by adding lime, fertilizer, compost, or other organic materials, and by installing proper drainage.

Adequate Sunlight. Sunlight is *absolutely* necessary to produce vigorous growing vegetables. Vegetables grow best and give best yields in full sunlight, with a minimum of 8 to 10 hours of direct sun each day.

Away From Trees and Shrubs. Do not plant your garden near trees or shrubs if at all possible. Trees and shrubs compete with garden crops for sunlight, plant food, and moisture. Walnut trees especially should be avoided because they produce a toxin that is injurious to vegetables.

Near a Water Supply. Whenever possible, locate your garden close to a water source. Water is particularly needed when you are starting seeds or transplanting crops, and during the development of the edible portion of the plant.



The above drawing shows the vegetables that can be grown in a limited area. These vegetables can also be fitted into informal arrangements around the patio or in the home landscape.

Close to Your House. By locating your garden near to your house, you will have the daily pleasure of watching your vegetables grow. You will also be able to take timely action to control weeds, insects, and diseases. A few minutes spent at the proper time will save hours that it would take you to do the same job later.

Suitable to the Landscape Design. 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.

Many vegetables and herbs are colorful and attractive, and can add ornamental value to garden plantings, as well as to the vegetable garden itself. The following vegetables have attractive forms and colorful flowers, leaves, or fruit. There may be several varieties of one vegetable (peppers, for example) that offer different colors and shapes of fruit.

Asparagus — fernlike foliage.

Beans — purple pod or wax varieties; brightly colored pods of Horticultural varieties.

Cabbage — red or green savoy varieties; red, green, and pink "flowering cabbage."

Chard — red- or green-leafstalk varieties.

Corn — purple husk; ears of Indian corn, strawberry corn, and black popcorn.

Gourds — brightly colored ornamental, dipper, spoon, warted, birdhouse, sponge, and large-fruited types.

Herbs — chives, dill, purple basil, and many others.

Kale — regular or "flowering" types.

Lettuce — ruby- or green-leaf types.

Midget or dwarf — varieties of tomatoes, melons, sweet corn, cabbage, cucumbers, carrots, etc., grown more for novelty than for food value.

Okra — attractive flowers; green or red pods.

Parsley — curled foliage.

Pepper — yellow, red, or ornamental varieties.

Squash — *summer*: patty pan, yellow prolific types; *winter*: turk's turban, Cinderella (bush-type).

Tomato — several training systems for dwarf, compact, and cherry varieties for hanging baskets, containers, and minigardens.

Row number	Inches between rows	First planting	Successive plantings
1	18	Early peas	Snap beans
2	18	Second early peas (later varieties)	Lettuce, kohlrabi, snap beans
3	18	Spinach	Late broccoli, cauliflower, brussels sprouts
4	12	Leaf lettuce and radishes	Beets, carrots
5	12	Onion sets or plants	Radishes, late leaf lettuce
6	12	Onions (direct seeded)	Radishes, late spinach
Row number	Inches between rows	Second planting	Successive plantings
7	24	Early cabbage or broccoli, cauliflower	Snap beans, lettuce, radishes
8	24	Early beets, carrots, or swiss chard	Turnips
9	24	Early snap beans	Late cabbage
Row number	Inches between rows	Third planting	Successive plantings
10	18	New Zealand spinach or peppers	None
11	30	Tomatoes or peppers	None
12	24	Lima beans	None
13	48	Choice of eggplant, summer squash, cucumbers, or bush forms of squash and pumpkins	None

Plan for a small, intensive garden (30 feet long by 25 feet wide).

Container Gardens

Growing vegetables in containers is popular with gardeners who do not have adequate ground space, as well as with those who also have conventional gardens. Containers may be located almost anywhere — the kitchen, patio, terrace, balcony, rooftop, or at strategic locations around the yard — but they must have fertilizer, water, and fresh air.

Often the vegetables grown in containers serve a dual purpose — they may be both decorative and provide fresh harvest. Among the choices for container gardens are attractive pots of kitchen herbs or parsley, hanging baskets of ripe red tomatoes, and bright leaf lettuce or fresh radishes.

All vegetables, or even varieties of the same vegetable, are not equally suitable for growing in containers (see table on page 8). Vegetables that will grow in a limited space and produce a continuous growth and yield, such as tomatoes, peppers, parsley, cucumbers, or chard, are good choices. You may also use more than one container for the same vegetable and plant at intervals. This technique will establish different growth stages for vegetables such as radishes that tend to mature their harvest at one time.

Some other characteristics that are important in selecting varieties for container gardens are (1) compact, bush, or dwarf growing habits; (2) colorful foliage or fruits; and (3) varieties that will supplement your other garden harvests or local supply.

Containers of all kinds, shapes, and sizes are used, including pots, tubs, baskets and hanging baskets, planters, and wooden boxes. Commercial growing containers almost always have bottom holes for drainage. Homemade containers should also be provided with holes. Place stones, crushed rock, or broken pot chips over the holes to prevent plugging and to insure free drainage of excess water.

Restricting the soil volume and the root system of a vegetable plant limits the plant's supply of fertility and water to that furnished within the container. Often the container is placed in a location for "eye appeal" rather than one best suited for the plant. As a result, the plant may be unduly exposed to wind and weather, and may not receive proper care.

Use a fertile soil or a growing mix. Soils are usually heavy, and the light weight of growing mixes may be an advantage.

Make sure that the volume of the rooting medium is large enough so that the vegetables will grow properly. Dwarf tomato, pepper, and chard need minimum volumes of 1 to 2 gallons per plant. Large



If possible, plant your garden a distance from trees and shrubs at least equal to their height. The leaves of trees and shrubs block sunlight, and the roots rob moisture and plant nutrients from the soil that is needed for proper growth of vegetables.

tomato plants, cucumbers, and eggplants should have 5-gallon volumes. Lettuce, radishes, onions, and beets require 6- to 10-inch-diameter containers; and most herb plants, parsley, and chives need 4- to 6-inch-diameter containers.

Volume depends upon the diameter, height, and amount of taper of the container. The rooting volume will be less than the actual volume because the container will not be filled to the top with the growing medium. The volumes shown in the chart on page 7 are *minimum* volumes. In general, larger containers provide improved growing conditions, require less watering, and will give better results than smaller containers.

Because the plants remain in the containers for extended periods, you should add fertilizer at least once a week with irrigation water. Use the fertilizers and rates suggested under "Starting Plants at Home," pages 36-39.

Most vegetables in containers need daily watering to prevent wilting and injury. Many vegetables (tomato, cucumber, and eggplant, for example) also require support, depending upon the variety and kind of container. The plant or vines may be tied to stakes or to a trellis. Remember — plants still need direct sunlight for best growth.





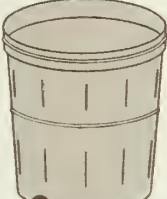
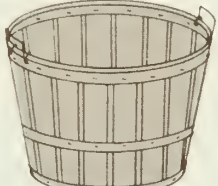

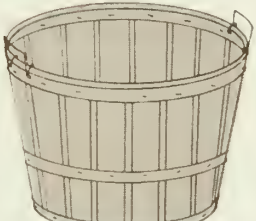
Selecting Vegetables

Choose vegetables that you and your family enjoy, and that can be grown successfully in your area. Some vegetables make better use of space than others, and can be produced efficiently in a small garden.

Another consideration in selecting vegetables is whether they taste noticeably better when they are fresh from the garden. Sweet corn is an outstanding example. Although corn requires more space than the other common garden vegetables, it is often grown because of its high quality when fresh from the garden. Other highly perishable crops that taste best immediately after harvest are peas, pea pods, asparagus, fresh herbs, muskmelons, lettuce, green beans, spinach, summer squash, green onions, and vine-ripened tomatoes. These and many other fresh vegetables may not be available locally, and they bring special enjoyment when grown at home.

The table on page 8 shows the suitability of growing various vegetables in containers, minigardens, and full-sized gardens. The vegetables are grouped in descending order of popularity. For example, the five vegetables in Group 1 are the most popular.

Types and Sizes of Growing Containers

		Diameter	Height	Approximate volume
Pot		4 inches	3½ inches	1 pint
Pot		6 inches	5½ inches	3 pints
No. 10 can		6 inches	7 inches	3 quarts
Planter		8 inches	8 inches	1½ gallons
Planter		10 inches	9 inches	2½ gallons
½-bushel basket		13 inches	9½ inches	4 gallons
5-gallon can		11 inches	12½ inches	5 gallons
1-bushel basket		17½ inches	11½ inches	8 gallons

Vegetables grouped according to popularity	Suitable for		
	Container garden	Mini-garden	Full-sized garden
Group 1			
Bean, snap		X	X
Lettuce	X	X	X
Onion	X (green)	X	X
Radish	X	X	X
Tomato	X	X	X
Group 2			
Beet		X	X
Broccoli		X	X
Cabbage		X	X
Carrot		X	X
Cucumber	X	X	X
Pea		X	X
Pepper	X	X	X
Squash, summer	X	X	X
Group 3			
Asparagus		X	X
Corn, sweet			X
Greens		X	X
Herbs	X	X	X
Kohlrabi		X	X
Parsley	X	X	X
Rhubarb		X	X
Group 4			
Cauliflower		X	X
Chard	X	X	X
Eggplant	X	X	X
Leek	X	X	X
Muskmelon			X
Potato, irish			X
Potato, sweet			X
Pumpkin		X (bush-type)	X
Squash, winter		X (bush-type)	X
Turnip		X	X
Watermelon			X

Hybrids and Varieties

The job of choosing the proper varieties for your garden is most important. By careful selection, you can grow vegetables that are resistant to diseases and yield high-quality, nutritious produce. You should decide which varieties you will grow well in advance of the garden season so that you will have ample time to obtain seeds or to grow your own plants.

An increasing number of vegetables offered today in seed catalogs and at garden centers are *hybrids*. A hybrid, by definition, results from crossing (breeding) two parental lines that differ in one or more important characters.

Hybrids are often superior to older varieties because they combine such desirable characteristics

as uniformity of plant and fruit type, uniform maturity, disease resistance, improved quality, and vigor. Hybrid seed is usually more expensive than other seed, and does not reproduce itself true to type in succeeding generations. Carefully consider resistance to disease, insects, and other elements influencing yield when selecting a new variety or hybrid to plant in your garden.

The performance of a particular variety may be influenced by any or all of the following: (1) climate (temperature, rainfall, humidity); (2) soil (type of soil, fertility, drainage); (3) season (spring, summer, or fall cropping); (4) culture (planting distances, training methods, mulch, fertilizer treatment); (5) method of harvest; and (6) intended use (fresh, storage, processing, or marketing).

The following suggestions will help you to compare new varieties and hybrids with favorites in your own garden.

(1) Limit the number of new varieties and hybrids that you try.

(2) Select a location with uniform soil and drainage where all of the plants will receive the same spray and cultural treatments. Avoid the edges or outside rows of a garden where the results may be influenced by children trampling the plants, damage from mowing, dogs, etc.

(3) Plant all of the varieties on the same day and in the same way. Be careful not to mix seeds or plants.

(4) Label each row and plant carefully. Draw a map showing where you have planted the new varieties in case the stakes are lost, moved, or destroyed.

(5) Record observations of plant growth, yield, disease, and fruit characteristics. These records will help you to make variety decisions for future gardens.

Vegetable Trials

University Trials. From time to time, University of Illinois horticulturists test plant varieties at various locations in the state for quality and disease resistance. The varieties listed under "Major Vegetables" (pages 42-112) in this book were selected as a result of these tests.

All-America Selections. All-America vegetables are those that have been scored with superior performance in selected trial gardens throughout the United States. The winners are designated by All-America Selection (AAS) or All-America Award in seed catalogs. The title is given by All-America Selections, a nonprofit organization of seedsmen who develop and promote new varieties of both flowers and vegetables.

A vegetable that wins an All-America Award (gold, silver, or bronze medal) has demonstrated

wide adaptability to soil and climatic conditions. Many of these varieties are well suited for Illinois. All new vegetable varieties are not submitted for testing by All-America Selections, however, and many varieties that are not entered in the program may be equally suitable for Illinois gardens.

Seeds, Plants, Equipment, and Supplies

Seeds

It is advisable to buy fresh seed each year. The seed should be clean, viable, and disease-free. Most seed from reliable seed companies will meet these specifications.

Seed should be treated to control seedborne disease organisms and to prevent decay and damping-off. Usually, the seed that you buy is already treated. Information about the kind of treatment that the seed has received will appear on the seed package. Some companies offer nonchemically treated seed for those who wish to avoid pesticides, but you must specify "untreated seed" on your order.

Many new varieties and hybrids may not be available from local sources. For this reason, it is wise to purchase your seeds well in advance. Then, if you must order from a particular seed house, you will have ample time to do so.

Seeds are alive, and proper storage conditions are important for their survival, for good germination, and for vigorous seedling growth. The best storage conditions are cool temperatures and a dry atmosphere. Some seed companies package seeds that have been properly conditioned in special moisture-proof foil envelopes. High temperatures and moisture (including high humidity) are very bad for storing seeds. It is preferable not to use seed that is more than one year old. If you do use seed that is more than one year old, sow it thicker than usual to insure a good stand of plants; then you can thin if necessary.

You may store most leftover vegetable seeds *except onion, parsley, and parsnip* for planting the following year. If you decide to store your own seed, place the seed in jars or tin cans that are tightly sealed against moisture, insects, and rodents. Store in a cool place — an unheated garage or outbuilding, or in your refrigerator.

The vegetable seed that may be kept for planting the next year and seed that may be stored for more than one year are listed below. Again — you must buy fresh onion, parsley, and parsnip seed each year.

Seed may be kept for planting the next year

Asparagus
Bean
Broccoli
Carrot
Corn, sweet
Herbs (most)
Kohlrabi
Leek
Lettuce
New Zealand spinach
Okra
Pea
Pepper
Salsify
Southern pea
Spinach

Seed may be stored for two years

Beet
Cabbage
Cauliflower
Celeriac
Chard
Cucumber
Eggplant
Endive
Kale
Muskmelon
Pumpkin
Radish
Squash
Tomato
Turnip-Rutabaga
Watermelon

Do not save seeds from the hybrid vegetables that you harvest this year. These seeds will usually produce plants that are of poorer quality than the original hybrid. It also does not usually pay to save seeds from varieties unless you have a variety that is not available from any other source.

Plants

Some vegetables do best when they are transplanted into the garden. The plants may come from greenhouses, southern plant growers, and garden stores, or they may be grown at home. Using plants rather than seeds shortens the time before harvest, and gets your crop off to the best possible start. The plants should be healthy, stocky, medium-sized, disease-free, and insect-free. Avoid plants that are tender, yellow, spindly, or too large. Do not buy plants with spots on the leaves, brown lesions on the stems, or knots on the roots.

Growing your own plants at home has certain advantages: you can use varieties that are not ordinarily obtainable; you can have plants when you want them for spring and summer planting; and you will derive satisfaction from starting the plants yourself.

Growing vegetable transplants requires special attention to details of media, temperatures, light, watering, and seeding depth and spacing. Usually, temperatures too low for proper germination and insufficient light for healthy growth are the chief problems in growing plants at home. The result is poor germination, damping-off, and weak, spindly plants that stretch toward the light. (For specific instructions on starting your own plants, see pages 36-39.)

Sample Seed Packet



Front

Weight of contents. The weight may also be given in grams. The number of seeds may be indicated.

Lot number. For identification by seller.

Trade or brand name.

Seed catalog number. Name of hybrid, resistance to verticillium and fusarium wilts.

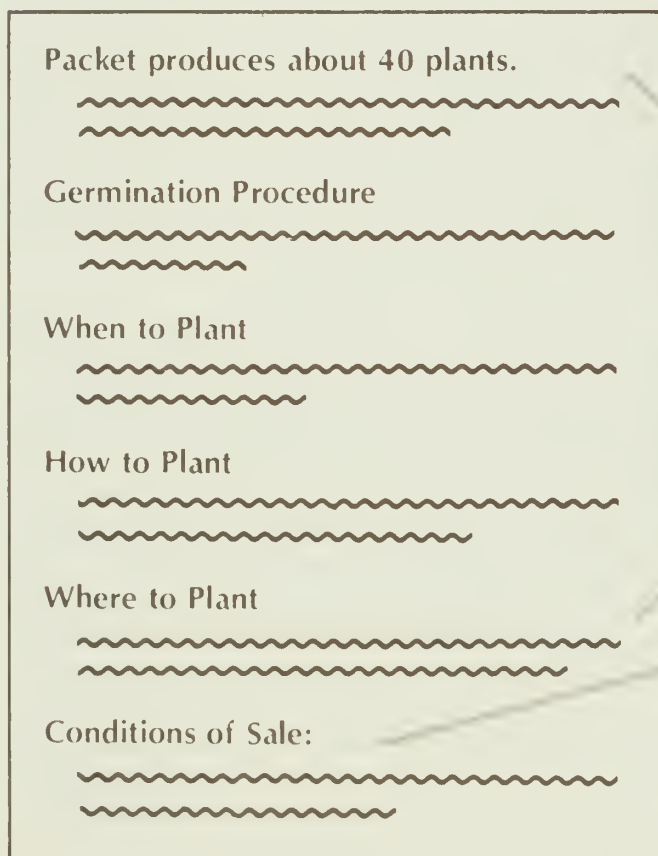
Description of seed treatment. Fungicide, insecticide, or hot-water treatments for protection from certain insects and diseases.

Season that seeds were packaged for sale.

Date of germination test.

Percentage of seeds germinated under specific laboratory conditions.

Name and address of seller.



Back

General planting and growing instructions.

Warranty. Limits the liability of the seller to the purchase price of the seeds. The seller guarantees the seeds in this packet to be exactly as described, true to name, and free from insects and diseases.

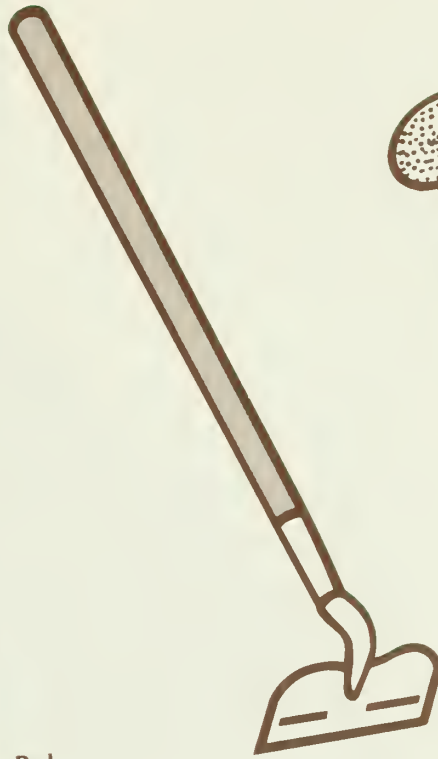
Equipment



Spade



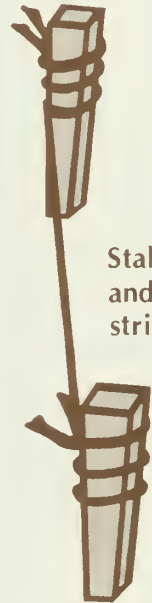
Rake



Hoe



Sprinkler can



Stakes and string



Spading fork



Trowel



Wheelbarrow

Equipment

Have all of 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. A seed drill is also desirable for larger gardens. Keep all tools clean and well sharpened. Each time you use your tools, 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. Whether you use a duster or a sprayer is a matter of choice; either is effective if used properly.

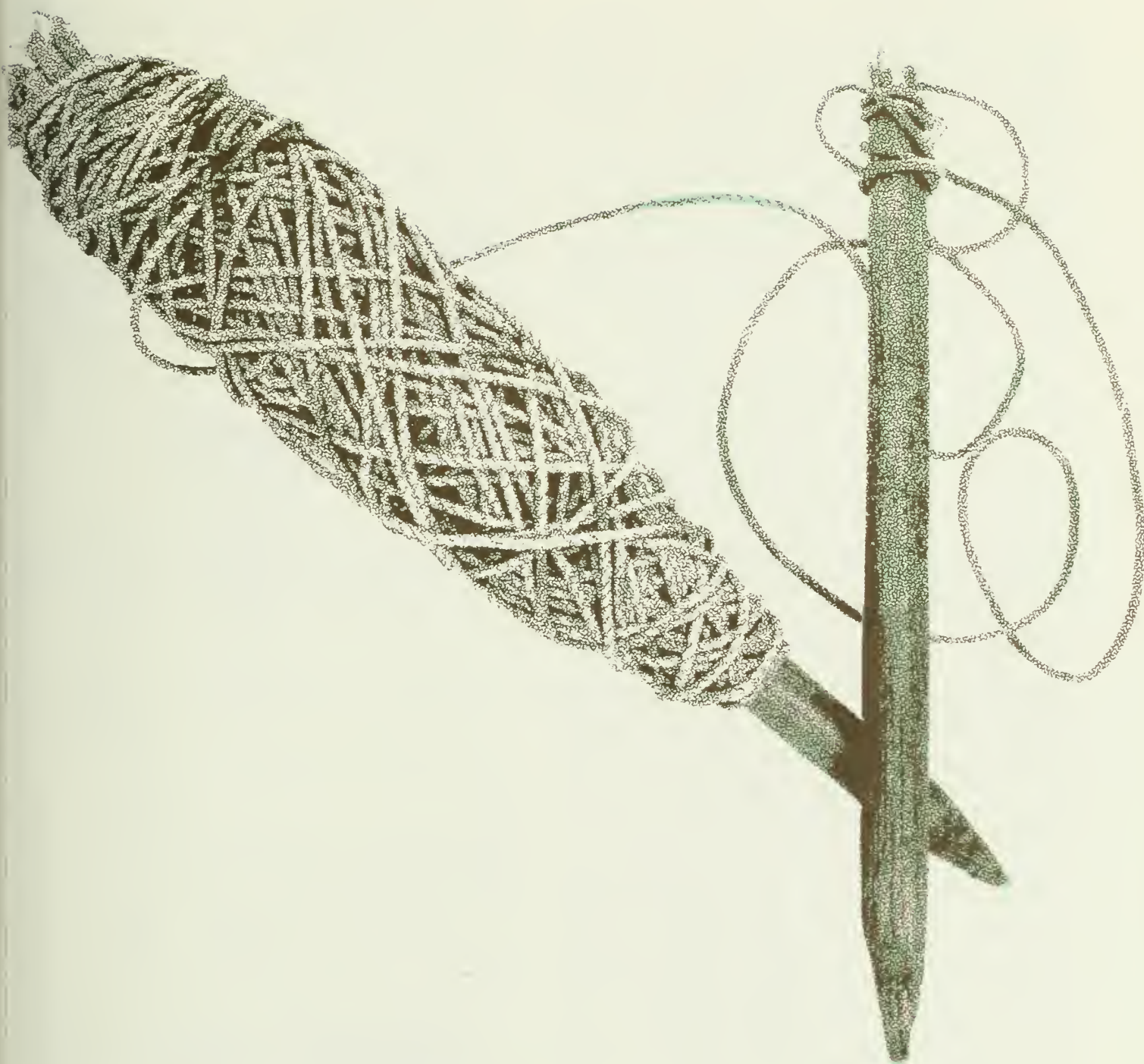
Plunger-type dusters, hose-on sprayers, and hand-held plastic spray bottles are the most practical applicators for the small garden. Crank-type dusters can be used satisfactorily in both small and large gardens.

Hand-pump 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 larger gardens. 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 weedkillers.

Supplies

Obtain fertilizers, insecticides, and fungicides in the spring so that you will have them when they are needed. Other supplies you may need include mulching material, stakes, plant protectors, and pots. The following checklist will help you in selecting your equipment and supplies.

Equipment	Supplies
Small Garden (Necessary)	
Hoe	Dry garden fertilizer
Rake	Measuring stick or tape
Spading fork or shovel	Marking labels
Sprayer or duster	Seeds and plants
Sprinkler can	Sprays or dusts
Trowel	Stakes
	Starter fertilizer
	String
Small Garden (Helpful)	
Garden hose with sprinkler	Compost, manure
Hotbed, cold frame	Plant-growing mixes and containers
Respirator	Plant protectors
Seeder	Plastic mulch film
Wheelbarrow	Rubber gloves
Wheel cultivator	Seed protectants
	Trellis or fencing
	Wire cages
Large Garden or Specialized Gardening	
Compost shredder	Herbicides for chemical weeding
Garden tractor	Plant-growing lights
Home greenhouse	Seed-germinating cables or mats
Power sprayer	
Power tiller	



Preparing the Garden

Improving Soil Tilth

The soil provides plant nutrients, air, and water. If these materials are not available, or if the soil is in poor condition (hard and crusty when dry or sticky when wet), vegetables will not grow and develop properly. Good soil is essential for a successful garden.

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

Organic materials to be spread per 100 square feet of garden are listed in the table below. The table also shows the pounds of nitrogen to be added per 100 pounds of material. *Note:* corncobs, sawdust, wood chips, leaves, and straw vary considerably in nitrogen content, and you may need to apply supplemental fertilizer containing nitrogen during the growing season. *Do not use* lawn clippings from grass that has been treated with sprays containing fungicides, insecticides, or herbicides.

Manure is a common form of organic matter used in gardens. It will also fulfill part of the fertilizer requirements of the soil. Because manure is low in phosphorus, you should 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. Sheep and goat manure should be used at one-half this rate. (See the table on page 17 for the fertilizer composition of other organic materials.)

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, or add about ¼ pound to each 10 pounds of green material. The mixture can be made from 5 pounds of 10-10-10 fertilizer and 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. 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 or cover crops, such as rye or oats, improve soil tilth when they are plowed under in the spring or fall. The seed can be broadcast over prepared soil areas and between rows of late vegetables. In-

corporate the seed into the soil with a rake, hand cultivator, or harrow.

The amounts of rye, rye-grass, and oats seed that should be sown per 1,000 square feet of garden, the best planting dates, and the times when the cover should be plowed under are as follows:

Rye: 3 pounds of seed; plant September 1-30; plow under in early spring.

Rye-grass: ½ pound of seed; plant September 1-15; plow under in early spring.

Oats: 1-1½ pounds of seed; plant late August to early September; plow under or incorporate into the soil in early spring.

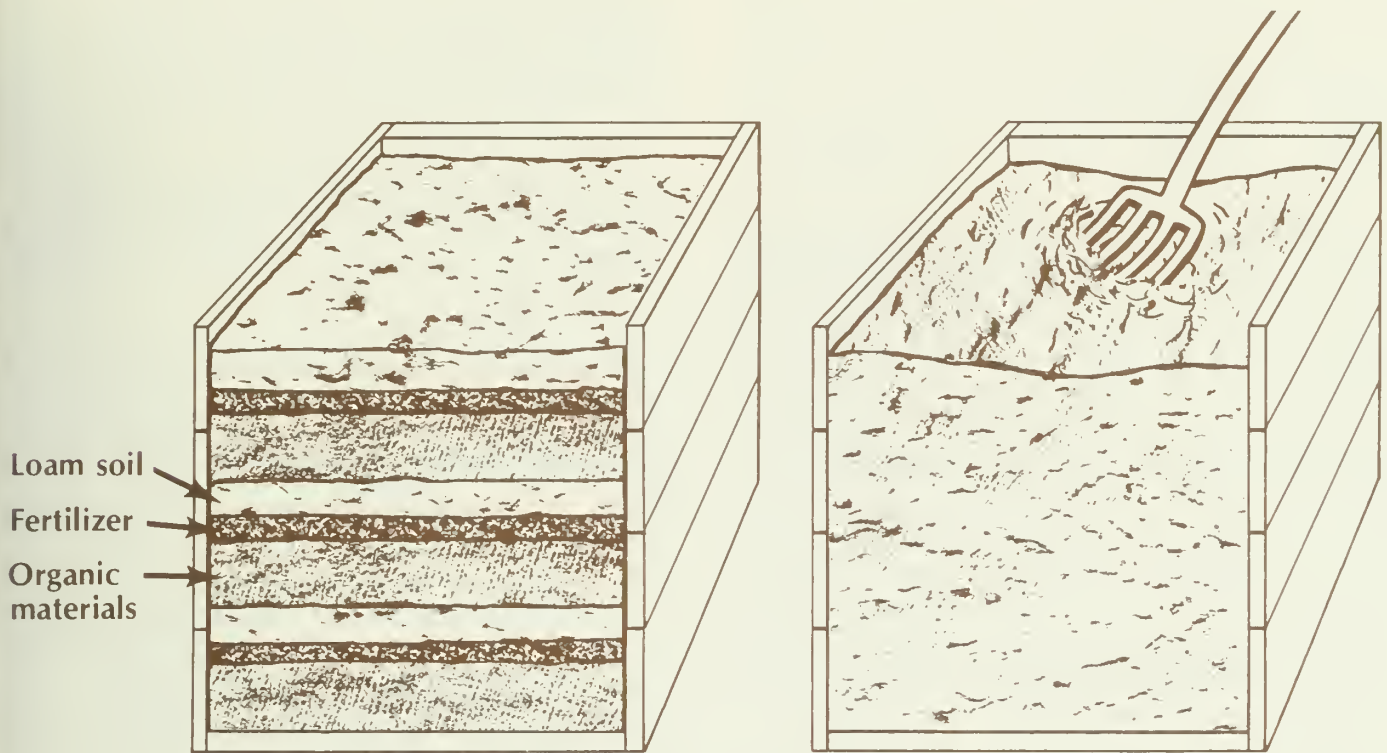
Organic material	Material per 100 square feet	Nitrogen to be added per 100 pounds of material*
Corncobs	50 pounds (2 bushels)	1-1½ pounds
Sawdust	50 pounds (2 bushels)	1¼-1½ pounds
Woodchips	50 pounds (2 bushels)	1¼-1½ pounds
Leaves	75 pounds (3-4 bushels)	½-1 pound
Straw	60 pounds (1 bale)	½-1 pound
Hay	60 pounds (1 bale)	None
Peat moss	6-10 cubic feet	None
Compost	10-20 cubic feet	None
Lawn clippings	4 bushels	None

* 1 pound of nitrogen = 10 pounds of 10-10-10 fertilizer or 3 pounds of ammonium nitrate (33.5-0-0).

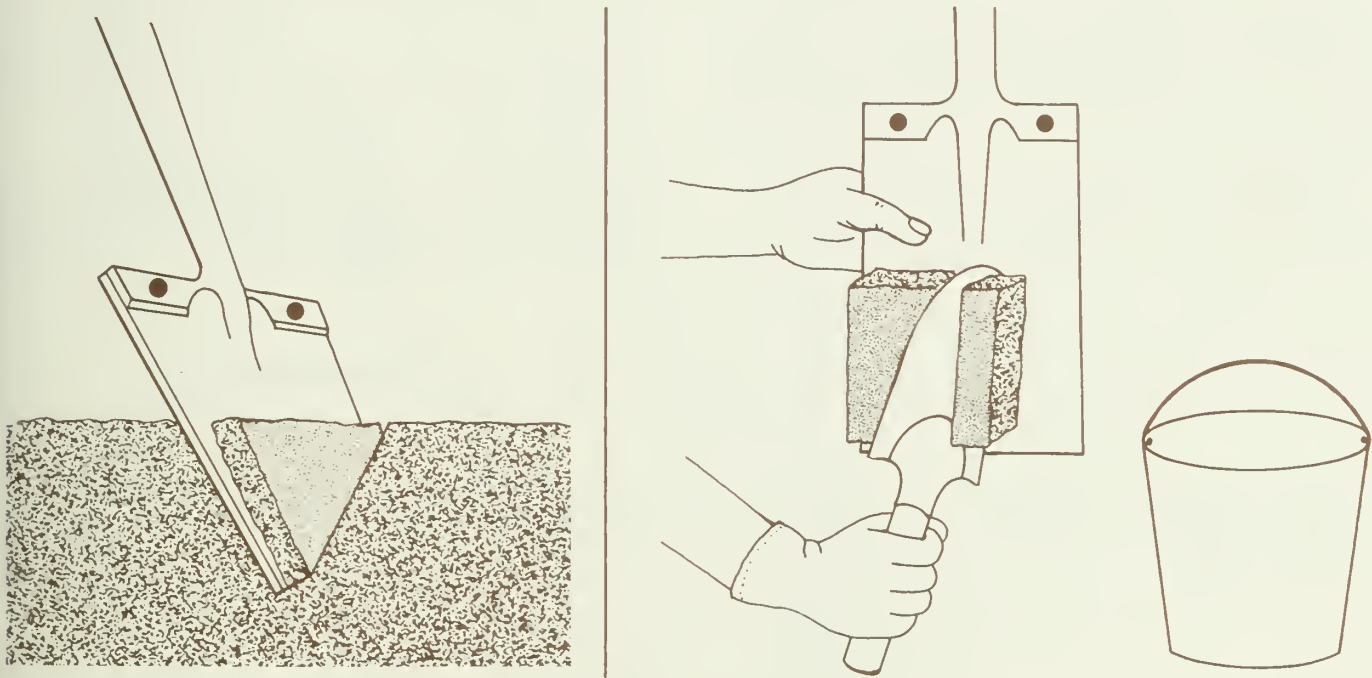
Fertilizing the Soil

Testing the Soil. To find out the amounts and availability of nutrients in your garden, you should have the soil tested. Gather small amounts of soil from seven or eight well-scattered locations in your garden, mix the soil together, dry at room temperature, and wrap in a sturdy ½-pint container. Write "For Vegetable Garden" on the container, along with your name and address, and send it to the nearest county soil-testing laboratory. In a few weeks, you will receive the results of the test, as well as fertilizer and lime recommendations for your garden.

If you have any questions about a soil test, call your county extension adviser. His telephone number should be listed in the directory under the county office of the Cooperative Extension Service (for example, Macon County Cooperative Extension



A simple wooden frame (left) can be used both for making compost and for storing it. Thoroughly mix the organic materials, soil, and fertilizer with a spading fork or other suitable tool (right). Keep the compost pile moist, and leave a depression at the top to catch rainwater.



Taking a soil sample for testing. Use a spade or trowel to remove a slice of soil 6 inches deep (left). Place a 1-inch section of this slice in a pail (right). Obtain similar sections from other random locations in your garden. Mix the soil thoroughly in the pail. Remove about ½ pint of the well-mixed soil, dry at room temperature, and place in a container. Do not take samples where fertilizer has been spilled or manure has been piled. Do not include debris (leaves, ticks, large stones, etc.) in your samples.

Service, Iroquois County Cooperative Extension Service, etc.) or in the yellow pages under Governmental Offices. If you cannot find your extension adviser's telephone number in the directory, call the Illinois Cooperative Extension Service (217) 333-2661 for this information.

Fertilizer Elements. The principal elements applied through fertilizers are nitrogen for top growth, phosphorus for root establishment and fruit formation, and potassium for root development and disease resistance. These elements are usually referred to as nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). A fertilizer marked 10-10-10 contains 10 percent nitrogen, 10 percent phosphoric acid, and 10 percent potash. *Do not use* fertilizers that contain either herbicides or insecticides. These fertilizers are for lawns, and are not approved for use in vegetable gardens. Trace or minor elements are rarely needed in Illinois soils. If you do not have your soil tested, you can follow the general fertilizer recommendations given below.

Organic Materials. Organic materials benefit the soil in many ways, but they should be supplemented with other fertilizers. Some of the materials used for fertilizers are listed in the table on page 17. One or more of these materials can supply part or all of the nutrients needed in your garden, but it is usually easier and cheaper to use the chemical fertilizers.

When and How to Fertilize. Fertilizer can be applied to the soil just before spading or plowing in the spring or fall; or it can be spread over the garden area and disked or raked into the top 4 to 6 inches of soil before planting.

When transplanting, use *starter fertilizer* in addition to other soil-fertilizer treatment to give your plants a faster start. Starter fertilizer is a water-

soluble fertilizer that is high in phosphorus — for example, 10-52-17 or 10-50-10. Mix the fertilizer with water (about 1 tablespoon per gallon of water). When you transplant, pour 1 cup of the solution around the roots of each plant.

If a regular starter solution is not available, you can mix 1 cup of steamed bonemeal in 1 gallon of water. Use 1 cup of the mixture for each plant (frequent stirring is necessary).

Later in the season, garden vegetables often need more fertilizer, especially nitrogen, than the soil can supply. Side-dress fertilizer (apply in a band along one side of the row about 6 to 12 inches from the plants) when the plants of leafy vegetables, greens, sweet corn, and root vegetables are half grown, and when tomatoes, peppers, beans, cucumbers, and other vine crops have begun to set fruit.

Use 10 pounds of 10-10-10 per 1,000 square feet of garden area. This rate is about equal to 1 pound of 10-10-10 spread along a 25- to 30-foot row. Ammonium nitrate or urea fertilizer may be used at about one-third of this rate. Keep dry fertilizer off plant leaves — it may injure them. Hoe or cultivate the fertilizer into the soil. In dry weather, water the soil to make the fertilizer more quickly available to the plant roots.

Soil pH. A soil that is slightly acid to neutral (pH of 6.1 to 7.0) is best for growing most vegetables. If the soil test indicates that your soil is more acid than it should be (pH below 6.1), apply the recommended amount of limestone. Add lime *only* if it is needed. Avoid overliming.

When soils are too alkaline (pH above 7.5), they can be corrected by adding sulfur. Work the lime or sulfur into the soil at the same time that you apply fertilizer. Changes in pH do not occur immediately

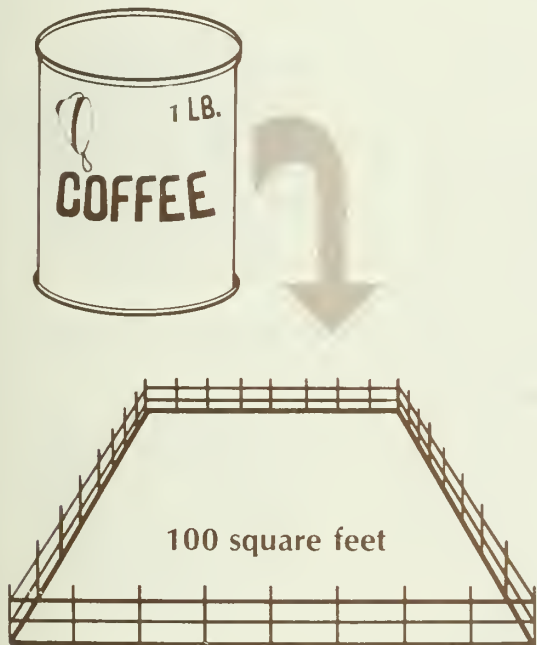
Previous fertilizer treatment	Fertilizer	Pounds to apply per 1,000 square feet	Pounds of nutrients per 1,000 square feet		
			N	P_2O_5	K_2O
Little or none	3-12-12	50	1.5	6.0	6.0
	or 5-20-20	30	1.5	6.0	6.0
Some	5-10-10	30	1.5	3.0	3.0
Heavy (established gardens that have produced well)	10-10-10	15	1.5	1.5	1.5
	or 15-15-15	10	1.5	1.5	1.5

because of delay in the reaction time of the soil. A single application of lime or sulfur is usually adequate for four to five years. After that period, the soil should be retested before making additional applications.

The table below shows the number of pounds of limestone or sulfur to be added per 1,000 square feet of garden area to adjust soil pH to desirable levels.

Soil pH	Pounds of limestone to raise pH to desirable level		
	Sandy soil	Loamy soil	Clayey soil
5.8 to 6.1	80	120	120
5.4 to 5.7	120	160	200
4.8 to 5.3	160	240	280

Soil pH	Pounds of sulfur to lower pH to desirable level		
	Sandy soil	Loamy soil	Clayey soil
8.5	40	50	60
7.5	10	15	20



To maintain fertility in an established garden that has produced well, apply 15 pounds of 10-10-10 fertilizer per 1,000 square feet of garden area. An easy method for measuring the correct amount of fertilizer is to fill a 1-pound coffee can (holds 1½ pounds of fertilizer) with 10-10-10 fertilizer. Spread the fertilizer uniformly over a 10-feet by 10-feet area (100 square feet).

Material	Percent of		
	Nitrogen (N)	Phosphoric acid (P ₂ O ₅)	Potash (K ₂ O)
Chemical fertilizers			
Ammonium nitrate	33.5	—	—
Ammonium sulfate	20.5	—	—
Muriate of potash	—	—	48.0-62.0
Nitrate of soda	16.0	—	—
Superphosphate	—	16.0-20.0	—
Triple superphosphate	—	46.0	—
Urea	42.0-46.0	—	—
Ureaform	30.0-40.0	—	—
Organic fertilizers			
Bonemeal (steamed)	2.0	22.0	—
Cottonseed meal	2.0	3.0	1.0
Garbage tankage	1.5	2.0	.7
Manure, cattle (dried)	1.3	.9	.8
Manure, cattle (fresh)	.5	.2	.5
Manure, hen (dried with litter)	2.8	2.8	1.5
Manure, hen (fresh)	1.1	.9	.5
Manure, horse (fresh)	.6	.3	.5
Tankage (animal)	9.0	6.0	—
Tankage (processed)	7.0	1.0	.1
Wood ashes (may be a problem in gardens with higher pH soils because of high pH)	—	.8	5.0

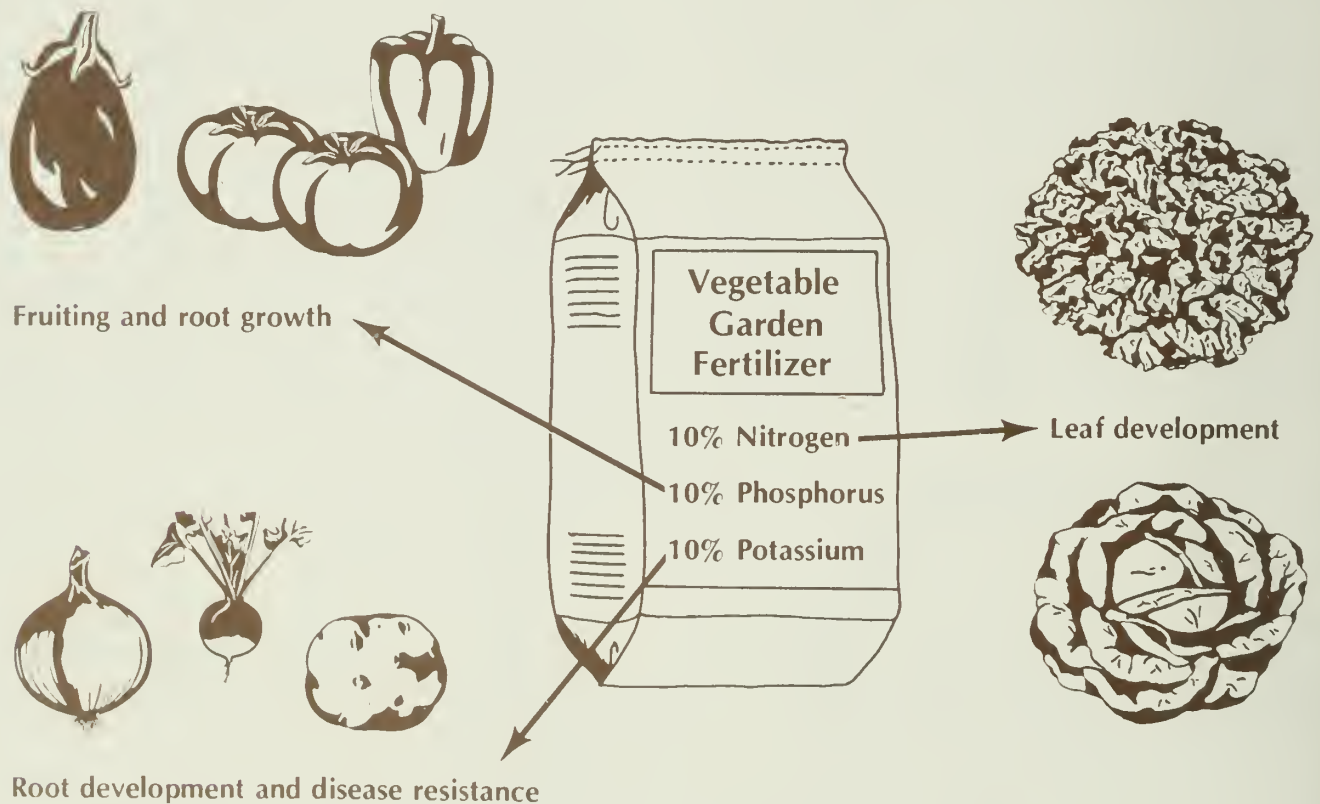
Plowing and Preparing the Seedbed

The garden can be plowed, tilled, or spaded in the spring or fall. With fall preparation, the soil can be worked and planted earlier in the spring. Spring soil preparation is desirable when there may be severe soil erosion and need of cover crops. Do not prepare the soil when it is too wet. A good test is to squeeze a handful of soil. It should not be sticky, and should form a ball that will crumble easily.

You may apply fertilizer before plowing or preparing the seedbed. Turn the ground over to a

depth of about 6 to 8 inches. If fertilizer is added to the soil after plowing, rake or harrow the plowed area to work the fertilizer into the soil to a 2- to 4-inch depth. Just before planting, prepare the seedbed 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 uniform stand. Heavy soils low in organic matter should not be worked to a fine consistency because they tend to become hard and crusty, preventing emergence of seedlings. Overworking any Illinois garden soils except sands and sandy loams will damage the soil structure.



Vegetable garden fertilizer is a "complete" fertilizer containing nitrogen (N), phosphorus (P), and potassium (K). For most vegetable gardens, the fertilizer analysis should be equal parts of N, P, and K. The numbers on the bag indicate the percentages (by weight) of each of these nutrients. For example, a 50-pound bag of 10-10-10 garden fertilizer contains 5 pounds of nitrogen, 5 pounds of phosphate, and 5 pounds of potassium oxide. These nutrients are required for root growth and development, leaf growth, fruiting, and disease resistance.

Planting the Garden



When to Plant

How early you can plant depends upon the hardiness of the vegetables and the climate in your area. Certain vegetables can withstand frost, while others cannot. Vegetables are classified as very hardy, frost-tolerant, tender, and warm-loving, according to their ability to withstand freezes, cold temperatures, or heat.

Very hardy vegetables will withstand freezing temperatures and hard frosts without injury. They can be planted as soon as the ground can be prepared. Spinach and lettuce seeds may even be broadcast on late snows over soil prepared in the fall.

Frost-tolerant (semihardy) vegetables can withstand light frosts. Their seeds germinate in cool soil temperatures, but not as readily as seeds of the very hardy group. They can be planted as early as two or three weeks before the average date of the last 32° F. freeze in the spring.

The very hardy and frost-tolerant vegetables are known as "cool-season vegetables." Their seeds germinate in cool soil, the plants withstand frost, and they grow best under the cooler weather of early spring and fall.

Tender (not cold-hardy) vegetables are injured or killed by frost, and their seeds do not germinate well in cold soil. They are usually planted at the average frost-free date in the spring.

Warm-loving (heat-hardy) vegetables are intolerant of frost and cold, and require warm soil temperatures for germination and good growth. Most are tolerant of high summer temperatures, and thrive when there is ample soil moisture. The tender and warm-loving vegetables are called "warm-season vegetables."

Cool-season and warm-season vegetables are listed at right according to whether they are best started from seeds or transplants.

The dates of the last 32° F. freeze in the spring and the first 32° F. freeze in the fall will help you to determine safe planting times in your area. The frost-free growing season varies greatly in Illinois. The range is about 160 days in the north to more than 200 days in the south. In the more northern areas of Illinois, late plantings are limited to very hardy and frost-tolerant vegetables. But in central and southern Illinois, where the growing season is longer, many tender vegetables can also be planted for harvesting in the fall.

A fall garden will not only extend your supply of fresh vegetables but will also provide vegetables for winter storage. Unfortunately, a successful fall garden demands additional work and planning at a

Cool-Season Vegetables for Early Spring Planting

Very hardy
(plant 4-6 weeks before average frost-free date)

Seed	Transplants
Kale	Asparagus (crown)
Kohlrabi	Broccoli
Leaf lettuce	Brussels sprout
Onion	Cabbage
Pea	Horseradish (root)
Rutabaga	Onion (set or plant)
Salsify	Parsley
Spinach	Potato, irish (tuber)
Turnip	Rhubarb (root)

Frost-tolerant
(plant 2-3 weeks before average frost-free date)

Seed	Transplants
Beet	Cauliflower
Carrot	Chinese cabbage
Chard	Herbs
Herbs	
Mustard	
Parsnip	
Radish	

Warm-Season Vegetables for Late Spring Planting

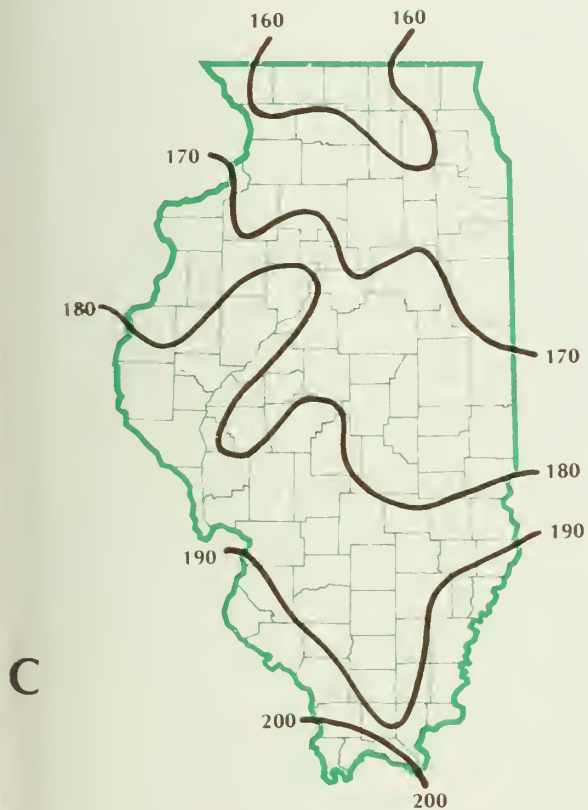
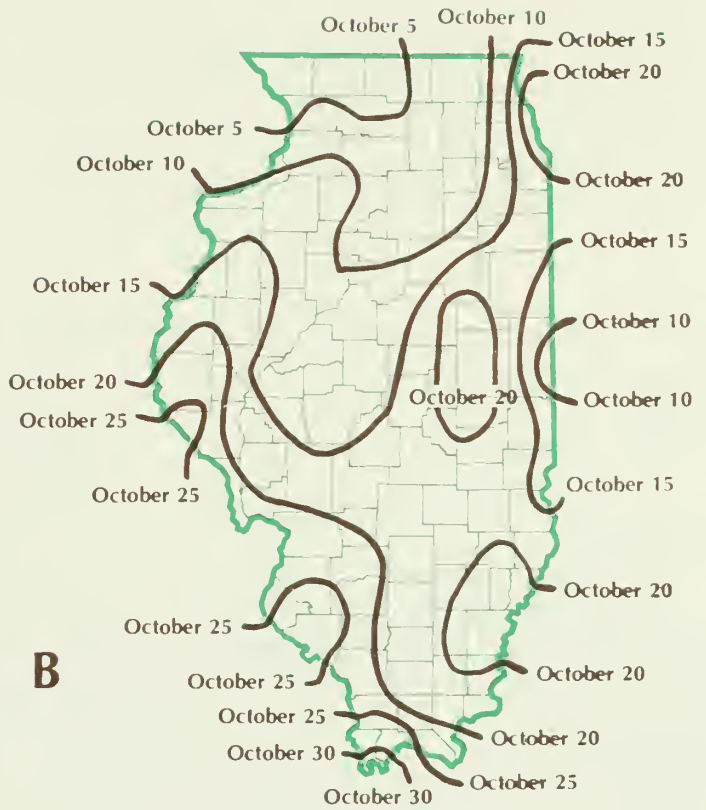
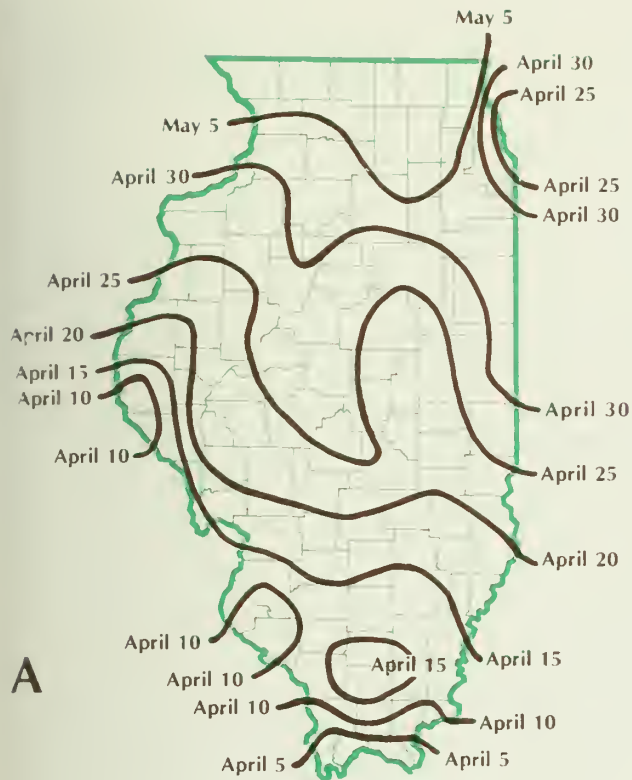
Tender
(plant on average frost-free date)

Seed	Transplants
Bean, snap	Tomato
Corn, sweet	
New Zealand spinach	
Squash, summer	

Warm-loving
(plant 1-2 weeks after average frost-free date)

Seed	Transplants
Bean, lima	Eggplant
Cucumber	Pepper
Muskmelon	Potato, sweet
Okra	
Pumpkin	
Squash, winter	
Watermelon	

Freeze Dates and Number of Frost-free Days in Illinois



A

B

C

A
Average dates of the last 32° F. freeze in the spring. There is a 50-percent chance that a freeze will occur on the dates shown.

B
Average dates of the first 32° F. freeze in the fall. There is a 50-percent chance that a freeze will occur on or after the dates shown.

C
Number of frost-free days in Illinois. The growing period may be extended if the garden plants are protected, or if they are frost-hardy.

time when you are busiest with your summer garden. Irrigation is usually necessary during the late summer and early fall months. Weeds grow quickly, and the garden must be kept weed-free through shallow cultivation. Insects and diseases also thrive during warm, humid weather, and the vegetables need almost daily care. But the pleasure you will derive from a fall garden far outweighs the extra effort involved in planning and planting it.

The planting dates shown on page 23 will help you to decide when to plant your vegetables.

How to Plant _____

Starting Seeds

In starting seeds in the garden, follow these directions:

Use disease-free seed.

Mark out straight rows. Straight rows add to the attractiveness of your garden, and 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. For deeper furrows, use a wheel hoe or the corner of the hoe blade. Use correct spacing between rows and between the plants in a row (see table on page 24).

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.

Space the seeds uniformly in the row. Small seeds can sometimes be handled better if they are mixed with dry, pulverized soil and then spread. (See table on page 24 for the number of seeds to sow per foot or hill.)

Plant at proper depth. A good 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.

Cover the seeds and firm the soil. Pack soil around the seeds by gently tamping the soil with your hands or an upright hoe. Firming prevents

rapid drying of the soil and rainwater from washing away the seeds.

Thin the plants while they are young. Remove the weakest plants. If you wait too long before thinning, the plants may be injured from crowding. (See table on page 24 for the proper distances between plants after they have been thinned or transplanted.)

Setting Plants

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

Transplant on a cloudy day or in the evening.

Handle plants with care. About an hour before transplanting, thoroughly water the plants and soil in the containers (pots, bands, flats, etc.). The 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 without disturbing the roots. Keep a ball of soil around the roots.

Dig a hole large enough so that the transplanted plant sets slightly deeper than it grew in the container or seedbed. If you must use tall, spindly plants, set them on an angle in a trench.

Use starter solution to get plants off to a fast start.

Cover the roots with soil, and firm the soil tightly around the plant. Some plant-growing containers are carefully removed before transplanting. Other containers are planted "roots and all," and the roots should penetrate the container. The following containers are disposable, and should be carefully removed while transplanting: clay pots; plastic pots; plastic packs and trays; fiber pots and trays; and homemade containers (egg cartons, milk cartons, etc.). Roots penetrate the following containers, and the containers should be buried, roots and all, below the soil line: Jiffy-7 (pellets); Jiffy-9 (pellets); peat pots; fertile cubes; and soil blocks.

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 constructed from baskets, boxes, or jars. Do not leave the protector over the plants longer than necessary. If the weather gets warm during the day, remove the protector or open it so that the plants receive ventilation. Wire cages placed over early tomatoes (see page 108) serve as a framework that can be covered with plastic or heavy paper to protect against late frosts.

Planting Dates for Illinois Gardens

Summer Gardens

Southern Illinois: March 10-25
 Central Illinois: March 25-April 10
 Northern Illinois: April 10-25

Very Hardy Vegetables

Asparagus, crowns
 Cabbage, seed
 Collard
 Kohlrabi
 Leek, seed
 Lettuce, leaf
 Mustard greens
 Onion, perennial
 Onion, seed
 Onion, sets
 Pea
 Potato, irish
 Radish
 Rhubarb, plants
 Spinach
 Turnip

Southern Illinois: March 25-April 10
 Central Illinois: April 10-25
 Northern Illinois: April 25-May 10

Frost-Tolerant Vegetables

Beet
 Broccoli, plants
 Brussels sprout, plants
 Cabbage, plants
 Carrot
 Cauliflower, plants
 Chard, swiss
 Chinese cabbage, plants
 Leek, plants
 Lettuce, head, plants
 Onion, plants
 Parsley
 Parsnip
 Radish
 Salsify

Successive Plantings

Kohlrabi
 Lettuce, leaf
 Radish

Southern Illinois: April 10-25
 Central Illinois: April 25-May 10
 Northern Illinois: May 10-25

Tender Vegetables

Bean, snap
 Corn, sweet
 New Zealand spinach
 Tomato, plants

Successive Plantings

Lettuce, leaf
 Mustard greens
 Radish

Southern Illinois: April 25-June 1
 Central Illinois: May 10-June 1
 Northern Illinois: May 25-June 1

Warm-Loving Vegetables

Bean, lima
 Cucumber
 Eggplant, plants
 Muskmelon
 Okra
 Pepper, plants
 Potato, sweet, slips
 Pumpkin
 Squash, summer
 Squash, winter
 Watermelon

Successive Plantings

Bean, snap
 Beet
 Carrot
 Corn, sweet

Fall Gardens

Southern Illinois: June 1-July 15
 Central Illinois: June 1-June 15
 Northern Illinois: June 1-June 5

Brussels sprout
 Cabbage, direct seeded
 Collard
 Kale
 Kohlrabi
 Pepper
 Potato, irish
 Squash, summer
 Tomato

Successive Plantings

Bean, snap
 Corn, sweet
 Cucumber

Southern Illinois: July 15-August 1
 Central Illinois: July 10-20
 Northern Illinois: June 25-July 5

Bean, snap
 Beet
 Broccoli, plants
 Cabbage, plants
 Carrot
 Cauliflower, plants
 Chinese cabbage, plants
 Endive
 Okra
 Rutabaga

Southern Illinois: August 15-25
 Central Illinois: August 1-10
 Northern Illinois: July 15-25

Chinese cabbage
 Kohlrabi
 Lettuce, Cos
 Lettuce, leaf
 Mustard greens
 Radish, winter
 Turnip

Southern Illinois: September 10-20
 Central Illinois: August 25-September 5
 Northern Illinois: August 10-20

Lettuce, leaf
 Mustard greens
 Radish, spring
 Spinach

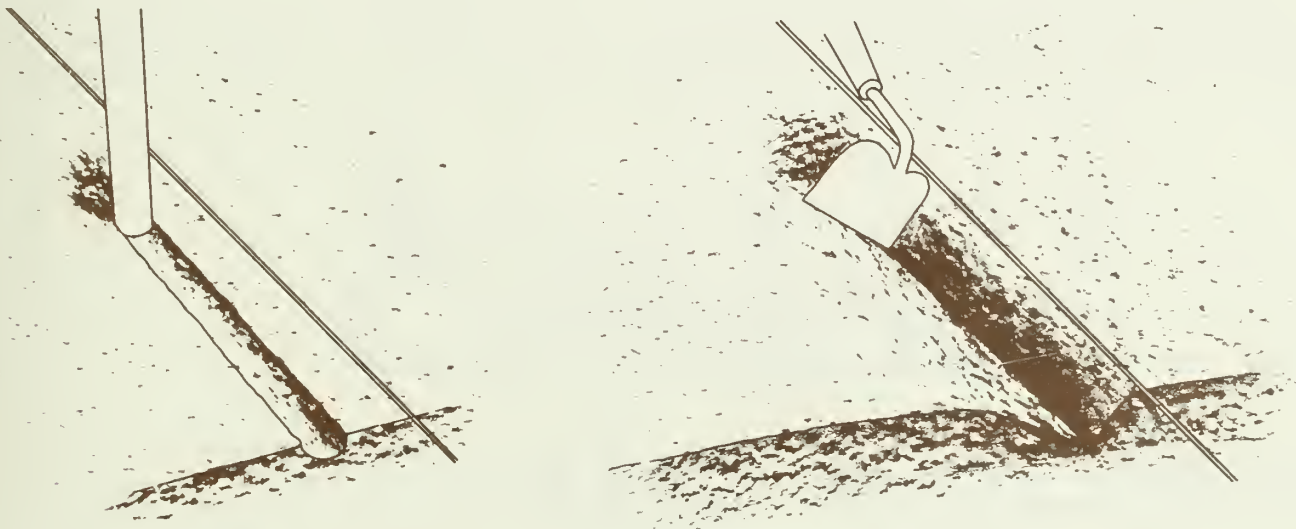
Vegetable	Seeds to sow per foot or hill	Inches between plants when thinned or transplanted	Inches between rows
Asparagus	—	10	36-60
Bean, bush, lima	3-4	Do not thin	18-30
Bean, bush, snap	6	Do not thin	18-24
Beet	10	2-3	12-18
Broccoli	—	18-24	30-36
Cabbage	—	12-18	18-30
Carrot	15-20	1-2	12-18
Cauliflower	—	18-24	24-36
Celery	—	6-8	24-36
Chard, swiss	8-10	4-6	18-24
Chinese cabbage	4-6	12-15	24
Corn, sweet	1-2 in row 4-6 per hill	9-12, single plants 36, hills (3 plants per hill)	24-48
Cucumber	3 in row	12, single plants 36, hills (3 plants per hill)	48-72
Eggplant	—	18-24	30-36
Endive	4-6	9-12	18-24
Garlic (from cloves)	—	3-5	12-18
Horseradish (from sets)	—	24	30-36
Kale	4-6	8-12	18-24
Kohlrabi	6-8	2-5	18-24
Leek	10-15	4	12-18
Lettuce, leaf	10	4	12-18
Muskmelon	3 in row 4-5 per hill	18-24, single plants 36, hills (3 plants per hill)	48-72
Mustard	20	2-4	12-18
New Zealand spinach	4-6	12	24-30
Okra	3	12-24	36
Onion (from seed)	10-15	1-2	12-18
Onion (from plant or set)	—	2-5	12-18
Parsley	10-15	6	12-18
Parsnip	15-20	2-4	18-24
Pea	10-12	Do not thin	18-24
Pepper	—	18-24	18-24
Potato, irish	1	Do not thin	24-36
Potato, sweet	—	12-18	36-48
Pumpkin	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120
Radish, spring	10-15	½-1	12-18
Radish, winter	10-15	2-4	12-18
Rhubarb	—	36-48	36-48
Rutabaga	4-6	6	18-24
Salsify	10-12	2-4	18-24
Soybean, edible	8-10	Do not thin	24-30
Spinach	12-15	2-4	12-18
Squash, summer	2-3 in row 4-5 per hill	24-36, single plants 48, hills (3 plants per hill)	36-48
Squash, winter	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120
Tomato	6-8	18-36	36-60
Turnip	15-20 (greens)	2-4	12-18
Watermelon	1-2 in row 4-5 per hill	24-36, single plants 72, hills (3 plants per hill)	84-120



Many gardeners tend to sow small-seeded vegetables too thickly. The plants must be thinned to allow space for proper growth and development. Thin plants carefully while they are small.



Plant tomato plants about $\frac{1}{2}$ inch deeper than they were grown previously (left). If only tall tomato plants are available, plant them in a shallow furrow rather than in a deep hole (right). The surface soil is warmer, and the roots will reestablish themselves along the stem.



To make a shallow furrow for planting seeds, draw a hoe or rake handle along a taut planting line (left). For deeper furrows, use the edge of a hoe blade (right).

Sample Sketch of a Vegetable Garden (10' x 20')



Tomatoes (5) — May 10
Plant 24" apart

Snap beans — May 10
Sow about 60 seeds

Lettuce — April 10
Sow 100 seeds
Thin to 2-4" apart

Onions — April 10
Plant 100 sets

Radishes — April 10
Sow 100-150 seeds

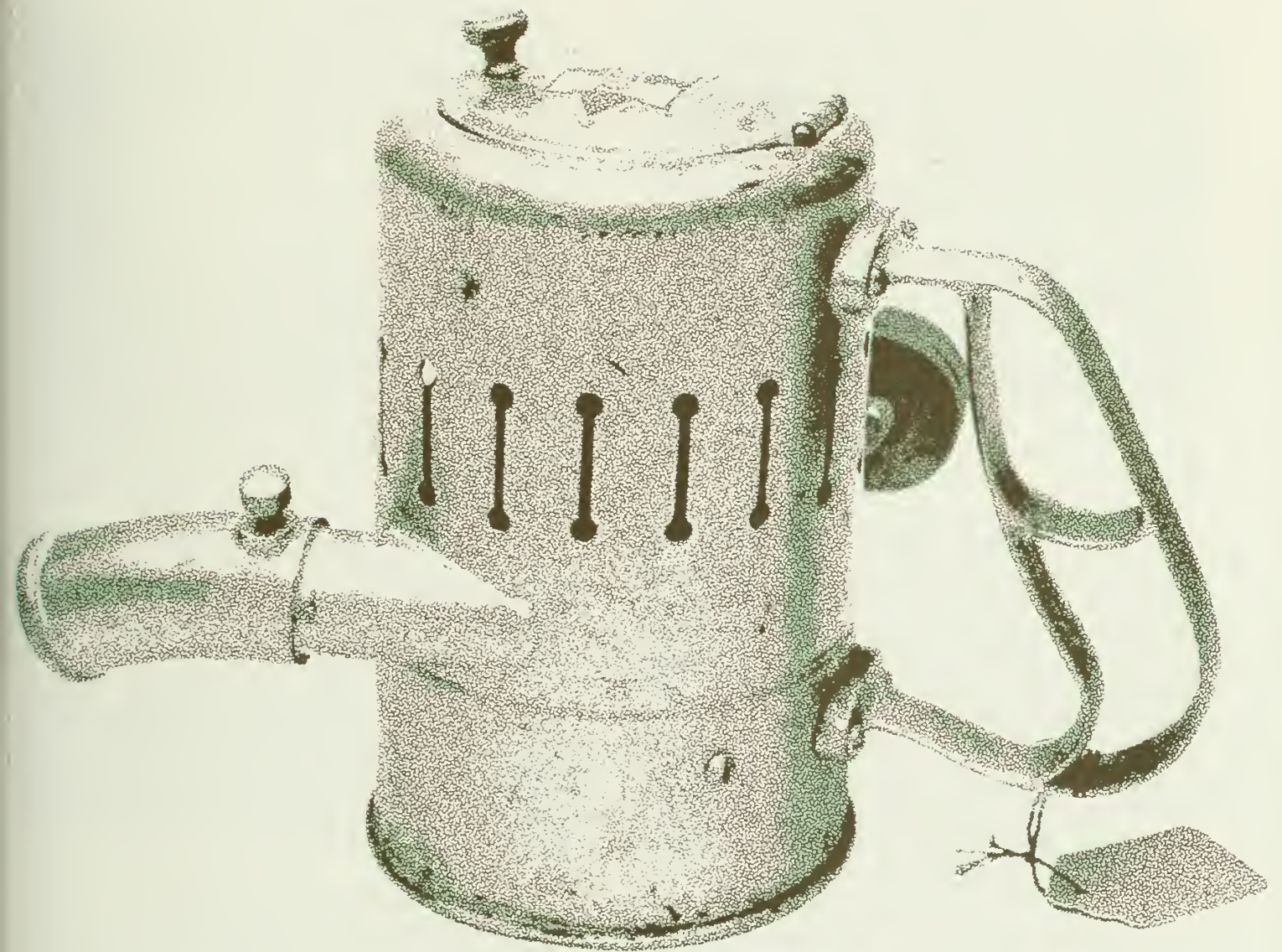
Beets — April 25
Sow 100 seeds
Thin to 2-3" apart

Broccoli (5-6) — April 25
Plant 18-24" apart

Swiss chard — April 25
Sow 80-100 seeds
Thin to 4-6" apart

Zucchini (2-3) — May 10
Plant hills 24" apart
Thin to best single plant

Cucumbers — May 10
Plant 10-15 seeds
Thin to best 4 plants about 12" apart



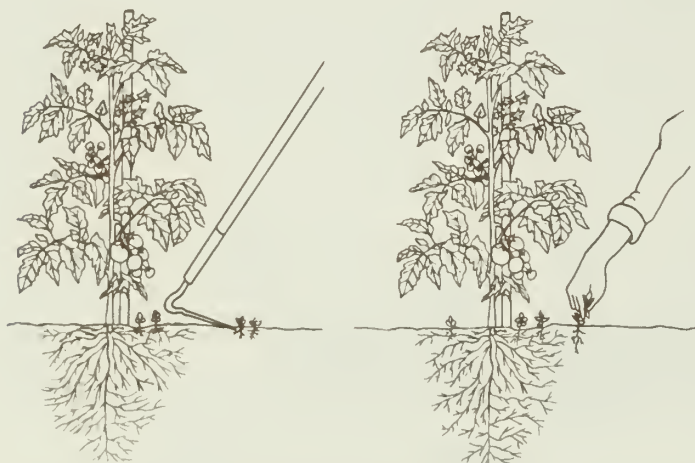
Caring for the Garden

Cultivation

The main purpose of cultivation is to control weeds. Some Illinois soils may need cultivation early in the season, however, to break the soil crust and aerate the soil. Weeds compete with vegetables for water, fertilizer nutrients, and light, and they may harbor insects and diseases. If weeds are allowed to become large, they will shade the vegetables and result in a poor crop.

Begin cultivation as soon as weeds begin to sprout, and repeat whenever they reappear, especially as the soil dries after irrigation or rain. Do not work the soil if it is too wet. The roots of many vegetables are near the soil surface, and can be damaged easily by a hoe or cultivator. Cultivate or hoe shallowly near plants and later in the season. Remember — the garden hoe is your most important tool. Use it properly.

Chemical weed control is not usually recommended for the home garden. Vegetables have varying tolerances for herbicides. Herbicides must be applied accurately and uniformly at the proper state of development of both the vegetable plant and the weed. Your garden will have many different kinds of vegetables in different stages of growth. You also should not apply herbicides in the yard near your garden because drift from the spray can damage the vegetable plants. Farm and market gardens can benefit from herbicides when the operator has the equipment and experience to apply these chemicals correctly.



Cultivate shallowly to prevent damage to the roots of vegetable plants (left). Pull weeds by hand when they are close to the plants (right).

Mulching

Mulching is covering the soil around vegetable plants with natural or man-made materials to control weeds, improve plant growth and yield, and keep vegetables clean. A mulch may have a cooling or warming effect on the soil, and soil temperature and moisture remain more uniform.

Vegetable plants usually grow better when mulched because an extensive root system develops undisturbed under the protective soil covering. The mulch prevents root pruning and injury when cultivation or hoeing is too close or too deep.

Although mulches help conserve moisture in the soil, they do not eliminate the need for water or irrigation. Mulches should be used in combination with other cultural practices such as stakes, cages, trellises, and irrigation.

Organic Mulches

The commonly used organic mulches include plant residues (straw, hay, leaves, grass clippings, crushed corncobs, peanut hulls, composts); peat; wood byproducts (sawdust, wood chips, shavings); and animal manures.

Many gardeners prefer to use organic mulches whenever possible (they are not available in certain areas). Organic mulches improve garden tilth as they decompose, returning organic matter and plant nutrients to the soil. They also keep soil moisture and temperature uniform, and usually have a cooling effect on the soil.

Organic mulches should be spread evenly over the soil between the rows and around the plants. Apply to a depth of 3 or 4 inches to keep down weeds. You may still need to remove a few weeds by hand.

Properly applied, organic mulches will benefit most garden vegetables. Because organic mulches slow the soil from warming in the spring, they should be placed on the soil after the plants have begun to grow and are well established. As the season progresses (and especially for late summer plantings), the cooling effect of organic mulches can be quite beneficial for many vegetables.

Unfortunately, organic mulches also have certain disadvantages — they are bulky, difficult to handle, and may require side dressings of nitrogen fertilizer (light green or yellowish leaves indicate that the vegetable plant needs nitrogen). Do not use organic mulches on poorly drained soils or soils where water is standing.

Synthetic Mulches

Black plastic (polyethylene) film blocks sunlight from the soil, and weeds do not grow beneath it. It warms the soil by 5° to 10° F., benefiting early spring plantings and warm-loving vegetables. As the mulched area is shaded by foliage, the soil temperature becomes about the same as that in the unmulched areas that are also shaded by foliage.

Black plastic film 1½ mils thick and 3 to 4 feet wide may be used for beans, cucumbers, eggplant, muskmelons, peppers, pumpkins, summer squash, tomatoes, watermelons, and winter squash. It can also be used advantageously in northern Illinois for early planted sweet corn, broccoli, and cabbage.

Clear plastic film raises the soil temperature by 10° to 20° F. or more at the surface. Clear plastic is preferable to black plastic for unusually cool seasons because the extra warming speeds up seed germination and growth in cold soil. Clear plastic film 1½ mils thick and 1½ to 3 feet wide may be used to cover rows of early planted peas, radishes, lettuce, sweet corn, beans, and potatoes.

The main problem with clear plastic is that weeds grow under the plastic along with the vegetables. The plastic should be removed after the vegetable seedlings have emerged. For potato plants, the film may be kept in place and covered with organic mulch to smother weeds growing underneath. Cut slits in the film so that the potato plants can grow. Sweet corn plants may be left folded under the plastic for up to three weeks in early spring, but

watch for high-temperature buildup — it can burn off the plants.

Seeds can be planted through plastic mulches by cutting slits in the film with a sharp knife. An old-fashioned corn jabber can be used to cut slits and plant seeds in one operation. Simply push the jabber through the film and operate it in the usual way. Flower-bulb planters with the bottom edge sharpened can be used to cut a hole in film mulch and remove a plug of soil in preparation for transplanting through the mulch.

Black and clear plastic film can be readily obtained from garden centers, hardware stores, and mail-order houses, or through seed catalogs. Other synthetic mulching materials include paper, paper-plastic combinations, foil, and foil-paper combinations.

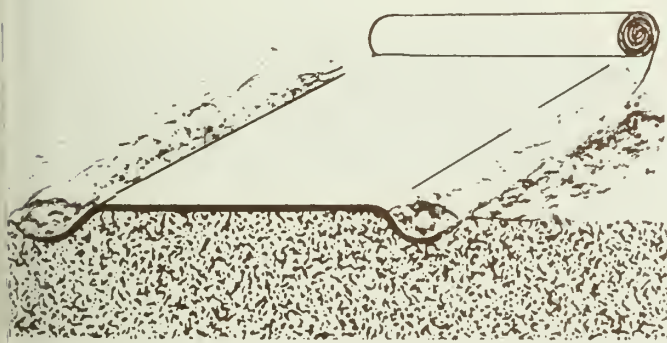
Watering

Water is important for producing high-quality crops. There are usually dry periods during the growing season when you will have to water your garden to start seeds, to keep vegetables growing vigorously, and to produce continuous fruiting.

When to Water. Water vegetables once a week during dry periods (when less than 1 inch of rain falls during a week). Watering early in the day so that moisture on the plants dries will help to keep down many diseases. (The critical periods of water needs for various vegetables are shown on page 30.)

How to Water. It is better to soak the soil thoroughly to a depth of at least 6 inches than to sprinkle 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 during the growing season. To measure the amount applied by overhead sprinkling methods, place four or five cans in the area being irrigated. These cans will collect approximately the same amount of water as the soil.

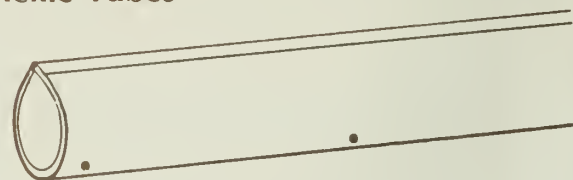
Trickle irrigation is a method of watering vegetable plants analogous to side-dressing fertilizer. Water is applied directly on the row by a special tube or hose, usually at low pressure. In addition to the original porous canvas tube, there are now many kinds of plastic tubes that pass water through their walls at a slow rate.



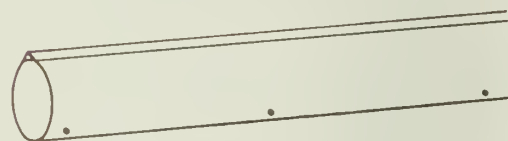
Black plastic film keeps down weeds, warms the soil, and conserves moisture and fertility. Anchor the film against the wind by covering the edges as well as the ends with 4 to 6 inches of soil. The soil should be well prepared, properly fertilized, and moist.

Vegetable	Critical period of water needs
Bean, lima	Pollination and pod development
Bean, snap	Pod enlargement
Broccoli	Head development
Cabbage	Head development
Carrot	Root enlargement
Cauliflower	Head development
Corn, sweet	Silking, tasseling, and ear development
Cucumber	Flowering and fruit development
Eggplant	Uniform supply from flowering through harvest
Melon	Fruit set and early development
Onion, dry	Bulb enlargement
Pea	Flowering and seed enlargement
Pepper	Uniform supply from flowering through harvest
Potato	Tuber set and tuber enlargement
Radish	Root enlargement
Squash, summer	Bud development and flowering
Tomato	Uniform supply from flowering through harvest
Turnip	Root enlargement

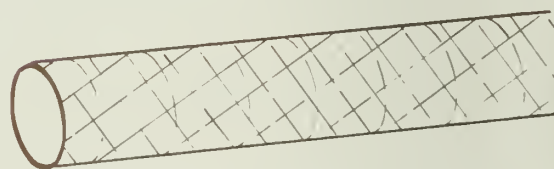
Trickle Tubes



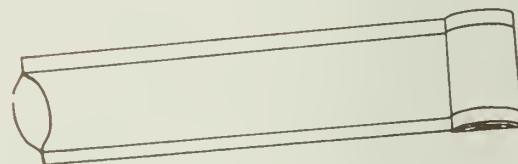
Twin-wall



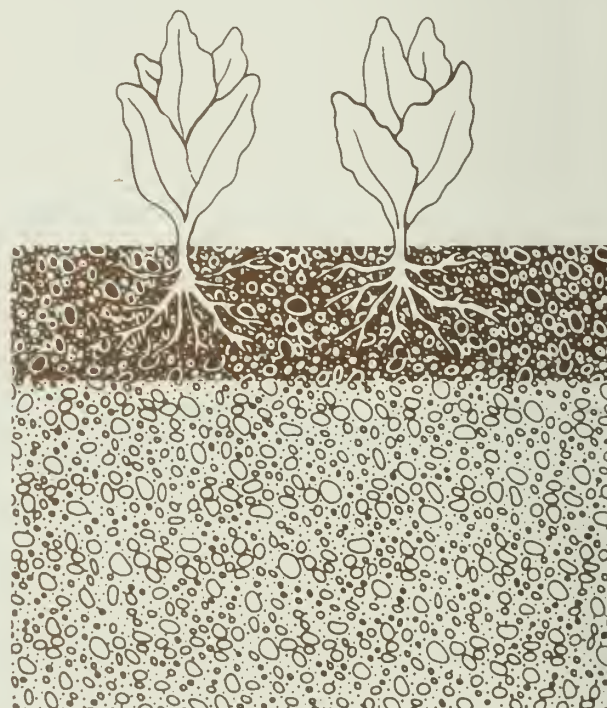
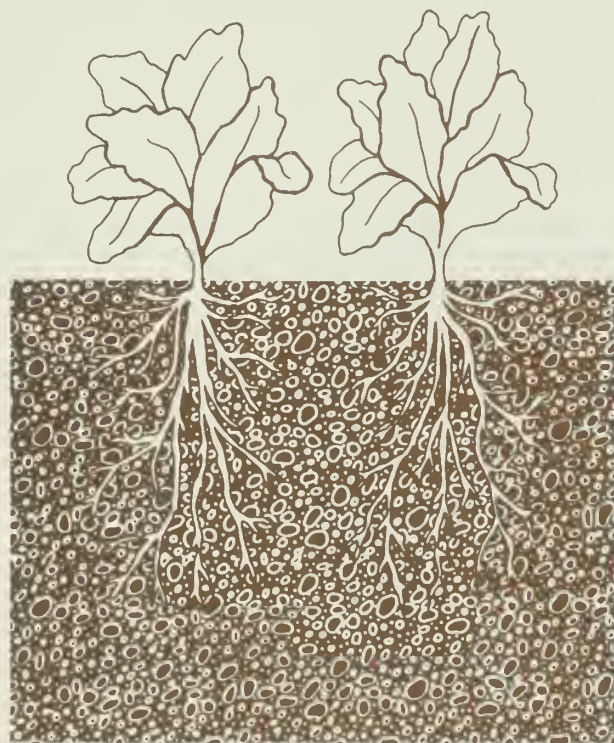
Single-wall



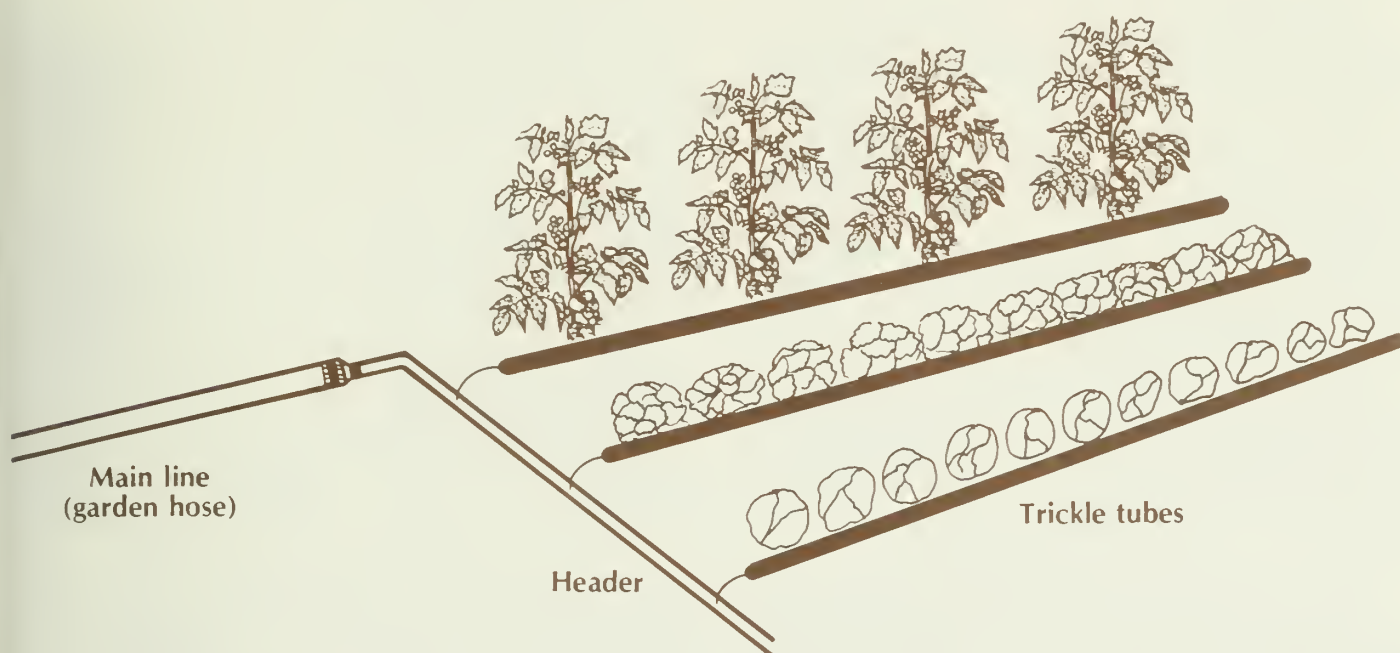
Canvas



Ooze



To encourage deep rooting, thoroughly water the upper 6 to 8 inches of soil (left). Shallow watering (right) promotes shallow development of roots, resulting in poor growth and increased risk of injury under severe weather conditions.



Trickle irrigation. A trickle line (tube) is placed beside each row of vegetable plants (or between pairs of rows). The system is supplied by a clean water source from a main line (garden hose, plastic pipe, etc.) to a header. Some of the new trickle irrigation systems require low water pressure, and the installation instructions vary according to the manufacturer.

The tubes may be placed at the side of a row or between companion rows so that they water the plants rather than the soil (walking path) between the rows. Some tubes may be buried 1 to 2 inches deep in the soil. Trickle irrigation uses less water and gives a more uniform supply of water than other watering systems, but it is costly to install.

Watering the Seedbed. Summer and fall gardens often require water to establish the crop because the soil has dried out during the summer months. If the soil is dry when you are ready to plant, apply $\frac{1}{2}$ to 1 inch of water uniformly to the area to be planted. After the water is equalized within the topsoil, lightly work the surface by raking or very shallow cultivation. This operation often requires one day.

Seed the vegetables, but do not apply additional water for one to two days. If it doesn't rain for two days, apply about $\frac{1}{2}$ inch of water every other day until the seed is germinated. This treatment is particularly important for green, wax, and lima beans. Heavy watering immediately after planting will cause these seeds to split, resulting in "bald heads," reduced yields, and complete crop failure.

Controlling Garden Pests

Make sure that you have identified your problem correctly. Plant symptoms can have many different causes: diseases (fungus, bacteria, virus); insects (foliage feeders and soilborne); chemical injury (from insecticides, fungicides, herbicides, and fertilizers); nematodes; mechanical damage (from hoeing and cultivating); and weather (cold, heat, wind, and lightning). Each of these causes requires a different solution. Although it may be necessary to use chemicals for certain pests, you can prevent many garden problems by following the general control practices listed below.

Grow disease-resistant varieties and hybrids.

Use treated seed.

Inspect purchased plants carefully. Check for cankers, spotty leaves, and root swellings. The plants should stand erect and have healthy green leaves.

Fertilize your garden properly for vigorous plant growth. Remember — nitrogen (N) promotes leaf growth; phosphorus (P) is responsible for fruit set,

as well as stem and root growth; and potassium (K) is necessary for root development and general disease resistance.

Keep weeds out of the garden. Weeds harbor both insects and diseases. Mow and weed all areas surrounding the garden.

Mulch plants. Mulching helps to keep down soilborne diseases and moisture stress. Always use disease-free mulches.

Do not work in the garden while the plants are wet. Cultivation or harvesting under wet conditions will cause plant diseases to be spread from infected to healthy plants.

Remove plant residues after each crop. Destroy plant materials that are infected with diseases or infested with insects. Plant materials that are not infected or infested may be composted or worked into the soil. Composting does not usually generate enough heat to destroy diseases or insects.

Each year rotate the vegetables in your garden to different locations. Certain related crops are susceptible to the same diseases. If possible, avoid planting any of the vegetables *within* each of the following groups in the same location more than once every three years. For example, cabbage and turnips should not be planted in the same location for two succeeding years. Cabbage could be followed, however, with late beans, cucumbers, and corn.

Cole crops (cabbage family): broccoli, brussels sprout, cabbage, cauliflower, kohlrabi, rutabaga, turnip.

Cucurbits (cucumber family): cucumber, gourd, muskmelon, pumpkin, squash (summer and winter), watermelon.

Solanaceous (tomato and potato family): eggplant, irish potato, pepper, tomato.

Use attractant baits to get rid of slugs and snails.

If necessary, construct a fence to keep out dogs, rabbits, and other animals.

Insects

You will find many kinds of insects in your garden. Some of these insects are destructive, some do not cause any damage, and some are actually beneficial because they feed on destructive insects. For example, lady beetles and aphid lions feed upon aphids, and parasitic wasps feed upon caterpillars and other insects. Natural populations of these insects should be encouraged, but it is questionable whether it is worthwhile to purchase them for release in your garden.

Destructive insects that attack certain vegetables (beans, broccoli, cabbage, cucumbers, eggplants,

muskmelons, etc.) each year are discussed under "Major Vegetables," pages 42-112.

Destructive insects that attack many garden crops are illustrated in the table on page 33. By comparing the insects with the symptoms of damage shown in the table, you can identify many common garden problems. (Since control measures are continually being developed and are subject to change, no specific recommendations for the control of insects and diseases are included in this book. Publications that offer this information are listed on page 132.

Some gardeners believe that certain herbs (catnip, rosemary, thyme, marigold, etc.) repel destructive insects. Extensive experiments conducted at the University of Illinois have not borne out this theory.

Diseases

Vegetables are subject to many diseases caused by plant pathogens (fungi, bacteria, viruses, and nematodes). Those diseases that are frequently found on particular vegetables are discussed under "Major Vegetables," pages 42-112. Diseases that are common to many vegetables are discussed below.










Damping-Off of Seedlings. Damping-off is caused by several soil fungi that affect both germinating seed and tender seedlings in the garden, in the home, or in special plant-growing structures (cold frames, greenhouses, hotbeds, etc.). When a seedling is attacked at ground level, it collapses. Damping-off can be prevented to a large extent by planting seeds in soil with the proper moisture and temperature, and by good culture (correct planting depth, spacing, watering, etc.).

Unless the fungi are controlled, they spread rapidly, and the entire seedling crop can be destroyed in a few days. Most commercially purchased seed has been treated against damping-off by the seed processor. You should also pasteurize any soil (see page 36) that is brought into the house for growing transplants.

Fungus Diseases of Mature Plants. Many fungus diseases attack vegetables, infecting both foliage and fruit. Early blight of tomatoes is the most common fungus-caused disease in Illinois gardens. Some fungus diseases (fusarium and verticillium wilts, for example) can best be controlled by planting resistant varieties.

Common blight diseases of carrots, cucumbers, irish potatoes, melons, pumpkins, squash, peppers, and eggplant can be prevented by applying a fungicide. To obtain effective control of fungus diseases on these crops, you must (1) select the correct fungicide;

Destructive Insects

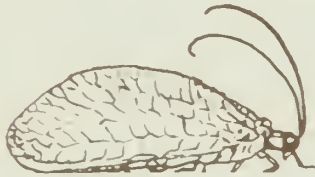
Insect	Description	Crops attacked	Symptoms of damage
Aphids or plant lice 	Tiny (less than 1/8 inch long), soft-bodied, usually wingless insects. Color ranges from pale green to black. Slow-moving. Often not noticed until there are many upon a plant.	Bean, broccoli, cabbage, cucumber, irish potato, muskmelon, squash, sweet corn, tomato, watermelon.	Curled leaves; "honeydew" (clear, sticky substance on leaves and fruit given off by aphids, turns black from mold growth); many tiny, soft-bodied insects.
Blister beetles 	1/2-5/8 inch long. Soft-winged black, gray, or striped beetles. Fast-moving. Usually appear in groups.	Bean, irish potato, tomato.	Blister beetles damage foliage by chewing and by secreting a toxin that causes wilting and leaf-burn. If unchecked, beetles can strip foliage from plants in a short time.
Cucumber beetles 	1/4 inch long. Black and yellow spotted or striped beetles. Feed on foliage, flowers, stems, or fruit. Fly from one plant to another.	Cucumber, muskmelon, squash (summer and winter), pumpkin, watermelon.	Holes in foliage; chewed flowers; scarred stems and fruit surfaces. Beetles may carry bacterial wilt disease that causes plants to wilt and die.
Cutworms 	Up to 1 1/2 inches long. Black, gray, or mottled caterpillars. Usually a single cutworm found curled up beneath soil surface at base of damaged plant.	Broccoli, brussels sprout, cabbage, cauliflower, eggplant, kohlrabi, pepper, sweet corn, tomato.	Cut-off or wilted plants. Cutworms chew through plant stems at or just beneath soil surface. They may also feed on ripening tomato fruits, leaving small, round holes.
Flea beetles 	Shiny, usually black beetles, often not observed because of their small size (1/16 inch) and ability to jump quickly from plants when disturbed.	Cabbage, chinese cabbage, eggplant, radish, spinach, sweet corn, turnip.	Flea beetles scratch holes or leave white streaks in green foliage in late spring. Intense feeding results in wilting and dying of leaves and decreased yield.
Grasshoppers 	Vary widely in size, up to 1 1/2 inches long. Color ranges from green to brown. Hop or fly. Young present in early summer, develop into large-winged adults by late summer.	Most vegetables.	Holes chewed in foliage.
Leafhoppers 	Up to 3/8 inch long. Green color. Wedge-shaped. May migrate from one area of garden to another. Hop away in large numbers when foliage is disturbed.	Bean, carrot, cucumber, irish potato, muskmelon.	Curled or crinkled foliage; "hopper burn" (caused by leafhoppers' feeding, indicated by brown edges on leaves). Leafhoppers may have migrated from damaged plants.
Maggots, root 	Tiny (up to 1/8 inch long), white, legless worms. Found in tunnels in underground parts of vegetables. Usually confined to northern one-third of Illinois.	Cabbage, onion, radish, rutabaga, turnip.	Wilting or stunting of plants. Numerous brown or gray tunnels throughout underground parts of vegetables.
Slugs (snails without shells) 	Range in size up to 2 inches long. Shiny, slimy, soft, legless animal. Seldom seen in daylight.	Most vegetables.	Paths of slugs marked by shiny mucous trails. Some feeding on foliage and scarring of fruit.

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Beneficial Insects



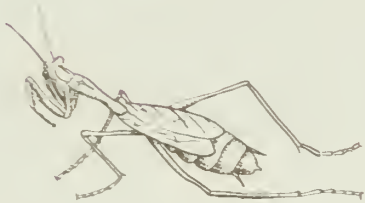
Aphis lion
($\frac{1}{2}$ inch)



Golden-eyed lacewing fly
(adult of aphid lion)
($1\frac{1}{4}$ inches)



Parasitic wasp
($\frac{1}{8}$ -2 inches)



Praying mantis
($2\frac{1}{2}$ inches)



larva



pupa

Lady beetle
($\frac{1}{4}$ - $\frac{3}{8}$ inch)

(2) apply it at the proper time; and (3) thoroughly cover all aboveground plant surfaces.

Fungicides may be applied as a dust or as a spray. They are most effective when applied as a preventive measure — before the disease appears. Follow the directions on the label of the container.

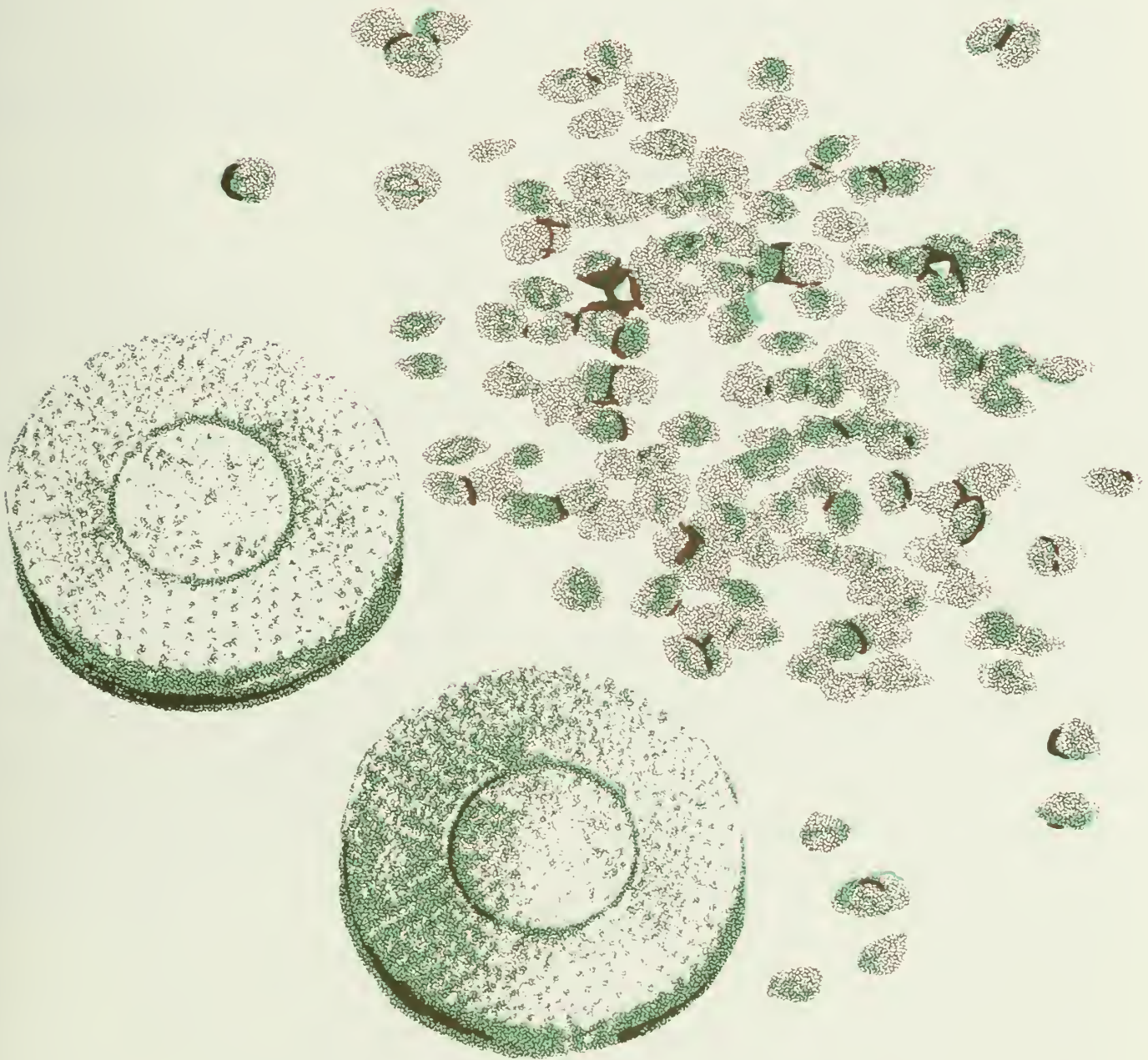
Root-Knot Nematodes. All vegetables are attacked by small, wormlike animals called *nematodes*. Root-knot nematodes burrow into the roots of plants and cause small, knotlike to rounded swellings or "galls." Galls are swellings *within* the root, as contrasted with beneficial bacterial nodules, which are attached loosely on the roots of peas and beans. Plants with severe root galling grow slowly, appear unthrifty, tend to wilt in dry, hot weather, and may die prematurely. The only control for home gardeners is to change the location of the garden or to fumigate the entire area with a nematicide.

If you suspect that nematodes are damaging your crops, send several diseased plants, including the roots, to the Nematode Laboratory, 106 Horticulture Field Laboratory, University of Illinois, Urbana, Illinois 61801. Ask your county extension adviser for information on how to collect and mail specimens for nematode analysis.

Bacterial and Virus Diseases. Many gardens have bacterial and virus diseases. These diseases are primarily transmitted by insects carrying the disease-causing organisms. When weeds and perennial plants serve as hosts for infection, insect control is essential. Many bacterial and virus diseases can also be spread within the garden by hoeing, cultivating, pruning, and harvesting. For this reason, infected plants should be removed as soon as possible.

Blossom Drop. Extreme weather conditions may cause blossoms and small fruits to drop. Blossom drop results in the failure of fruits to develop on beans, peppers, and tomatoes. 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 herbicides may sometimes be involved.

Starting Plants at Home



Growing Media

It is desirable to use a sterile plant-growing medium. Several kinds of soilless growing mixes, germinating mixes, potting soils, peat cubes, and compressed pellets may be obtained from garden centers, seed stores, and garden catalogs. These are usually free from insects, diseases, and weeds, and have enough fertilizer incorporated for the first three or four weeks of plant growth. They are easy to use, and many gardeners and commercial growers believe that their extra cost is justified.

Outdoor soils may also be used for growing plants. Unfortunately, these soils often need improvement in fertility, aeration, and drainage, and they may harbor insects or disease organisms.

If you use outdoor soil, you should fertilize it and mix in rotted compost or manure the summer before you intend to use it. A good soil mixture for growing plants may be made by combining the following ingredients: 1 part fertile garden soil; 1 part shredded peat moss or well-decomposed compost; and 1 part vermiculite, perlite, or sand. Mix thoroughly and pasteurize if possible before using.

Pasteurizing the Soil

Pasteurization (heating at 180° F.) usually kills most diseases, weeds, and insects in the soil. You can pasteurize soil at home in your oven. After making sure that the soil mixture has adequate moisture for seed germination, put the mixture in a pan or glass dish (the mixture should not be more than 3 to 4 inches deep). Place a thermometer in the center of the mixture, cover with aluminum foil, and put in the oven.

Set the oven at 250° to 275° F., and heat until the soil temperature (as indicated by the thermometer) is 180° F. Lower the oven temperature and maintain the soil temperature at 180° F. for 30 minutes. Remove the soil from the oven and allow it to cool before planting. Be careful not to contaminate the mixture with unclean tools, soil, or seeds.

It is equally important to clean old or used plant containers, pots, and tools with a disinfectant. You can use 1 part of household bleach (5.45 percent sodium hyperchlorate) mixed in 9 parts of water. Thoroughly wash the container and tools outdoors, and allow them to dry completely before use.

Sowing Seeds

The most common method of starting seeds is to sow them in shallow boxes in rows about 2 inches apart and cover lightly with vermiculite. Soon after the seedlings come up, they can be transplanted to trays, pots, or other containers.

A simpler method of starting seeds is to sow the seeds directly into the final growing container. This method saves a step in handling the tender seedlings, and avoids the transplanting shock. It requires additional space, however, because of the larger number of containers needed. The dates for planting various vegetable seeds indoors are shown below.

Vegetable	Planting dates		
	Southern Illinois	Central Illinois	Northern Illinois
Broccoli	February 15	March 5	March 25
Cabbage	to	to	to
Cauliflower	March 1	March 15	April 5
Lettuce			
Eggplant	March 5	March 25	April 1
Herbs	to	to	to
Pepper	March 15	April 5	April 15
Tomato			
Cucumber	April 1	April 15	April 25
Muskmelon	to	to	to
Watermelon	April 10	April 25	May 5

Temperature

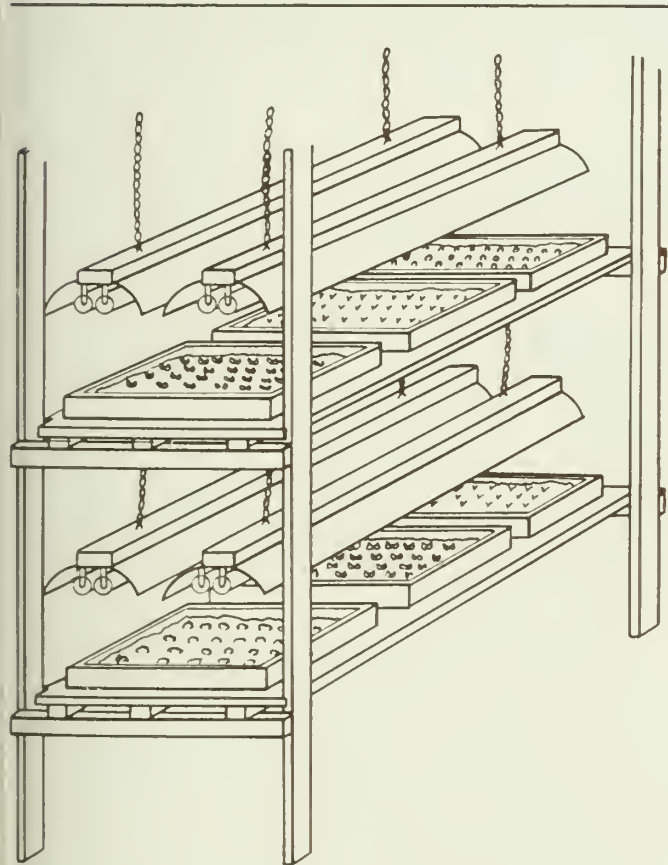
The temperature of the medium is important for rapid and successful seed germination. Often the medium will have a lower temperature than the surrounding air. To insure the proper temperature for seed germination, use a thermometer with a soil probe. The temperature can be increased by covering the seed containers with glass or clear plastic, or by adding heat with special heating cables or mats. Heating cables or mats are especially helpful when large numbers of plants are to be grown.

The table on page 39 shows the optimum temperature ranges for germinating seeds and for growing vegetable plants. Frost-tolerant plants can be hardened out-of-doors for one to two weeks before they are planted in the garden. Growing times for plants may be changed significantly by temperature, moisture, and light.

Watering and Fertilizing

Next to proper temperature, uniform moisture is the most important requirement for seed germination. Some containers, such as peat pellets, dry out quickly and may need frequent watering. Water the plants as they grow in size, but do not water too much.

Your soil or growing medium should be fertile enough to sustain the plants for the first three or four weeks. You may supplement the fertility of the soil or growing medium by adding water-soluble fertilizer. Use the fertilizer (10-50-10, 20-20-20, 18-12-6, etc.) at rates of 1 tablespoon per 1 gallon of water. Apply once a week, or less often, as needed for plant growth. It is good practice to use plain water between feedings because water prevents the accumulation of fertilizer salts that could injure the young plants.



Structures for growing transplants may be homemade or purchased. The structures should be sturdy, and the lights should be adjustable for height.

Light

Vegetable plants need direct light. A window that receives sunlight only part of the day may not furnish enough light to grow the best plants. Many gardeners use plant-growing lamps to supplement the light coming in through a window, or when there is no natural light.

Large lighting setups may require special electrical circuits, and the wiring and ballasts may be separated from the fixtures themselves. Light fixtures may be purchased as complete units, or they may be assembled at home. Ask an electrician for help.

Artificial light systems in a workroom, family room, kitchen, garage, or basement may be the total source of light. Make sure that the temperatures are suitable for the plants you want to grow. For the best plant growth as well as for germination, you may need to provide supplemental heat in addition to light. An accurate thermometer is essential.

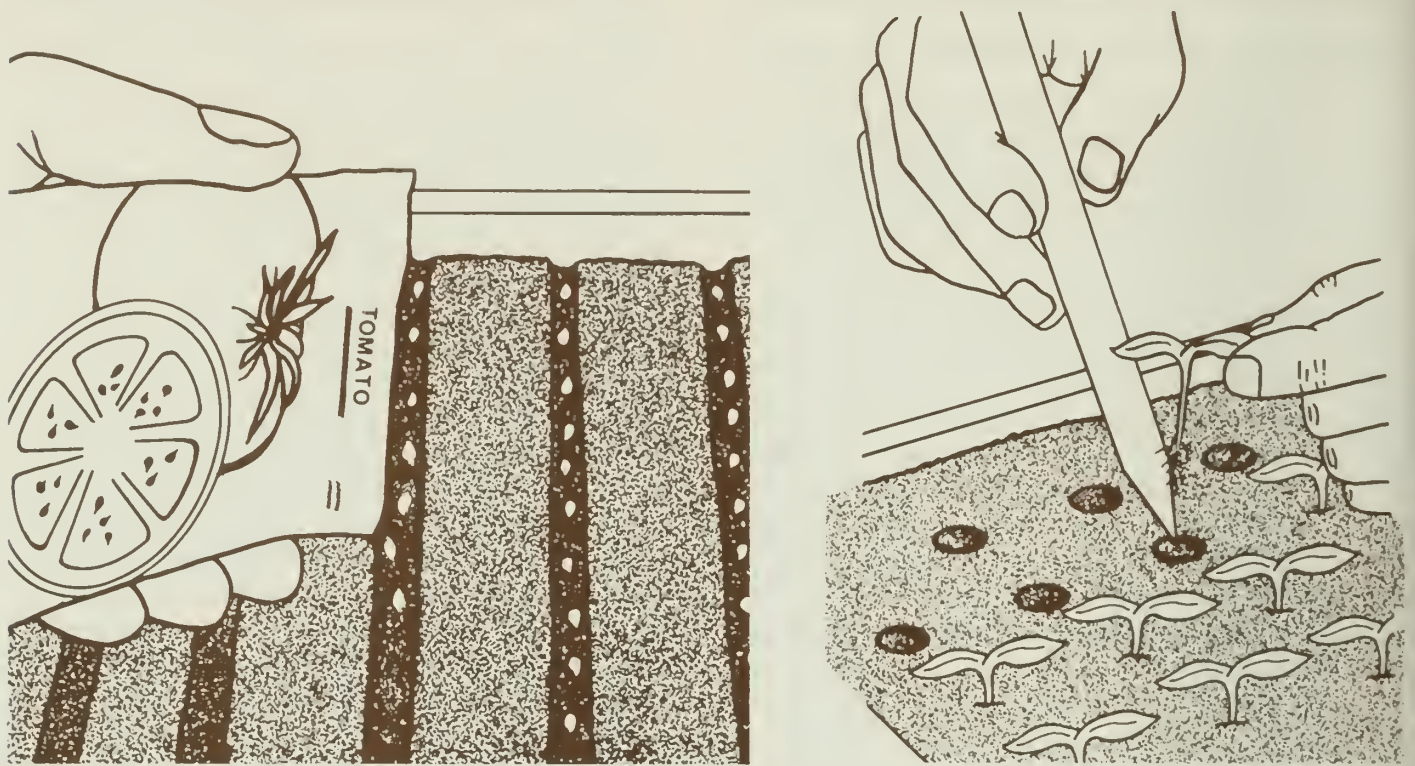
Two double-tube fixtures (a total of four tubes) placed side by side are preferable to one fixture with two fluorescent tubes. They will provide light for a 16- to 18-inch-wide growing area. Long fluorescent tubes (48, 72, or 96 inches in length) will produce more light than shorter ones (18, 24, or 36 inches) combined to produce the same length. The standard 40-watt, 48-inch-long fixture is the most popular, and replacement parts for this unit are readily available.

Cool White is the most commonly used tube. Add one or two incandescent light bulbs with each four-tube fluorescent bank of lamps. This simple addition provides light quality for plant growth that is superior to fluorescent light alone.

There are several kinds of "plant-growth" lamps designed for indoor-light gardening. Their light will not appear as strong to the eye as light from Cool White tubes, however, and the color may be objectionable in a room environment.

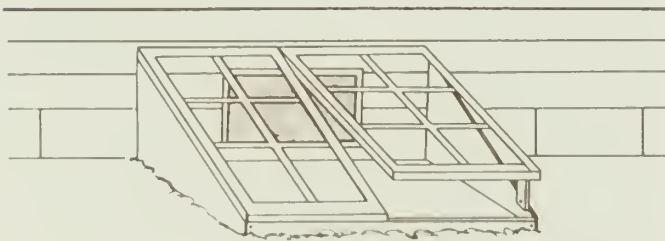
Seedlings and plants should be lighted for 12 to 16 hours per day. Do not light onion plants for more than 12 hours. A timer that automatically turns the lights on and off is helpful.

Place the lamps close to the leaves of the plants. A distance of 6 to 12 inches is recommended. There is twice as much light (intensity) 6 inches away from a fluorescent tube as from 18 inches away. Make either the light fixtures or the plant shelf adjustable to permit close spacing of lights as the plants grow in size. The total weight of lights, plants, and growing media can be substantial. For this reason, be sure that the supports and tables are sturdy.



Seeds can be sown uniformly in germinating flats or containers (left) and covered lightly with soil or vermiculite. The seedlings may be left in the original containers or transplanted into flats, pots, peat pellets, or other growing containers soon after the seed leaves (cotyledons) are fully developed. Make a hole in the growing medium with a pencil-like stick. Hold the seedling carefully by the tip of the seed leaf to avoid damage to the tender stem (right). Insert the roots of the seedling in the hole and gently firm the medium. Water thoroughly.

Before plants grown under lights are transplanted outdoors, they should be gradually hardened by exposing them to outside conditions. Place the plants outdoors a few hours each day, extending the period as you approach planting time. Frost-tolerant vegetables can be left outdoors in cold frames for their final growth and hardening. The degree of success achieved in growing plants under lights varies with the kind of plants, the length of time that they are grown, and the mixtures of lights and intensities that are used.



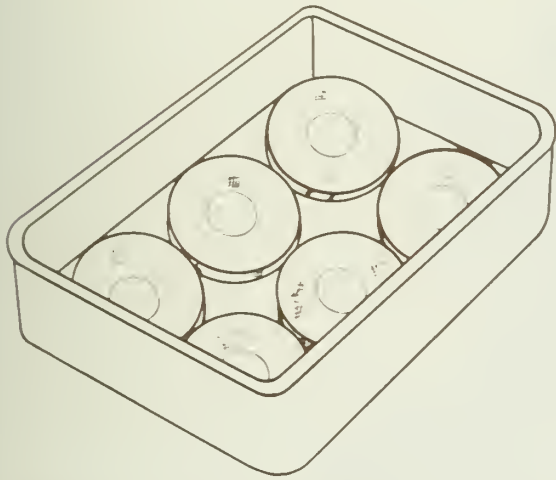
A cold frame (which depends upon solar energy for heat) or hotbed (with supplemental nighttime heat) can provide outdoor growing space for large numbers of plants and for hardening plants in preparation for planting.

Growing Time

The time required to grow plants to a stage suitable for transplanting to the garden varies with the kind of vegetable and the environmental conditions under which the vegetable is grown. If you cannot provide the best conditions, grow your plants for less time (three to six weeks, for example) than shown in the table on page 39, and then transplant the smaller, younger plants in the garden. Even though they may not be as large as they might have been under ideal conditions, they are preferable to tall, spindling plants for starting outdoors.

You can also germinate the seed indoors until the seedlings are started, and then place them outdoors in a protected location during the day. Bring the plants inside at night to protect them against cold temperatures. A hotbed or cold frame is helpful if many plants are grown.

Growing plants out of season in a *home-greenhouse* can be a rewarding hobby. The best plants are usually grown in greenhouses because light, temperature, ventilation, and moisture are more easily controlled.



Peat pellets for growing plants at home can be readily obtained through catalogs or from garden centers. The pellets, which are dry and compressed, can be purchased in a special plastic tray for easy handling (left). When you are ready to plant, expand the pellets by submerging them in water. Use warm water for best results. Seeds may be planted or seedlings may be transplanted into the expanded pellets (right). Use a pencil-like stick to make a hole in the top of each pellet. Gently firm the peat mixture over the seeds or around the roots of the seedlings.

Vegetable	Seed germination		Growing plants			
	Optimum soil temperature, degrees F.	Days for seedlings to emerge	Optimum air temperature, degrees F.	Spacing for best transplants, inches	Weeks before transplanting	Frost susceptibility
Broccoli	70-80	5	60-70	3 x 3	5-7	Tolerant
Brussels sprout	70-80	5	60-70	3 x 3	5-7	Tolerant
Cabbage	70-80	4-5	60-70	3 x 3	5-7	Tolerant
Cauliflower	70-80	5-6	60-70	3 x 3	5-7	Tolerant
Cucumber	70-95	2-5	70-80	3 x 3	3-4	Very susceptible
Eggplant	75-85	6-8	70-80	4 x 4	6-8	Very susceptible
Herbs	70-80	6-15	70-75	2 x 2	4-8	Varies
Lettuce	60-75	2-3	55-75	2 x 2	5-7	Moderately tolerant
Muskmelon	75-95	3-4	70-80	3 x 3	3-4	Very susceptible
Onion	65-80	4-5	60-70	—	8-10	Very tolerant
Pepper	75-85	7-8	65-80	3 x 3	6-8	Susceptible
Tomato	75-80	6	60-75	3 x 3	4-7	Susceptible
Watermelon, regular	75-95	4-5	70-80	3 x 3	4-6	Susceptible
Watermelon, seedless	85-95	5-6	70-80	3 x 3	4-6	Susceptible



Major Vegetables



Asparagus (also known as "grass") is a hardy perennial. It is the only vegetable that grows wild along roadsides and railroad tracks in Illinois. Although establishing a good asparagus bed requires considerable work, your efforts will be rewarded. A well-planned bed will last from 20 to 30 years. For this reason, asparagus should be planted at the side or end of the garden, where it will not be disturbed by normal garden cultivation. Asparagus is one of the earliest vegetables harvested in the spring.

Varieties

Mary Washington; Martha Washington; Waltham Washington; California numbered varieties and hybrids. All are resistant to rust.

When to Plant

Asparagus should be planted as soon as the ground can be worked in the spring. One-year-old crowns or plants are preferred. These plants may be purchased from a garden store or nursery or through a seed catalog. The young plants have compact buds in the center (crown), with dangling pencil-sized roots.

Spacing of Plants and Depth of Planting

Place the plants in a trench 12 to 18 inches wide and a full 6 inches deep. The crowns should be spaced 9 to 12 inches apart. Spread the roots out uniformly, with the crown in an upright, centered position.

Cover the crown with 2 inches of soil. Gradually fill the remaining portion of the trench during the first summer. Asparagus has a tendency to "rise" as the plants mature, and many gardeners apply an additional 1 to 2 inches of soil from between the rows in later years.

Care

As asparagus plants grow, they produce a mat of roots horizontally rather than vertically. In the first year, the top growth will be spindly. As the plants become older, the stems become larger in diameter.

Asparagus plants are *dioecious* (either male or female). The male plants develop more spears or stems than the female plants, but the stems are smaller in diameter. Gardeners plant both male and female plants in an approximate ratio of 1:1. Yields are not appreciably different between the sexes. After the first year, small red berries form on the female plants in late summer. Following freezing weather in the fall, the asparagus tops should be removed to decrease the chances of rust infection.

Asparagus should be fertilized in the same way as the rest of the garden for the first three years. In the spring, apply 10-10-10, 12-12-12, or 15-15-15 fertilizer at the rate of 20 to 25 pounds per 1,000 feet of area and incorporate with soil cultivation. Starting in the fourth year and thereafter, apply the same amount of fertilizer, but delay application until June or July (immediately after the final harvest).

Weeds and grasses are the worst problems with asparagus. They compete with the developing spears, make a foul area in the garden, and significantly decrease the yield and quality. Start frequent light, shallow cultivation early in the spring in both young plantings and patches that are being harvested.

Harvesting

Asparagus can be harvested the third year after planting crowns, but do not harvest for more than one month the first time. The plant is still expanding its root and storage system, and excessive removal of spears will weaken the plants. During the fourth year and thereafter, the spears may be harvested through May or June.

Harvest spears 5 to 8 inches in length by cutting or snapping. To cut a spear, run a knife under the ground where the spear is emerging. Since the spear will be cut below the point of fiber development, it will still be necessary to snap the stem. Cutting may damage some spear tips that have not yet emerged from the ground. To snap a spear, bend it from the top toward the ground. The spear will break at the point where it is free of fiber. Either method is acceptable — cutting is preferred by commercial growers and snapping by home gardeners. Asparagus deteriorates rapidly after harvest. If it is not eaten immediately, it should be processed or refrigerated.

Common Problems

Asparagus beetles are commonly found in home plantings. If numerous, they may be controlled by a suggested insecticide or by hand picking.



Asparagus beetle
($\frac{1}{4}$ inch)

Questions and Answers

Q. What causes my asparagus spears to have loose heads? **A.** When the weather turns hot, the growing point expands rapidly, and the bracts (green modified leaves) are spread by the early development of the stems and ferns. The asparagus is safe to eat — only the appearance is affected.

Q. Early spring freezes caused the asparagus spears in my garden to turn brown and wither. Are they safe to eat? **A.** Frozen tips should be harvested and thrown away. These spears, although not poisonous, will be off-flavor.

Q. Can I start asparagus from seed? **A.** Yes. You can grow your own plants by planting seeds $\frac{1}{2}$ inch deep and 2 inches apart in the row. Start the seeds in the spring when the soil temperatures have reached 60° F. Dig the plants the following spring, and transplant them to the permanent bed as soon as the garden can be worked. Growing your own plants delays establishment of your bed an additional year.



Seed
(4X)*

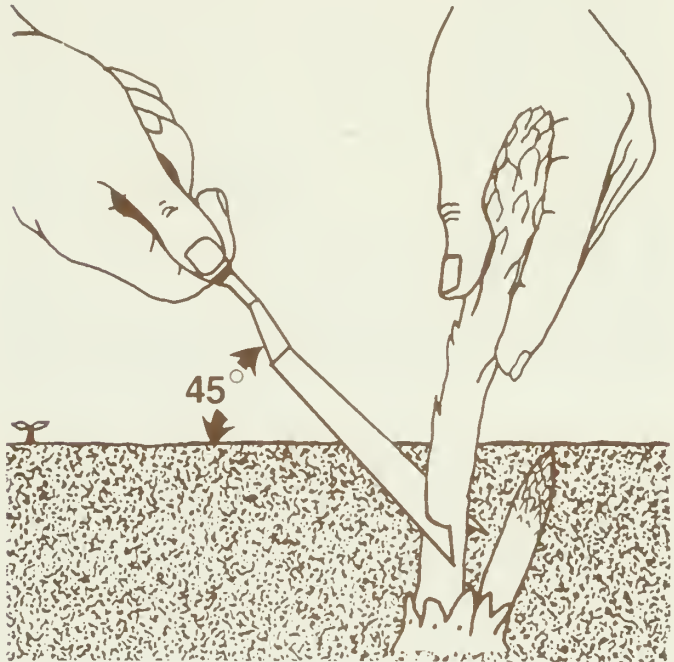


Seedling

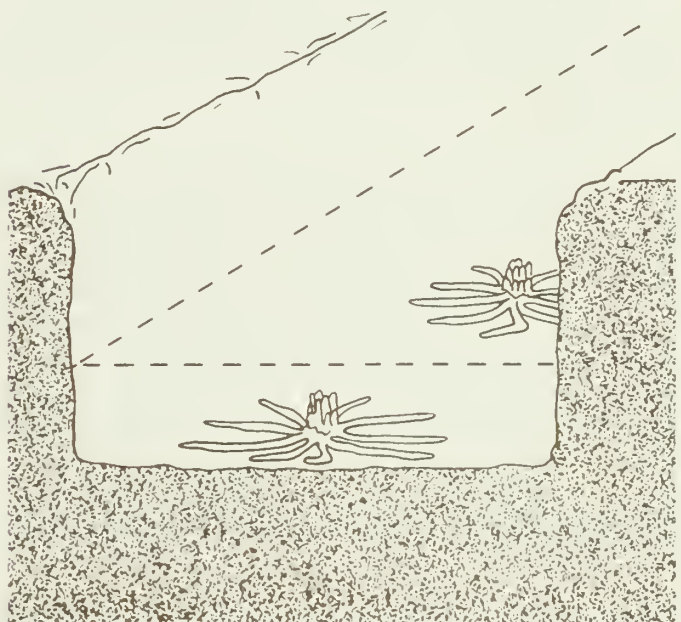


Spear tip

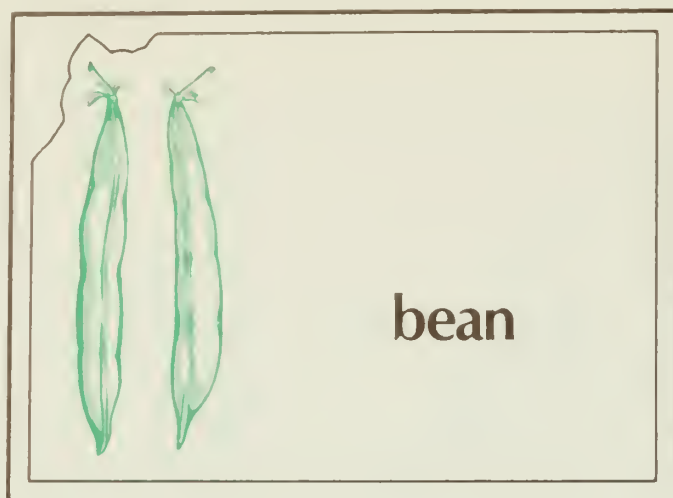
* X = times actual size (length and width). For example, 4X indicates that the seed is shown approximately four times actual size.



Cutting asparagus spears. Place the knife under the soil line next to the spear to be cut. Do not cut beyond the spear. You may damage other spears that have not yet emerged from the soil.



Set asparagus plants 9 to 12 inches apart in a trench 6 inches deep and 12 to 18 inches wide. Cover the plants with 2 inches of soil (dotted line in drawing) and gradually fill in the trench with soil during the first season.



Bean is a tender, warm-season vegetable that ranks second in popularity to tomato in Illinois gardens. Beans may be classified by (1) growth habit (bush or pole beans); (2) use (as immature pods, shellouts, and dry beans); and (3) type (green and yellow snap, romano, and lima beans).

Bush beans (also called "bunch beans") stand erect without support. They are the most popular type because they yield well and require the least amount of work. Green bush beans were formerly called "string beans" because of the fiber development along the tops and bottoms of the pods. Plant breeders have reduced these fibers, and green beans are now referred to as "snap beans." Bush beans are available in green, yellow wax, romano, and lima varieties.

Pole beans climb supports and are easily harvested. They are available in green, romano, and lima varieties.

Varieties

Green Bush (Snap Bean): Astro (53 days to harvest — *resistant to bean mosaic*); Blue Crop (56 days to harvest); Blue Lake (56 days to harvest — *resistant to bean mosaic*); Commodore (58 days to harvest); Contender (53 days to harvest — *resistant to bean mosaic*); Greencrop (55 days to harvest); Greensleeves (56 days to harvest); Harvester (53 days to harvest — *resistant to bean mosaic*); Provider (53 days to harvest — *resistant to bean mosaic*); Slenderwhite (55 days to harvest — *resistant to bean mosaic*); Slim Green (60 days to harvest — *resistant to bean mosaic*); Spartan Arrow (53 days to harvest — *resistant to bean mosaic*); Sprite (54 days to harvest); Tender Crop (53 days to harvest — *resistant to bean mosaic*); Tenderette (55 days to harvest — *resistant to bean mosaic*); Tendergreen (53 days to harvest — *resistant to bean mosaic*).

Wax Bush (yellow): Resistant Cherokee Wax (55 days to harvest — *resistant to bean mosaic*); Earliwax (55 days to harvest — *resistant to bean mosaic*); Goldcrop (55 days to harvest); Kinghorn Wax (56 days to harvest); Midas (55 days to harvest); Moongold (55 days to harvest); Sungold (56 days to harvest).

Green Pole (Snap Bean): Blue Lake (65 days to harvest — *resistant to bean mosaic*); Dade (65 days to harvest — *resistant to bean mosaic*); Kentucky Wonder (65 days to harvest); McCaslan (65 days to harvest — *resistant to bean mosaic*).

Romano Bush (Italian): Green Ruler (52 days to harvest); Roma (55 days to harvest).

Romano Pole (Italian): Romano (66 days to harvest).

Lima Bush: Allgreen (67 days to harvest); Baby Bush (70 days to harvest); Bridgton (75 days to harvest); Burpee Improved Bush (75 days to harvest — *resistant to bean mosaic*); Fordhook 242 (75 days to harvest — *resistant to bean mosaic*); Henderson (70 days to harvest); Thaxter (70 days to harvest); Thorgreen (66 days to harvest).

Lima Pole: King of the Garden (90 days to harvest); Prizetaker (90 days to harvest).

Asparagus Pole (Yardlong Bean): 70 days to harvest.

Horticultural: French Horticultural (bush, 80 days to harvest); King Horticultural (pole, 90 days to harvest).

Dry (Bush Type): Cranberry (95 days to harvest); Great Northern (100 days to harvest — *resistant to bean mosaic*); Michilite (95 days to harvest); Pinto (90 days to harvest — *resistant to bean mosaic*); Red Kidney (95 days to harvest); White Marrowfat (100 days to harvest).

When to Plant

Beans are sensitive to cold temperatures and frost, and should be planted after all danger of frost is past in the spring. They are usually planted in early May in southern Illinois, and in late May or early June in the northern areas of the state. You can assure yourself a continuous supply of beans by planting every two weeks until early August.

Spacing of Plants and Depth of Planting

Plant seeds of all varieties 1 inch deep. Plant seeds of bush beans 2 inches apart in rows at least 18 to 24 inches apart. Plant seeds of pole beans 4 to 6 inches apart in rows 30 to 36 inches apart; or in hills (4 to 6 seeds per hill) 30 inches apart, with 30 inches between rows.

Care

The seeds of most bean varieties tend to crack and germinate poorly when the moisture content is too high. For this reason, bean seed should never be soaked before planting or watered immediately after planting. Beans are shallow rooted, and frequent shallow cultivation and hoeing are necessary to remove the small weeds and grasses. Deep, close cultivation injures the plant roots, delays harvest, and reduces yields.

Harvesting

Green and wax beans. Harvest when the pods are firm and crisp but before the seed within the pod has developed significantly. Pick beans after the dew is off the plants and they are thoroughly dry. Picking wet beans spreads bean bacterial blight, a disease that will seriously damage the plants. Be careful not to break the stems or branches. The bean plant will continue to form new flowers and produce more beans if all pods are removed before the seeds mature.

Lima beans. Harvest lima beans when the pods are plump and firm. The pods of different varieties vary greatly in external appearance as the beans are developing. Test pick a few pods to be sure that the beans are at a desirable stage of maturity. Lima beans are of best quality when young. They become mealy and tough-skinned if allowed to remain on the plant beyond peak maturity. Bush-type lima beans are usually harvested in two to three pickings. The pole varieties will continue to yield until frost if the old pods are removed before the beans mature.

Asparagus beans (yardlong beans). Asparagus beans are usually grown in a single row, with the plants supported by poles and twine. If allowed to mature, the beans may grow up to 3 feet long. When they reach this length, however, they are past the best stage for cooking. Asparagus beans should be harvested when they are 10 to 12 inches long, and about $\frac{3}{8}$ inch in diameter. The plants continue to produce for several weeks. Asparagus beans are often used as oriental vegetables. They are cut or snapped and then stir-fried or steamed. Mature asparagus beans may be shelled out and used in the same manner as southern peas (see page 119).

Horticultural beans. Harvest horticultural beans when the pods start changing from green to yellow. At that time, the beans (often referred to as "shellouts") are fully formed. They can be stored for a few days under refrigeration. Shellouts are usually served as a buttered vegetable or with pork.

Dry beans. Dry beans are seldom planted in home gardens because they are generally available in food

markets at moderate prices. They may be grown much like snap beans, and will produce good yields. Pull the vines when the leaves of the plants have turned yellow and begin to fall naturally. Dry the plants in the garden or on a clean floor. When the plants are dry, the pods start to split and the seed is easily removed. Store dry bean seeds in jars or cans in a cool, dry location (see pages 127-128).

Common Problems

The bean mosaic diseases cause plants to turn a yellowish green and produce few or no pods. The leaves on infected plants are a mottled yellow, and are usually irregularly shaped. The only satisfactory control for these diseases is to use mosaic-resistant bean varieties.

Bright yellow or brown spots on the leaves or watersoaked spots on the pods are signs of bacterial bean blight. Bacterial blight is best controlled by planting western-grown, disease-free seed, avoiding working among wet bean plants, and removing all bean debris from the garden.

Bean leaf beetles feed on bean plants, causing holes in the leaves. These beetles can cause serious damage, especially when the plants are young. Use a suggested insecticide for control.



Bean leaf beetle
($\frac{1}{4}$ inch)

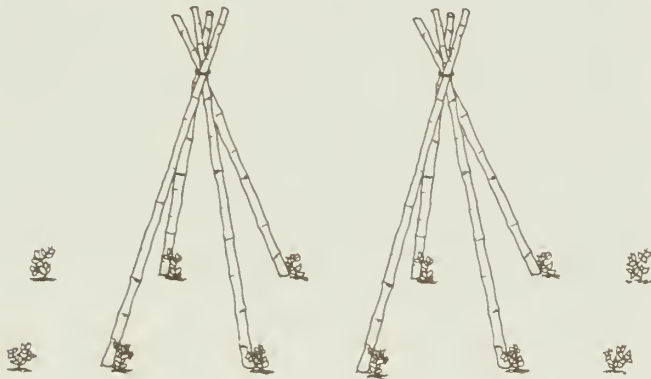
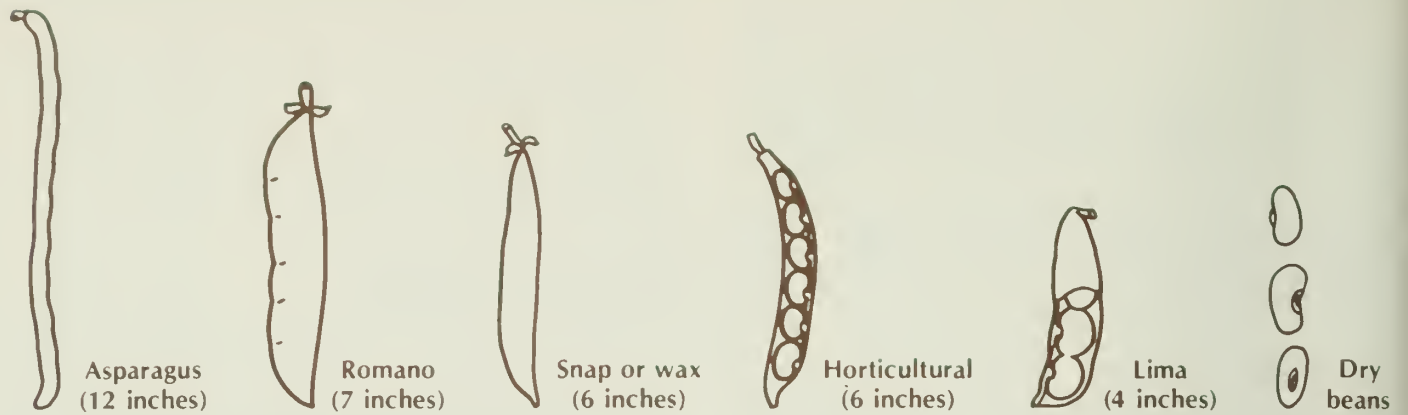
Questions and Answers

Q. My beans appear healthy, but not very many beans have formed. Why not? **A.** The blossoms drop and fail to form pods during periods of hot, dry winds.

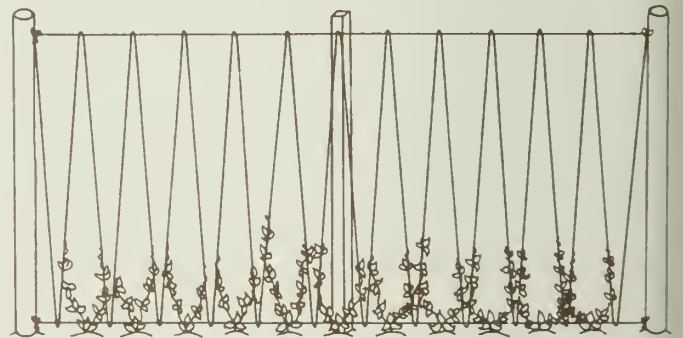
Q. Is it a good practice to plant pole beans at the base of corn plants for double cropping? **A.** No. Neither crop will reach its maximum potential. Weed control becomes difficult, and cornstalks offer weak support when the beans are maturing.

Q. Is it necessary to plant beans in a different area of the garden each year? **A.** Yes. Beans are subject to diseases that may carry over in the soil to reinfect the following bean crop.

Q. Will bean varieties cross in my garden? **A.** Since the flowers are self-pollinated, bean varieties will not usually cross. You should obtain new seeds each year, however, to avoid seedborne diseases.



Pole beans may also be supported by placing poles at the bases of two plants from each of two adjoining rows. The four poles, which form a "teepee," are tied firmly with heavy twine to hold them in place. When the bean plants begin to elongate, they should be started up the supports.



Pole beans (as well as asparagus beans, cucumbers, gourds, and other vining vegetables) may be supported by twine laced between two 9- to 12-gauge wires. The wires are fastened to 7- to 8-foot posts located at the ends of each row. Stakes or poles between the posts prevent sagging or breaking because of wind or the weight of the bean plants. Beans may be harvested easily from both sides of the row.

Q. Can I use beans from my garden that have matured past the green, edible stage? **A.** Yes. Snap beans (pole or bush) may be harvested for shellouts and for dry beans, and lima beans may be harvested for butter beans.

Q. Why do some snap bean varieties have white seeds? **A.** Most bean varieties are developed for the canning and freezing industry. When colored-seeded varieties are used, the cooking water is slightly off-color. White seed is preferred because it does not discolor the cooking water.

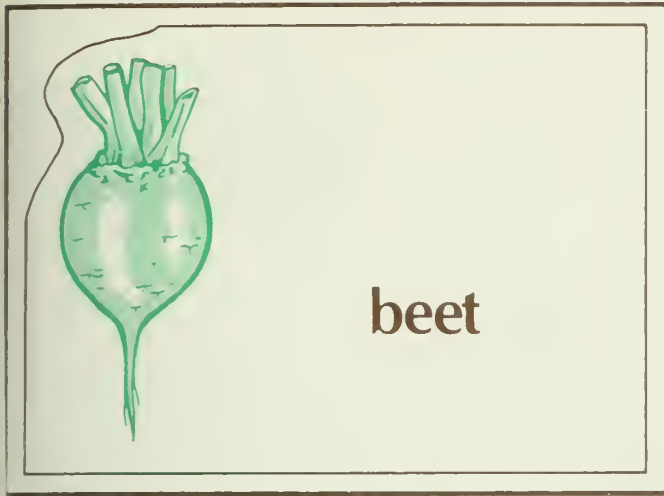
Q. What are the fuzzy, bright yellow insects on my bean plants? **A.** These are larvae of the Mexican bean beetle. The adult resembles a large ladybug. The larvae do the most damage. They are not generally a problem, but are occasionally found in southern Illinois. Use a suggested insecticide for control.



Seed
(1X)



Seedling



beet

Beet (also known as garden beet and red beet) is a popular garden vegetable throughout Illinois. Beet tops are a good source of vitamin A, and the roots are a good source of vitamin C. The tops are cooked or served fresh as greens, and the roots may be pickled or salads or cooked whole, sliced, or diced. Beet juice is a basic ingredient of Russian borscht. The garden beet is closely related to swiss chard, sugar beet, and mangel. Mangels (also known as stock beets) are considered too coarse for human consumption but are grown for stock feed.

Varieties

Garden Beet: These varieties are red and round-shaped unless otherwise indicated. Crosby; Detroit Dark Red; Early Wonder; Explorer; Egyptian (flat); Garnet; Gladiator; Golden Beet (yellow); Long Red Blood (cylindrical or elongated); Red Ball; Ruby Queen; Sweetheart. **Mangel:** Mammoth Long Red; Yellow Intermediate. **Sugar Beet:** Klein Wanzlebein.

When to Plant

Beets are fairly frost-hardy, and can be planted in the garden 30 days before the frost-free date for your area. Although beets grow well during warm weather, the seedlings are established more easily under cool, moist conditions. Start successive plantings at three- to four-week intervals into July for a continuous supply of fresh, tender, young beets. Irrigation assures germination and establishment of the later plantings.

Spacing of Plants and Depth of Planting

The beet "seed" is actually a cluster of seeds in a dried fruit, and several seedlings grow from each seed. Plant seeds approximately ½ inch deep and 1 inch apart. Allow 12 to 18 inches between rows. Poor stands are often the result of planting too deep or the crusting of heavy soil after a rain. The seedlings may

emerge over a relatively long period of time, making a stand of different sizes and ages of seedlings.

Hand thinning is almost always necessary. The seedlings should be thinned to 2 to 3 inches apart. If thinning is delayed until the plants are 3 inches high, those removed may be cooked as greens similar to spinach. Some cooks leave the small root (usually about the size of a marble), attached to the greens.

Care

Frequent shallow cultivation is important because beets compete poorly with weeds. Because beets are extremely shallow rooted, hand weeding and early, frequent, and shallow cultivation are the most effective methods of controlling weeds in the rows. Deep cultivation after the weeds are large will damage the beet roots. Like most root crops, beets need a fertile soil (especially potassium) for vigorous growth. Keep your beet plants well supplied with moisture.

Harvesting

Beets can be harvested whenever they grow to the desired size. About 60 days are required for beets to reach 1½ inches in diameter — the size often used for cooking, pickling, or canning as whole beets. Beets will enlarge rapidly to 3 inches with adequate moisture and space. They may be stored in a polyethylene bag in a refrigerator for several weeks. Beets can also be stored in outdoor pits if the beets are dug before the ground freezes in the fall. Cut off the tops of the beets 1 inch above the roots. Beets store best at 32° F. and 95 percent humidity (see pages 127-128). Do not allow them to freeze.

Questions and Answers

Q. What causes the beets in my garden to develop tops but not roots? **A.** The most frequent cause for beet plants failing to develop roots is overcrowding because of improper thinning.

Q. What causes my beet roots to have internal black spots and many of the bottom leaves to die? **A.** Beets are a relatively heavy feeder of the element boron. Applying 1 tablespoon of household borax dissolved in a 12-quart pail of water along 100 feet of row may help to alleviate this condition. If the soil is acid, it should be limed according to a soil test.

Q. What varieties should I grow for beet greens?

A. A special vigorously growing variety, Beets for Greens, is excellent for producing greens. Crosby Green Top and Early Wonder, although they are sometimes difficult to find, can also be used for greens. Planting the seeds $\frac{1}{2}$ inch apart without thinning will produce an abundance of greens.

Q. How do I grow mangels and sugar beets? **A.** Plant in early spring as you would garden beets and thin the seedlings to 8 to 12 inches apart. Both sugar beets and mangels will be ready for harvest in October and November.

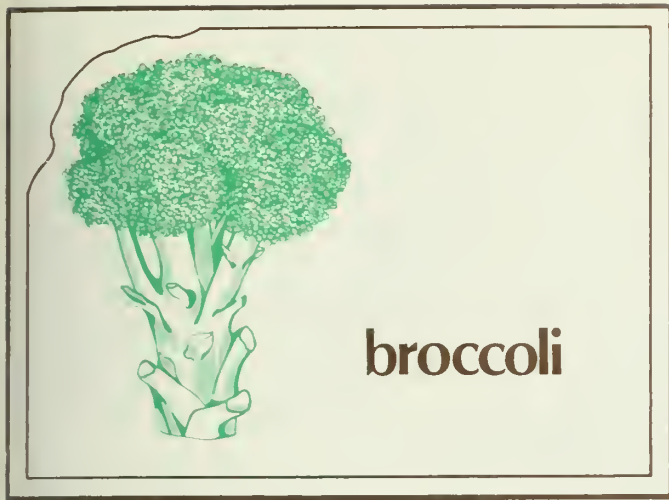
Q. Is it practicable to grow sugar beets to make sugar at home? **A.** No. Special equipment for juice extraction and great amounts of energy for evaporation are required to make beet sugar.



Seed
(5X)



Seedling



Broccoli (also known as Italian broccoli, sprouting broccoli, and calabrese) is a hardy vegetable of the cabbage family that is high in vitamins A and D. It develops best during cool seasons of the year. Broccoli has become popular in Illinois for both small and large gardens.

When broccoli plants are properly grown and harvested, they yield over an extended period. Two crops per year (spring and fall) may be grown in most parts of Illinois. Transplants are recommended for the best start, especially for spring planting.

Varieties

Green Comet (hybrid — 60 days to harvest); Premium Crop (hybrid — 65 days to harvest); Royal Purple Head (90 days to harvest, *resistant to yellows*).

When to Plant

Transplant vigorously growing plants in early spring. For fall crops, buy or grow your own transplants or plant seeds directly in the garden.

Spacing of Plants and Depth of Planting

Plant seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep, or set transplants slightly deeper than they were originally grown. Plant or thin seedlings 18 to 24 inches apart in the row, and allow 36 inches between rows. Broccoli plants grow upright, often reaching a height of 2½ feet.

Care

Use *starter fertilizer* for transplants, and side-dress nitrogen fertilizer when the plants are half grown (see page 16). Provide ample soil moisture, especially during dry periods as the heads develop.

Harvesting

The edible parts of broccoli are compact clusters of unopened flower buds and the attached portion of stem. The green buds develop in one large central head and several smaller side shoots. Cut the central head with 5 to 6 inches of stem — after the head is well developed but before it begins to loosen and separate and the flowers start to open (show bright yellow). Removing the central head stimulates the side shoots to develop for later pickings. These side shoots grow from the axils of the lower leaves. You can continue to harvest broccoli for several weeks.

Common Problems

Aphids (see page 33); cabbage worms (see page 52); diseases (see page 52).

Questions and Answers

Q. How large should the central head of broccoli grow before cutting? **A.** Harvest the central head when it reaches 4 to 6 inches in diameter. The heads grow even larger under ideal conditions.

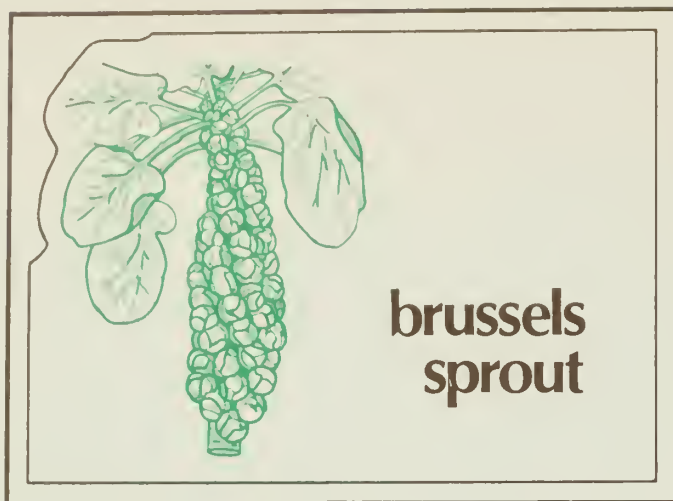
Q. What causes small plants, poor heading, and early flowering? **A.** The yellow flowers appear before the heads are ready to harvest during periods of high temperatures. Planting late in the spring and failing to get the plants started properly contribute to this condition. Premature flower development may also be caused by interrupted growth resulting from extended chilling of young plants, extremely early planting, the plants being held in a garden center until they are too old or too dry, and severe drought conditions. Applying a *starter fertilizer* when transplanting will get the plants off to a good start.



Seed
(6X)



Seedling



Brussels sprout (named after Brussels, Belgium, where the vegetable was first popular) is a hardy, slow-growing, long-season vegetable belonging to the cabbage family. It can be grown with fair success in Illinois.

The "sprouts" (small heads that resemble miniature cabbages) improve in quality and grow best during cool weather or even light frosts. Brussels sprouts require a long growing period. Midwestern summers are usually too warm for completely satisfactory production of spring plantings.

Varieties

Jade Cross (hybrid — 90 days to harvest, *resistant to yellows*).

When to Plant

Transplant in early to midsummer about the same time that you would plant late cabbage. The seed should be sown in a protected location in the garden four to five weeks before transplanting. Transplant the seedlings to the permanent garden location. For summer harvest, you must plant in early spring and use transplants. Fall production is the most practicable and rewarding.

Spacing of Plants and Depth of Planting

Space plants 24 inches apart in the row. Cover seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep, and transplant the seedlings when they are about 3 inches high.

Care

Brussels sprout is grown much like its related cole crops, cabbage and broccoli. Apply one side-dress application of nitrogen fertilizer (see page 16) when the plants are 12 inches high, and water to keep the crop growing vigorously during the heat of

summer. Without ample soil moisture, the crop will fail. Cultivate shallowly around the plants to prevent root damage. The sprouts form in the axils of the leaves (the space between the base of the leaf and the stem above it).

Commercial gardeners remove the leaves to accelerate harvest, but this practice is not essential in the home garden. Some gardeners believe that the sprouts develop better if the lowermost six to eight leaves are removed from the sides of the stalk as the sprouts develop. Two or three additional leaves can be removed each week, but several leaves should be left intact on top.

Harvesting

The small sprouts or buds form heads 1 to 2 inches in diameter. They may be picked (or cut) off the stem when they are firm and about 1 inch in size. The lower sprouts mature first. The lowermost leaves, if they have not already been removed, should be removed when the sprouts are harvested. Harvest sprouts before the leaves turn yellow.

Common Problems

Aphids (see page 33); cabbage worms (see page 52); diseases (see page 52).

Questions and Answers

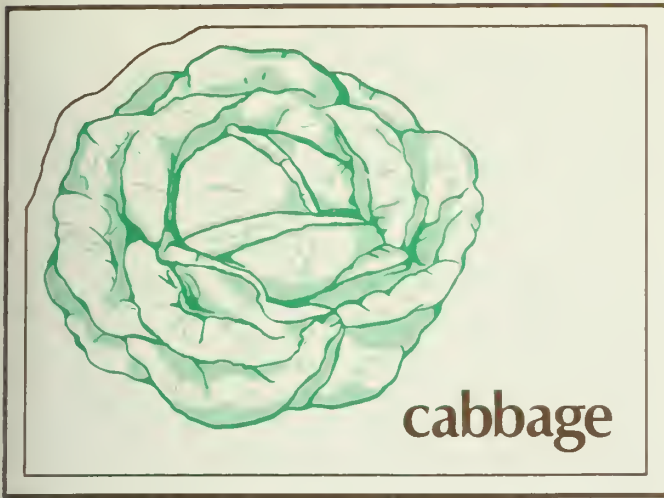
Q. Why do my sprouts remain loose tufts of leaves instead of developing into firm heads? **A.** When the sprouts develop in hot weather (after spring seeding or during a warm fall), they often do not form compact heads. Use transplants for early plantings and maintain ample soil moisture. You can also cut off the top growing point of the plant when the plant reaches 24 to 36 inches in height. This practice stops leaf growth and directs plant energy to the developing sprouts. In addition, check the variety you have planted. The older, long-maturing varieties are generally unsuitable for Illinois.



Seed
(6X)



Seedling



Cabbage is a hardy vegetable that grows well in fertile soils. There are several types of cabbage — pointed, flat, red or green, and savoy. Cabbage is easy to grow if you select suitable varieties and practice proper culture and insect management. A good source of vitamins, cabbage thrives during both the spring and fall seasons. It tolerates frost but not heat. Cabbage is used in slaw, salads, sauerkraut, and cooked dishes.

Varieties

Green cabbage is generally preferred over the red or savoy types, but red cabbage is becoming increasingly popular for color in salads and cooked dishes. The savoy varieties are grown for slaw and salads. The later maturing varieties usually grow larger heads, and are more suitable for making sauerkraut than the early varieties. All of the varieties listed below are *resistant to fusarium wilt* ("yellows") unless otherwise indicated.

Green: Defender (hybrid — 70 days to harvest, *resistant to black rot*); Early Jersey Wakefield (63 days to harvest); Emerald Cross (hybrid — 63 days to harvest, *not resistant to yellows*); Greenback (78 days to harvest); Guardian (hybrid — 65 days to harvest, *resistant to black rot*); King Cole (hybrid — 78 days to harvest); Market Dawn (hybrid — 63 days to harvest); Market Prize (hybrid — 76 days to harvest); Market Topper (hybrid — 73 days to harvest); Resistant Danish (105 days to harvest); Resistant Golden Acre (64 days to harvest); Stonehead (70 days to harvest). **Savoy:** Savoy Ace (hybrid — 80 days to harvest, *not resistant to yellows*); Savoy King (hybrid — 85 days to harvest); Vanguard II (72 days to harvest). **Red:** Red Ball (hybrid — 70 days to harvest); Red Danish (95 days to harvest); Red Head (hybrid — 75 days to harvest).

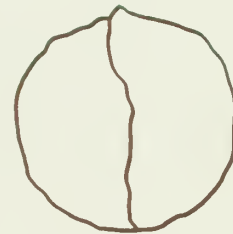
When to Plant

Transplant early cabbage soon enough so that it matures before the heat of summer. Many varieties are available, and two or three varieties will provide harvest over a long period of time. Hardened plants are tolerant of frosts, and can be planted among the earliest garden vegetables. Cabbage is easily transplanted from either bare-root or container-grown plants. Late cabbage must be started during the heat of midsummer, but it develops its main head during the cooling weather of fall. It may be transplanted or seeded directly in the garden.

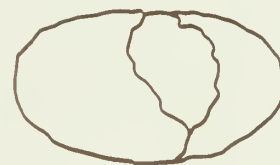
Spacing of Plants and Depth of Planting

Space plants 9 to 18 inches apart in the row, depending upon the variety and the size of head desired. The closer the spacing, the smaller the heads. Early varieties are usually planted 9 to 12 inches apart, and later varieties are planted 15 to 18 inches apart. Early varieties produce one- to three-pound heads, and late varieties produce four- to eight-pound heads. Sow cabbage seed $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Keep the seeds moist, and thin or transplant the seedlings to the desired spacing. The removed plants may be transplanted to another row.

Round



Flat



Pointed



Care

Use *starter fertilizer* when transplanting, and side-dress nitrogen fertilizer when the plants are half grown (see page 16). Cultivate shallowly to keep down weeds. Ample soil moisture is necessary to produce good cabbage. Irrigation is especially important in fall plantings for starting the plants and developing the heads.

Harvesting

Cabbage can be harvested any time after the head develops. Cut the cabbage heads when they are solid (firm to hand pressure) but before they crack or split. Cabbage for storage must be firm, mature, and free from injury from insects or diseases. The late varieties, especially the Danish types, usually store better than the early ones. Cabbage should be stored under cold, moist conditions (see pages 127-128).

In addition to harvesting the mature heads of the spring-planted cabbage, you can harvest a later crop of small heads (cabbage sprouts). These sprouts develop on the stumps of the cut stems. Cut as close to the head as possible, leaving the loose outer leaves intact. Buds grow in the axils of these leaves (the angle between the base of the leaf and the stem above it) that will later form sprouts. The sprouts develop to 2 to 4 inches in diameter, and should be picked when firm. Continue control of cabbage worms and other pests.

Common Problems

Yellows or fusarium wilt is a relatively common disease that causes the leaves of plants to wilt and die. The first sign of the disease is yellowing and browning of the lower leaves. The plants will be stunted before wilting occurs. Grow yellows-resistant (YR) or yellows-tolerant varieties.

Blackleg and black rot are two diseases that cause severe losses. The plants may be stunted, turn yellow, and die. Blackleg is named for the black cankers on the stem. The taproot often rots away. Black rot can be recognized by large, v-shaped, yellow-to-brown areas in the leaves, starting at the leaf edge. The veins turn black. Soft rot usually follows black-rot infection.

Control for blackleg and black rot is essentially the same. Both diseases are spread by seed, transplants, and insects. Buy seed that has been hot-water-treated to kill the disease organisms. Do not buy transplants that are wilted, are an unhealthy shade of green, or have black spots on the stems or leaves.

When you find diseased plants in the garden, collect the leaves, stems, and tops and burn or dispose

of them. *Do not* put diseased plants in the compost pile. Avoid cultural practices (crowding, overwatering, planting in poorly drained soil, and inadequate insect control) that support black rot- and blackleg-disease organisms. If possible, grow black rot-resistant varieties.

Aphids (see page 33). Apply a suggested insecticide before cabbage heads begin to form.

Flea beetles (see page 33). Apply a suggested insecticide.

Cabbage worms. Three species of cabbage worms (imported cabbage worms, cabbage loopers, and diamondback worms) commonly attack the leaves and head of cabbage and related cole crops in Illinois. *Imported cabbage worms* are velvety green caterpillars. The moth is white, and is commonly seen during the day hovering over plants in the garden. *Cabbage loopers* ("measuring worms") are smooth, light-green caterpillars. The cabbage looper crawls by doubling up (to form a loop) and then moving the front of its body forward. The moth is brown, and is most active at night. *Diamondback worms* are small, pale-green caterpillars that are pointed on both ends. The moth is gray, with diamond-shaped markings when the wings are closed.

The larva or worm stages of these insects cause damage by eating holes in the leaves and cabbage head. The adult moths or butterflies lay their eggs on the leaves, but otherwise do not cause damage to the plants. The worms are not easy to see because they are very small and blend in with the cabbage leaves. Cabbage worms are quite destructive, and will ruin the crop if not controlled. They are even worse in fall plantings than in spring gardens. Protect your plants with suggested biological or chemical insecticides from the time that they are transplanted until harvest.



Imported cabbage worm
(1 ¼ inches)



Cabbage looper
(1 ½ inches)

Questions and Answers

Q. What can I do to prevent my cabbage heads from splitting? **A.** Splitting is caused by the pressure of excessive water taken up after the heads are solid. Cutting the roots (spading on two sides of the plant) or breaking the roots (lifting and twisting the head to one side) can often reduce excessive splitting or bursting.

Q. What causes cabbage to develop seedstalks rather than solid heads? **A.** Cabbage plants "bolt" (form premature seedstalks) when they are started too early and are exposed to low temperatures (35° F. to 45° F.) for extended periods. After the plants have stems as large as a pencil, they are subject to this "cold conditioning."

Q. What is flowering cabbage? **A.** Nonheading varieties of cabbage (similar to flowering kale) have been developed for ornamental uses. They have colorful white, pink, or red rosettes of leaves surrounded by green or purple outer leaves. They are most colorful during cool fall weather.

Q. Why do butterflies fly around my cabbage plants? **A.** Those butterflies (white or brown) are probably the moths of cabbage worms. They lay eggs on the plants. These eggs hatch into the worms that cause considerable damage unless controlled.

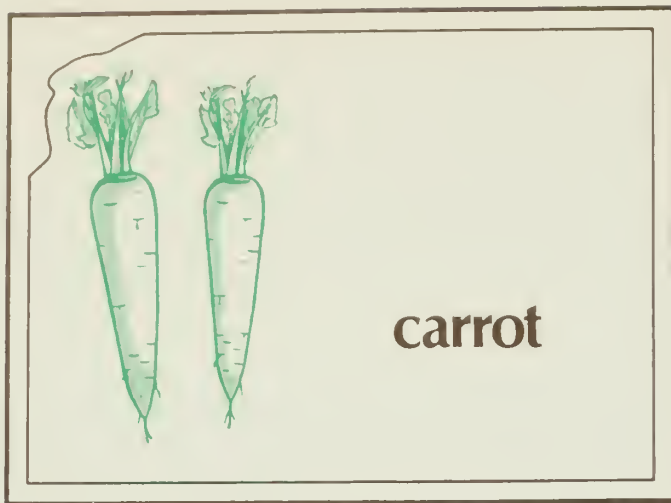
Q. What causes large, lumpy swellings of my cabbage roots? The plants are also stunted. **A.** Swellings and distorted roots on stunted, wilted plants may be symptoms of clubroot disease. This disease is caused by a fungus that will remain in the garden soil or many years after it has become established. The fungus is spread by movement of infested soil and infected transplants. Other related cole crops (broccoli, cauliflower, etc.) may also become infected. If you suspect that you have clubroot disease in your garden, ask your county extension adviser for help.



Seed
(6X)



Seedling



Carrot is a hardy, cool-season annual that is grown for its thickened root. Although carrots can endure summer heat in Illinois, they grow best when planted in early spring. Carrots are eaten both raw and cooked, and can be stored for winter use. They are rich in carotene (source of vitamin A) and high in sugar content.

Varieties

The following varieties have high uniform color, a sweet, flavorful taste, and little or no fiber. **Short (2 to 4 inches long):** Goldinhart; Gold Nugget; Sweet and Short. **Finger (3 to 4 inches long):** Little Finger; Minipak; Tiny Sweet. **Half-long (5 to 6 inches long):** Danvers Half-long; Danvers 126; Gold King; Red Core Chantenay; Royal Chantenay; Sweetheart. **Cylindrical (6 to 7 inches long):** Nantes Coreless; Scarlet Nantes; Tuchon Pioneer. **Standard (7 to 9 inches long):** Gold King; Gold Pak; Hipak; Spartan Bonus; Spartan Fancy; Tendersweet; Trophy.

When to Plant

Carrots are usually planted with the other frost-tolerant vegetables in mid to late April. They may be planted earlier in gardens with sandy soil.

The soil should be plowed to a depth of 8 to 9 inches to allow full development of the carrot roots, and the seedbed should be worked uniformly to break up clumps and clods that prevent penetration of the roots. Varieties with extremely long roots (Imperator and Emperor Long) are not usually recommended for home gardens.

Spacing of Plants and Depth of Planting

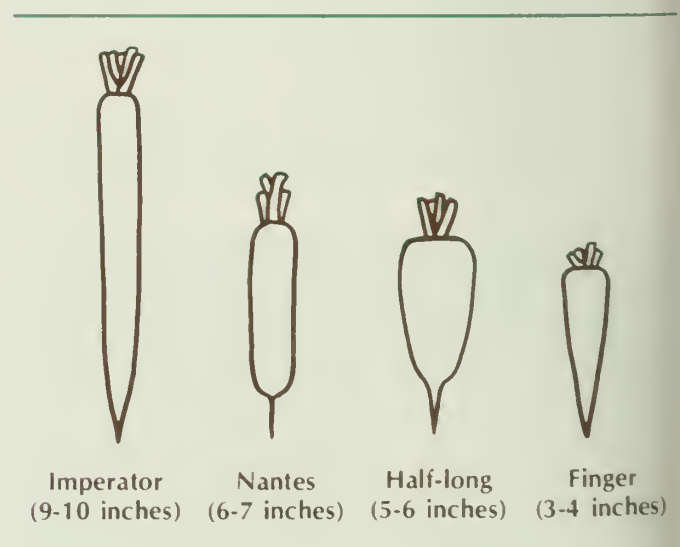
Plant seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep (no more than 2 to 3 seeds per inch) in early spring. Later sowings may be planted $\frac{1}{2}$ to $\frac{3}{4}$ inch deep when the soil is dryer and

warmer. Space rows 12 to 18 inches apart. A single radish seed planted every inch will mark the row.

Germination requires up to two weeks, and the seedlings may not emerge uniformly. Thin the seedlings when they are about 1 inch high to no more than 3 seedlings per inch for the finger carrots, 1 to 2 seedlings per inch for carrots that will be harvested young, and 1 seedling per 1 to 2 inches for larger varieties (Spartan Bonus, Danvers, and Chantenay) that will be harvested mature for canning, freezing, and cubing.

Care

Carrots germinate best in warm, moist soil. Covering the row with clear polyethylene film (see page 29) will warm the soil and conserve moisture. Remove the film when seedlings appear. To assure germination of successive plantings, it may be necessary to supply water by sprinkling during the late spring and summer months.



Carrot seedlings are weak and grow slowly while young. It is important to keep weeds down during the first few weeks. Cultivate very shallowly with a knife-blade cultivator or hoe. Deep cultivation may injure the roots.

Harvesting

Carrots can be harvested or "pulled" when the roots are $\frac{1}{2}$ inch or more in diameter. Finger carrots are usually ready to harvest within 50 to 60 days. Other varieties should usually be allowed to grow until they have reached a minimum diameter of $\frac{3}{4}$ inch (about 60 to 70 days after planting). They may then be harvested over a three- to four-week period. Summer-planted carrots may be left in the ground until a killing frost. Some gardeners place straw mulch over the row so that carrots can be harvested until the ground freezes solid.

Cut off the tops of the carrots 1 inch above the root, and place in storage at 32° F. with high humidity. Carrots may be placed in a refrigerator, buried in sand in an underground cellar, or placed in a pit in the garden insulated with straw (see page 128). Under proper storage conditions, carrots will keep for four to six months.

Questions and Answers

Q. What causes my carrots to turn green on the crown (top) of the root? **A.** This condition is called "sunburning." It causes an off flavor and dark-green pieces in the cooked product. Cut away the green portion and use the remainder of the root. Sunburning can be avoided when the tops are healthy by pulling a small amount of loose soil up to the row when the roots are swelling (approximately 40 to 50 days after planting).

Q. Why are my carrots misshapen, with forked and twisted roots? **A.** Forking may result from attacks of root-knot nematodes (see page 34), stones, deep and close cultivation, or (more frequently) from planting in a soil that was poorly prepared. Twisting results from seeding too thickly and inadequate thinning of seedlings.

Q. What caused my carrots to have fine hairy roots, poor color, and a bitter taste? **A.** These conditions are caused by a virus disease known as "aster yellows." See "Bacterial and Virus Diseases," page 34 for control recommendations.



Seed
(10X)



Seedling



Cauliflower is a cool-season vegetable that can be cooked, pickled, or used as a salad delicacy. It is more difficult to grow than most of its relatives in the cabbage family. Cauliflower will not tolerate as much heat or cold as cabbage or grow as well as broccoli in dry weather.

Varieties

Early Snowball (54 days to harvest); Snow Crown (hybrid — 60 days to harvest, *resistant to yellows*); Self Blanche (hybrid — 70 days to harvest); Snow King (hybrid — 58 days to harvest).

When to Plant

Cauliflower is best started from transplants for both spring and fall crops. Do not transplant sooner than two to three weeks before the average frost-free date in the spring. It is important to start cauliflower early enough so that it matures before the heat of the summer but not so early that it is injured by the cold. Make fall plantings at the same time as plantings for fall cabbage. Use *starter fertilizer* (see page 16) when transplanting.

Spacing of Plants and Depth of Planting

Space plants 18 to 24 inches apart in the row. Use the wider spacing for fall planting.

If plants are not available, or if you wish to grow your own transplants, see "Starting Plants at Home," pages 36-39. For fall harvest, start seeds indoors or in a protected location four to five weeks before you need the plants (see "Planting Dates for Illinois Gardens," page 23). Plant seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep (10 seeds per inch), and keep watered during germination and growth of seedlings. Transplant the seedlings to the permanent location in the garden.

Care

Cauliflower plants should be kept growing vigorously from the seedling stage through harvest. Any interruption (extreme cold, heat, drouth, or plant damage) can abort development of the edible portion. Cauliflower must have a consistent and ample supply of soil moisture. Side-dress nitrogen fertilizer (see page 16) when the plants are half grown.

When the head begins to form (shows 2 to 3 inches of white curd in the leaves), it is ready to blanch. Tie the outer leaves together over the center of the plant to protect the head from sunburn and to keep it from turning green and developing an off-flavor. The variety Self Blanche is named for its natural tendency to curl its leaves over its head. Under cool conditions, this variety blanches very well, and tying is unnecessary.

Harvesting

The cauliflower head (curd) develops rapidly under proper growing conditions. It will grow 6 to 8 inches in diameter, and will be ready to harvest within 7 to 12 days after blanching. The mature heads should be compact, firm, and white. Harvest the heads by cutting the main stem. Leave a few green outer leaves to protect the heads. Cut the heads before they become overmature and have a coarse, "ricey" appearance.

Common Problems

Cabbage worms (see page 52); black rot (see page 52). If growth is interrupted, the heads may not develop or may develop poorly. Growth can be interrupted by plants being held too long, hardening and cessation of growth before transplanting, too much chilling before or after transplanting, and drouth.

Questions and Answers

Q. What causes leaves in the head and separation of the head into loose, smaller curds? **A.** These conditions are caused when cauliflower matures during hot weather.

Q. Why does my late cauliflower fail to make satisfactory heads? **A.** Late plantings are sometimes difficult to grow in the Midwest. The young plants often do not become well established under hot, dry summer conditions. Use a *starter fertilizer*, give the plants ample water, and do not plant late cauliflower plants too close together.

Q. Is purple cauliflower grown in the same way as regular cauliflower? **A.** Purple cauliflower is actually a type of broccoli that is purple. It resembles cauliflower in overall appearance, and does not require blanching. The purple head turns green upon cooking.

Q. What causes browning of the curd? **A.** This condition is caused by downy mildew. Downy mildew, which is brought on by wet conditions, can be controlled through the use of a suggested fungicide.



Seed
(6X)



Seedling



Chard (also known as swiss chard) is a member of the beet family that can be successfully grown as a vegetable green in all parts of Illinois. It is planted early because the seedlings are tolerant to moderate frost.

Chard will produce fresh greens throughout the summer, even in southern Illinois. The large, fleshy leafstalks may be white or red, with broad, crisp, green leaf blades. The leaf blades are prepared like spinach, and the midribs or stalks may be cooked in the same manner as asparagus. Chard is an attractive ornamental that adds to the beauty of a garden. Many gardeners like to grow chard because it is not available in food markets, and it yields well with few production problems.

Varieties

Red Mid-Rib: Burgundy; Ruby; Rhubarb. **White Mid-Rib:** Fordhook Giant; Geneva; Large White Broad-Ribbed; Lucullus; Perpetual.

When to Plant

Chard does well on any soil where lettuce or spinach will grow. Plants may be started inside and transplanted to the garden after the danger of frost is past, but most gardeners plant seeds directly into the garden in late April or early May.

Spacing of Plants and Depth of Planting

For seeding outdoors, plant seeds $\frac{1}{2}$ to $\frac{3}{4}$ of an inch deep (8 to 10 seeds per foot of row) in rows far enough apart for proper cultivation. Thin the seedlings to 4 to 6 inches apart. An alternative method is to thin the seedlings to 2 to 3 inches apart; then, when they are sufficiently large for greens (6 to 8 inches high), harvest the excess plants, leaving a final spacing of 9 to 12 inches between plants. Transplants should also be set in the garden 9 to 12 inches apart.

Harvesting

The most common method of harvesting chard is to cut off the outer leaves $1\frac{1}{2}$ inches above the ground while they are young and tender (about 8 to 12 inches long). Be careful not to damage the terminal bud.



Seed
(3X)



Seedling



Chinese cabbage (also known as celery cabbage and Wong Bok) is an ancient Oriental crop that is gaining popularity among Illinois gardeners. The name "chinese cabbage" is misleading because this hardy, cool-season salad vegetable is closely related to mustard, not cabbage. Its mild flavor is similar to that of celery (although chinese cabbage is not related to celery), and its leaves are thinner and more delicate than those of cabbage. Unfortunately, many gardeners do not consider growing chinese cabbage as a salad vegetable because of the failure of spring sowings to form desirable heads.

Varieties

There are two more or less distinct forms: Pe-tsai, a heading type that resembles Cos lettuce but grows larger and more compactly; and Pakchoi (white mustard cabbage), a nonheading type that grows in loose, upright form like swiss chard. There are many varieties of both types, but the Pe-tsai varieties are easiest to obtain and are most suitable for growing in Illinois. The Pakchoi varieties are usually susceptible to early seedstalk formation.

The recommended varieties for Illinois are as follows: Burpee Hybrid (hybrid — heading type, 75 days to harvest); China Queen (hybrid — heading type, 75 days to harvest); Crispy Choy (Pakchoi type — 55 days to harvest); Early Hybrid G (hybrid — heading type, 65 days to harvest); Michili (heading type, 70 days to harvest).

When to Plant

For best development, it is important not to interrupt growth. Since chinese cabbage seedlings are more sensitive to transplanting than cabbage seedlings, the plants are best started in individual containers (peat pellets, pots, etc.). For spring planting,

transplant two to three weeks before the frost-free date, and before the plants are too old (four to five weeks). Sowing seeds directly in the garden may not allow enough time for the seedlings to grow before warm summer days stimulate seedstalk formation and the plant is useless.

Chinese cabbage develops best during cool weather, and is an excellent vegetable for fall gardens. Start seeds in early to midsummer, and transplant at the same time as late cabbage.

Spacing of Plants and Depth of Planting

Space plants 12 inches apart for upright varieties such as Michili, and 15 to 24 inches apart for the larger heading types. For fall planting, sow seeds directly in the garden $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Keep the soil moist, and thin or transplant with care. If possible, start seeds in a protected place and transplant on a cloudy day. Use a *starter fertilizer* solution (see page 16).

Care

Maintain sufficient soil moisture to keep the plants growing vigorously. Side-dress nitrogen fertilizer (see page 16) when the plants are half grown.

Harvesting

The Pakchoi type develops long, loose, dark-green leaves. The Pe-tsai type forms moderately firm one- to three-pound heads. The blanched inner leaves resemble lettuce. They are crisp, delicate in flavor, and an excellent substitute for lettuce.

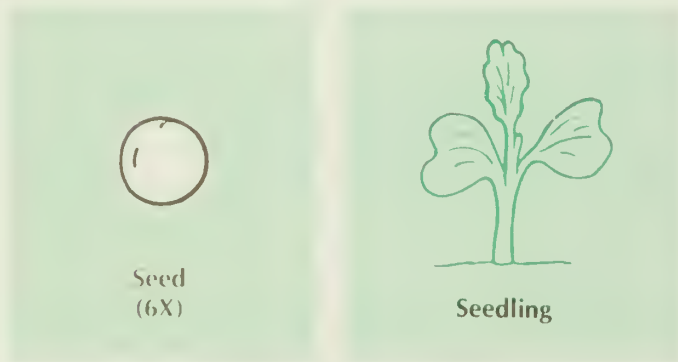
Cut the entire plants at groundline when the heads are compact and firm. Harvest before the seedstalks form in early summer, and before hard freezing temperatures in the fall.

Common Problems

Aphids (see page 33); cabbage worms (see page 52); flea beetles (see page 33).

Questions and Answers

Q. Why does my chinese cabbage fail to form a good head in the spring? Instead it sends up an early seed stalk. **A.** Chinese cabbage quickly goes to seed during warm summer days. Dry weather accelerates the process. For best results, choose early varieties, start plants in individual containers, and transplant after the hard frosts in the spring. Late spring-seeded chinese cabbage will also go to seed.





Collard (also known as tree-cabbage or non-heading cabbage) is a cool-season vegetable green that is rich in vitamins and minerals. It grows better in warm weather and can tolerate more cold weather in the late fall than any other member of the cabbage family. Although collard is a popular substitute for cabbage in the Deep South, it can also be grown in northern areas because of its tolerance to frost. Collard is a close relative of kale.

Varieties

Vates (75 days to harvest); Georgia (80 days to harvest).

When to Plant

Plant in early spring for summer harvest, and again in midsummer for fall and early winter harvest.

Spacing of Plants and Depth of Planting

Sow seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Thin seedlings to 6 to 12 inches apart to allow enough space for plants to mature. Thinned plants may be eaten. Allow at least 3 feet between rows because plants become large.

Care

If you maintain ample soil moisture during hot periods in the summer, collards will produce an abundant harvest.

Harvesting

All green parts of the plant are edible, and may be harvested at any time during the growing season. Plants grown 6 inches apart can be cut at ground level when they reach 6 to 10 inches in height. As an alternative method of harvesting, you can pick the larger leaves when the plants are 10 to 12 inches high. This harvesting method allows the younger leaves to develop for later use.

Some gardeners prefer the young, tender leaves, and cut the inner rosette of young growth. This "loose head" may be blanched by tying the outer leaves together to keep out the sun. Frost improves the flavor in the fall.

Common Problems

Aphids (see page 33); cabbage worms (see page 52); diseases (see page 52).



Seed
(6X)



Seedling



Sweet corn is a warm-season vegetable that can be easily grown in any garden with sufficient space. It is especially popular with home gardeners because it tastes appreciably better when it is harvested fresh from the garden. Successive plantings will yield continuous harvests.

Sweet corn may be divided into three distinct types according to genetic background: standard, extra-sweet, and synergistic.

Standard sweet corn varieties contain a "sugary gene" that is responsible for the sweetness and creamy texture of the kernels.

Extra-sweet varieties contain a special gene that makes the kernels sweeter than those of the standard varieties. The sugar is also converted to starch more slowly, preserving the sweetness for a longer time. The kernels of the extra-sweet varieties have a crispy texture, and contain low amounts of the water-soluble polysaccharides that impart the creamy texture to other sweet corn varieties. Although this lack of creamy texture is not especially noticeable in fresh corn on the cob, it affects the quality of frozen and canned corn.

Synergistic sweet varieties (75 percent normal "sugary" kernels and approximately 25 percent extra-sweet kernels) contain multiple gene combinations that impart both a creamy texture and increased sweetness. The sugar content is not as high, however, as that of the extra-sweet varieties.

Varieties

The varieties listed below (like nearly all sweet corn sold today) are hybrids. They have yellow kernels unless otherwise indicated. The maturity dates are relative — the actual number of days to harvest varies from year to year and location to location.

Standard Sweet Corn Varieties

Early: Aztec (75 days to harvest); Earlibelle (71 days to harvest); Early Sun Glow (68 days to harvest); Golden Beauty (68 days to harvest, *resistant to bacterial wilt*); Spring Gold (68 days to harvest); Sprite (mixed white and yellow kernels, 68 days to harvest); Sundance (70 days to harvest).

Main-Season: Bonanza (84 days to harvest, *resistant to bacterial wilt*); Comet (white kernels, 84 days to harvest, *resistant to bacterial wilt*); Gold Cup (80 days to harvest, *resistant to bacterial wilt, helminthosporium*); Gold Winner (80 days to harvest, *resistant to bacterial wilt*); lochief (86 days to harvest); Jubilee (84 days to harvest); NK 199 (84 days to harvest, *resistant to bacterial wilt*); Seneca Chief (82 days to harvest, *resistant to bacterial wilt*); Style Pak (84 days to harvest, *resistant to smut*); Wonderful (84 days to harvest).

Late: Bi-Queen (mixed white and yellow kernels, 92 days to harvest, *resistant to bacterial wilt*); Country Gentleman (white kernels, 92 days to harvest, *resistant to bacterial wilt, rust, smut*); Gold Queen (92 days to harvest, *resistant to bacterial wilt*); Silver Queen (white kernels, 92 days to harvest, *resistant to bacterial wilt, helminthosporium*); Sweet Sue (mixed white and yellow kernels, 88 days to harvest).

High-Sugar Sweet Corn Varieties

Extra Sweet: Candyman (84 days to harvest); Early Xtra Sweet (72 days to harvest); Illini Xtra Sweet (82 days to harvest).

Synergistic Sweet: Honey Comb (80 days to harvest); Sugar Loaf (84 days to harvest).

When to Plant

Sweet corn requires warm soil for germination (above 55° F. for standard sweet corn varieties and about 65° F. for extra-sweet varieties). Early plantings of standard sweet corn should be made at the mean frost-free date unless you use special soil-warming protection such as clear polyethylene mulch film (see page 29).

For a continuous supply of sweet corn throughout the summer, plant an early variety, a second early variety, and a main-crop variety in the first planting. For example, you may wish to select Sundance (70 days to harvest) for the first early variety, Aztec (75 days to harvest) for the second early variety, and Gold Cup (80 days to harvest) for the main-crop variety. Make a second planting and successive plantings of your favorite main-crop or late variety when three to four leaves have appeared on the seedlings in the previous planting. Plantings can be made as late as the first week of July.

Spacing of Plants and Depth of Planting

Plant the kernels (seeds) $\frac{1}{2}$ inch deep in cool, moist soils and 1 to $1\frac{1}{2}$ inches deep in warm, dry soils. Space the kernels 9 to 12 inches apart in the row. Plant two or more rows of each variety side by side to insure good pollination and ear development. Allow 30 to 36 inches between rows.

If you plant extra-sweet or synergistic sweet varieties, plan your garden arrangement and planting schedule so as to prevent cross-pollination between these varieties and with other corn. Extra-sweet varieties that are pollinated by standard sweet corn, popcorn, or field corn will not develop a high sugar content and will be starchy. Synergistic sweet varieties will be normal in sugar content (loss of the 25 percent extra-sweet kernels) if pollinated by standard sweet corn, but will taste starchy if pollinated by popcorn or field corn. Cross-pollination between yellow and white sweet corn varieties affects only the appearance of the white corn, not the eating quality.

Care

Cultivate shallowly to control weeds. Chemical herbicides are not recommended for home gardens. Although corn is a warm-weather crop, lack of water at critical periods can seriously reduce quality and yield. If rainfall is deficient, irrigate thoroughly during emergence of the tassels, silking, and maturation of the ears.

Hot, drouthy conditions during pollination result in missing kernels, small ears, and poor development of the tips of the ears. Side-dress nitrogen fertilizer (see page 16) when the plants are 12 to 18 inches high.

Some sweet corn varieties produce more side shoots or "suckers" than others. Removing these side shoots does not improve yields.

Harvesting

Each cornstalk should produce at least one large ear. Under good growing conditions (correct spacing, free of weeds, insects, and diseases, adequate moisture and fertility), many varieties will produce a second ear. This second ear is usually smaller and develops later than the first ear.

Sweet corn ears should be picked during the "milk stage" when the kernels are not fully mature. This stage occurs about 20 days after the appearance of the first silk strands. The kernels are smooth and plump, and the juice in the kernel appears milky when punctured with a thumbnail. Sweet corn remains in the milk stage less than a week. As harvesttime approaches, check frequently to make sure that the

kernels do not become too mature and doughy. Other signs that indicate when the corn is ready for harvest are drying and browning of the silks, fullness of the tip kernels, and firmness of the unhusked ears.

To harvest, snap off the ears by hand with a quick, firm, downward push, twist, and pull. The ears should be eaten as soon as possible, processed, or refrigerated. At summer temperatures, the sugar in sweet corn quickly decreases and the starch increases.

Cut or pull out the cornstalks immediately after harvest and put them in a compost pile. Cut the stalks in 1-foot lengths or shred them to hasten decay.

Common Problems

Corn earworms are a problem in sweet corn every year. Earlier plantings are not badly infested, but later harvests will usually have severe earworm damage unless timely control measures are followed. Corn earworms deposit eggs on the developing silks or on the leaves near the ear. The tiny caterpillars follow the silks down into the ear, where they feed on the tip. Once the worm is inside the protective husk covering, there is no effective control. A suggested insecticide must be applied before the worms enter the "silk channel." For good control in heavy infestations, make several applications two to three days apart until the silks are brown. Anything that restricts the worm — tightening the tip of the husk with a rubber band or clothespin after the silk appears, or inserting mineral oil ($\frac{1}{2}$ medicine dropperful) in the silk tube — will help to decrease the damage.

European corn borers damage stalks, tassels, and ears. As their name indicates, corn borers bore into the plant, and the stalks break over when damage is severe. Corn borers may also bore into the cob and be found after cooking. A suggested insecticide can be applied at five-day intervals, beginning with egg hatching in June. Spray applications for earworms usually give adequate control of corn borers.

Flea beetles (see page 33) often attack early in the spring as the corn plants emerge through the soil. They can be quite damaging when numerous, and they may carry Stewart's bacterial wilt disease (see below). Suggested insecticides must be applied early to control flea beetles.

Stewart's wilt is a bacterial disease spread by the flea beetle. This disease causes yellow streaks in the leaves, stunting, and death of young plants of susceptible varieties. The disease generally occurs in the southern half of Illinois, and is not severe after cold winters or when resistant varieties are planted. Plant varieties with good resistance if possible.

Smut is caused by a fungus that invades the kernels. It develops as a swollen black pustule (gall) in the ear, and sometimes infects the tassel. Some sweet corn varieties are more tolerant of smut than others. Smut occurs most frequently on white varieties, and is often severe when extremely dry or hot weather occurs just before and during tasseling. Remove and destroy smut galls while they are moist and firm. Do not discard these galls in or near the garden. Place in the garbage or burn them. The smut is not poisonous, but it is unpleasant to handle. Break off the infected part of the ear. The remainder is suitable for eating.



Corn earworm
(1½ inches)



European corn borer
(1 inch)

Questions and Answers

Q. How long does it take sweet corn to develop from the first appearance of silks to harvest? **A.** About five days are required for complete pollination after the first silks appear. Harvest begins approximately 20 days after first silking.

Q. The germination of my Illini Xtra Sweet is low. How can I get a better stand? **A.** The seeds of Xtra Sweet varieties are shrunken, and do not germinate readily in cold, wet soil. Do not plant too early in the spring. Wait until the soil is warm, preferably 65° F. Sow the seed more thickly and thin if necessary. Fungicide seed treatments may also be helpful.

Q. Why didn't my sweet corn ears fill out to the tip? **A.** Several conditions will cause poor kernel development at the tip of the ear: dry weather during silking and pollination; planting too close; poor fertility, especially lack of potassium; and poor natural pollination. These conditions may be overcome by watering in dry weather; planting at recommended spacing (9 to 12 inches in the row); proper fertilization; and planting short rows in blocks of two or more for self-pollination.

Q. What is the best way to grow early corn? **A.** Choose an early maturing variety, plant early and shallowly (about ½ inch deep), and cover the row with clear polyethylene film. Use 1- or 2-mil film 3 feet wide, and cover the edges and ends to warm the soil around the seeds. The small plants can be left under the plastic for two to four weeks. Remove the film, or cut slits and carefully pull the plants through before the weather becomes too hot. It is wise to experiment with this technique on a small scale first.

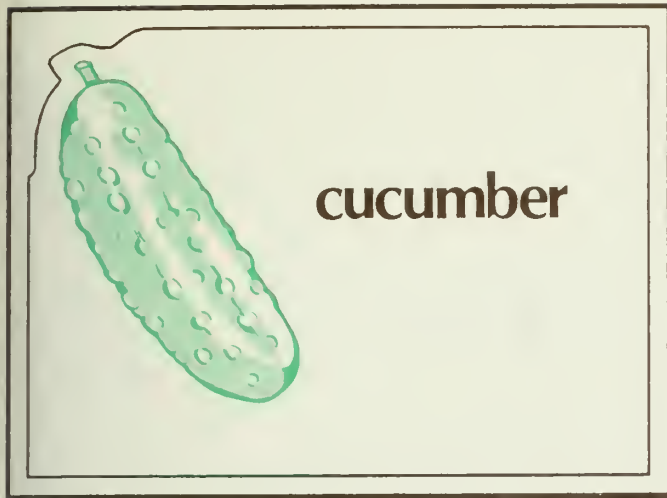
Q. How can I keep raccoons out of my sweet corn? **A.** It is virtually impossible to keep raccoons out of a garden, although many methods are employed. The most successful seems to be an electric fence made with two wires, one about 4 inches above ground level and the other at 12 inches. The fence must be operating well in advance of the time that the corn approaches maturity. Raccoons prefer to eat sweet corn in the early milk stage, just before it is ready to harvest.



Seed
(1X)



Seedling



Cucumber is a tender, warm-season vegetable that produces well in Illinois gardens when given proper care. The vines of standard varieties grow rapidly, and require substantial space. Through the use of vertical training methods and new dwarf varieties, however, cucumbers may now be grown even in small gardens for slicing, salads, and pickling.

Varieties

Slicing (6 to 8 inches long): Burpee Hybrid (hybrid — 60 days to harvest, *resistant to downy mildew, mosaic*); Challenger Hybrid (hybrid — 60 days to harvest, *resistant to downy mildew, mosaic*); Poinsett (65 days to harvest, *resistant to anthracnose, downy and powdery mildews, leaf spot*). **Pickling (2 to 6 inches long):** Spartan Dawn Hybrid (hybrid — 51 days to harvest, *resistant to mosaic, scab*); SMR-18 (53 days to harvest, *resistant to mosaic, scab*). **Burpless (6 to 15 inches long):** Burpless Hybrid (hybrid — 65 days to harvest); Sweet Slice Hybrid (hybrid — 65 days to harvest, *resistant to downy and powdery mildews, mosaic, scab*). **Novelty Cucumbers (dwarf plants for containers or limited space):** Patio Pik Hybrid (pickling type — 50 days to harvest, *tolerant of downy and powdery mildews*); Peppi Hybrid (pickling type — 50 days to harvest, *tolerant of downy and powdery mildews, mosaic, scab*); Lemon (small, yellow, lemon-sized cucumbers that grow on normal vines — 55 days to harvest).

When to Plant

Cucumbers are usually started by planting seed directly in the garden. Plant after the danger of frost has passed and the soil has warmed in the spring. Warm soil is necessary for germination of seeds and proper growth of plants. With ample soil moisture, cucumbers thrive in warm summer weather. A sec-

ond planting for fall harvest may be made in mid- to late summer.

Cucumbers may be transplanted for early yields. Sow 2 or 3 seeds in peat pots, peat pellets, or other containers three to four weeks before the frost-free date. Thin to 1 plant per container. Cucumbers do not transplant successfully when pulled as bare-root plants.

Spacing of Plants and Depth of Planting

Plant seeds $\frac{1}{2}$ to 1 inch deep, and thin the seedlings to 1 plant every 12 inches in the row or 3 plants every 36 inches in the hill system. If you use transplants, plant them carefully in warm soil 12 inches apart in the row.

Care

Cucumber plants are shallow-rooted and require ample soil moisture at all stages of growth. For best yields, incorporate compost or well-rotted manure before planting. Cucumbers respond to mulching with soil-warming plastic (see page 29) in early spring or organic materials in summer. Side-dress nitrogen fertilizer (see page 16) when the plants begin to vine. Cucumber beetles should be controlled from the time that the young seedlings emerge from the soil (see "Common Problems" below).

In small gardens, the vines may be trained on a trellis or fence. When the long burpless varieties are supported, the cucumbers hang free and develop straight fruits. Winds whipping the plants can make vertical training impractical. Wire cages can also be used for supporting the plants (see "Tomato," page 108). Do not handle, harvest, or work in the leaves and vines when they are wet.

Harvesting

Pick cucumbers at any stage of development before the seeds become hard. Cucumbers are usually eaten when immature. The best size depends upon the use and variety. They may be picked when they are 2 inches long or less for pickles, 4 to 6 inches long for dills, and 6 to 8 inches long for slicing varieties.

A cucumber is of highest quality when it is uniformly dark green, firm, and crisp. The large burpless types of cucumbers should be 1 to 1½ inches in diameter and not over 10 inches long. Some varieties will grow considerably larger. Do not allow cucumbers to turn yellow. Remove old fruits from the vine so that the young fruits will develop. The cucumber fruits grow rapidly to harvest size, and the vines should be picked every other day.

Common Problems

Cucumber beetles (see page 33). Spotted and striped cucumber beetles attack seedlings soon after they emerge from the soil. The beetles may be in large numbers, and can stunt or kill the small plants. The beetles may also carry bacterial wilt disease (see below). Cucumber beetles can be controlled by applying a suggested insecticide.

Aphids (see page 33). Watch for buildup of colonies of aphids on the undersides of the leaves. Use a suggested insecticide if these colonies appear.

Bacterial wilt. Plants are infected with the bacterial wilt disease by the natural attack of cucumber beetles. The disease organism overwinters in the beetles from one year to the next. The beetles hibernate among the trash and weeds around the garden. Plants are usually infected with the disease-causing bacteria long before they show any symptoms. When the vines wilt and collapse (usually about the same time that the first cucumbers are half grown), it is too late to prevent the disease.

Questions and Answers

Q. Some of my small cucumbers are badly misshapen. Will they develop into normal cucumbers? **A.** No. They should be removed from the vines. Misshapen cucumbers may result from poor pollination or low fertility. Side-dressing a complete fertilizer may help later cucumbers to develop normally.

Q. Why do some of my plants suddenly wilt and die? Dead or dying plants are scattered all over my cucumber patch. One plant in a hill may be healthy, while another dies. **A.** These are typical symptoms of the bacterial wilt disease. This disease is spread by cucumber beetles early in the season. The beetles must be controlled when the plants are small.

Q. Is there really a "burpless" cucumber? **A.** Yes. Burpless cucumbers are no longer considered novelties, and are offered in most garden catalogs. They are mild, sweet, and crisp when fresh. The skin is tender and free of bitterness, although many people peel it off. Most varieties are long (10 to 12 inches) and curved unless grown on a trellis.

Q. What cucumber variety should I buy for gherkins? **A.** Buy the West Indian gherkin. It is a close relative of the garden cucumber used for pickling. The fruits are generally oval, 1 to 3 inches long, and more warty than cucumbers. They are also called "burr cucumbers," but are usually listed in catalogs as West Indian Gherkin. They are grown in the same way as cucumbers.

Q. Why do my cucumbers fail to set fruit and yield properly? **A.** The first yellow flowers that appear on the plants are male flowers that provide pollen. The male flowers normally drop off after blooming. The small cucumber is evident at the base of the female flower, and it should develop into an edible fruit. Anything that interferes with pollination of the female flowers will reduce fruit set and yield, including cold temperatures and rainy weather that hamper bee activity, or improper use of insecticides that kill bees.

Q. What are *gynoecious* hybrids? **A.** Gynoecious ("female flowering") hybrids are special hybrids of slicing and pickling cucumbers that are advertised in many garden catalogs. Because they have all female flowers, they may be earlier and higher yielding than other varieties. Usually, the seed company mixes in a small proportion of seed of a standard cucumber as a pollinator.

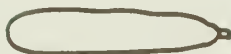
Q. How far apart should I plant my cucumbers from melons? I am concerned about cross-pollination. **A.** Contrary to popular opinion, cucumbers will not cross-pollinate with muskmelons or watermelons and cause them to become bitter, tasteless, or off-flavor. Since cucumbers and melons require considerable space in the garden, however, plant the rows far enough apart for proper vine growth.

Q. What causes my cucumber plants to be stunted? The leaves are a mottled yellow, and the fruits are blotchy and taste bitter. **A.** This condition is caused by the cucumber mosaic virus. Grow mosaic-resistant varieties.

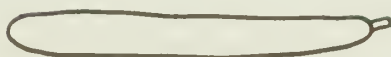
Q. What causes the white mold growth on the upper surfaces of my cucumber leaves? **A.** This condition is caused by powdery mildew, a fungus disease that is most severe during late summer and fall plantings. Grow resistant varieties.



Pickling
(2-6 inches)



Slicing
(6-8 inches)



Burpless (Salad)
(10-14 inches)



Seed
(2X)



Seedling



Eggplant (also known as guinea squash and aubergine) is a very tender vegetable that requires a long warm season for best yields. The culture of eggplant is similar to that of tomato, but eggplants are spaced closer together than tomato plants and are not staked. Eggplant requires careful attention for a good harvest. Small-fruited and ornamental varieties can be grown in containers and for decorative purposes.

Varieties

Large Oval Fruit: Black Beauty (80 days to harvest); Black Magic (hybrid — 72 days to harvest); Burpee Hybrid (hybrid — 80 days to harvest); White Beauty (ornamental — 80 days to harvest). **Small Elongated Fruit:** Ichiban (hybrid — 70 days to harvest); Long Tom (hybrid — 75 days to harvest); Short Tom (hybrid — 75 days to harvest); Slim Jim (70 days to harvest).

When to Plant

Eggplant is best started by transplanting, and it is important to get the plants off to a proper start. Select plants that have soil with the roots. Do not plant too early. Transplant *after* the soil has warmed and the danger of frost has passed. Eggplants are more susceptible than tomato plants to injury from low temperatures.



Large oval
(7-9 inches)



Small elongated
(3-9 inches)

Spacing of Plants

Space plants 18 to 24 inches apart in the row. Three to six plants are usually sufficient for most families. Allow 30 to 36 inches between rows.

Care

Use *starter fertilizer* (see page 16) for transplanting. Side-dress nitrogen fertilizer (page 16) when the plants are half grown, and again immediately after harvest of the first fruits. The plants will tolerate dry weather after they are well established, but you should irrigate during extended dry periods. Eggplant thrives in the heat of summer.

Harvesting

Harvest the fruits when they are 6 to 8 inches long and glossy. Use a knife or pruning shears rather than breaking or twisting the stems. Leave the large, usually green calyx attached to the fruit.

When the fruits become dull or brown, they are too mature for culinary use, and should be cut off and discarded. Overmature fruits are spongy and seedy. The fruits do not store well, and should be eaten soon after they are harvested. Large, vigorous plants can yield as many as four to six fruits at the peak of the season.

Common Problems

Verticillium wilt causes yellowing, wilting, and death of the plants. Flea beetles (see page 33) cause tiny holes in the leaves. Damage can be severe if unchecked. These beetles can be controlled by applying an insecticide.

Questions and Answers

Q. I planted my eggplants early, but they did not grow very well. **A.** They probably were planted while the soil was too cold. It is better to hold the plants (but keep them growing) until the soil warms. Mulching with black plastic film (page 29) can help warm the soil, especially in northern Illinois.



Seed
(3X)



Seedling



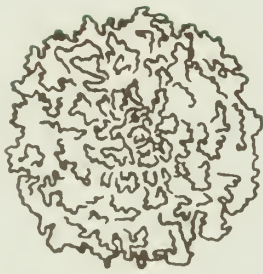
Endive and escarole are related hardy annual vegetables that have the same growing requirements. The primary difference between them is that endive has curled, fine cut, and curly leaves, while escarole has broad, flat leaves. They are cool-season plants that grow best in the spring in northern Illinois and during the fall months over the entire state. (Although endive is grown in Florida, it is produced there as a winter vegetable.) Endive and escarole are delicacies when blanched and used for salads or as a garnish.

Varieties

All varieties of endive and escarole can be harvested within 80 to 100 days. **Endive:** Green Curled; Salad King. **Escarole:** Broad Leaved Batavian; Florida Deep Heart; Full Heart Batavian.

When to Plant

Endive and escarole do not thrive under hot conditions, and they must be grown as an early spring or fall crop. They grow in much the same manner as lettuce, and respond well to fertile soil and mean growing temperatures between 60° F. and 70° F., with a uniform supply of moisture.



Endive



Escarole

Spacing of Plants and Depth of Planting

Plants may be started inside in early March and transplanted into the garden in April. Plant seeds $\frac{1}{4}$ inch deep in a container of sterile soil or directly into peat pellets. When the seedlings are less than 1 inch high, they may be spaced $1\frac{1}{2}$ to 2 inches apart in a flat. The seedlings are ready to plant in the garden when they are $2\frac{1}{2}$ to 3 inches high. Use a *starter fertilizer* solution to establish a fast start before summer heat.

Seeds may be planted directly into the garden in late March or early April. Plant seeds $\frac{1}{4}$ inch deep in rows 18 to 24 inches apart. When the seedlings are 1 inch high, they should be thinned or transplanted to 9 to 12 inches apart. Adequate moisture and space are necessary to assure rapid development of the heads.

Summer planting for a fall crop is often quite rewarding. Plant seeds $\frac{3}{8}$ to $\frac{1}{2}$ inch deep in July, and thin seedlings to 9 to 12 inches apart. Water frequently during the hot summer months. Endive is very hardy, and will withstand frost to give harvest throughout the fall months.

Care

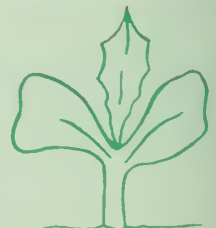
Unless blanched, the spreading plants are likely to be bitter. When sunlight is kept from the center leaves, their green color is reduced, bitterness is decreased, and texture and flavor are improved. Heads are usually blanched after the leaves spread sufficiently to touch the next plant. Tie the tops of the outermost leaves together as the heads develop. Make sure that the plants are dry before tying the leaves. If the plants are not dry, the inner leaves may rot. Blanching requires two to three weeks, and several plants may be blanched at one time.

Harvesting

After the blanched heads have developed, cut the plants at ground level. If the weather turns very hot in the summer or hard freezing is expected in the fall, cut the heads, wash, drip dry, and store in a polyethylene bag in the refrigerator for later use. Discard the tough outer leaves.



Seed
(6X)



Seedling



Jerusalem artichoke (also known as sun choke) is a true native of North America, and was one of the few vegetables grown by the Indians. It is a perennial plant, cultivated as an annual, that may persist in the garden as a weed. An entirely different plant from the Globe artichoke grown in California, Jerusalem artichoke is related to the sunflower. The fleshy oblong tubers may be baked, boiled, or fried like white potatoes. They are also used as animal food, especially for hogs.

In recent years, Jerusalem artichoke has gained attention because the tubers contain inulin that breaks down into the sugar fructose when they are eaten. Fructose is reputed to be of value in the diets of people suffering from diabetes.

Varieties

Jerusalem artichoke tubers for garden use are improved seedstock selections. You may obtain tubers from nurseries, seed supply houses, the gourmet sections of food stores (under the name "sun chokes"), or possibly from another gardener. For subsequent plantings, you can dig your own tubers and set out a new row when you bring in the spring harvest.

When to Plant

Jerusalem artichoke grows in all parts of Illinois. It thrives best in a well-drained garden with high fertility, particularly potassium. Plant the entire tubers in early spring.

Spacing of Plants and Depth of Planting

Plant individual tubers 2 to 3 inches deep spaced 24 to 30 inches apart. Since the plants grow 6 feet high or higher, you should allow 3 to 4 feet between rows.

Care

Early cultivation and hoeing are necessary. As the plants become established, however, little or no further care is required. The large, woody tops that resemble sunflowers should be cut off above the ground before harvest.

Harvesting

Dig the tubers anytime from September until after frost in the spring and before new growth starts. Usually, the tubers are dug as needed. A supply can be harvested and stored as potatoes before the soil freezes. Any tubers that are not harvested will regrow, and may become troublesome weeds in the garden.

Questions and Answers

Q. What are the best storage conditions for Jerusalem artichokes? **A.** If possible, store at a temperature of 32° F. with high (95 percent) humidity. Jerusalem artichokes do not form a thick skin like the potato, and tend to lose moisture rapidly. The tubers can also be placed in polyethylene bags in the refrigerator.



Plant



Kale (also known as nonheading cabbage and borecole) is a hardy, cool-season green of the cabbage family that is rich in vitamins A and C. Although kale will tolerate summer heat, it grows best in the spring and fall. The highly curled, bluish-green leaves (some varieties have plain leaves) do not form a solid head.

“Flowering” varieties of kale are quite colorful. They are planted for use as accent or pot plants. The leaves develop their highest color under cool fall weather. In addition to serving as ornamentals, kale plants are used for greens as a garnish or in salads, and may be cooked in place of cabbage.

Varieties

Dwarf Blue Curled Scotch (70 days to harvest); Dwarf Curled (Vates) (60 days to harvest); Dwarf Siberian (65 days to harvest).

When to Plant

Plant kale in the garden any time from early spring to early summer. In southern Illinois, planting in late summer will provide harvest from fall until the ground freezes hard in early winter.

Spacing of Plants and Depth of Planting

Sow seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep in rows. Thin the seedlings to 8 to 12 inches apart. The seedlings may be transplanted.

Care

Kale is relatively easy to grow, requiring only normal cultivation and watering.

Harvesting

The lower leaves may be individually picked when they are small and tender (8 to 10 inches or shorter). The entire kale plant may also be cut. Quality is improved by frost, and the plant will withstand night freezes. Late summer plantings usually give best results. Kale can be harvested until early winter, when severe freezes injure or kill the plants.

Common Problems

Aphids (see page 33); cabbage worms (see page 52).

Questions and Answers

Q. Will new leaves develop if the tip of the plant is removed? **A.** No. Removing the tip prevents further growth.



Seed
(6X)



Seedling



Kohlrabi (also known as stem turnip) is a hardy, cool-season vegetable belonging to the cabbage family. It has a turniplike appearance, with leaves standing out like spokes. The edible portion is an enlarged stem that grows just above the groundline. Kohlrabi is sometimes misclassified as a root vegetable.

Varieties

Early White Vienna (55 days to harvest).

When to Plant

Sow seeds in early spring. Make small plantings every two to three weeks for continuous spring and early summer harvest. One or two late plantings can also be made in midsummer at the same time as late cabbage.

Spacing of Plants and Depth of Planting

Sow seeds in rows and cover them $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Thin the seedlings to 2 to 5 inches apart. Transplant the surplus seedlings if more plants are needed in the row.

Care

Plant in fertile soil, maintain adequate soil moisture, and keep down weeds. Proper care allows kohlrabi to achieve the rapid growth that results in best quality.

Harvesting

Kohlrabi has the mildest and best flavor (resembling mild white turnips) when it is small. Unfortunately, many gardeners allow kohlrabi to grow too large before harvesting it. Large, older kohlrabi is tough and woody, and may have an off-flavor. Harvest (pull and cut off the leaves) when the stem is 2 to 3 inches in diameter. The young leaves may be cooked like spinach.

Common Problems

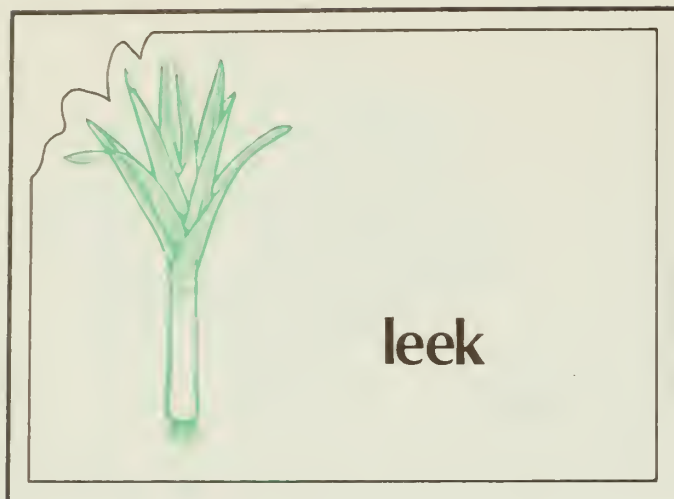
Cabbage worms (see page 52); diseases (see page 52).



Seed
(6X)



Seedling



Leek is a hardy, mild-flavored vegetable of the onion family that has been cultivated for centuries. The leek plant resembles a large onion plant with flat leaves, but it is made up of a sheaf of basal leaves rather than a bulb. Leeks may be eaten raw or cooked, but they are used primarily for flavoring soups and stews in place of onions.

Varieties

American Flag; Broad London; Conqueror; Electra; Giant Musselburgh; Swiss Special; Tivi.

When to Plant

Seed 10 to 15 seeds per foot of row directly in the garden in early spring. Thin the seedlings to 4 inches apart. Leeks may also be started in hotbeds or in the house during February in the same manner as onion transplants (see page 80).

Care

Leeks will grow in any garden that produces good onions. When the plants begin strong growth in the summer, cultivate and draw soil toward the plants to blanch the edible portion. Blanching makes the leeks longer and whiter at harvest. Leeks are slow growers, requiring 120 days or more to reach 1 to 1½ inches in diameter. Do not bank soil around the plants for blanching until they are at least the size of a pencil. Early banking while the leaves are small will cause the plants to rot and die.

Harvesting

Leeks may be harvested for use throughout the late summer and fall. To harvest, loosen the soil with a spading fork and pull out the plant. Cut off the roots and all but 2 inches of the green leaves. Leeks may be dug before hard freezes and stored under refrigeration (see pages 127-128). The plants may also be mulched heavily with fresh straw for harvest whenever the ground is not frozen. Spring harvest is usually completed in late March or early April before the leeks begin second growth and send up a seedstalk.

Questions and Answers

Q. Why do my leeks rot where the fine roots are attached? **A.** This condition may be the result of maggot infestation in the soil. Treat the soil with a suggested soil insecticide in early spring.



Seed
(4X)



Seedling



lettuce

Lettuce is a fairly hardy, cool-weather vegetable that thrives when the mean daily temperature is between 60° F. and 70° F. It should be planted in early spring or late summer. At high temperatures, growth is stunted, the leaves may be bitter, and the seedstalk elongates rapidly. Some types and varieties of lettuce withstand heat better than others.

There are five distinct types of lettuce: leaf (also called loose-leaf) lettuce, Cos or romaine, crisphead, butterhead, and stem (also called asparagus) lettuce.

Leaf lettuce, the best adapted to Illinois conditions, produces crisp leaves loosely arranged on the stalk. Nearly every garden has at least a short row of leaf lettuce, making it the most widely planted salad vegetable. **Cos or romaine** forms an upright, elongated head, and is an excellent addition to salads and sandwiches. The **Butterhead** varieties are generally small, semiheading types that have tender, soft leaves with a delicate flavor. **Stem lettuce** forms an enlarged seedstalk that is used mainly in stewed, creamed, and Chinese dishes. **Crisphead** varieties are the least adapted to Illinois conditions, and require the most care. They must be grown from transplants, started early, and are extremely sensitive to heat.

Varieties

Leaf Lettuce: Black-Seeded Simpson; Grand Rapids; Green Ice (*resistant to heat*); Oak Leaf (*resistant to tipburn*); Prizehead (*resistant to tipburn*); Ruby (red color, *resistant to tipburn*); Salad Bowl (*resistant to tipburn*); Slobolt (*resistant to heat, tipburn*); Waldmann's Green (*resistant to tipburn*); **Cos or Romaine:** Paris Island; Sweet Midget; Trianon; Valmaine; White Paris. **Butterhead:** Bibb (limestone); Buttercrunch (*resistant to heat*); Boston; Butter King; Matchless (Deer Tongue); Summer Bibb (*resistant to heat*); Summerlong (*resistant to heat*); Tom Thumb Midget. **Heading or Crisphead:** Fairton; Great Lakes;

Iceburg; Imperial; Ithaca; Pennlake. **Stem or Asparagus:** Celtuce.

When to Plant

Leaf, Cos, and butterhead lettuce can be planted anytime in the spring when the soil is dry enough to rake the surface. Two or more successive plantings at 10- to 14-day intervals will provide a continuous supply of lettuce. Lettuce does not withstand hot summer days, and spring planting should be completed during May. Late plantings started in August will mature during the cool fall weather. Watering is essential for seed germination and establishment of seedlings.

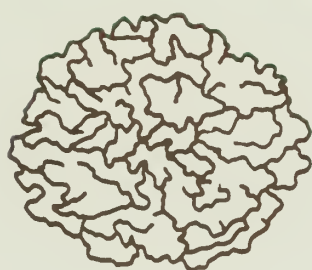
Head lettuce must be transplanted, and requires more care than other types of lettuce. Start transplants indoors or in a cold frame (see page 38) and set them in the garden in early April. Harden transplants outdoors so that they become acclimated to the conditions under which they will be grown. Cos and leaf varieties of lettuce can also be transplanted for earlier harvest.

Spacing of Plants and Depth of Planting

Plant seeds $\frac{1}{4}$ to $\frac{1}{2}$ inch deep (10 seeds per foot) in single, double, or triple rows 12 to 18 inches apart. Thin seedlings to 4 inches apart for leaf lettuce and 6 to 8 inches apart for Cos or butterhead. The removed seedlings may be transplanted or eaten. Transplant crisphead seedlings 10 to 12 inches apart in the row.

Care

Because lettuce is shallow rooted, it should be hoed or cultivated carefully. Frequent light watering will cause the leaves to develop rapidly, resulting in high-quality lettuce. Overwatering, especially in heavy, tight soils, can lead to disease, soft growth, and scalding or burning of the leaf margins.



Leaf



Butterhead



Cos



Head

Harvesting

Leaf lettuce may be cut whenever it is large enough to use. Cutting every other plant at ground level will give the remaining plants more space for growth. Leaf lettuce reaches maximum size (6 to 12 ounces) in 50 to 60 days. Butterhead varieties form small, loose heads that weigh from 4 to 8 ounces at harvest (60 to 70 days). The innermost leaves, which tend to blanch themselves, are a delicacy. Cos varieties have an upright growth habit, and form a long head.

To store lettuce, wash, drip dry, and place in a plastic bag in the refrigerator. Lettuce keeps best at 32° F. and high (95 percent) humidity (see page 127).

Common Problems

Aphids (see page 33). Tipburn is a physiological condition that causes lettuce to “die back” at the edges of the leaves. It results from a change in the moisture relationship between the soil and the plant. Clip off any brown leaf tissue and use the remainder of the leaf. Frequent light waterings will help prevent tipburn. Some varieties are resistant to this condition.

Questions and Answers

Q. Why didn't my lettuce seeds germinate? **A.** Failure of seeds to germinate is caused by insufficient moisture or old seed. Lettuce seed does not keep well, and it is advisable to obtain new seed each spring. Store seed for fall gardens in a sealed container in the refrigerator.

Q. Seedstalks have appeared in the center of my lettuce plants. What should I do? **A.** The formation of seedstalks is caused by a combination of long days, warm temperatures, and age. When seedstalks begin to form, harvest your lettuce immediately and store it in the refrigerator.

Q. My lettuce tastes bitter. What can I do about it? **A.** Lettuce may become bitter during hot weather and when seedstalks begin to form. Wash and store the leaves in the refrigerator for a day or two. Much of the bitterness will disappear.

Seed
(6X)

Seedling



Muskmelon (also known as cantaloupe) is a tender, warm-loving vegetable that requires a culture similar to that of cucumber but has a longer season. Most varieties popular in Illinois have salmon-colored flesh (some are green-fleshed) and netted rinds, and are properly called "muskmelons." The name describes the aroma (musk or perfume) of the ripe fruit. Cantaloupe is the name used interchangeably with muskmelon for the round-to-oval, netted-type of muskmelons grown in the Southwest and shipped to grocery stores. The true cantaloupe, however, has a hard, warty rind and green flesh, and is not widely grown in the United States.

Honeydew, Crenshaw, and Casaba are sometimes referred to as "winter melons." (The true winter melon is a Chinese vegetable.) Their cultural requirements are similar to those of muskmelons. They are late in ripening (require the longest season), usually have a smooth rind surface, and lack a distinctive odor. Even the earliest varieties may not ripen fully in northern Illinois.

Varieties

Ambrosia (hybrid — 86 days to harvest); Burpee Hybrid (hybrid — 85 days to harvest); Early Crenshaw (hybrid — 90 days to harvest); Gold Star (hybrid — 87 days to harvest, *resistant to fusarium wilt*); Harper Hybrid (hybrid — 86 days to harvest, *resistant to alternaria blight, fusarium wilt, mosaic*); Harvest Queen (90 days to harvest, *resistant to fusarium wilt*); Saticoy (hybrid — 86 days to harvest, *resistant to fusarium wilt, powdery mildew*); Supermarket hybrid — 88 days to harvest, *resistant to fusarium wilt, powdery mildew*).

When to Plant

Muskmelons are usually directly seeded. Unless the weather is warm, the seeds will not germinate

and the plants will not grow. Plant after the danger of frost has passed and the soil has warmed. Gardeners in northern Illinois or those who want early production may use transplants. To increase earliness, start seed for transplants three to four weeks ahead of planting time. Since muskmelons do not transplant well if the roots are disturbed, you should start seeds in individual containers. Proper temperatures for germinating and growing the transplants are very important.

Spacing of Plants and Depth of Planting

Plant seeds 1 inch deep, and thin the seedlings 18 to 24 inches apart or the equivalent (two plants every 36 inches or three plants every 48 inches in the hill system). Space rows at least 5 feet apart.

Care

Fertile garden soils will usually grow a fine crop of muskmelons with the maintenance fertilizer application plus one side-dress application when the plants begin to vine. Muskmelons benefit from the incorporation of well-rotted manure prior to planting. All melons respond favorably to mulching with black plastic (see page 29). The mulch can be installed when the soil is in good planting condition any time from a few days to two or three weeks before planting. Make holes every 2 to 3 feet and plant seed or transplants. Use *starter fertilizer* (see page 16) for transplants.

Muskmelons suffer from extremes in soil moisture (too much rain or an extended drouth). Irrigation is recommended in case of drouth, especially when the vines are growing and the fruits are developing. Muskmelons ripen to highest quality when the vines remain healthy, when temperatures are warm but not excessively high, and when the weather is comparatively dry at the time of maturity.

Harvesting

Good eating quality depends upon the texture of the melons and the development of sugars from proper ripening on the vines. When muskmelons are ripe, the rind changes from a green to tan or yellow between the netting. They should be picked when the stem separates easily near the point of attachment ("half-slip" or "full-slip" stages of development). At these stages, there will be a crack near the point of attachment. Do not pick too early—the quality will not be as high as that of melons that ripen on the vine.

Harvest early in the day after the plants are dry, and be careful not to damage the vines. Pick every other day at the beginning of the season, and go over the patch every day at peak season. Honeydew and Crenshaw melons are cut off the vine after they turn completely yellow. These melons will continue to improve (become soft and mellow) if kept at room temperature for a few days. When they are completely ripe, the blossom end is soft to pressure.

Common Problems

Control cucumber beetles (see page 33). They damage muskmelons and spread bacterial wilt by feeding on the plants. When possible, plant varieties that are resistant to fusarium wilt and leaf diseases such as powdery mildew and alternaria blight.

Questions and Answers

Q. Why do the first blossoms drop off my muskmelon plants? **A.** The first flowers to appear on the vines are male, and they drop naturally. The female flowers, which open later, have a swelling at the base that forms the fruit. Bees will pollinate these female flowers, and the fruit then develops.

Q. What causes poor (sparse) fruit set and low yields? **A.** The failure of female flowers to set and develop melons can result from lack of proper pollination by bees; cool, wet weather (which also slows bee activity); and planting too close, resulting in a heavy growth of leaves.

Q. How can I grow muskmelons in a small garden? **A.** Muskmelon plants can be trained to a fence or trellis. Soon after the fruits begin to enlarge, they should be supported with mesh bags tied to the supporting structures.

Q. Will muskmelons cross-pollinate with other vine crops? **A.** No. Muskmelons will not cross-pollinate with cucumbers, watermelons, squash, or pumpkins. Different varieties of muskmelons will cross-pollinate readily, but this cross-pollination will not be evident unless seeds are saved and planted the following year. Melons are not bitter because of cross-pollination.

Q. What causes poor flavor and lack of sweetness or fruits with smooth rinds? **A.** Poor soil fertility (especially low potassium), cool temperatures, wet or cloudy weather, choice of a poorly adapted variety, loss of leaves by disease, or picking the melons before they are ripe can all contribute to poor quality.



Seed
(1X)



Seedling



Mustard greens (also known as mustard spinach, leaf mustard, and white mustard) is a quick-maturing, easy-to-grow, cool-season vegetable for greens or salads. Although mustard is grown primarily in the Deep South, it is also suitable for southern and northern Illinois gardens. Mustard greens are high in vitamins A and C.

Varieties

Green Wave (45 days to harvest); Southern Giant Curled (40 days to harvest).

When to Plant

Plant early in the spring (three weeks before the frost-free date) and again three weeks later. Plant in mid to late summer for fall harvest. The later plantings are usually the best under Illinois conditions.

Spacing of Plants and Depth of Planting

Sow seeds $\frac{1}{2}$ inch deep and thin seedlings to 2 to 4 inches apart.

Care

Mustard grows rapidly. Give ample water during dry periods.

Harvesting

Harvest the leaves when they are young and tender. Do not use wilted or yellowed leaves. You can cut the entire plant, or pick off individual leaves as they grow. The leaf texture becomes tough and the flavor strong in summer.

Common Problems

Aphids (see page 33); cabbage worms (see page 52).

Questions and Answers

Q. What causes flowers to develop in my spring mustard? **A.** Mustard is a cool-season vegetable that naturally flowers during the long, warm days of summer. Pull the spring planting when hot weather arrives and before flower stalks develop.

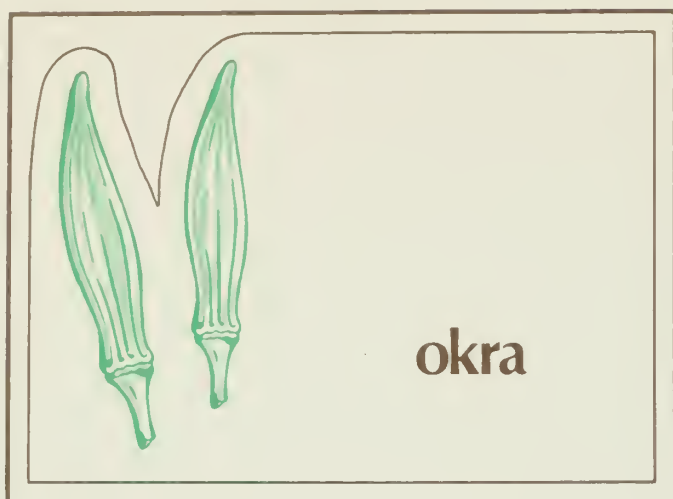
Q. What causes mustard leaves to have yellow blotches and be misshapen? **A.** This condition is caused by downy mildew. It can be controlled by applying a suggested fungicide.



Seed
(6X)



Seedling



Okra (also known as gumbo) is a tall-growing, warm-season annual vegetable. The immature pods are used for soups, canning, and stews, or as a fried or boiled vegetable. The hibiscuslike flowers and upright plants (3 to 6 feet in height) have ornamental value for backyard gardens.

Varieties

Dwarf Green Long Pod (ribbed pods, 52 days to harvest); Emerald (dwarf — smooth pods, 55 days to harvest).

When to Plant

Plant seeds after the soil has warmed in the spring.

Spacing of Plants and Depth of Planting

Sow seeds 1 inch deep. When the seedlings are 3 inches high, thin to 12 to 24 inches apart. The seeds may be soaked in water overnight to accelerate germination.

Care

Okra usually grows well in any good garden soil. Shallow cultivation near the plants will keep down weeds.

Harvesting

The pods should be picked (usually cut) while they are tender and immature (2 to 3 inches long for most varieties). They must be picked often — at least every other day. When the stem is difficult to cut, the pod is probably too old to use. The large pods rapidly become tough and woody. The plants bear until frost, and four or five plants will produce enough okra for most families.

Questions and Answers

Q. Should I remove the old okra pods? **A.** Yes. Cut them off to allow the plant to continue producing young ones.

Q. Why doesn't my seed germinate even after soaking? **A.** Okra seed does not keep well. Buy fresh seed.

Q. My okra plants grew over 6 feet high, and the pods were difficult to pick. **A.** Choose a dwarf variety that will grow only 2½ to 5 feet high.

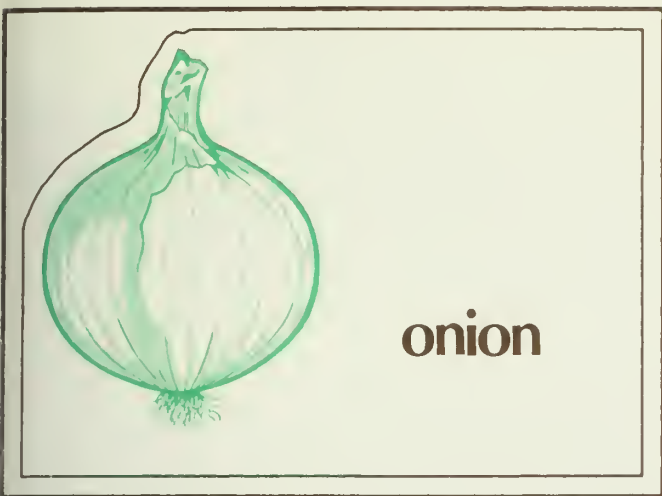
Q. What causes yellowing, wilting, and death of plants in midsummer? **A.** These conditions are caused by either verticillium or fusarium wilt. Okra varieties, unlike certain tomato varieties, are not resistant to verticillium and fusarium wilt. Rotate crops to prevent buildup of these diseases in your garden.



Seed
(2X)



Seedling



onion

Onion is a cool-season vegetable that can be grown successfully throughout Illinois. Onions may be grown from *sets*, *transplants*, or *seeds*. In all three methods, the onions are planted as soon as the garden can be tilled in late March or early April. Good fertility, adequate soil moisture, and cool temperatures aid development.

Onions start bulb formation when the day length is of the proper duration, and different varieties of onions require different day lengths to initiate bulbing. For this reason, onion varieties that are grown in the South are not adaptable to Illinois. Late plantings of the suggested varieties for Illinois will also result in small bulbs.

High temperatures and low humidity are advantageous during bulbing and curing. Onions are shallow rooted, and compete poorly with weeds and grasses. Timely shallow hoeing and cultivation are important, especially when the onions are small.

Onions may be eaten raw, broiled, boiled, baked, creamed, steamed, fried, french fried, and pickled. They are used in soups and stews, and in combination with vegetables and meats.

Onions from Sets

Growing onions from sets is the most successful method for the home gardener. The plants are quickly established, and will become vigorous and strong. Onion sets may be used to produce both green onions and dry onion bulbs.

Varieties

Several varieties are used for onion sets. All of these varieties are adaptable to Illinois conditions. The home gardener has little choice of varieties, however, because sets are seldom sold under varietal name.

Purchase firm, dormant sets early — before they begin growth in heated salesrooms. Divide the sets into two sizes before planting. Large sets (larger than a dime in diameter) are best used for green onions. If allowed to grow, these sets may “bolt” and form flower stalks. The small sets (smaller than a dime in diameter) produce the best bulbs for large, dry onions, and they usually do not “bolt.”

Round onion sets produce flat onions; elongated or “torpedo” sets mature into round onions. Most gardeners prefer white sets for green onions, although red or brown sets are also acceptable.

Spacing of Plants and Depth of Planting

To produce green onions, plant the larger sets 1½ inches deep and close enough to touch one another. To produce dry onions, plant the smaller sets 1 inch deep, with 2 inches between sets. Allow 12 to 18 inches between rows.

Care

Keep free from weeds by shallow cultivation and hoeing. To develop long, white stems for green onions, slightly hill the row with a hoe by pulling the loose soil toward the onions when the tops are 4 inches high. *Do not hill* onions that will be used as dry onions. Hilling may cause the necks of the stored bulbs to rot.

Harvesting

Pull green onions whenever the tops are 6 inches high. Green onions become stronger in flavor with age and increasing size. They may be used for cooking when they are too strong to eat raw.

Remove any plants that have formed flower stalks and use immediately. They will not produce good bulbs for dry storage. Harvest in late July or early August, when most of the tops have fallen over. Allow the plants to mature and the tops to fall over naturally. Breaking over the tops early will interrupt growth, and the bulbs will be smaller and will not keep in storage.

Pull the plants in the morning and allow the bulbs to air-dry in the garden until late afternoon. Then place them under dry shelter on elevated slats or screens or hang them in small bunches. Full air circulation for two to three weeks is necessary for complete drying and curing.

Cut the tops 1½ to 2 inches long, and place the bulbs in dry storage with good air circulation. Do not store bulbs that are bruised, cut, or diseased, or have green tops or necks. Store under cool, dry conditions (see pages 127-128). Dry onions grown from sets should keep until late winter.

Onions from Transplants

Transplanting young onion plants has become a popular method of growing large, dry onions for slicing. Transplants are purchased in bundles (usually 60 to 80 plants) from garden stores and through seed and nursery catalogs.

Varieties

Round: Benny's Red; Red Burgundy; Yellow Sweet Spanish; White Sweet Spanish. **Flat:** Red Hamburger; White Bermuda; Yellow Bermuda.

Spacing of Plants and Depth of Planting

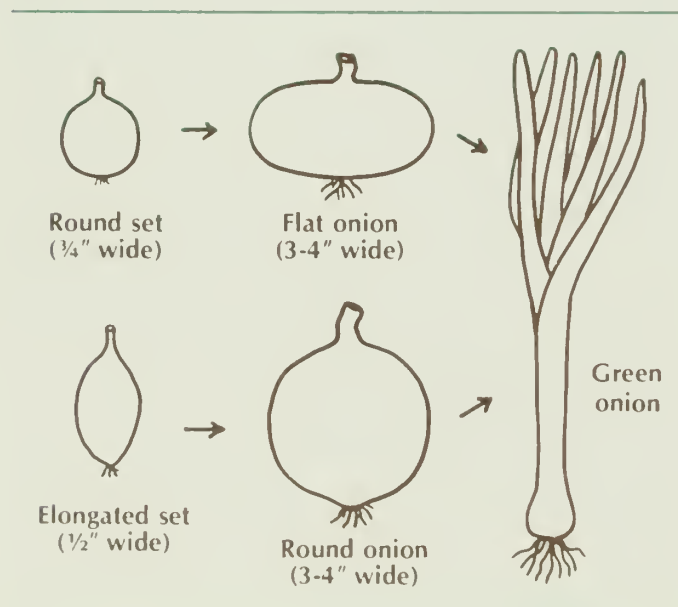
Plant in fertile soil in early spring. Space the plants 4 to 5 inches apart in the row to produce large-sized bulbs (closer spacing will significantly decrease bulb size). Allow 12 to 18 inches between rows. Set the transplants 1 to 1½ inches deep, and apply 1 cup per plant of a *starter fertilizer* solution (see page 16).

Care

Weeds and grass compete with the onion plants for nutrients and moisture during the growing season. Remove all weeds and grass by shallow cultivation and hoeing. Side-dressing with fertilizer (see page 16) may be necessary.

Harvesting

The bulbs are usually ready to harvest in August. When most of the tops have fallen over, the onions may be pulled and dried (see above). Onions from transplants are easily bruised. They have a relatively short storage period, and should be used by early winter.



Onions from Seed

Growing onions from seed is the least popular of the three methods. A longer period of time is required for development, especially for dry onions. Both green and dry onions can be grown directly from seed, and the varieties are different from the varieties sold as sets.

Varieties

Green Onions: Beltsville Bunching; Evergreen Long White Bunching; Southport White Bunching; White Spanish Bunching. **Dry Onions (yellow):** Abundance; Autumn Spice; Autumn Splendor; Bounty; Fiesta; Golden Globe; Nutmeg; Ringmaster; Topez; Yellow Globe; Yellow Sweet Spanish. **Dry Onions (white):** White Globe; White Sweet Spanish. **Dry Onions (red):** Benny's Red; Red Globe; Red Weathersfield; Ruby.

Spacing of Plants and Depth of Planting

Plant seeds 1 inch deep (10 to 15 seeds per foot). Allow 12 to 18 inches between rows. Plant onion seeds as soon as the garden can be tilled in the spring.

Care

Grasses and weeds must be controlled with shallow hoeing and cultivation throughout the season. When the seedlings are 3 to 4 inches high, thin to ½ to 1 inch between plants for green onions. Thin to 2 inches between plants for most varieties of dry onions, and 3 to 4 inches between plants for Sweet Spanish and other large onions.

To develop long, white stems for green onions, draw as much as 1 inch of loose soil up to the plants when they are 5 to 6 inches high. *Do not* pull soil up to the plants for dry bulbs. You will increase the possibility of bulb decay.

Harvesting

Harvest green onions whenever the base of the plant is ¾ inch or larger. Dry bulbs will be ready for harvest in September. After most of the tops have fallen over naturally, the onions should be pulled and dried (see above). When stored under cool, dry conditions (see pages 127-128), dry onions from seed will keep until spring.

Common Problems

Root maggots (see page 33) may attack the roots of onion plants in the northern one-third of Illinois. Use a suggested soil insecticide prior to planting.

Questions and Answers

Q. I harvested my onions in late summer, and they started to rot by fall. Why? **A.** Onions may rot at either the base or neck. Rotting at the base may be caused by soilborne fungi or carelessness in harvesting and handling, but it is usually caused by damage from root maggots (see page 33). Onion bulbs that rot at the neck have either been insufficiently cured before storage, or the leaves have been severely infected by fungi during the growing season. Onions that were "hilled" or covered with soil before harvest often start to rot.

Q. What happens when onions are broken over? **A.** Onions stop bulb development at that point, and may be immature. As a result, they will not cure or dry properly. In some cases, the rings also separate, and the bulbs are of poor quality.

Q. My parents came from Europe, where they braided the tops of onions. Why are onions braided? **A.** Onions are braided for curing and storage. After the tops are air-dried, they are braided and the onions are hung in a dry, sheltered location with good air circulation. Incorporating twine with the braiding adds strength. Individual onions may be cut from the braided "rope" as needed.

Q. My grandparents grew winter onions. Can I grow these in Illinois? **A.** Yes. Winter onions (Egyptian or Walking onions) are planted from sets formed at the tops of the plants in place of flowers. Plant the sets 1 inch deep during August. Space sets 4 to 5 inches apart. The clump may also be divided in early spring (March or April) and transplanted in the same manner as sets. In either case, be sure to place the winter onion bed at the side or end of your garden because these onions are perennials. Sets are available from a limited number of seed houses.

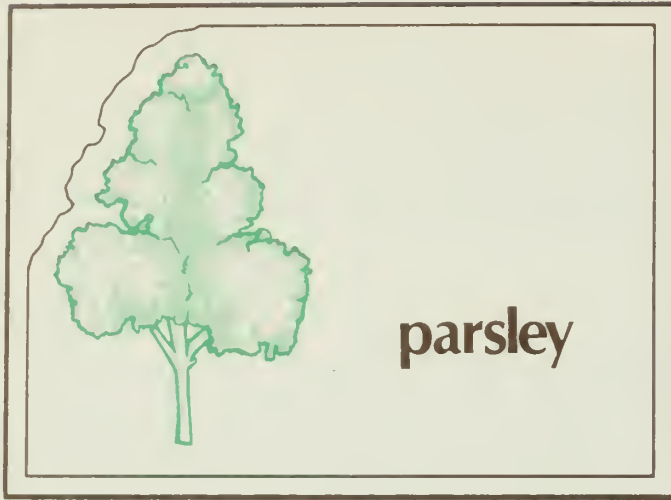
Q. How do I grow multiplier onions? **A.** Multiplier onions (sometimes referred to as "potato onions") are planted and handled in exactly the same manner as shallots (see page 119). True multiplier onions, like winter onions, are difficult to obtain. They do not form seed under Illinois growing conditions.



Seed
(4X)



Seedling



Parsley is one of the most popular vegetable plants grown in Illinois gardens. Because of its unique ability to blend flavors, parsley is frequently used in fine herb mixtures (see page 124). It is also used as a garnish, for flavor in salads, soups, and stews, cooked with other vegetables, and dipped into a light batter and served as a french fried vegetable. The parsley plant is prized for its ornamental value, and may be grown in pots and other containers as well as in the garden.

Root parsley, which is grown in the same manner as carrots (see page 54), is usually washed, cubed, and added to soups and stews. It can be stored like parsnips (see page 83), but cold is not necessary to develop its full flavor.

Varieties

Curled Leaf: Banquet; Deep Green; Extra Curled; Forest Green; Minicurl; Moss Curled; Perfection; Triple Curled. **Plain or Flat Leaf:** Italian. **Root Parsley:** Hamburg; Helmisher; Parsnip Rooted; Turnip Rooted.



Flat



Curled

When to Plant

Parsley is hardy, and seeds may be planted as soon as the soil is warm in the spring. Since parsley seeds are slow to germinate, they should be soaked overnight before planting. Seedlings may be started indoors or in a protected cold frame (see page 38) and transplanted into the garden.

Spacing of Plants and Depth of Planting

Parsley seed is short-lived, and fresh seed is important in establishing a crop. Plant 10 to 15 seeds per inch of row no more than $\frac{1}{4}$ inch deep. Thin the seedlings to 4 to 6 inches apart. (The seedlings of root parsley are usually thinned to 3 to 5 inches apart.) Allow 12 to 18 inches between rows.

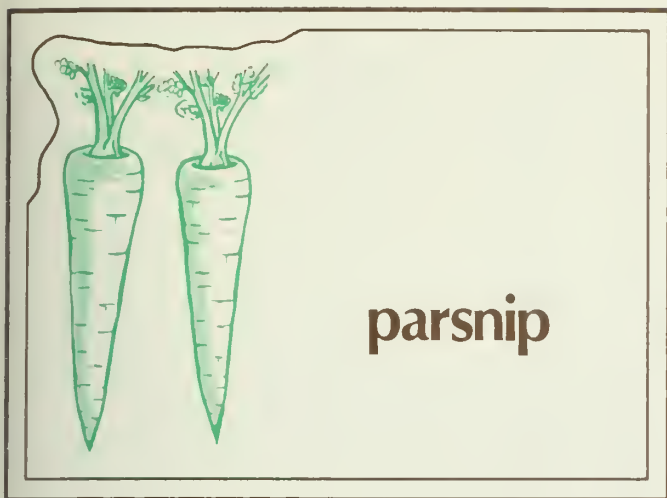
Harvesting

Parsley is usually picked leaf by leaf for daily use after the plants are well established. When the summer supply is adequate, the leaves may be harvested and dried (see page 121). To store parsley leaves, wash, drip dry, and place in a plastic bag or widemouthed jar in the refrigerator. Parsley may be covered lightly with straw and used continuously overwinter.

You can also carefully dig a few plants, pot them in 4- to 6-inch pots, and continue to grow them in the house for a fresh winter supply. The plants need a cool location and ample light. Discard these plants the following spring. If they are set outside, the leaves will be tough and strong in flavor, and the plants will develop seedstalks.

Seed
(8X)

Seedling



Parsnip is a hardy, full-season annual grown for its long, tapered root that resembles a white carrot. It is considered a winter vegetable because its flavor is not fully developed until the roots have been exposed to near-freezing temperatures for two to four weeks in the fall and early winter. The starch in the parsnip root then changes into sugar, resulting in a sweet, nutlike flavor.

Varieties

All American; Hollow Crown; Model.

When to Plant

Plant seed in early April or May in a deep, well-prepared, fertile soil. Parsnip seed is short-lived, and you must obtain a fresh supply each spring.

Depth of Planting and Spacing of Plants

Plant seeds $\frac{1}{2}$ to $\frac{3}{4}$ inch deep. To assure a good stand, plant 2 to 3 seeds per inch of row. Space rows 18 to 24 inches apart. Parsnip seed is slow to germinate, and some gardeners drop a radish seed every inch to mark the row and help break the soil crust. Thin seedlings to 2 to 4 inches apart. When the plants are too far apart, the roots become large, and the edible portion has a woody, fibrous texture.

Care

Keep young parsnip plants free of weeds by shallow hoeing or cultivation.

Harvesting

Parsnips should remain in the ground until the tops freeze in late fall. At this time, the roots may be harvested and stored or left in the garden to be used as needed. Gardeners who do not have storage facilities

often mulch parsnips with straw so that they can be dug throughout the winter. Like beets and carrots, parsnips may be stored in outdoor vegetable pits or underground cellars, or under refrigeration at 32° F. with high (95 percent) humidity (see pages 127-128). Dig the roots (usually $1\frac{1}{2}$ to 2 inches in diameter and 7 to 8 inches long) with a spading fork. Yields frequently exceed 1 pound per foot of row.

Common Problems

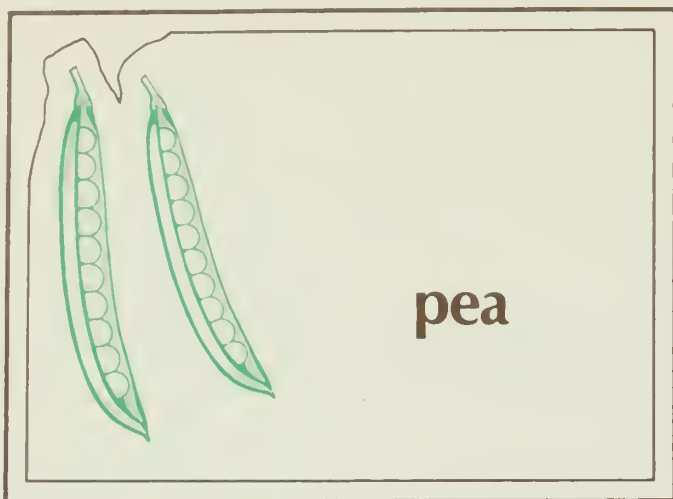
Low soil fertility is a common problem. It can usually be overcome by side-dressing a complete fertilizer in late June (see page 16). Parsnips are relatively free of both insects and diseases.



Seed
(2X)



Seedling



Pea is a frost-hardy, cool-season vegetable that can be grown throughout Illinois. For gardening purposes, peas may be classified as garden peas (English peas) and edible podded peas (Chinese pea pods or snow peas). The garden pea varieties have smooth or wrinkled seeds. The smooth-seeded varieties tend to have more starch than the wrinkle-seeded varieties. The wrinkled-seeded varieties are generally sweeter, and are usually preferred for home use. The southern pea (cowpea) is a warm-season vegetable that is planted and grown in the same manner as beans (see page 119).

Varieties

The following varieties have wrinkled seeds and are resistant to fusarium wilt unless otherwise indicated. **Extra Early (55 days to harvest):** Alaska (smooth-seeded); Super Alaska (smooth-seeded). **Early (60 days to harvest):** Dainty; Dainty Dot (smooth-seeded); Dwarf Grey Sugar (smooth-seeded); Freezonian; Frosty; Little Marvel (*not resistant to fusarium wilt*); Progress; Sparkle; Thomas Laxton. **Midseason (65-70 days to harvest):** Green Arrow; Lincoln; Perfection; Wando. **Late (70-80 days to harvest):** Alderman (Tall Telephone). **Edible Podded (65-75 days to harvest):** Dwarf Grey Sugar (smooth-seeded); Giant Melting; Melting Sugar; Oregon Sugar Pod.

When to Plant

Peas thrive in cool, moist weather, and produce best in the northern half of Illinois. Early plantings normally produce larger yields than later plantings. Peas may be planted whenever the soil temperature is 45° F. or higher, and when the soil is dry enough to till without its sticking to garden tools.

Spacing of Plants and Depth of Planting

Plant peas 1 to 1½ inches deep and 1 inch apart in single or double rows. Allow 18 to 24 inches between single rows and 8 to 10 inches between double rows.

Care

The germinating seeds and small seedlings are easily injured by direct contact with fertilizer or improper cultivation. Cultivate and hoe shallowly during the early stages of growth. Most dwarf and intermediate pea varieties are self-supporting. The taller varieties (Thomas Laxton and Alderman) are more productive when trained to poles or to a fence for support, and are more easily picked. They can be mulched (see pages 28-29) to cool the soil, reduce moisture loss, and keep down soil rots.

Fall peas may be started in July in northern Illinois and in August in the southern part of the state. To help keep down diseases, do not make fall plantings in the same area of the garden where spring peas were grown. Fall peas are harvested in September and early October.

Harvesting

Garden Peas. When the pea pods are swollen (appear round), they are ready to be picked. Pick a few pods every day or two near harvesttime to determine when the peas are at the proper stage for eating. Peas are of the best quality when they are immature and fully expanded but not hard and starchy. Peas should be picked immediately before cooking because their quality, like that of sweet corn, deteriorates rapidly. The pods on the lower portion of the plant mature the earliest. The last harvest (usually the third) is made about one week after the first. Pulling the entire plant for the last harvest makes picking easier. All the listed varieties, excellent as fresh peas, may be canned or frozen. Since hand-shelling is slow, some gardeners prefer the variety Green Arrow because it contains more peas per pod than any other variety.

Edible Podded Peas. These varieties are generally harvested before the individual peas have grown to the size of BB's. The pods are usually picked five to seven days after flowering. They can be fried, stir-fried, or steamed, and mixed with ornamental vegetables or meat dishes. Remove pods from the plants missed in earlier pickings. Fibers along the edges of larger pods and the stem and blossom ends are removed during preparation. Pea pods will lose their crispness if overcooked. The pods have a high sugar content, and



English
(4 inches long)



Edible podded
(3 inches long)



Southern pea
(8 inches long)

will brown or burn quickly. Do not stir-fry over intense heat.

Pea pods can be stored in a plastic bag in the refrigerator for two weeks. Unlike fresh green peas, pea pods deteriorate only slightly in quality when they are stored.

Common Problems

The first signs of fusarium wilt and root-rot diseases are the yellowing and wilting of the lower leaves and stunting of the plants. Infection of older plants will usually result in the plants producing only a few poorly filled pods. These diseases are not as prevalent on well-drained soils. Fusarium wilt can be avoided by growing wilt-resistant varieties.

Questions and Answers

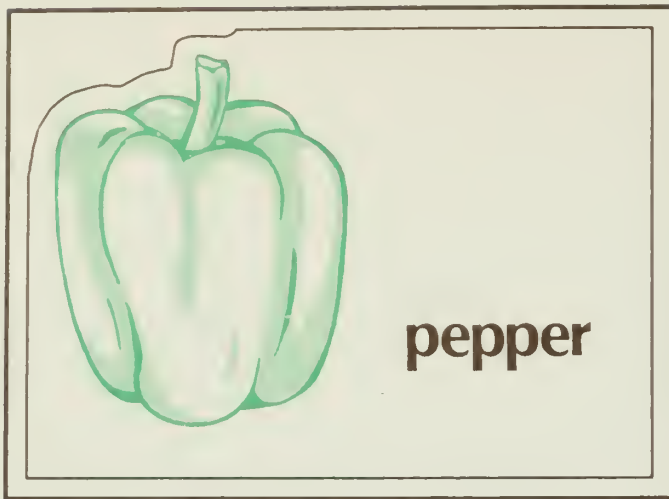
Q. Should I inoculate my peas with nitrogen-fixing bacteria before planting? **A.** When planting on new land, yields may be increased by inoculating peas with a commercial formulation of nitrogen-fixing bacteria. In an established garden, however, inoculation is of doubtful value.



Seed
(2X)



Seedling



Pepper (also known as mango) is a tender, warm-season vegetable. Peppers require somewhat higher temperatures than tomatoes, although pepper plants grow more slowly. Several kinds of garden peppers (bell, pimiento, tabasco, cayenne, chili, and paprika) may be grown for food or as ornamentals in Illinois.

The sweet varieties of peppers (bell or mango) are by far the most popular. They are eaten green or ripe, and are used for salads, stuffing, soup, stews, relishes, and pickling. The other peppers listed above should be familiar to you from the spice rack in the grocery store. Do not confuse these peppers with black pepper, the familiar table condiment. They are not related.

Varieties

Bell Peppers: Bell Boy (hybrid — 70 days to harvest); Bellringer (75 days to harvest, *resistant to mosaic*); California Wonder (72 days to harvest); Keystone Resistant Giant (75 days to harvest, *resistant to mosaic*); Lady Bell (hybrid — 72 days to harvest); Tasty (hybrid — 70 days to harvest); Yolo Wonder (75 days to harvest, *resistant to mosaic*); Yellow Belle (75 days to harvest). **Sweet Salad Peppers:** Sunnybrook, pimiento type (73 days to harvest); Sweet Banana (70 days to harvest). **Hot Peppers:** Cherry (75 days to harvest); Gold Spike (75 days to harvest); Hungarian Wax (70 days to harvest); Jalapeno (80 days to harvest); Long Red Cayenne (70 days to harvest); Red Chili (84 days to harvest).

When to Plant

Peppers are best started from transplants after the soil has warmed in the spring. The plants cannot tolerate frost, and they do not grow well in cold, wet soil. When night temperatures are 50° F. to 55° F. or

lower, the plants grow slowly, the leaves may turn yellow, and the flowers will drop off.

Spacing of Plants

Set transplants 18 to 24 inches apart in the row. A dozen plants, including one or two salad and hot types, will provide enough peppers for most families.

Care

Peppers thrive in a well-drained, fertile soil that is well supplied with moisture. Use a *starter fertilizer* when transplanting (see page 16). Apply supplemental fertilizer (side-dressing) cautiously, and only after a good crop of peppers is set. Gardeners do more harm than good by applying too much fertilizer. Irrigate during dry periods. A uniform moisture supply is essential throughout the harvest season. Hot, dry winds and dry soil prevent fruit set.

Harvesting

Fruits may be harvested at any size. The bell varieties, however, are usually picked when they are full-grown and mature — 3 to 4 inches long, firm, and green. When the fruits are mature, they will break easily from the plant. Some gardeners prefer to cut off the fruits to prevent damage to the plant. The fruits may be left on the plant to ripen fully to a red or yellow color. Hot peppers, except Jalapeno, which remains green when ripe, are usually harvested at the red ripe stage. Entire plants may be pulled in the fall before frost and hung in an outbuilding or basement to dry.



Bell
(4-5 inches)



Banana
(6-8 inches)



Spike
(4-5 inches)



Cherry
(1 ½ inches)

Common Problems

People who use tobacco should wash their hands with soap and water before handling pepper plants to prevent spread of tobacco mosaic disease. Grow resistant varieties, if possible. Watch for accumulation of aphids (see page 33) on the underside of the leaves. When a large aphid population is present, "honeydew" appears on the lower leaves and fruit. If this situation occurs, apply a suggested insecticide.

Questions and Answers

Q. Why do my pepper plants grow large but do not develop fruits? They are dark green, and do not appear to be diseased. **A.** Several weather conditions can reduce fruit set of peppers. The most common problems in Illinois are hot, dry winds and warm nights (above 70° F.). These conditions, coupled with too much nitrogen fertilizer, often result in poor yields, although the plants will be large and healthy.

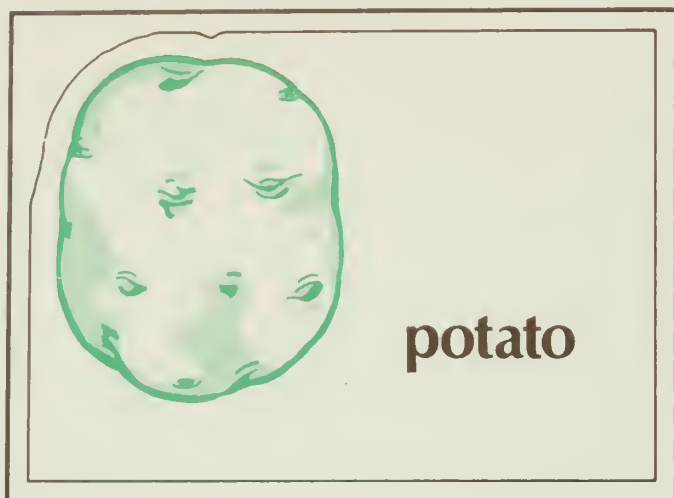
Q. What causes small, dry, sunken black areas near the ends of the peppers? **A.** This condition is blossom-end rot, similar to that in tomato. It is caused by drouth or by pruning roots through improper cultivation. Blossom-end rot is more severe on some varieties of peppers than on others. Remove infected fruits and throw them away. Irrigation and mulching will help to prevent blossom-end rot.



Seed
(3X)



Seedling



Potato is a cool-season vegetable that ranks with wheat and rice as one of the most important staples in the human diet. The white potato is referred to as the "Irish potato" because of its association with the potato famine in Ireland in the nineteenth century. Potatoes are not roots but specialized underground storage stems called "tubers." Maximum tuber formation occurs at soil temperatures between 60° F. and 70° F. The tubers fail to form when the soil temperature reaches 80° F. Potatoes withstand light frosts in the spring, and can be grown throughout Illinois.

Varieties

There are more than 100 varieties of potatoes. The horticultural varieties all have white flesh and light-brown or red skin. Russet Burbank is the most important variety produced in the United States, but the weather in Illinois is too warm and the moisture fluctuation is too great for the production of smooth tubers and good yields.

The following varieties are well adapted to Illinois conditions. If possible, use northern-grown seed potatoes that are certified disease-free. **Early:** Irish Cobbler (light-brown skin, often irregularly shaped); Norland (red skin, smooth — *resistant to scab*). **Superior** (light-brown skin — *resistant to scab*). **Mid-season:** Red Lasota (red skin, smooth); Red Pontiac (red skin, deep eyes). **Late:** Katahdin (light-brown skin, smooth — *resistant to some viruses, verticillium and bacterial wilts*); Kennebec (light-brown skin, smooth — *resistant to some viruses, late blight*).

When to Plant

Potatoes are among the earliest vegetables planted in the garden. Early, mid-season, and late varieties may all be planted in March or early April. Mid-season and late varieties may be planted as late as the first of July. Late potatoes are best for winter storage.

Spacing of Plants and Depth of Planting

Potatoes are started from "seed pieces" rather than from true seed. These seed pieces may be small whole potatoes or potatoes that are cut into 1½- to 2-ounce pieces. Plant the pieces soon after cutting. Be sure that there is at least one good "eye" in each seed piece. Some garden centers and seed suppliers sell "potato eyes" that weigh less than an ounce. Small, whole, certified seed potatoes are the best choice for home gardeners.

Plant seed pieces 10 to 12 inches apart, and cover in a furrow between 2 and 3 inches deep. Space rows 24 to 36 inches apart. The 24-inch spacing is often beneficial because the plants will shade the soil and prevent high soil temperatures that inhibit tuber development.

Care

The soil should be fertile and well drained. Clay soils should be improved with organic matter and plowed deeply in the fall.

Mulching is usually helpful in growing potatoes. Organic mulch can be applied after the potato plants have emerged to conserve moisture, help keep down weeds, and cool the soil (see page 28). Some gardeners cover rows of early potatoes with clear plastic film at planting (see page 29) to warm the soil and promote early growth when the soil temperature is low. When the plants emerge, remove the film to allow the plants to grow.

After the potatoes break the surface of the ground, gradually build up a low ridge of loose soil by cultivation and hoeing. This ridge, which may become 4 to 6 inches high by summer, reduces the number of "sunburned" (greened) tubers. The object of potato cultivation is to eliminate competition from weeds, to loosen and aerate the soil, and to ridge the row. Misshapen potatoes develop in hard, compact soil.

Irrigate to assure uniform moisture while the tubers are developing (see pages 29-31). A uniform moisture supply also helps to cool the ground and eliminate knobs caused by secondary growth.

Harvesting

Harvest potatoes after the vines have died. Handle as gently as possible during harvest. Since the tubers develop 4 to 6 inches beneath the soil surface, a spading fork is a useful tool for digging potatoes.

Potatoes for use in early summer ("new" potatoes) may be dug before the vines die (usually in July). When the potatoes reach 1 to 2 inches in size, you may wish to dig a few hills to use for soup or to cook with peas, cream, or butter.

Late potatoes are usually dug in August or early September. They will keep in the garage or basement for several weeks in their natural dormancy. Store over the winter in a dark room at a temperature between 38° F. and 40° F. with high humidity (see pages 127-128). Check periodically for spoilage.

“Straw Potatoes”

Potatoes grown by a special cultural method in which they are not hilled or cultivated after planting are called “straw potatoes.” The seed pieces and rows should be spaced the same as for conventional cultivation, but the tops of the seed pieces are planted at or within 1 inch of the soil surface. When the green sprouts appear, place straw 4 to 6 inches deep around the plants and between the rows. Cultivation will not be necessary unless a heavy rain occurs before strawing.

Harvest by carefully removing the straw and picking up the tubers that lie on the soil surface. In addition to weed control, strawing has several other advantages. The straw keeps the soil temperature approximately 10° F. cooler, reduces water loss, and results in better shaped tubers. It is more rewarding to straw late varieties than early ones because of the longer period for tuber development. Many gardeners who grow potatoes for competition in exhibits and fairs use the strawing method because the potatoes are of excellent size, color, and shape.

Common Problems

The early blight disease causes yellowing and dying of the leaves. The first signs of the disease are the presence of brown spots and yellowing of the lower leaves. The entire plant will become infected if the disease is not controlled. Early blight is best controlled by weekly applications of suggested fungicides, beginning when the seedlings are 6 to 8 inches high.

The potato scab disease (indicated by scabby, rough skins) does not develop when the soil pH is 5.6 or lower. Plant resistant varieties when available.

Colorado potato beetles, flea beetles (see page 33), and leafhoppers (see page 33) can significantly reduce potato yields. These insects can be controlled with suggested insecticides.



Colorado potato beetle
(½ inch)

Questions and Answers

Q. Should I save some of my potatoes for seed?

A. No. Saving your own seed potatoes can lead to a buildup of viruses and diseases. If possible, plant certified seed potatoes each year. These potatoes are certified to be free from certain viruses and diseases.

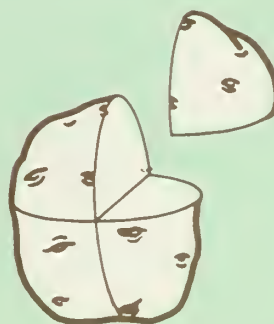
Q. My potato plants flowered and formed green fruits that resemble small tomatoes. What are they?

A. These small seed balls are the fruits that contain the true seeds. They are not edible.

Q. What causes green skin on my potatoes? **A.** The green areas on tubers develop where the potato was exposed to the sun. This condition occurs when the potatoes were not planted deeply enough or not covered with straw. The green portions taste bitter because they contain an alkaloid. These green areas should be cut off and discarded. Exposure of potato tubers to fluorescent light or sunlight will cause greening during storage.

Q. How should potatoes that are cut into seed pieces be cured? **A.** They can be cured by holding them for a week at 60° F. to 65° F. with high humidity (85 percent or higher). This treatment is of questionable value for the home gardener.

Q. Can I make chips from homegrown potatoes? **A.** Yes. Almost any potato variety can be used to make chips when the potatoes are freshly dug. Commercial chips are made from selected varieties that are carefully handled and stored. Chips made from inferior varieties or improperly stored potatoes will be brown or have a dark ring because they contain excessive amounts of sugar. A high sugar content results from improper storage or using an inferior variety.



Seed pieces



Irish potato



Sweet potato

Sweet Potato

Sweet potato is a tender, warm-weather vegetable that requires a long growing season. It is one of the most important food crops in tropical and subtropical countries, as well as in the southern United States. Sweet potatoes, which are related to morning glory, grow on trailing vines that quickly cover the soil.

Because of their ornamental value, sweet potatoes are often grown as groundcover or in hanging baskets, planters, and even in bottles of water in the kitchen. The sweet potato is rich in vitamin A. It is not related to the yam (the true yam is an entirely separate species that grows in the tropics).

Varieties

Allgold (*resistant to black rot, internal cork, soil rot, wilt*); Centennial (*resistant to internal cork, wilt*); Goldrush (*resistant to white rust, wilt*); Jasper (*resistant to internal cork, nematodes, scurf, soil rot, wilt*); Nemagold (*resistant to internal cork, root-knot, wilt*).

When to Plant

Sweet potatoes are started from plants called "slips." Transplant the slips soon after the last frost to allow the maximum growing period. Always buy plants grown from certified disease-free roots. To grow your own plants, place several sweet potato roots about 1 inch apart in a hotbed and cover with 2 inches of sand or light soil. Add another 1 inch of sand when the shoots begin to appear. Do not let the soil bed dry out—keep it between 70° F. and 80° F. Plants will be ready to pull in about six weeks (when they are rooted and 6 to 8 inches high). The sprouts (slips) are planted directly in the garden.

Spacing of Plants

Set the plants 12 to 18 inches apart, preferably on a wide ridge about 8 inches high. A ridge not

only dries better in the spring but also warms earlier than an unridged area. Since the vines need a great deal of space, allow at least 3 to 4 feet between rows.

Care

After early cultivation, sweet potatoes need minimum care to keep down weeds. Once the vines spread to cover the ground, little weeding is required. Irrigate if an extended drouth occurs. Do not water during the last three to four weeks before harvest.

Harvesting

Dig sweet potatoes just before the first frost in the fall. Use a spading fork, and be careful not to bruise or damage the roots. Proper curing can be a problem. Ideally, the roots should be allowed to dry on the ground for 2 or 3 hours, placed in a warm room for curing (85° F. and 85 percent humidity, if possible) for 10 to 14 days, and then stored in a cool (55° F.) location (see pages 127-128). Sweet potatoes should be handled as little as possible. In case of frost, dig sweet potatoes immediately, and cut the vines from the roots to prevent decay spreading from the vines to the roots. Use the potatoes as soon as possible after they have been stored.

Common Problems

To prevent diseases, plant varieties with multiple resistance, use "certified" plants, and rotate sweet potatoes in the garden.

Questions and Answers

Q. My sweet potato roots are covered with black splotches in the skin. What can I do to prevent this condition? **A.** This condition is probably caused by a disease known as "scurf" that is superficial in the skin of the root. The sweet potatoes are still good to eat, although they may not keep as well in storage. The new variety Jasper is resistant to scurf.

Q. Why did my sweet potato roots grow long and stringy instead of short and plump? **A.** Too much rain, irrigation, or poorly drained soil prevent proper root formation. Sweet potatoes prefer hot, dry weather after the vines have covered the ground.

Q. What makes sweet potatoes crack and split? **A.** Heavy rains or too much water during the three to four weeks before harvest will cause the roots to split.

Q. Are my sweet potatoes ruined if they were frosted before digging? **A.** No, but they should be harvested immediately. The length of time that they can be stored may be reduced.



Pumpkin is a warm-season vegetable that can be grown throughout Illinois. In addition to being used as jack-o'-lanterns at Halloween, pumpkins are grown for pies, custard, pumpkin butter, pumpkin bread, pumpkin cookies, and soup. The flowers may be dipped in batter and fried as a delicacy. The small, immature (before the seed develops) pumpkin fruit may be steamed or boiled and served as a buttered vegetable, or sliced, dipped in batter, and fried. The immature pumpkin is sometimes eaten raw with dips for snacks. The seeds of "naked-seeded" varieties do not have seed coats, and can be roasted in the oven or sautéed for snacks.

Varieties

Small types of pumpkins are grown primarily for cooking and pies; the naked-seeded varieties for their seeds; the intermediate and large varieties for cooking and jack-o'-lanterns; and the jumbo varieties for showing at exhibits or fairs.

The following varieties of pumpkins are well adapted to Illinois conditions. They are vining types unless otherwise indicated. The vining types require considerable growing space, and are best suited for large gardens. The bush and semivining types can be grown in smaller gardens.

Small (4-6 pounds, 100-110 days to harvest): Early Sweet Sugar; Luxury; Small Sugar; Spookie; Sugar Pie. **Naked Seeded:** Lady Godiva (flesh low in quality for table use, with mottled green exterior); Tricky Jack (bush type); Triple Treat. **Intermediate (8-15 pounds):** Cinderella (bush type); Funny Face (hybrid); Green-Striped Cushaw; Jack-O'-Lantern; Japanese Pie; Spirit (hybrid — semivining type); Tennessee Sweet Potato; Youngs' Beauty. **Large (15-25 pounds, 100 days to harvest):** Big Tom; Cheese (tan skin color); Connecticut Field; Dickinson Field (widely used for commercially canned pumpkin in

Illinois); Howden's Field; Jackpot (hybrid); Halloween; Kentucky Field; White Cushaw. **Jumbo (50-100 pounds, 120 days to harvest):** Big Max; King of the Mammoths; Mammoth Chili; Mammoth Prize.

Halloween Pumpkins: The following pumpkins are of a suitable orange color, size, and shape for jack-o'-lanterns. They vary in growth habits (see above). Big Max; Big Tom; Cinderella; Connecticut Field; Funny Face; Halloween; Howden's Field; Jack-O'-Lantern; Jackpot; Spirit; Spookie; Tricky Jack; Triple Treat; Youngs' Beauty.

When to Plant

Pumpkin is a very tender vegetable. The seeds will not germinate in cold soil, and the seedlings are injured by frost. Do not plant until all danger of frost is past. Plant pumpkins for Halloween in early June in the northern one-half of Illinois, and not before mid-June in the southern part of the state. If pumpkins are planted too early, they may rot before Halloween.

Spacing of Plants and Depth of Planting

The vining types of pumpkins require a minimum of 50 to 100 square feet per hill. Plant seeds 1 inch deep (4 to 5 seeds per hill). Allow 5 to 6 feet between hills. When the young plants are well established, thin each hill to the best two or three plants.

Plant semivining varieties 1 inch deep (4 to 5 seeds per hill), and thin to the best two plants per hill. Allow 4 feet between hills and 8 feet between rows.

Plant bush varieties 1 inch deep (1 to 2 seeds per foot of row), and thin to a single plant every 3 feet. Allow 7 to 12 feet between rows.

Care

Pumpkin plants should be kept free from weeds by hoeing and shallow cultivation. Irrigate (see pages 29-31) if an extended dry period occurs in early summer.

Bees, which are necessary for pollinating squashes and pumpkins, are killed by insecticides. If insecticides are used, they should be applied only in late afternoon or early evening when the bees are not visiting the blossoms.

Harvesting

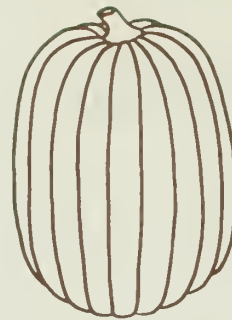
Pumpkins can be harvested whenever they are a deep, solid color (most varieties are orange) and the rind is hard. Harvest in late September or early October before heavy frosts. Cut pumpkins from the



Dickinson Field
(12 inches long)



Eat-All (naked-seeded)
(7 inches long)



Connecticut Field
(18 inches long)



Sugar Pie
(8 inches wide)

vines carefully, leaving 3 to 4 inches of stem attached. Pumpkins without stems usually do not keep well.

Avoid cuts and bruises when handling. Fruits that are not fully mature or have been injured or subjected to heavy frost will not keep. Store in a dry building where the temperature is between 50° F. and 55° F. (see pages 127-128).

Common Problems

Powdery mildew causes a white, powdery mold growth on the upper surfaces of the leaves. This growth can kill the leaves prematurely. Apply a suggested fungicide if powdery mildew appears before the fruits are fully grown.

Cucumber beetles (see page 33) attack seedlings, vines, and both immature and mature fruits. They can be controlled with a suggested insecticide. Be alert for an infestation of cucumber beetles in early September because these beetles can damage the mature fruits.

Questions and Answers

Q. The first flowers that appeared on my pumpkin plants did not form fruits. Why not? **A.** This condition is natural for cucurbits (cucumber, gourd, muskmelon, pumpkin, squash, watermelon, etc.). The first flowers are usually male. They furnish pollen for bees to pollinate the female flowers, and then drop off the plants. The male flowers may predominate under certain conditions, especially early in the season. The small fruits are visible at the bases of the female flowers. There is no swelling on the bases of the male flower stems.

Q. How can I grow pumpkins that weigh more than 100 pounds? **A.** Use one of the jumbo varieties. Plant in early June, and allow 150 square feet per hill. Thin to the best two plants. High fertility, proper insect control, and shallow cultivation are essential. Remove the first two or three female flowers after

the plants start to bloom so that the plants grow larger before setting fruit. Allow a single fruit to develop, and pick off all female flowers for the next couple of weeks.

Q. My grandmother made pie with a green-striped, long-necked pumpkin. Is this variety still available? **A.** Yes. The variety is Green-Striped Cushaw. Because of its coarse texture, some cooks prefer it for custards and pies.



Seed
(1X)



Seedling

Crossings Between Pumpkins and Squashes

Pumpkins and squashes are members of the vine crops called "cucurbits." The name is derived from their botanical classification as *Cucurbita* (C.). The varieties within a botanical species (whether they are referred to as pumpkins or squash) will cross-pollinate. For example, zucchini will cross with Connecticut Field pumpkin or Acorn squash (a winter squash) because they are all members of the same botanical species (*C. pepo*). However, cross-pollination will not affect the taste, shape, and color of the fruits unless the seeds are saved and grown the following year.

The table on page 93 shows the common varieties of pumpkins, squashes, and gourds belonging to the botanical species *C. pepo*, *C. maxima*, *C. moschata*, and *C. mixta*. Not all of the varieties listed in the table are recommended in this book.

Botanical species	Pumpkin	Summer squash	Winter squash	Gourds and ornamental squash
<i>C. pepo</i>	Big Tom	Green elongated	Acorn	Gourds
	Cinderella	Caserta	Ebony	Apple
	Connecticut Field	Cocozelle	Table Ace	Bicolor
	Early Sweet Sugar	Zucchini	Table King	Crown of Thorns
	Funny Face	Yellow elongated	Table Queen	Miniature
	Halloween	Butterbar		Miniature Bottle
	Howden's Field	Crook Neck	Vegetable Spaghetti	Nest Egg
	Jack-O'-Lantern	Eldorado		Orange
	Jackpot	Goldbar		Pear
	Luxury	Golden Girl		Spoon
	Small Sugar	Golden Zucchini		Warted
	Spirit	Straight Neck		
	Spookie	Flat-shaped		
	Sugar Pie	Green Tint		
	Tricky Jack	Pattie Pan		
Youngs' Beauty	Scallopini			
Naked seeded	White Scallop			
Eat-All				
Lady Godiva				
Triple Treat				
<i>C. maxima</i>	Big Max		Baby Blue Hubbard	Ornamental squash
	King of the Mammoths		Banana	Aladdin
	Mammoth Chili		Boston Marrow	Turk's Turban
	Mammoth Prize		Buttercup	
			Delicious	
			Emerald	
			Gold Nugget	
			Golden Turban	
			Hubbard	
			Hybrid R	
			Kindred	
			Marblehead	
			NK 530	
			NK 580	
		Sweet Meat		
<i>C. moschata</i>	Cheese		Butternut	
	Dickinson Field		Hercules	
	Golden Cushaw		Hybrid Butternut	
	Kentucky Field		Patriot	
			Ponca	
		Waltham		
<i>C. mixta</i>	Green-Striped Cushaw			
	Japanese Pie			
	Tennessee Sweet Potato			
	White Cushaw			



Radish is a cool-season, fast-maturing, easy-to-grow vegetable. Garden radishes can be grown wherever there is sun, even on the smallest city lot. They usually grow best in the spring, but some later maturing varieties can be planted for summer use. Winter radishes are slower to develop than spring radishes, and they grow considerably larger, remain crisp longer, and are usually more pungent.

Varieties

Spring Radishes: Burpee White (23 days to harvest); Champion (23 days to harvest); Comet (23 days to harvest); Early Scarlet Globe (22 days to harvest); Red Prince (23 days to harvest, *resistant to fusarium wilt*). **Radishes for Summer Use:** All Seasons (40 days to harvest); Icicle (25 days to harvest). **Winter Radishes (for storage):** China Rose (white — 52 days to harvest); Round Black Spanish (black skin, white flesh — 55 days to harvest); White Chinese (white — 60 days to harvest).

When to Plant

Spring radishes should be planted from early to midspring. Make successive plantings of short rows every 10 to 14 days. Plant in spaces between slow-maturing vegetables (tomatoes, peppers, brussels sprouts, etc.). Spring radishes can also be planted in late winter in a protected cold frame, window box, or container in the house or on the patio. Later maturing varieties of radishes (Icicle, All Seasons)

usually withstand heat better than the early maturing varieties, and are recommended for late spring planting for summer harvest. Winter radishes require a much longer time to mature than spring radishes, and are planted at the same time as late turnips.

Spacing of Plants and Depth of Planting

Sow seed $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Thin spring varieties to $\frac{1}{2}$ to 1 inch between plants. Winter radishes must be thinned to 2 to 4 inches or even farther apart to allow for proper root development.

Care

Radishes grow well in almost any soil that is well prepared, fertilized before planting, and has adequate moisture. Slow development makes radishes hot in taste and woody in texture.

Harvesting

Pull radishes when they are of usable size (usually 1 to 1½ inches) and relatively young. Radishes remain in edible condition for only a short time before they become pithy (spongy) and hot.

Common Problems

Root maggots (see page 33) may tunnel into radishes. These insects are more common in the northern one-third of Illinois. Apply a suggested soil insecticide before the next planting.

Questions and Answers

Q. What causes my radishes to crack and split?

A. The radishes are too old. Pull them when they are younger and smaller.

Q. Why do my radishes grow all tops with no root development? **A.** There may be several reasons: seed planted too thick and plants not thinned, weather too hot for the spring varieties that do best in cool temperatures, and too much shade.

Q. What causes my radishes to be too "hot"?

A. The "hotness" of radishes results from the length of time they have grown rather than size. The radishes either grew too slowly or are too old.



Garden
(1 1/2 inches)



Icicle
(3-6 inches)



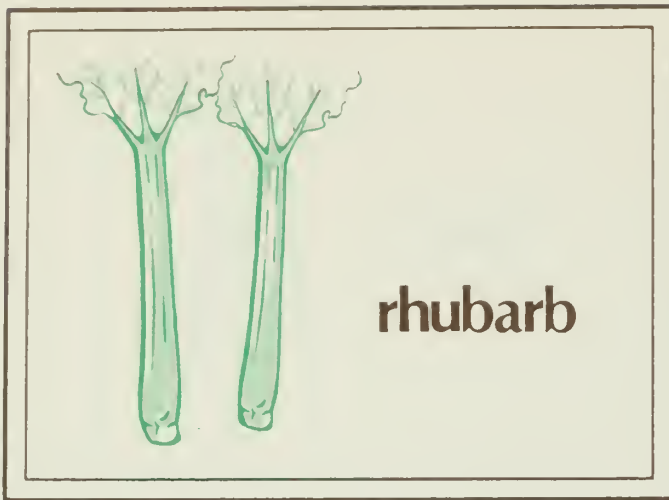
Winter
(8-9 inches)



Seed
(6X)



Seedling



Rhubarb (also known as pie plant) is a very hardy perennial garden vegetable that grows well in all parts of Illinois. Although considered a vegetable, rhubarb is used as a fruit in pies, tarts, and sauces. Since rhubarb produces yields for five years or longer in the same location, it should be planted at the end or one side of the garden where it will not be disturbed. A half-dozen plants should provide enough rhubarb for most families.

Varieties

Red Petioles (leafstalks): Canada Red; Mac Donald; Ruby; Valentine. **Green Petioles (leafstalks):** Victoria (shaded with red).

When to Plant

Plant rhubarb roots in early spring. Planting seeds is not recommended because it may take too long for the plants to become established, and the seedlings do not come true to color and size.

Spacing of Plants and Depth of Planting

Plant the roots with the crown bud 2 inches below the surface of the soil. Space the roots 36 to 48 inches apart in rows 3 to 4 feet apart. Good garden drainage is essential in growing rhubarb. Planting on raised beds insures against rotting of the crowns.

Old roots may be dug and divided to make new plantings. Cut the roots into 4 to 8 pieces. Each piece must have at least one strong bud. To improve vigor and leaf size, many gardeners divide the old plants and establish a new planting after five or more years of full harvest. Dig the roots of the most vigorous, healthy plants to establish a new bed the spring before the old planting is to be discarded.

Care

Fertilize each year, and cultivate shallowly as often as necessary to remove weeds. Apply a complete garden fertilizer in early spring or side-dress fertilizer in late June (see page 16). Irrigate during extended dry periods. An application of manure or compost is beneficial in late fall or early winter. *Do not* cover the crowns.

Harvesting

Do not harvest rhubarb during the first year of planting. Stalks may be harvested for one or two weeks during the second year, and for 8 to 10 weeks (a full harvest season) during the third and subsequent years. harvest in the fall only when the plants are to be discarded next season. To harvest, pull the leafstalks from the plant, and trim off the leaf blades. The leaf blades contain large amounts of oxalic acid, and should not be eaten.

If seedstalks and flowers develop during the spring and summer, cut them from the base of the plant as soon as they appear and discard them. The petioles (leafstalks) are of highest quality (maximum color, flavor, and tenderness) in early spring. They should be crisp and fairly thick.

You can grow tender stalks out of season by "forcing" rhubarb at home during the late winter and early spring. Forcing is most successful with the Victoria variety because it produces stalks with large diameters. Dig the roots of plants that are to be forced (three-year-old plants are best) and allow them to freeze on top of the ground. Keep excess soil on the roots to prevent damage from subzero freezing. After the roots are thoroughly chilled, take them indoors to a warm, dark place (a cellar, hotbed, etc.), and cover with peat, soil, or sawdust. Place the crowns close together and keep moist. The ideal temperature is 55° F. to 60° F. Harvest when the stalks are 12 to 18 inches high. The leaves will be small, and the petioles will be tender and uniformly bright pink. The harvest period for forced roots is about one month.

Common Problems

Rhubarb curculio, a snout beetle, bores into the stalks, crowns, and roots of rhubarb plants. It also attacks wild dock, a weed that is prevalent in many areas of Illinois. Destroy all wild dock growing around the garden. Treat base of plants with a suggested insecticide. Burn badly infested rhubarb plants in July after the beetles have laid their eggs.



Rhubarb curculio
(1/5 inch)

Questions and Answers

Q. A severe freeze has damaged my rhubarb. Can I safely eat the leafstalks? **A.** No. The leafstalks will be of poor texture and flavor, and oxalic acid may have migrated from the leaf blades.

Q. Why do my rhubarb plants send up seedstalks and produce small leaves and leafstalks? The petioles are not as large as they have been in previous years.

A. These conditions may result from excessive crowding, old plants, or low soil fertility. Allow more spacing between rhubarb plants, divide parent plants, and fertilize regularly.



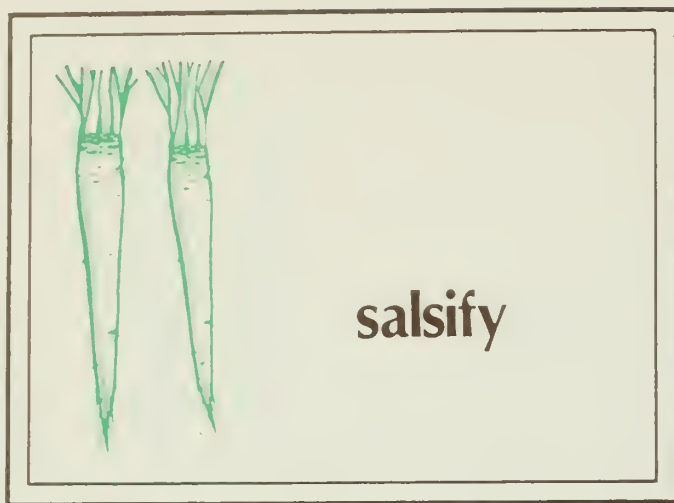
Seed
(2X)



Bud



Seedling



Salsify (also known as vegetable oyster or oyster plant because of the flavor of the cooked roots) is a hardy biennial that produces an edible root the first year. The tops tend to spread rather than to grow upright, giving salsify a somewhat different appearance from most garden vegetables. Because of its ability to withstand hard freezing in the winter, salsify may be harvested until early spring. The tapered roots ($\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter and 8 to 10 inches long) are made into a milk stew or cooked and served cold as a salad vegetable.

Varieties

Mammoth Sandwich Island.

When to Plant

Salsify is grown in much the same way as parsnip. Plant seeds in a deep, well-prepared, fertile soil in early spring (about 100 days before freezing weather in the fall).

Spacing of Plants and Depth of Planting

Plant seeds $\frac{1}{2}$ to $\frac{3}{4}$ inch deep (10 to 12 seeds per foot of row) in rows 18 to 24 inches apart. When the seedlings are 2 inches high, thin to 2 to 4 inches apart.

Care

Salsify is slow growing when young, and frequent shallow cultivation is necessary to remove weeds. It is free from most garden diseases and insects, and will withstand dry conditions once it is well established.

Harvesting

The flavor of salsify, like that of parsnip, is improved after several hard frosts in the fall cause a

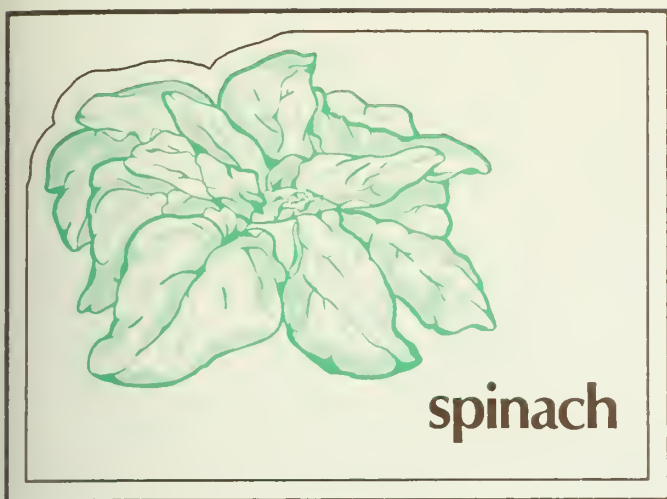
sweetening of the roots. Harvest any time through April. Cut off the leaves 1 inch above the roots, and store the roots under conditions similar to those for storing parsnips (see page 83). Gardeners without storage facilities may mulch the salsify rows with straw and dig the roots as needed throughout the winter. If allowed to grow a second year, salsify will send up a seedstalk and bloom.



Seed
(2X)



Seedling



Spinach is a hardy, cool-season vegetable. It is grown in early spring or late fall because long, hot summer days cause it to "bolt" (form premature seedstalks), making it unusable. One of the more important vegetable greens grown in the United States for both salads and cooking, spinach is rich in vitamins, and can be grown in all parts of Illinois.

Varieties

Choose the best varieties for spring or fall planting. All of the following varieties are crinkled leaf types except Giant Nobel, which has large, smooth leaves. **Spring Varieties:** America (45 days to harvest); Bloomsdale Long Standing (44 days to harvest); Giant Nobel (43 days to harvest); Melody (hybrid — 45 days to harvest, *resistant to downy mildew*). **Fall Varieties:** Early Hybrid (hybrid — 37 days to harvest, *resistant to blight, downy mildew*); Old Dominion (41 days to harvest, *resistant to blight*); Savoy Hybrid (hybrid — 40 days to harvest, *resistant to blight, downy mildew*).

When to Plant

The first planting can be made as soon as the soil is prepared in the spring. If the soil was prepared in the fall, seeds can be broadcast over frozen ground or snow cover in late winter. Seed spinach again in late summer for fall and early winter harvest. In southern Illinois, spinach will survive over winter (when plants are one-fourth to one-third grown) on well-drained soils and resume growth in spring for early harvest. In northern Illinois, spinach can be grown in hotbeds or protected cold frames for winter salads.

Spacing of Plants and Depth of Planting

Sow 12 to 15 seeds per foot of row. Cover $\frac{1}{2}$ inch deep. When the plants are 1 inch high, thin to 2 to 4 inches apart. Closer spacing (no thinning) is satisfactory when the entire plants are to be harvested. The rows may be as close as 12 inches apart, depending upon the method used for keeping weeds down. Little cultivation is necessary.

Care

Spinach grows best with ample moisture and a fertile, well-drained soil. Usually, no supplemental fertilizer is needed. If growth is slow or the plants are light green, side-dress with nitrogen fertilizer (see page 16).

Harvesting

The plants may be harvested whenever the leaves are large enough to use (a rosette of at least five to six leaves). Cut the plants at or just below the soil surface. Spinach is of best quality if cut while young. Two or three separate seedings of short rows will provide harvest over an extended period. Some gardeners prefer to pick the outer leaves when they are 3 inches long and retain the younger leaves for later harvest. Harvest the entire crop when seedstalk formation begins in the spring.

Questions and Answers

Q. What causes spinach to develop flower stalks (seedstalks) before a crop can be harvested? **A.** Spinach bolts quickly to seed during the long days in late spring or summer. Warm temperatures accelerate this development. Varieties that are "long-standing" or slow to bolt are best adapted for spring planting.

Q. What causes yellowing, stunting, and early death of plants? **A.** These conditions are caused by blight disease (cucumber mosaic virus). Grow resistant varieties.



Seed
(4X)



Seedling



Spinach



New Zealand spinach

New Zealand Spinach

New Zealand spinach is a green and salad vegetable that thrives under summer heat. It is not true spinach, but another species grown as a substitute for spinach because of its tolerance to heat and drought. The large, spreading plants produce succulent leaves and branch tips that are used in the same way as spinach.

Varieties

This vegetable green is indeed native to New Zealand, and it is listed in garden catalogs simply as "New Zealand spinach." There is some variation in plant type.

When to Plant

Since New Zealand spinach plants are tender, seeds should not be planted before the frost-free date. Seeds can also be started indoors for transplanting.

Spacing of Plants and Depth of Planting

Plant seeds 1 inch deep. Keep the seeds moist because they are sometimes slow to germinate. Thin

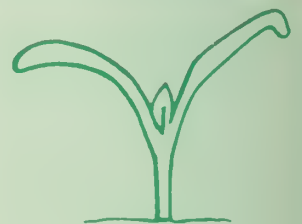
or space plants 12 inches apart. Be sure to allow space between rows because the plants will spread 4 to 6 feet.

Care

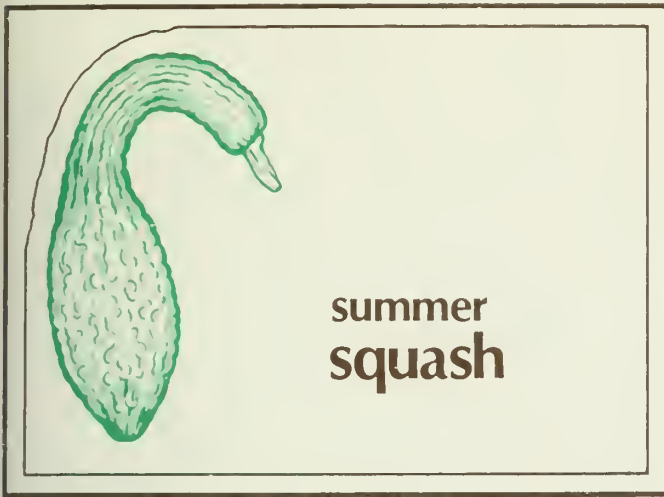
New Zealand spinach requires no special care other than normal cultivation.

Harvesting

The young, tender leaves and tips of shoots (3 to 4 inches) are cut as needed throughout the summer. Plants may be cut back (sheared) occasionally to force new growth. Harvest until the first hard freeze in the fall. Gardeners who plant regular spinach in the fall remove the New Zealand spinach plants at that time.

Seed
(2X)

Seedling



Summer squash (also known as vegetable or Italian marrow) is a tender, warm-season vegetable that can be grown throughout Illinois anytime during the frost-free season. The true English vegetable marrow is a vining type that is of good quality when immature. It is not commonly grown in the United States. Summer squash differs from fall and winter squash because it is harvested before the rind hardens and the fruit matures. It grows on bush-type plants that do not spread like the plants of fall and winter squash and pumpkin. A few plants will produce abundant yields.

Varieties

Summer squash has many different fruit shapes and colors: scallop (or patty pan), which are usually white; constricted neck ("crookneck" or "straightneck"), which are usually yellow; and the club-shaped Italian marrows, such as zucchini, cocozelle, and caserta.

Butterbar (hybrid — yellow, 50 days to harvest); Early Prolific Straightneck (yellow, 50 days to harvest). Scallopini (hybrid — deep patty-pan type, green, 60 days to harvest); Zucchini (variety or hybrid — green, gray-green, dark-green, yellow, 60 days to harvest). St. Patrick Green Tint (patty-pan type, white or light-green, 60 days to harvest).

When to Plant

Plant anytime after the danger of frost has passed from early spring until midsummer. Some gardeners have two plantings — one for spring harvest and a later one for fall harvest.

Spacing of Plants and Depth of Planting

Sow 2 to 3 seeds 24 to 36 inches apart for single-plant production, or 4 to 5 seeds in hills 48 inches apart. Cover 1 inch deep. When the plants are 2 to 3 inches high, thin to one vigorous plant or no more than two or three plants per hill.

Care

Any well-drained garden soil will produce excellent yields of summer squash. Mulching (see pages 28-29) increases earliness and yields because the plants are shallow-rooted.

Harvesting

Summer squash are often picked when they are too big and mature. They should be harvested when small and tender for best quality. Most elongated varieties are picked when they are 2 inches in diameter or 6 to 8 inches long. Patty-pan types are harvested when they are 3 to 4 inches in diameter. Do not allow summer squash to become large, hard, and seedy. Pick oversized squash and throw them away. Go over the plants every one or two days. Squash grow rapidly, and are usually ready to pick within 4 to 8 days after flowering.

Although summer squash has both male and female flowers, only the female flowers produce fruits. Since the fruits are immature, they bruise easily. Handle with care, and use immediately after picking. Some gardeners also pick the open blossoms before the fruits develop. These blossoms are a delicacy when dipped in a batter and fried.

Common Problems

Cucumber beetle (see page 33); squash vine borer (see page 104).

Questions and Answers

Q. Will summer squash cross with winter squash?
A. Summer squash varieties will cross with one another, with acorn squash, and with jack-o'-lantern pumpkins. (See table on page 93). Cross-pollination will not be evident in the current crop, but the seed should not be sown for the following year. Summer squash will not cross with melons or cucumbers.



Crookneck



Scallopini



Zucchini



Patty Pan



Straightneck



Seed
(1X)



Seedling



Winter squash is a warm-season vegetable that can be grown in all parts of Illinois. It differs from summer squash because it is harvested and eaten in the mature fruit stage, and the fruits of most varieties can be stored for use throughout the winter.

Winter squash may be steamed, baked, or made into pies, and it is frequently used in place of Irish potatoes, sweet potatoes, or rice. Squash blossoms may be dipped in batter and fried in the same manner as pumpkin blossoms.

Varieties

The following varieties of squash are well adapted to Illinois conditions. They are vining types unless otherwise indicated. The vining types require considerable growing space, and are best suited for large gardens. The bush and semivining types can be grown in smaller gardens. Some of these varieties may be listed as pumpkins by certain seedsmen.

Small (1-4 pounds, 80-100 days to harvest):

Acorn types — Ebony; Table Ace (semivining); Table King (bush); Table Queen. **Butternut types** — Hercules; Hybrid Butternut; Patriot; Ponca; Waltham.

True Winter Squash — Baby Blue Hubbard; Buttercup; Emerald (semivining); Golden Turban; Hybrid R. **Intermediate (6-12 pounds, 110 days to harvest).**

Banana (green, pink, blue, rainbow); Delicious (green, golden, red); Hubbard (red, golden, green, warted); Hybrid NK 530 (hybrid); Kindred; Sweet Meat. **Large**

(15-40 pounds, 120 days to harvest): Blue Hubbard; Boston Marrow; Hybrid NK 580 (hybrid); Jumbo Pink Banana. **Jumbo (50-100 pounds, 120 days to harvest):**

See Jumbo Pumpkins, page 91.

When to Plant

Squash is a very tender vegetable. The seeds will not germinate in cold soil, and the seedlings are injured by frost. Do not plant until all danger of frost is past.

Spacing of Plants and Depth of Planting

The vining types of squash require a minimum of 50 to 100 square feet per hill. Plant seeds 1 inch deep (4 to 5 seeds per hill). Allow 5 to 6 feet between hills. When the young plants are well established, thin each hill to the best two or three plants. Allow 7 to 12 feet between rows.

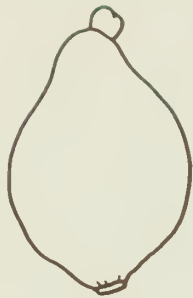
Plant semivining varieties 1 inch deep (4 to 5 seeds per hill), and thin to the best two plants per hill. Allow 8 feet between rows.

Plant bush varieties 1 inch deep (1 to 2 seeds per foot of row), and thin to a single plant every 3 feet. Allow 5 feet between rows.

Care

Squash plants should be kept free from weeds by hoeing and shallow cultivation. Irrigate (see pages 29-31) if an extended dry period occurs in early summer. Squash requires minimum care after the vines cover the ground.

Bees, which are necessary for pollinating squash and pumpkins, are killed by insecticides. If insecticides are used, they should be applied in late afternoon or early evening when the bees are not visiting the blossoms.



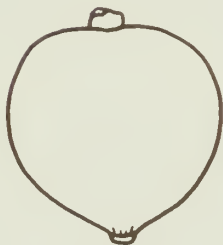
Hubbard



Butternut



Acorn



Delicious



Turk's Turban



Buttercup



Banana



Cushaw



Seed
(1X)



Seedling

Harvesting

Winter squash can be harvested whenever the fruits have turned a deep, solid color and the rind is hard. Harvest in late September or early October before heavy frosts. Cut squash from the vines carefully, leaving 2 inches of stem attached. Avoid cuts and bruises when handling. Fruits that are not fully mature, have been injured, or have been subjected to heavy frost will not keep. Store in a dry building where the temperature is between 50°F. and 55°F. (see pages 127-128). For prolonged storage, do not pile squash more than two fruits deep.

Common Problems

Cucumber beetles (see page 33) attack seedlings, vines, and both immature and mature fruits. They can be controlled with a suggested insecticide applied weekly either as a spray or dust. Be alert for an infestation of cucumber beetles in early September because these beetles can damage the mature fruits.

Questions and Answers

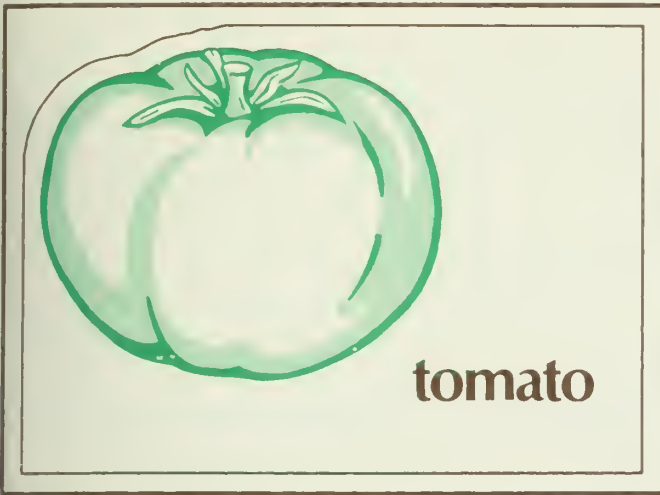
Q. Will squash varieties cross-pollinate with one another or with pumpkins in the garden? **A.** Yes. Any variety of squash or pumpkin in the same species will cross-pollinate (see table on page 93). Cross-pollination will not affect the current crop, but the seed will not come true the following year.

Q. Does squash make as good a pie as pumpkin? **A.** Yes. Most people cannot tell whether pumpkin or squash is used in a pie. Many cooks prefer winter squash to pumpkin.

Q. Can squash be transplanted? **A.** Yes. Squash can be transplanted when the plants are young (15 to 20 days old) and have been started in containers. None of the vining crops transplants well if the plants are very large. Many gardeners place 2 seeds in a peat pellet in late April or early May to start a few acorn or butternut squash plants for summer use.

Q. I have vine borers in my squash. Can I control them with insecticides? **A.** No. Vine borers cannot be controlled effectively with insecticides. You can reduce potential damage the following season by disposing of infested plants.

Q. Is Turk's Turban an edible squash? **A.** Yes, but it is more often grown for its ornamental value than for cooking purposes. (See "Gourd," pages 116-117, and table, page 93.)



Tomato is the most popular garden vegetable in Illinois. For many years, tomatoes (then called "love apples") were considered poisonous, and were grown solely for their ornamental value. Tomatoes are easy to grow, and a few plants provide adequate harvest for most families. The tomato plant is a tender, warm-season perennial that is handled like an annual for growing in summer gardens. Spring and fall freezes limit the outdoor growing season in Illinois.

Varieties

Hundreds of varieties of tomatoes are now available for the home gardener. They range widely in size, shape, color, plant type, disease resistance, and season of maturity. Catalogs, garden centers, and greenhouses offer a large selection of tomato varieties, and selecting the best one or two varieties can be extremely difficult. Choose the varieties best suited for your intended use and method of culture.

The main-crop and special-purpose varieties listed below are well adapted to Illinois conditions and produce good yields. The letters V, F, and N following the name of a variety indicate that it is resistant to verticillium wilt (V) and fusarium wilt (F), or tolerant to root-knot nematodes (N).

Main-Crop Varieties

Most of these main-crop varieties bear medium-sized to large fruit, have adequate foliage cover, and are relatively free from fruit cracking and other deformities. They are suitable for growing on mulch or in wire cages, and many of them can be pruned and trained to stakes or trellises.

Medium Early (72-80 days to harvest): These varieties have medium-sized red fruit, and are suitable for pruning unless otherwise indicated. Big Early (hybrid); Burpee VF (VF — hybrid); Campbell 1327 (VF

— not suitable for pruning); Cardinal (hybrid); Heinz 1350 (VF — not suitable for pruning); Jet Star (VF — hybrid); Spring Giant (VF — hybrid, not suitable for pruning); Super Fantastic (VF — hybrid); Terrific (VFN — hybrid).

Mid-Season to Late (80-90 days to harvest): All of these varieties are suitable for pruning. Beefmaster (VFN — hybrid, very large red fruit); Better Boy (VFN — hybrid, large red fruit); Big Boy (hybrid — large red fruit); Big Girl (VF — hybrid, large red fruit); Delicious (very large red fruit); Floradel (VF — medium-sized red fruit, *resistant to foliage diseases*); Manalucie (VF — medium-sized red fruit, *resistant to foliage diseases*); Pink Lady (hybrid — medium-sized pink fruit); Supersonic (VF — hybrid, large red fruit); Traveler (medium-sized pink fruit); Tropic (VF — medium-sized red fruit); Wonder Boy (VF — hybrid, large red fruit).

Special-Purpose Varieties

Some of these special-purpose varieties may not be available at your garden center or greenhouse. You can start your own plants by ordering seeds well in advance of the garden season.

First Early (60-70 days to harvest): These varieties have more compact plant growth than the main-season varieties, and sunburning of the fruit is a problem in hot summer weather. The main-crop varieties are generally far superior for summer-long harvest. First early varieties are better suited for the northern areas of Illinois, where the growing seasons are shorter and the summers are cooler. They have small to medium-sized red fruit, and are *not suitable* for pruning unless otherwise indicated. Early Girl (hybrid — suitable for pruning); Galaxy; New Yorker (V); Springset (VF — hybrid); Starfire.

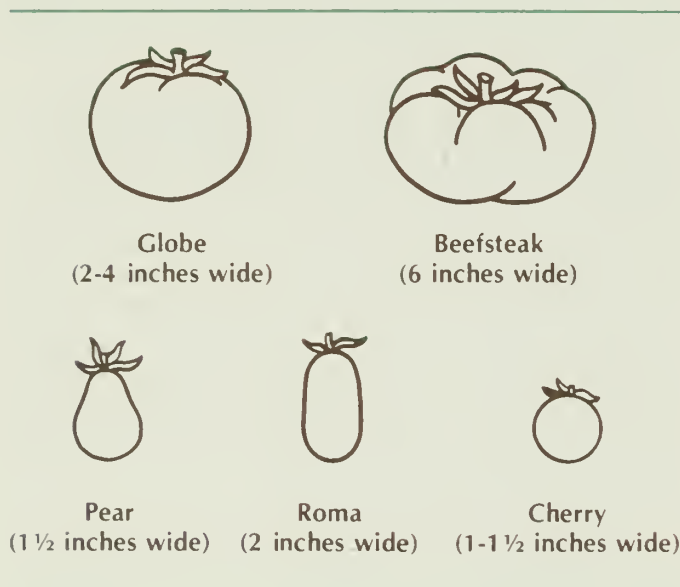
Extra Large Fruit: These varieties are late maturing. The fruits are often misshapen, with rough scar tissue ("cat-facing") on the blossom end. This scar tissue must be cut away, and the advantage of extra large size is lost. Beefsteak (red, pink, or yellow; some varieties have compact plants, are not suitable for pruning, and are best grown in wire cages); Ponderosa (red or pink; suitable for pruning).

Yellow or Orange Fruit: Contrary to popular belief, yellow-and-orange-fruited varieties are not significantly lower in acid content than red tomatoes, and are equally safe to can or process. They "taste" sweeter than red varieties because of their higher sugar content. The following mid-season to late varieties have medium-sized fruit and are suitable for pruning. Caro-Rich (orange); Golden Boy (yellow); Jubilee (yellow); Sunray (yellow).

Paste Tomatoes (catsup, paste, whole canning): Roma (VF — small red fruit; not suitable for pruning; *tolerant to early blight*).

Salad Tomatoes: These varieties are generally vigorous growing and productive. The round-fruit varieties are red, and the pear-shaped varieties are red or yellow. They vary in size from ½ to 1¼ inches in diameter, and are suitable for pruning unless otherwise indicated. Cherry (small and large); Gardeners' Delight; Pear; Plum; Sugar Lump (not suitable for pruning); Sweet 100 (hybrid).

Container and Patio Varieties: These tomatoes are popular for use in containers, hanging baskets, and garden or patio locations where space is limited. Their ornamental value is often considered more important than fruit quality. They have red fruit and are *not suitable* for pruning. Patio (hybrid); Pixie (hybrid); Salad Top (cherry type); Small Fry (VFN — hybrid, cherry type); Tiny Tim (cherry type); Toy Boy (hybrid); Tumbler Tom (hybrid).



When to Plant

Transplanting tomatoes gets them off to the best start, and saves several weeks in growing time. Some gardeners transplant their tomatoes soon after the soil is prepared for spring gardening, when there is a high risk of damage from freezing. (See page 21 for the average frost-free date for your area.) Be prepared to cover early set plants overnight to protect them from frost. For best results, plant when the soil is warm soon after the frost-free date.

In southern Illinois, late plantings may be made in midsummer for fall harvest and early winter storage of tomatoes. These plantings have the advantage of

increased vigor and freedom from early diseases, and often produce better quality tomatoes than later pickings from early spring plantings. Time late plantings for maximum yield before killing freezes in your area (about 100 days from transplanting for most varieties).

Spacing of Plants

The space required depends upon the variety and method of culture. Space dwarf plants 12 inches apart in the row, staked plants 15 to 24 inches apart, and wirecaged or groundbed plants 24 to 36 inches apart.

Care

Apply *starter fertilizer* when transplanting (see page 16). Hoe or cultivate shallowly to keep down weeds without damaging roots. Mulching is recommended, especially for gardeners who wish to maintain their plants for full-season harvest. Black plastic or organic materials are suitable for mulching (see pages 28-29).

Water the plants thoroughly during prolonged dry periods. Plants confined in containers need daily watering. Side-dress nitrogen fertilizer (ammonium nitrate) at the rate of 1 pound per 100 feet of row (equivalent to 1 tablespoon per plant) after the first tomatoes have grown to the size of golf balls. (If ammonium nitrate is not available, use 3 pounds of 10-10-10 fertilizer.) Make two more applications three and six weeks later. If the weather is dry following these applications, water the plants thoroughly. Do not get fertilizer on the leaves.

Many gardeners train their tomato plants to stakes, trellises, or cages with great success. All varieties are not equally suitable for staking and pruning. The advantages and disadvantages of various cultural systems are shown in the table on page 108.

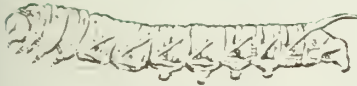
Harvesting

Tomatoes should be firm and fully colored. They are of highest quality when they ripen on healthy vines and daily summer temperatures average about 75° F. When temperatures are high (air temperature of 90° F. or more), the softening process is accelerated and color development is retarded.

During hot summer weather, pick your tomatoes every day or every other day. Harvest the fruits when they have a healthy pink color and ripen them further indoors (at 70° F. to 75° F.). Harvest all green mature fruit in the fall on the day before a killing freeze is expected. Wrap the tomatoes individually in paper and store at 60° F. to 65° F. They will ripen slowly over the next several weeks.

Common Problems

Tomato hornworms are large (2 to 3 inches long when fully grown), green worms with white stripes on the body. A horn protrudes from the top rear end of the worm. Tomato hornworms feed on the leaves and fruit, and several worms on one plant can quickly defoliate it. They are difficult to see. Hand pick or use suggested biological insecticides.



Tomato hornworm
(2-3 inches)

Verticillium and fusarium wilts are soilborne diseases that cause yellowing of the leaves, wilting, and premature dying of plants. These diseases will persist in gardens where susceptible plants are grown. Once they build up, the only practicable control is the use of resistant (VF) varieties.

Early blight is characterized by dead brown spots that usually start on the lower leaves and spread up the plant. Upon close inspection, you can see concentric rings within the spots. Although early blight is most severe on the leaves, it sometimes occurs on the stems, and can cause defoliation. You may need to use fungicide sprays to achieve high yields and high-quality fruit. Certain varieties (Jet Star, Manalucie, Manapal, Roma, and Supersonic) are more tolerant of early blight than others.

Septoria leafspot is characterized by numerous small black spots on the leaves. The centers of these spots later turn white, and tiny black dots appear in the white centers. The disease starts on the bottom leaves, and may become severe in wet weather. Use suggested fungicides for control.

Blossom-end rot is a dry, leathery brown rot of the blossom end of the fruit that is common on home-grown tomatoes. It is caused by the combination of a calcium deficiency and wide fluctuation in soil moisture. Pruning causes stress to the plants that increases the incidence of blossom-end rot. Some tomato varieties are much more susceptible to this condition than others. Mulching and uniform watering will help to prevent blossom-end rot.

Poor color and sunscald occur when high temperatures retard the development of full red color in tomatoes exposed directly to the hot sun. Sunscald occurs as a large, whitish area on the fruit during hot, dry weather. It becomes a problem when foliage has been lost through other diseases such as early blight.

Questions and Answers

Q. What causes the lower leaves of my tomato plants to roll up? **A.** Leaf roll (curling of the leaflets) is a physiological condition that occurs most commonly when plants are trained and pruned. It does not affect fruiting or quality, and it is not a disease.

Q. What causes the flowers to drop off my tomato plants? **A.** During unfavorable weather (night temperatures lower than 55° F., or day temperatures above 95° F. with drying hot winds), tomatoes do not set and the flowers drop. The problem usually disappears as the weather improves.

Q. What can I do to prevent my tomatoes from cracking? **A.** Cracking varies with the variety. Many of the newer varieties are resistant to cracking. Severe pruning increases cracking. Keep soil moisture uniform as the tomatoes develop.

Q. What causes small, irregular, cloudy white spots just under the skin of my tomatoes? **A.** These spots on green or ripe fruit are caused by the feeding of stink bugs.

Q. What causes the young leaves of my plants to become pointed and irregular in shape? I noticed some twisting of the leaves and stems after spraying the plants for the first time. **A.** Judging from your description, it seems likely that your tomato plants have been injured by 2,4-D or a similar weed killer. Never use the same sprayer for weed control in your vegetable garden that you use in your lawn. Drift from herbicides originating one-half mile or more away can also injure your tomato plants.

Q. What is a tree tomato? **A.** The treelike plant sold as a "tree tomato" is a different species from garden tomatoes. It is a woody tree that grows 8 feet or more high and bears after two years. The tree tomato is a tropical plant, and will not overwinter outside under Illinois conditions. The fruits are small (1 to 2 inches in diameter), and are used primarily in stews or preserves rather than in salads. Some of the vigorous, common garden tomato varieties that are suitable for training and pruning (such as Ponderosa) are also sold as climbing or "tree tomatoes" by some seed stores.

Q. What is a "potomato"? **A.** Although both potato and tomato plants can be grafted, the "potomato" (sometimes called "topato") commonly advertised is simply a tomato seed inserted into a potato tuber and planted together, producing both a tomato plant and a potato plant in the same hill. The results are not likely to be successful.



Wire cages placed over small tomato plants (left) will hold the vines and fruit off the ground. Short cages (2½ to 3 feet high) usually support themselves when the wire prongs at the bottom are pushed into the ground. Taller cages require a stake, post, or wire for support. Large (6-inch by 6-inch) mesh permits easy harvest. Tomato plants must be tied to supporting stakes or a trellis because (unlike cucumber plants) they do not support themselves with tendrils. Loop ordinary soft twine, cord, or cloth loosely around the main stem and tie tightly to the stake (right). Tying the stems too tightly will injure them.

Cultural system	Variety	Pruning	Mulching	Advantages	Disadvantages
Plants allowed to sprawl on ground.	All varieties are suitable.	Not recommended.	Highly recommended.	High yields (15-25 pounds per plant); least work; normal size and maturity.	Most space; sunburn, ground spots, and rots.
Plants tied to stake or trellis.	Use recommended vining types.	Recommended: increases size and earliness; may use single-stem, double-stem, or multiple-stem pruning systems.	Highly recommended.	Intermediate yields (10-15 pounds per plant); least space; plants can be closer together; fruits are larger and easy to pick.	More fruit cracking and blossom-end rot; lowest yield per plant; labor and time to tie and prune the plants.
Plants grown inside wire cage.	Most varieties are suitable.	Not generally recommended; some gardeners prune early and allow plants to grow naturally later in the season.	Highly recommended.	High yields (15-25 pounds per plant); intermediate space; best ripening in hot weather; normal size; no tying necessary.	Cost of cage; storage and handling of cage; latest to mature; difficult to pick inside foliage.



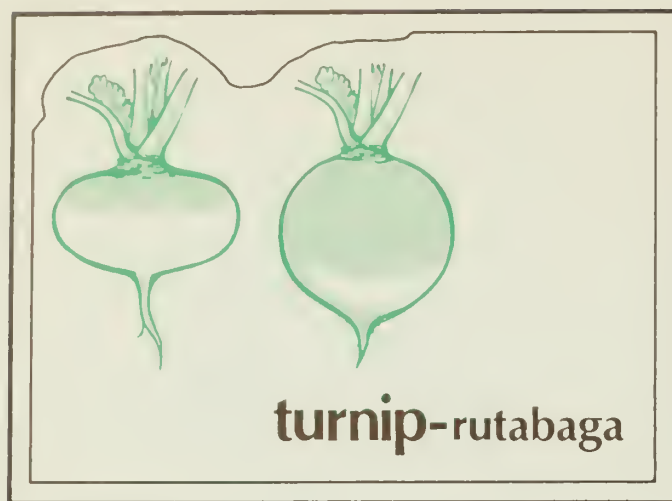
You may wish to prune staked or caged tomato plants to stimulate early maturity. Be sure that your variety is suitable for pruning (see list of varieties). To prune the plants properly, remove the shoots (suckers) when they are 1 to 2 inches long. The shoots develop in the axil of each leaf (the angle between the leaf petiole and the stem above it). Breaking off the shoots by hand is preferable to cutting them. Bend the shoots in opposite directions until they snap. Prune the plants every five to seven days. Be careful not to prune the developing flower clusters that grow from the main stem or to pinch off the growing tip (terminal) of the plant. Remember — the more severely you prune the foliage (for example, a single stem rather than two or more stems), the more you limit plant growth, including root development. Double-stem or multiple-stem pruning systems sacrifice some of the earliness and fruit size for less risk of cracking, blossom-end rot, and sunburn.



Seed
(4X)



Seedling



Turnip and rutabaga (also known as Swede or Swede turnip) are frost-hardy, cool-season vegetables that are often used as substitutes for potatoes in the diet.

Turnips are easy to grow. They mature in two months, and may be planted either in the spring or fall for roots or greens. The spring crop is planted for summer use. The fall crop, which is usually larger and of higher quality than the spring crop, may be stored for winter use.

Rutabagas require four weeks longer to mature than turnips, and are best grown as a fall crop. The foliage has smoother leaves, and the roots are round, larger, and firmer than those of turnips.

Varieties

Turnips (white-fleshed): Just Right (40 days to harvest); Purple Top Strap Leaf (50 days to harvest); Purple Top White Globe (60 days to harvest); Tokyo (50 days to harvest). **Turnip Greens:** Seven Top (40 days to harvest); Shogoin (40 days to harvest). **Rutabaga (yellow-fleshed):** American Purple Top (90 days to harvest); American Yellow Top (90 days to harvest); Laurentian (90 days to harvest); Red Chief (90 days to harvest).

When to Plant

For summer use, turnips should be planted as early in the spring as possible. For fall harvest, plant rutabagas in June, and plant turnips during July or early August.

Fall turnips may also be broadcast after early potatoes, cabbage, beets, and peas, or between rows of sweet corn. Prepare a good seedbed and rake the seed in lightly. No cultivation is necessary. Provide ample water for seed germination and to keep the plants growing vigorously.

Spacing of Plants and Depth of Planting

Plant seeds $\frac{1}{2}$ inch deep (3 to 20 seeds per foot of row). Allow 12 to 24 inches between rows. Water if necessary to germinate the seed and establish the seedlings. Thin rutabaga seedlings to 6 inches apart when they are 2 inches high. Thin turnip seedlings to 2 to 4 inches apart when they are 4 inches high. The removed plants will be large enough to use as greens. If you have planted turnips for greens, harvest the tops as needed when they are 4 to 6 inches high. Successive plantings at 10-day intervals will provide later harvests of quality roots or greens. Old turnips tend to be tough and woody.

Care

When the plants are small, cultivate 2 to 3 inches deep between rows. As the plants become larger, cultivate shallowly to prevent injury to the tender roots. Pull weeds that appear in the row.

Harvesting

Harvest in late September or as needed. Turnips and rutabagas are of best quality (mild and tender) when they are medium-sized (turnips should be 2 to 3 inches in diameter and rutabagas 3 to 5 inches in diameter). Both are hardy to fall frosts. A heavy straw mulch will extend harvest through the early part of the winter. Turnips and rutabagas keep well in refrigeration, in an outdoor pit, or in an underground cellar (see page 128). They may be dipped in warm wax to prevent loss of moisture.

Common Problems

Root maggots (see page 33) can be a problem in areas where radishes, turnips, or rutabagas were grown the previous year. The soil should be treated with a suggested insecticide before the next planting.

Questions and Answers

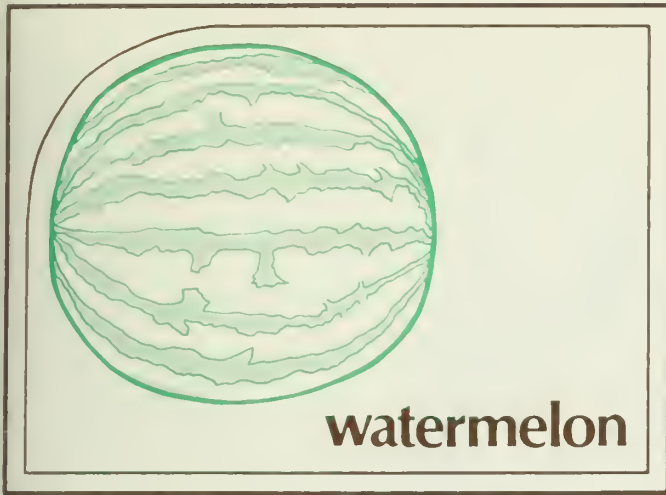
Q. Why are my rutabagas small, tough, and bitter tasting? **A.** Rutabagas are best grown in northern areas and as a fall crop. When they develop and mature in hot weather, they do not develop typical sweetness and flavor.



Seed
(6X)



Seedling



Watermelon is a tender, warm-season vegetable. Watermelons can be grown in all parts of Illinois, but the warmer temperatures and longer growing season in the southern two-thirds of the state especially favor this vegetable. Gardeners in the northern areas of Illinois should choose early varieties and use transplants. Mulching with black plastic film (see page 29) also promotes earliness by warming the soil and conserving moisture.

Varieties

Early (70-75 days to harvest): Golden Midget (red flesh, green skin; turns yellow when ripe); New Hampshire Midget (5 pounds); Sugar Baby (6-10 pounds); Yellow Baby (hybrid — yellow flesh, 6-10 pounds); You Sweet Thing (10-12 pounds). **Main Season (80-85 days to harvest):** Charleston Gray (20-25 pounds); Crimson Sweet (20-25 pounds); Iopride (22-28 pounds); Sweet Favorite (hybrid — 20 pounds); Sweet Princess (20-25 pounds). **Seedless (90 days to harvest):** Triple Sweet (hybrid — 12-15 pounds); Tri-X 313 (hybrid — 12-15 pounds).

When to Plant

Plant after the soil is warm, and when all danger of frost is past. Watermelons grow best on a sandy loam soil, although yields on clay soils can be increased significantly by mulching with black plastic film.

Spacing of Plants and Depth of Planting

Watermelon vines require considerable space. Plant seeds 1 inch deep in hills spaced 6 feet apart. Allow 7 to 10 feet between rows. After the seedlings are established, thin to the best three plants per hill.

Start the seeds inside three weeks before they are to be set out in the garden (see "Starting Plants at Home," pages 36-39). Plant 2 or 3 seeds in peat pellets or peat pots and thin to the best two plants. Do not start too early — large watermelon plants transplant poorly. Growing transplants inside at warm temperatures insures germination of seedless varieties that require temperatures between 80° F. and 85° F. Place black plastic film (see page 29) over the row before planting. Use a *starter fertilizer* (see page 16) when transplanting. If you grow seedless melons, you must plant a row of a standard seeded variety alongside. The seedless melon varieties do not have the fertile pollen necessary to pollinate and set the fruit.

Care

Watermelons should be kept free from weeds by shallow hoeing and cultivation. The plants are deep rooted, and watering is seldom necessary unless the weather turns dry for a prolonged period early in the growing season.

Harvesting

Many home gardeners do not know how to determine when watermelons are ripe. Use a combination of the following indicators: (1) light-green, curly tendrils on the stem near the point of attachment of the melon turn brown and dry when the melon is ripe; (2) the surface color of the fruit turns dull; (3) the skin becomes resistant to penetration by the thumbnail and is rough to the touch; and (4) the bottom of the melon (where it lies on the soil) turns from a light green to a yellowish color. These indicators for choosing a ripe watermelon are much more reliable than "thumping" the melon with a knuckle. Many watermelons do not emit the proverbial "dull thud" when ripe.

Common Problems

Cucumber beetles (see page 33) attack watermelon plants. Apply a suggested insecticide for control.

Questions and Answers

Q. My watermelons are not very sweet or flavorful. Is the low sugar content caused by the watermelons crossing with other vine crops in the garden?

A. No. Although watermelon varieties will cross with one another, this cross-pollination will not be apparent unless seeds are saved and planted the following year. Watermelons do not cross with muskmelons, squash, pumpkins, or cucumbers. The poor quality of your melons may result from wilting vines, high rainfall, cool weather, or a short growing season in extreme northern areas.

Q. What can I do to prevent my watermelons from developing poorly and rotting on the ends?

A. This condition is probably caused by an extended period of extremely dry weather when the melons were maturing. It may be aggravated by continued deep hoeing or close cultivation. Mulching the plants with black plastic film helps to reduce this problem, especially on heavier, drouthy soils.

Q. What causes deep holes in the tops of my watermelons? **A.** The holes were probably made by pheasants or other wildlife searching for water during dry weather.

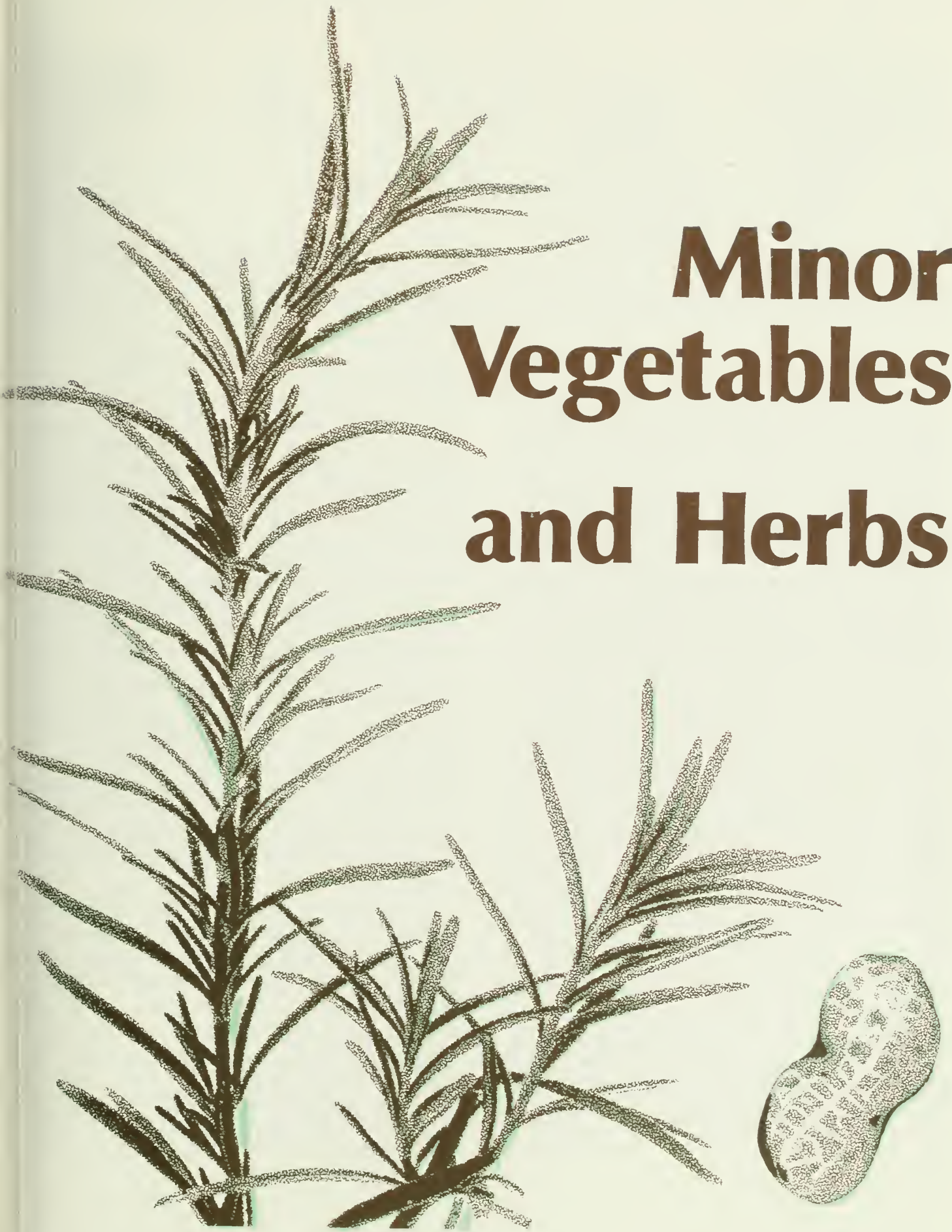


Seed
(1X)



Seedling

Minor Vegetables and Herbs





Celeriac

Celeriac (also known as celery root, knob celery, turnip-rooted celery, and German celery) is an odd form of celery. It is grown for its swollen root that develops at the groundline. The attractive dark-green stems and leaves are generally free from pests. Celeriac is popular with many Europeans, who eat it grated or sliced in salads, and cooked in soups and stews.

Celeriac requires a minimum growing period of 120 days, and can be grown successfully in all parts of Illinois. Alabaster, Marbleball, and Giant Prague are the most frequently grown varieties. The seed should be planted in the early spring either in a cold frame or in the house. Plant the seed $\frac{1}{4}$ inch deep. When the plants are 2 to 2½ inches high, they can be transplanted into the garden. Space the plants 6 inches apart in rows 18 to 24 inches wide. Use a *starter fertilizer* solution (see page 16) to get the plants established. Interruptions of growth seriously decrease the size of the roots, and the plants should be watered uniformly during periods of drought.

Celeriac does not attain its full flavor until after the first frost in the fall. In central and southern Illinois, celeriac may be left in the garden to be harvested as needed. In northern Illinois, the roots should be harvested before freezing weather. Some gardeners mulch the plants with straw or leaves to protect the roots, permitting harvesting at any time during the winter months. The yield should exceed one pound of usable root per foot of row. Celeriac can be blanched by slightly hilling the plants to cover the roots as they develop. The flesh remains a bright white, although the exterior is brown in color.

Chicory

Chicory is a hardy vegetable that is used in three basic forms. The roots are dried, roasted, and prepared as a coffee substitute or coffee blend. The slightly bitter, curled dandelionlike greens (called Italian Dandelion) are grown and used as potherbs. Witloof Chicory (also called French Endive) is forced as a blanched, tender, fresh salad delicacy. It is sold in some produce markets at high prices.

The following varieties are listed according to intended use. **Greens:** Catalogna (asparagus type); Radichetta; San Pasquale; Sugarhat (cut leaf). **Chicory Root:** Brunswick; Madgeburg; Zealand. **Forcing:** Witloof (French Endive).

Plant seeds $\frac{1}{2}$ inch deep (12 to 15 seeds per foot of row). Allow 18 to 24 inches between rows. When the seedlings are 2 to 3 inches high, thin to 9 to 12 inches apart for chicory roots and greens and 3 to 4 inches apart for Witloof. Plant in May for greens and roots, and about 120 days before frost (varies from May 15 for northern Illinois to June 15 for the southern part of the state) for production of roots for forcing.

Greens. Young, tender leaves can be harvested for greens in 60 to 70 days when they are 6 to 8 inches long. Chicory may also be blanched by tying the outermost leaves in the same manner as endive and escarole (see page 68).

Chicory Root. Chicory root is grown as a long-season annual. Most commercial production is in Michigan, but chicory root is easily grown under Illinois conditions. Dig roots in the late fall before they are frozen in the garden. The roots will be 5 to 7 inches in diameter at the crown and tapered into a

taproot. The usable root will be 9 to 10 inches long. The roots are scrubbed to remove garden soil, cubed, and roasted for grinding.

Forcing Chicory. Do not plant seeds too early for forcing roots. The roots may grow too large or develop flower stalks, making them unsuitable for forcing. Roots with a diameter of 1 to 1¼ inches at the crown are preferred for forcing. When the weather becomes cold, dig the roots and cut off the tops about 2 inches above the crown (top of root). Store the roots in a cool place with high moisture such as an outdoor vegetable pit or underground cellar.

During the winter and early spring, roots can be prepared in a new forcing box every two to three weeks for a continuous supply. Most gardeners put their forcing boxes in the basement because lack of light does not affect the quality of the Witloof heads. Some gardeners use cold frames or hotbeds or force in a trench in the garden. A sheet of clear or black polyethylene film (see page 29) should be placed over the trench to increase soil temperature.

Cut off the slender tips so that the roots are a uniform length (6 to 8 inches), and place the roots close together in a box or other container. Fill with sand or fine soil sifted in between the roots up to the tops of the crowns. Add 6 to 8 inches of sand or sawdust over the crowns. The blanched tops will grow into compact, pointed heads. The proper temperature for forcing is between 60° F. and 70° F. Water thoroughly after preparing the forcing box. One or two additional waterings may be necessary. Forcing requires three to four weeks to develop firm heads.

When the heads break the surface, remove the sand or sawdust. Cut off the head with a knife at the point of attachment with the root. Prepare heads for the kitchen by removing dirty and loose outer leaves. Store the excess in a plastic bag in the refrigerator. Chicory heads will keep for two to four weeks.

Dandelion

Dandelion is a hardy perennial whose leaves are gathered as potherbs or greens. Dandelion may be cultivated in the home garden when wild plants are not available. There is a great deal of variability in plant types. The named varieties, Thick-leaf and Improved Thick-leaf, are superior in flavor and growth characteristics to the wild dandelion.

Dandelion requires a long growing season, and develops best at low temperatures. Sow seeds ¼ to ½ inch deep in May to early summer, and thin seedlings

to 8 to 12 inches apart in the row. The plants form a rosette of leaves and overwinter in the garden. They will grow in any well-drained garden soil. A polyethylene tunnel can be placed over the row to force growth for late winter or early spring cutting.

Harvest in the fall when plants are of satisfactory size. Cut just below the crown with a sharp knife so that the leaves remain attached. Unharvested plants may be left for use the following spring. Harvest in early spring before the plants form flower stalks and go to seed. If flowering occurs, the greens will become bitter and of poor quality. Some gardeners blanch the inner rosette of leaves by tying the outer leaves together over the plant. Blanching makes the leaves milder and less bitter.

Edible Soybean

Edible soybean (also called soya bean) can be successfully grown as a shellout bean in all parts of Illinois. It is a natural food high in protein that is prepared as a fresh vegetable similar in flavor to English peas.

Edible soybeans may not be listed by variety name in garden catalogs. Of the listed varieties, the following are particularly suitable for growing in Illinois: Disoy, Emerald, Favorite, Green Giant, Pickett, Frostbeater, and Prize. These garden varieties of soybeans are usually larger than the field varieties, and are preferred for that reason. Field soybeans, harvested immature, may also be used as edible soybeans.

Edible soybeans are planted and grown much like snap beans. Plant seeds 1 inch deep (8 to 10 seeds per foot) after the danger of frost has passed. Allow 24 to 30 inches between rows.

Edible soybeans reach maturity in about 80 to 90 days. They are ready to harvest when the seeds are fully enlarged but before they become hardened. At this time, the pods are plump, green, rough, and hairy. Nearly all of the beans will be of the same size, and you can pull the entire plants and pick off the beans in the shade.

Soybeans are difficult to shell, but boiling them for 1 to 3 minutes or steaming them in a covered pan for 5 minutes makes shelling a comparatively easy task. The beans may be frozen if you are not ready to use them. To harvest soybeans for sprouting, wait until the leaves have turned yellow and fallen. At this time, the pods will be brown. When completely dry, they may be easily shelled or flailed in the same manner as mung beans.

Garbanzo Bean

Garbanzo bean (also known as chick-pea, chestnut bean, and Egyptian pea) is a tender annual that is neither a pea nor a bean. It is grown for its chestnut-flavored beans, which are dried or roasted for soups and salads. Garbanzo beans are long-maturing (about 100 days to harvest), and are not commonly grown in Illinois. They are listed as Garbanzo or Chick-pea in garden catalogs.

Garbanzo beans grow in any well-drained garden soil. They do not require high fertility, and side-dress fertilizer applications are not necessary. After the soil warms, plant seeds 1 inch deep in rows 24 to 36 inches apart. Thin seedlings to 3 inches apart. The bushy plants grow about 2 feet high. Pick fully mature pods, shell as dried beans, and store in airtight jars or cans.

Garden Cress

Garden cress is a hardy, cool-season salad green. Curleycress is a named variety of garden cress that grows rapidly (12 to 20 days to harvest). It is used as a garnish or spicy addition to salads. Winter cress (often listed as Upland Cress in garden catalogs) requires 50 days to harvest. The familiar water cress is an aquatic plant that grows in shallow, fresh, moving water, such as streams, and is not usually suited for home gardening.

Sow 10 to 15 seeds per foot of row, and cover $\frac{1}{4}$ to $\frac{1}{2}$ inch deep. Plant garden cress at two-week intervals as soon as the ground can be worked in the spring. Garden cress is not usually thinned. Plant seeds of winter cress in late summer at the same time that you plant spinach. Thin seedlings of winter cress to 2 to 3 inches apart in the row.

The cresses require relatively moist soil and cool growing conditions. They can be grown in protected cold frames during the winter months. Pick the leaves when they are 3 to 5 inches long, or cut the entire plants at any size before the seedstalks form.

Garden Huckleberry

Garden huckleberry (also known as wonderberry or sunberry) is a tender, warm-season annual plant of the nightshade family. The seeds are listed in garden catalogs simply as "garden huckleberry." Ripe garden huckleberries are used for pies or preserves. Unlike true highbush blueberries, which grow on a woody, shrublike perennial plant, garden huckleberries are not eaten fresh.

Sow seeds or transplant after the soil has warmed in the spring. Plant seeds $\frac{1}{2}$ inch deep and thin to 12

inches apart. The plants grow semierect, widely branched, and 2 to 3 feet high. They should be given the same general care as tomatoes. Pick the berries when they are *fully ripe* (usually two weeks after they first turn black). The ripe berries are $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter, and grow in loose clusters. The green, immature berries are not edible.

Gourd

"Gourd" is the name commonly applied to certain warm-season vining crops that are closely related to pumpkin and squash. The hard-shelled, ornamental fruits are used primarily for fall decorations or for making cooking utensils. Some varieties of gourds are eaten when immature. When garden space is limited, gourds can be grown on fences, trellises, or stakes (see page 46).

The following varieties of gourds are suitable for growing in Illinois. Some of these varieties may cross-pollinate with pumpkin, summer squash, or winter squash (see table on page 93). **Ornamental:** Apple; Bicolor; Crown of Thorns (Bear Claw); Large Warded; Nest Egg; Orange; Pear (bicolored, striped, and white); Small Warded; Spoon; Turk's Turbin (ornamental pumpkin). **Utility:** Bottle; Calabash; Cave Man's Club; Dipper; Dolphin (Maranka or Swan gourd); Drum; Hercules' Club. **Dishrag (Luffa or Sponge):** Anglecia; Cylindrical. **Edible:** Italian; New Guinea Bean (Guinea Bean); Vegetable Gourd; Zucco.

Plant seeds 1 inch deep and 6 to 12 inches apart. Allow 6 to 8 feet between rows. When the seedlings are well established (with one or two true leaves), thin to 2 to 3 feet apart. Plant after the danger of the last frost has passed (usually in May). Control cucumber beetles (see page 33) with weekly applications of a suggested insecticide from the time that the plants emerge from the soil. Keep the rows free from weeds by shallow hoeing and cultivation during June and July, when rapid vine growth should cover the entire ground. Some gardeners in northern Illinois use black polyethylene mulch (see page 29) to warm the soil for better growth and to control weeds.

The utility gourds (dipper, bottle, and club varieties) develop the best-shaped fruits. The plants should be grown on a fence or trellis so that the fruits grow long and straight. The fruits are picked for eating when they are immature (less than one week after blossom). The New Guinea Bean is frequently grown on a support for easy harvesting. The pubescent fruits (covered with fine, soft, hairlike structures) hold soil if allowed to lie on the ground.

Ornamental and utility gourds should mature on the plant until September, when the fruits develop

hard, glossy, brightly colored shells. The stems should be quite tough. Harvest with 1 to 2 inches of stem.

Handle gourds carefully. Bruises, scratches, or punctures will result in discoloration and deterioration. Cure gourds for a few days in the shade under warm, dry conditions. Wash dirty fruits, and rinse in a weak chlorine solution before drying. After curing, the fruits of brightly colored ornamental varieties may be polished with a dry cloth and waxed or dipped in shellac.

Utility gourds require additional drying for extended periods in a warm, dry room. The gourds should be hung on wires until they are thoroughly dry. They may then be made into dippers, plant containers, pipes, birdhouses, wastepaper baskets, etc.

Zucco gourds are harvested before killing frosts and stored for fall use. Some cooks use the thick flesh in soups and stews. Harvest dishrag gourds after a hard frost. When they are dry, the outer surface can be easily removed. Cut off both ends, shake out the seeds, and free the center "sponge core" by cutting lengthwise halfway through the gourd. The resulting rectangular sponge may be used as a scouring pad, bathing sponge, intersoles for shoes, and other purposes. The American Gourd Society, P.O. Box 274, Mt. Gilead, Ohio 43338 publishes a newsletter on varieties and uses of gourds.

Horseradish

Horseradish is a very hardy, perennial vegetable condiment. It is savored for its hotness when ground or grated and mixed in sauces for seafood, pork, and beef dishes. Most home gardeners do not grow horseradish today because the prepared product is readily available in grocery stores. The connoisseur, however, continues to grow his own horseradish for its freshness. A few plants will provide ample roots.

Maliner Kren or Bohemian are the varieties offered in most garden catalogs, but they are often not true to the original type. Maliner Kren, also called "common horseradish" by commercial growers, has crinkled, rounded leaves. The Bohemian types are usually taller growing, and have smooth, more pointed leaves. Either variety makes a suitably hot preparation.

Horseradish is started from crown divisions or root cuttings. Plant whenever the soil can be worked in early spring. Place the roots 18 to 24 inches apart in shallow trenches, and cover with a ridge or mound of soil to a depth of 4 to 5 inches.

Horseradish grows best in deep, loose, fertile soil with abundant moisture. The plants grow 2 to 2½ feet high, and the roots make their greatest

growth during the cooling weather of fall. Most gardeners allow horseradish to grow as a perennial along one end of the garden, and keep it weeded by shallow cultivation or heavy organic mulch. Apply water if the plants wilt during hot weather in the late summer and early fall. The roots may be dug anytime from late fall (after a hard frost) until growth starts in the spring. Leave some small pencil-sized roots for next year's harvest, or plant them in another row.

Prepare your favorite sauce soon after digging. Surplus sauce can be frozen in small containers for year-round use. The roots can be cleaned and stored in a cold (32° F.), moist storage and used as needed (see pages 127-128). The prepared product must be kept in a closed container and refrigerated between servings. Even under these conditions, horseradish turns brown and develops an off-flavor in four to six weeks. For this reason, gardeners like to prepare fresh horseradish to meet their immediate needs.

Horseradish is grown commercially as an annual crop. The set roots, which are 10 to 12 inches long, are planted in early spring, and the plants are dug in the fall. "Lifting" the roots removes the side roots from the upper portion of the set root, forcing the plant to develop one large main root. These one-to two-pound roots are sold to commercial grinders. The sets, which grow from the bottom, are stored to plant the following year. Illinois is the leading state in commercial production of horseradish.

Husk Tomato

Husk tomato (also known as ground cherry, chinese lantern plant, strawberry tomato, Poha berry, and *Physalis*) is a tender, warm-season annual or perennial plant grown for its sweet cherrylike flavor. It is used in jam, preserves, or pies. The plants are also grown as pot plants or for other ornamental uses. The roots of the perennial species overwinter when grown outdoors.

The varieties offered in garden catalogs have either a yellow or red fruit when mature. Most varieties are listed simply as "ground cherry" or "husk tomato," but named varieties may be listed under *Physalis*.

Plant seeds or transplants after the soil has warmed in the spring. Sow seeds ¼ to ½ inch deep, and thin or transplant to 18 inches apart in the row. The low-growing plants should be given the same general care as tomatoes. The berrylike fruits are smooth, about 1 inch in diameter, and completely enclosed inside a papery husk. When the husks turn brown, the fruits are ripe and can be harvested. They may drop off the plant when fully mature.

Mung Bean

Mung bean (Chinese bean for sprouting) is popular with gardeners interested in oriental vegetables. Seeds may be ordered through a limited number of vegetable seed catalogs, and are occasionally found in garden center seed racks. Seeds purchased in gourmet food stores can be planted to grow your own mung beans for sprouting.

Berken and Oklahoma-12 are commercial varieties suitable for Illinois. They are listed simply as "mung bean" in most seed catalogs.

Plant mung beans 1 inch deep and 1 inch apart. Allow 24 to 30 inches between rows. Keep free of weeds by shallow hoeing and cultivation. The beans start forming when the plants are 15 to 18 inches high.

Mung beans will be ready to harvest in about 100 days. Harvest the beans by pulling up the entire plant. Tie the plants in bunches and hang them overhead, or dry them on clean papers on the floor of a shed or garage. The beans can be easily shelled or flailed when they are completely dry. They can be stored for sprouting or for planting the following year. (See gourmet and specialty books for information about sprouting and how to use the beans or sprouts.)

Peanut

Peanut (also known as goober and earth nut) is a warm-season annual that resembles clover in appearance. Although usually considered a crop of the Deep South, peanuts can also be grown successfully in the southern one-half of Illinois, and, with special care, in most other areas of the state.

Peanuts develop best in loose, sandy soil, and require a minimum of 120 frost-free days to reach maturity. Varieties of peanuts suitable for growing in Illinois are Early Northern, Early Spanish, Jumbo Virginia, and Red Tennessee.

Plant individual seeds (or the entire husk containing the seeds) 1 to 1½ inches deep and 10 to 12 inches apart. Allow 36 inches between rows. The seedlings emerge with three cloverlike leaflets that rapidly grow into plants 18 to 20 inches high. In extreme northern Illinois, peanuts can be started indoors in late March or early April in peat pots and transplanted without disturbing the roots.

Keep the soil loose and hilled to the row of plants. After the bright yellow flowers are pollinated, the flowering shoots elongate and send a "peg" into the soil. These pegs, which form the peanuts, readily enter loose soil (they do not have to be covered by hand), but they will not penetrate hard, baked soil. A light covering (1 to 2 inches) of loose organic mulch material around the plants will help to keep the soil loose and the peanuts near the surface of the

ground. Do not disturb the soil after the flower pegs have buried themselves. Usually 50 to 75 peanuts are formed in each hill. Hand pull weeds in the row.

Dig the plants after they have matured (begun to turn yellow) in the fall. Harvest in early to mid-October before a hard freeze. The soil should be dry so that it can be shaken off the peanuts. Cure the peanuts by stacking the plants in an open shelter, or by hanging them in a warm, dry shed or garage for a week. After the plants have dried, shake off any remaining soil, and pull the peanuts from the vines. Continue to air-dry the peanuts for another one to two weeks.

When the peanuts are dry, they are ready to shell or roast. Peanuts should be roasted in a shallow pan in a 350° F. oven for 20 minutes. Roasted peanuts are favorite snacks, and are made into peanut butter. Raw peanuts are used in baking and candy. Peanut plants may also be grown for their ornamental value as patio or pot plants, but they usually do not yield any harvest.

Popcorn

Popcorn can be grown in large gardens for food and in small gardens as an ornamental. With proper care, harvesting, and storage, homegrown popcorn will achieve maximum popping size (30 to 40 times the volume of the unpopped kernels).

There are two basic types of popping corns: round "pearl" kernels (usually produced on large ears), and sharp-pointed "rice" kernels (usually produced on smaller ears). Color varies from the standard yellow and white to red, brown, black, and even multicolored kernels. The highly colored small-ear types are often dried for ornamental purposes. Some of these novelty varieties are Black Jewel, Tom Thumb, Strawberry, Lady Finger, and Squirrel Tooth. The hullless hybrids, which leave little or no hull after popping, are especially tender, and are prized by home gardeners.

Early-season varieties include Ipop 12 (pearl kernels, yellow); Japanese Hullless (rice kernels, white); P-305 (rice kernels, white); and White Cloud Hullless (rice kernels, white). P-402 (pearl kernels, yellow) is a midseason variety, and P-410 (pearl kernels, yellow) is a late variety.

Popcorn may be grown in any good, fertilized, well-drained garden soil. Plant at the same time as early sweet corn. Select early maturing varieties for northern Illinois so that the corn has sufficient time to mature before frost.

Space rows 30 to 40 inches apart. Plant kernels ½ to 1 inch deep (2 to 3 kernels per foot of row). Thin the plants to 6 to 8 inches apart. Some gardeners

check-plant four kernels per hill, with the hills spaced 40 inches apart in two directions. This planting method permits cross-cultivation to help keep down weeds.

Side-dress nitrogen fertilizer (see page 16) when the plants are 12 to 18 inches high. Cultivate or hoe shallowly close to the plants. Irrigate if an extended dry period occurs. Popcorn planted near sweet corn or field corn may be pollinated by these crops. Cross-pollination will not affect popping, but do not save cross-pollinated ears for seed for the following year. The resulting hybrid will have little or no popping ability.

The plants should dry and the popcorn should mature in the garden. Popcorn can usually be harvested by mid-September. Popcorn will normally dry to less than 20-percent kernel moisture before the first frost. A light frost will not damage popcorn unless the kernel moisture is above 35 percent, and freezing will not damage popcorn unless the kernel moisture is above 20 percent.

Harvest by hand, shuck the ears, and place them where they will continue to dry. To prevent rodents from eating the popcorn, store in coarse mesh sacks or wire baskets and hang from a beam. Popcorn will dry naturally in an outdoor shelter to about 13-percent kernel moisture — ideal for popping. If stored in a heated room during the winter, popcorn will dry to 7-percent kernel moisture. This moisture content is too low for good popping.

Many gardeners prefer to airdry the ears for a week or two (longer if necessary), shell them, and place the kernels in moisture-proof jars or cans for storage. Popcorn can be conveniently stored almost indefinitely in the home freezer. Package in one-pound or two-pound containers and use as needed. If the corn becomes too dry, you can increase the moisture content by adding 1 tablespoon of water to a one-quart container of popcorn. Seal the container, shake several times, and leave at room temperature for a few days. The moisture content of the shelled popcorn will be increased about 2 percentage points.

Shallot

Shallot is a hardy member of the onion family that is prized for its delicate, onionlike flavor. Many gourmet chefs use shallots for sauces, stews, gravies, and roasts. Shallots are planted and cared for in much the same manner as onions.

Although there are several varieties of shallots, they are usually listed in garden catalogs simply as "shallots." Bulbs for planting may be obtained from seed houses, a fellow gardener, or from the gourmet section of a food store.

Shallots produce a cluster of bulbs from a single planted bulb. To plant, divide the clump of shallots into individual bulbs. Plant these individual bulbs 1 to 1½ inches deep and 3 to 4 inches apart. Allow 12 to 24 inches between rows. Planting during April, as soon as the soil can be tilled, will give the best yields. In the southern half of the state, the next year's crop can be planted in late October. The bulbs should be planted 2 to 3 inches deep. Shallots are very hardy, and will survive most winters.

Shallots may be pulled as green onions when their tops are 6 to 8 inches high. Each bulb ("scallion") will be ¾ inch or larger in diameter. For dry bulbs, allow the tops of the plants to die down in August. Harvest and handle in the same manner as dry onions (see page 79). The dry bulbs may be placed in a mesh bag and stored under cool, dry conditions. Shallots keep well, and are easily stored until planting time in the spring.

Southern Pea

Southern pea (also known as cowpea, black-eyed pea, and crowder pea) is an important garden vegetable in the southern part of the United States. It is not actually a pea but a member of the bean family, and is adaptable to all areas of Illinois as a green or mature shellout vegetable. Many people eat black-eyed peas and rice on New Year's Day for good luck. The yardlong or asparagus bean (see page 45) is technically classed as a southern pea, but the asparagus bean is eaten as a green bean rather than as a shellout vegetable.

Varieties of southern pea suitable for growing in Illinois are Big Boy, Brown Crowder, California Blackeye, Colossus, Crowder, Crowder Knuckle Purple Hulled, Mississippi Silver, Purple Tip, and White Crowder.

Southern peas are grown in the same manner as green beans. Plant seeds 1 inch deep and 1 inch apart after the danger of frost has passed. Allow 24 to 36 inches between rows. The bushy plants will grow 24 to 30 inches high.

The peas are ready to harvest when the pods appear firm and plump (60 to 70 days after planting). Pick twice a week. The pods range from 3 to 8 inches long, and the "peas" are colored, speckled, or have an eye pattern, depending upon the variety. The pods mature first on the lower portion of the plant. Many gardeners harvest all of the seeds that they want for fresh use, and then allow the remaining beans to mature on the plants. The vines may then be pulled and dried and the beans shelled for winter use.

Spaghetti Squash

Spaghetti squash (also known as vegetable spaghetti) is technically a pumpkin that resembles a small (8 to 10 inches long), yellowish squash. It may be planted and cared for in much the same manner as pumpkins. Only a single variety of this novelty vegetable currently exists. Seed may be found in a few seed racks and in several garden seed catalogs.

Spaghetti squash, which is low in calories, can be baked or boiled and served with cheese, meat sauce, or sour cream. It can also be eaten as a salad by baking or boiling, removing the vegetable filaments, chilling, and serving with seasoning or salad dressing. The spaghetti-like strands are similar in taste to slightly crisp, mild, nutty-flavored squash.

Plant seeds 1 inch deep and 6 to 10 inches apart after the danger of the last frost has passed. Allow 6 to 8 feet between rows. Thin seedlings to 18 to 24 inches apart. Control cucumber beetles (see page 33) with an approved insecticide.

Spaghetti squash is ready to harvest when the outside of the rind has turned a light tan to golden yellow. The surface will then be difficult to pierce with a thumbnail, and the fruit will weigh from 2 to 5 pounds. Cut the stem 1 to 2 inches from the fruit. Harvest all mature fruits before a hard frost, and store in a dry location at temperatures between 55° F. and 60° F. Fruits stored under these conditions will last for several months.

Sunflower

Sunflower (*Helianthus*) is a tender, warm-season annual that is grown commercially for oil. Home

gardeners grow sunflowers for the seeds, which may be eaten as salted nuts or used in chicken or wild bird feed.

The plants have ornamental value as background screens. Some varieties of sunflowers are extremely tall-growing; others have been developed for their attractive yellow, red, or white flower heads. Most varieties of sunflower require 100 to 120 days to harvest mature seed heads. Mammoth or Giganteus are tall varieties (6 to 12 feet high) that bear large single heads. Other varieties adapted to Illinois are Grey Stripe and Manchurian. Ornamental or dwarf sunflowers (1½ to 6 feet high) may be multiflowered, of various colors, and have many branches and smaller flower heads. Some of these varieties are perennial.

Plant seeds 1 inch deep. Thin seedlings of the ornamental varieties to 12 inches apart and seedlings of the taller varieties to 24 inches apart. Sunflowers need full sun, and will grow in most garden soils with good drainage. Side-dress nitrogen fertilizer twice during the season to promote growth.

The tall, large-seeded varieties of sunflowers are harvested for food. Allow the heads to mature in the garden. At maturity, the back of the head is brown and dry, most of the yellow petals have dried and fallen, the seeds are plump, and the seedcoats are black-and-white striped. Cut the main stem about 1 foot below the head before the seed starts to loosen and shatter. Rub the seeds loose by hand, dry, and store for future use. Sunflower seeds may be eaten without processing, dehulled and roasted, or salted in the hull.



Herb gardens may be formal, informal, or limited to individual specimen plants. Small herb gardens of 5 to 10 square feet may be located near doorways, along walkways, incorporated into the patio or terracing, or worked into a rock garden. Some herb plants can be grown successfully indoors for use throughout the year.

Herbs will do well in any soil that is suitable for vegetables in Illinois. The soils should be moderately fertile and well supplied with organic matter. Good soil drainage is essential. If your soil drainage is poor, it is preferable to grow herbs in raised beds, containers, or pots.

It is not always best to grow herbs from seed. Although rosemary, thyme, and sage can be started from seed, they are grown most successfully from plants or rooted cuttings. Dill, anise, caraway, coriander, parsley, savory, basil, and sweet marjoram are well adapted to direct seeding.

Herb gardeners experience few problems from insects or diseases in Illinois. Herbs do not, however, have the ability to repel insects from other vegetables in the garden. Tests conducted throughout Illinois showed no reduction in insect population when vegetables and herbs were planted in the same row.

Culinary experts classify herbs into two groups—*robust herbs* and *fine herbs*. Herbs added while food is being prepared or cooked are classified as robust; herbs that may be eaten uncooked in salads or sprinkled over a cooked dish are classified as fine herbs. Fine herbs are also often used before or during cooking. Parsley is used both raw and in cooking. This herb is unique because it serves as a “blender” of other herbs and flavors.

Drying Herbs

The herbs should be gathered at the proper stage of maturity, washed until they are clean, and dried rapidly in the shade so that they will retain color. A dark, well-ventilated room such as an attic is ideal. No herb should be dried at temperatures exceeding 100° F. Higher temperatures will cause loss of the plant oils, and may be responsible for flavor changes. Two common methods of drying are *bag drying* and *tray drying*.

Bag Drying. Collect 8 to 12 stems approximately 6 inches long. Remove all of the blossoms and rinse the herbs with cold running water to remove dirt. Shake off excess water, and wrap with absorbent toweling. When the herbs are dry, place them in a brown paper bag and tie loosely. Leave 1 or 2 inches of the stems exposed. Place the bag in a warm, dry location. When the leaves become brittle, tap them free of the stems and package them in an airtight container away from the light. When you are ready to use the leaves, pulverize them between your hands by rubbing.

Tray Drying. The preparation is the same for tray drying as for bag drying, except that the heavy stalks can be discarded. Spread the leafed stems one layer deep on drying trays. Put the trays in a dark, ventilated room. Turn the herbs to insure uniform drying. When the leaves are dry and the stems are tough, remove the leaves by rubbing. Rubbing reduces the number of small pieces of stem mixed with the leaves. Allow the leaves to become very dry and package in an airtight container away from the light.

The quality of herbs declines rapidly. Under proper conditions, the total shelf life of many herbs

is only one to two years. When exposed to light, heat and open air, the quality declines even more rapidly.

The herbs discussed below are suitable for growing under Illinois conditions. They are listed in alphabetical order.

Anise

Anise is an annual plant grown commercially in Europe that is easily adapted to Illinois conditions. The plant grows to a height of 24 to 30 inches, and then produces seed. The seed heads resemble those of wild carrot.

Seeds should be planted early in the spring at the rate of 10 to 15 per foot in rows 2 to 3 feet apart. The surface of the soil should be made smooth, and the seeds covered to a depth of ½ inch. The stand should be thinned to 3 or 4 plants per foot. Only light cultivation is needed for weed control.

The fruiting umbels (seed-bearing stalks) should be harvested when the seeds turn brown in the late fall. Clip the umbels from the plants, and thoroughly dry them either in the shade or in the sun. The seeds should be separated, cleaned, and stored for later use.

The fresh leaves have a flavor similar to that of the seeds, and may be added to fruit salads, especially apple salads. The seeds are used in cookies and candy.

Basil

Basil is a tender, annual aromatic plant with a spicy odor and flavor. Basil plants may be either green or purple. Basil is known for its attractive foliage and growth habits, and is often used as a border plant. Dark opal basil won an All-American Award because of its wide adaptability and attractiveness in ornamental gardens.

The plants usually grow from 12 to 18 inches high. There are many variations in plant habit, leaf shape, stiffness, and featheriness. To keep the plants actively growing, remove all of the flowers before the seeds mature. Pinch back the growing terminals, leaving only the main stems and leaves. Basil plants should be thinned or transplanted 8 to 10 inches apart so that they develop into strong plants.

Basil may be used both as a green leaf and dried for winter. Since basil is extremely frost-sensitive, it should be harvested before the first freeze. Many gardeners cut back a plant or two and put them in containers or pots in the house for winter use.

Caraway

Caraway is a biannual plant grown for its seeds. Plant seeds ½ inch apart in the spring in rows 2 feet apart and thin to 6 to 8 plants per foot of row. The plants will grow through the first season, and die down with freezes during the winter. They regrow in the spring to send up seedstalks (umbels) during the second summer. When the umbels have turned from green to brown, cut them from the plant before they shatter. A few feet of row usually produce enough seed for a family. Dry the umbels thoroughly either in the shade or sun, and separate the seed by rubbing the heads over screens or papers. When the seed has become thoroughly dry, place in sealed containers for storage.

Caraway seeds are used in baking and with many vegetables. Caraway is particularly popular for use with cabbage and cole slaw, carrots, cheese, potatoes, and breads. Some cooks crush the seed with oil and onion juice to make a mixture used in roasting pork.

Chive

The chive is a perennial plant belonging to the onion family. It is grown throughout most of North America. The small, bulbous plants grow in clumps 8 to 12 inches high. The attractive violet-colored flowers appear in May.

The plants are usually propagated by dividing the clumps, keeping 4 to 6 bulblets per clump. They are planted in the same manner as onion transplants (see page 80). They can be divided in the fall or early spring. It is necessary to divide clumps every two to three years to prevent overcrowding. Chives may also be started with seed planted in the early spring.

The tender leaves or the entire plant may be harvested whenever desired during the season. The bulbs are not used. Some gardeners dry the leaves; others chop them up fresh and keep them in the freezer for winter use. Many gardeners dig a clump of chives in late January, place them in a pot, and bring them in the house for fresh use during the winter.

The Chinese chive resembles the common chive in clump-growth habit, but it has flat, powdery gray leaves and white flowers. The leaf portion of the Chinese chive is prized as a fresh product.

Chives are used with many foods, and are frequently blended with other herbs to make excellent combinations for salads and omelets. The green leaves of both the common and Chinese chive add a delicate onionlike flavor to soups, salads, and sauces. The flowers should be removed to insure greater growth of the green edible portion.

Coriander

Coriander is an annual plant that is found in all parts of the world. It has long been cultivated for its dried fruits, but the seeds are also valuable for their flavor and odor. The seeds should be planted in early spring in rows 20 to 30 inches apart. Plant 1 seed every inch and do not thin. The seed heads should be cut when they are turning brown and before shattering (approximately 90 days from planting). Another method is to harvest the entire plant.

Tie the plants in bundles or spread on screens to dry. As soon as the plants are dry, separate the fruit by rubbing the plants together. Clean the fruit before storing it in containers. Cleaning is necessary to insure the pleasing flavor of the coriander fruit, since both the foliage and green seed have objectionable odors.

The seeds are used in desserts, particularly cookies, in dressings, and in combination with many other spices and herbs.

Dill

Dill is a tall-growing, self-reseeding annual with feathery leaves and open, umbrella-shaped seed-heads. The plants are similar to wild carrot in appearance. Dill is easily grown from seed. It will usually grow in all types of soil, but it prefers well-drained, fertile conditions. To prevent dill from becoming a weed in your garden, remove the heads so that the plants will not reseed.

After the seeds have germinated and the seedlings have established themselves (1 to 2 inches high), thin them to 6 to 9 inches apart. The ultimate height of the plants should be 3 to 3½ feet.

The method of harvesting depends upon how you intend to use the herb — as dill weed, flower heads, or seed. The most common use is in pickles, where the flower heads are preferred. Cut the stems with the flowers in full bloom. Tie the stems in bunches and dry in the open or bag dry as described on page 121. For seed, allow the flowers to mature (usually two to three weeks after the blossoms appear), then cut and tie the plants. Hang the plants in bunches with papers spread beneath them to collect the seed.

Dill weed is prepared by bag drying or tray drying the young plant foliage before the flower heads appear. Remove the stems and place the foliage in a container that is stored in the dark. Many Illinois gardeners dry the self-seeded dill that appears in their gardens in the fall. Self-seeded dill that develops in late summer and early fall makes the highest quality dill weed. Dill weed is used as a fine herb in salads, omelets, and herb blends.

Garlic

Garlic, a member of the onion family, may be grown successfully in most Illinois home gardens. Garlic is started by planting small cloves that are divisions of the large bulb. Each bulb contains a dozen or more cloves; each clove is planted separately. The larger the clove, the larger the size of the mature bulb at harvest. Do not divide the bulb until you are ready to plant — early separation of the cloves results in decreased yields. Select “seed bulbs” that are large, smooth, fresh, and free of disease.

Garlic grows best on friable loam soils that are fertile and high in organic matter. Gardeners that grow good onion crops can grow good garlic. Garlic does well at high fertilizer levels. Apply 3 pounds of 10-10-10 fertilizer per 100 square feet. The bulb will be small if the soil is excessively dry, and irregular in shape if the soil becomes compacted.

Garlic must be planted very early in Illinois (March or April) to permit full development. Fall preparation of the soil is desirable if the soil can be fertilized and planted with minimum tillage in the spring. Plant the cloves 3 to 5 inches apart in an *upright position* (to assure a straight neck), and cover them to a depth of ½ to 1 inch. Allow 18 to 30 inches between rows.

The bulbs may be harvested when the tops start to dry, usually in August. Place the bulbs on trays with screens or slatted bottoms, and remove the tops when dry. The mature bulbs are best stored under cool, dry conditions. If you grow only a few plants, braid the tops together with twine and hang the bulbs to dry.

Garlic is used both cooked and raw in a wide variety of dishes.

Mint

There are several kinds of mint. The most common are spearmint and peppermint. Mint is propagated from roots, rooted cuttings, or entire plants. If mint is not contained, the underground stems will spread rapidly and become a garden weed. A large tile or chimney flue set on end may be used for individual mints to contain their growth.

Under Illinois conditions, mint will live as a perennial. To insure high-quality mint, however, you should mulch the area. In the late fall, commercial mint growers turn the top 6 inches of soil (which contain the rhizomes or underground stems) to form a soil mulch. This practice is recommended for home gardeners.

Spearmint is used principally for flavoring iced tea and other beverages; peppermint is used in medicines, confectionaries, etc. No special care is necessary for mint other than removing the weeds. Since the plants grow rapidly in the spring, the leaves are available for use throughout the entire year, with best-quality foliage in July and August.

Many gardeners harvest their mint when the flower buds appear. When the mint is thoroughly dry, remove the leaves, crumble them between your hands, and place in a sealed container. Commercial mint is grown for the plant oil, a process that is not practicable for the home gardener.

Some gardeners are especially interested in various kinds of mint, such as curly mint, apple mint, and orange mint. All mints are propagated and grown in the same way. The vigor and hardiness varies, but most mints will prosper in Illinois gardens.

Oregano

Oregano is a hardy perennial that may not overwinter under Illinois conditions. Use a generous application of mulch in November or December, and uncover the plants in April.

The plant is usually started from seed, but it may be started from root cuttings or crown divisions. Oregano is handled in the same way as sweet marjoram, a close relative. The leaves are usually dried, removed from the stems, and placed in a closed container.

The dried leaves are used in many Spanish, Italian, and Mexican dishes, as well as in stuffings for fish and game.

Parsley

Parsley is a biannual that may also be grown as an annual under Illinois conditions. It is the most widely grown of the herb plants for garnishing and flavoring.

There are two distinct types of parsley. The moss-curled or triple-curled parsley forms rosetta leaves, and is frequently used as a garnish. The flat-leaf or Italian parsley is used for both its root and leaves.

Parsley seeds can be planted in the spring in cold frames, window boxes, or directly in the garden. For best results, start the plants indoors and transplant to the garden. Seeds sown directly in the garden should be planted early in the spring at the rate of 10 to 15 seeds per foot of row. The seedlings should be thinned to 4 to 6 inches apart.

The green leaves may be harvested anytime during the growing season. The plants will remain green in the garden until early winter, and many gardeners harvest the entire plant to dry in late fall. Parsley leaves are usually placed in a closed container and stored in the dark so that they do not lose their healthy green color. Loss of color means loss of flavor.

The fresh or dried leaves are used as a garnish in soups, vegetables, salads, meats, and poultry. The roots are used, finely chopped, in soups. Many cooks use parsley because of its unique ability to blend the flavors of various herbs. Parsley may also be used as a base with thyme, sweet marjoram, basil, rosemary, summer savory, and a small amount of sage. The combination acts as a unit, rather than the expression of a single herb flavor.

Rosemary

Rosemary is a small, perennial evergreen shrub grown as an annual because it is not winterhardy under Illinois conditions. Some gardeners mulch the rosemary plant, and then protect it with rose cones or a combination of rose cones and mulch during the winter months. The narrow leaves have a spicy odor that makes rosemary valuable for flavoring and as a scenting agent.

Rosemary plants may be purchased from greenhouses or garden centers. The plants may also be propagated from stem cuttings or by planting seed indoors in very early spring. Some gardeners pot a rosemary plant from the garden in the fall and bring it into the house for winter use and spring stem propagation. Rosemary may be started from seed in a cold frame or indoors.

When transplanting rosemary to the garden in the spring, allow 1 foot or more between plants so that the individual plants maintain their beauty. The growth can be pruned back several times a season for drying. When the stems are thoroughly dry, strip the leaves and store them in closed containers.

Fresh or dried leaves are used sparingly as an accent in soups, leafy greens, poultry, stews, and sauces. Rosemary is one of the fine herbs, and may also be added without cooking as an excellent ingredient in mixed herbs.

Sage

Sage is a shrubby perennial plant of the mint family. It is one of the most widely cultivated herbs in Illinois. Plants may grow to a height of 18 inches

and bloom the second season. Prune your sage plant back severely in the early spring to eliminate flowering that prevents vegetative growth.

Plants may be propagated from seeds, stem cuttings, or crown divisions. Seeds can be planted in cold frames, window boxes, or in the house. Transplant the young seedlings when they are 2 to 3 inches high. Space seedlings 15 to 18 inches apart so that they become large, attractive plants.

Cut 6 to 8 inches of top growth from the plants at least twice during the growing season. After washing and drying the stems, strip the leaves from them and place in closed containers for winter storage. Many herb growers use the bag-drying method (see page 121), and do not remove the sage until they are ready to use it.

Use the leaves sparingly with onion for stuffing pork, turkey, duck, or goose. Rubbing the powdered leaves on the outside of fresh pork, ham, and loin results in a flavor resembling that of stuffed turkey. Some people steep the dried leaves for tea.

Summer Savory

Summer savory is an annual plant belonging to the mint family that is well-adapted throughout Illinois. It grows under a wide range of climatic conditions, but prefers a dry, fertile loam.

Summer savory is easily grown from seeds in the spring. The seeds may be started in a cold frame or seeded directly in the row. They should be planted $\frac{1}{4}$ to $\frac{1}{2}$ inch deep, with 10 to 12 seeds per foot. The seedlings should be thinned to 6 inches apart. The plants will grow to a height of 12 to 15 inches, and require little cultivation other than weeding.

The tender leaves and stems may be used anytime during the growing season. The plants may be cut when blooming begins, and are usually dried when the top growth is 6 to 8 inches high. Two or three crops may be harvested under Illinois conditions. The cut top growth may be tied into small bundles and spread on papers or screens to dry. When the top growth is thoroughly dry, strip the leaves from the stems and store in a closed container. Woody pieces of stems interfere with the flavoring of foods, and should be removed.

Summer savory is a fine herb, and may be used both fresh and cooked. It is excellent in herb blends. Fresh or dried summer savory leaves may be added to the water for cooking green beans, or in soups, stuffings, sauces, veal, poultry, and many egg dishes. Summer savory is considered one of the mixer herbs, along with parsley.

Sweet Marjoram

Of the three kinds of marjoram (pot, common, and sweet), sweet marjoram is most frequently grown in Illinois. Although sweet marjoram is a perennial, it frequently winterkills in Illinois, and is usually cultivated as an annual. Selected locations, mulching, and other protection make overwintering possible.

Sweet marjoram may be started from seed, by cuttings with the aid of rooting hormone, or by division of crowns. Transplant the plants to a permanent location when they are 2 to 3 inches high in the spring. They respond best to rich, moist soil, and full sunlight. Space the plants 6 to 8 inches apart. The plant may be dug up in the fall to overwinter as a houseplant and be redivided for use the following spring.

As soon as the first blooms appear, cut back the plants several inches. The plants can be cut back two or three times each season in Illinois. The leaves and flower tops should be dried rapidly, the stems removed, and the clean, dry leaves stored for winter. Fresh leaves, of course, may be used throughout the season.

The leaves of sweet marjoram are especially good with veal and liver, in herb butter, on cold roast beef sandwiches, in egg dishes and meat, and in poultry stuffings and soups. They also add flavor to potato salad, creamed potatoes, and green beans. Chopped sweet marjoram leaves in melted butter may be added to cooked spinach before serving.

Tarragon

Tarragon is a vigorous perennial plant. There are two types of tarragon — the horticultural variety (French tarragon) and the Russian or common tarragon. Russian tarragon has a strong flavor that many people do not like, but French tarragon is quite popular as a scenting-agent herb.

French tarragon is propagated by plant divisions or rooted stem cuttings; the Russian variety can be propagated from seed. The French tarragon plants or crown divisions are usually planted 1 foot apart in the row, and may be subdivided every three to four years.

After a plant has become established, the leaves of the tender top can be harvested throughout the growing season, and used fresh. The leafy top growth should be cut back several times during the season to encourage "bushing out." Although it is preferable to use tarragon fresh, some gardeners use it dried. The leaves and tops should be dried rapidly

without light and stored in a dark-brown sealed glass jar to prevent rapid deterioration.

Tarragon leaves are used in salads, dressings, vinegars, fish sauces, tartar sauces, and certain egg dishes. They are also blended with other herbs to make an excellent addition to the mixture. Tarragon vinegar can be made by putting a fresh stem or two of washed tarragon in a pint of apple or wine vinegar. Allow a few weeks for the flavor balance to develop.

Thyme

The common or French thyme is a small, low-forming shrublike perennial that grows to a height of 6 to 10 inches under Illinois conditions. Common thyme may be used fresh or as a dried herb. Several related varieties of thyme are often used as ornamentals in rock gardens and along walks.

Thyme is best propagated from seed indoors, by dividing clumps, or by making stem cuttings. When the plants are 2 to 3 inches high, set them 1 foot apart in a row. Most thyme growers start new plants every three to four years. Old plants should be divided; otherwise, they become excessively woody, and will not produce the tender leaves desired in culinary use. A well-drained, sunny location is essential for growing thyme successfully.

When the plants are in bloom, cut off 5 to 6 inches of the flowering tops with clippers or a sharp knife. Often two or more crops can be harvested during one season. The plants should be spread on a fine screen or newspapers in a dark, well-ventilated room to dry. After the plants are thoroughly dry, strip the leaves and flowering tops from the stems and store in a closed container.

The leaves, usually blended with other herbs, may be used in meats, poultry stuffings, gravies, soups, egg dishes, cheese, and clam chowder.

Appendix I: Storing Vegetables

When storing vegetables for later use, follow the recommendations given in the table below. Vegetables in the cold-moist and cool-moist groups may be stored in an old-fashioned outdoor pit, an underground cellar, or a specially designed interior stor-

age area in the basement. Vegetables in the cold-dry and cool-dry groups may be stored in a cool area in a heated basement. Avoid water that may condense and drop from pipes or ceilings. *Do not* allow the vegetables to freeze.

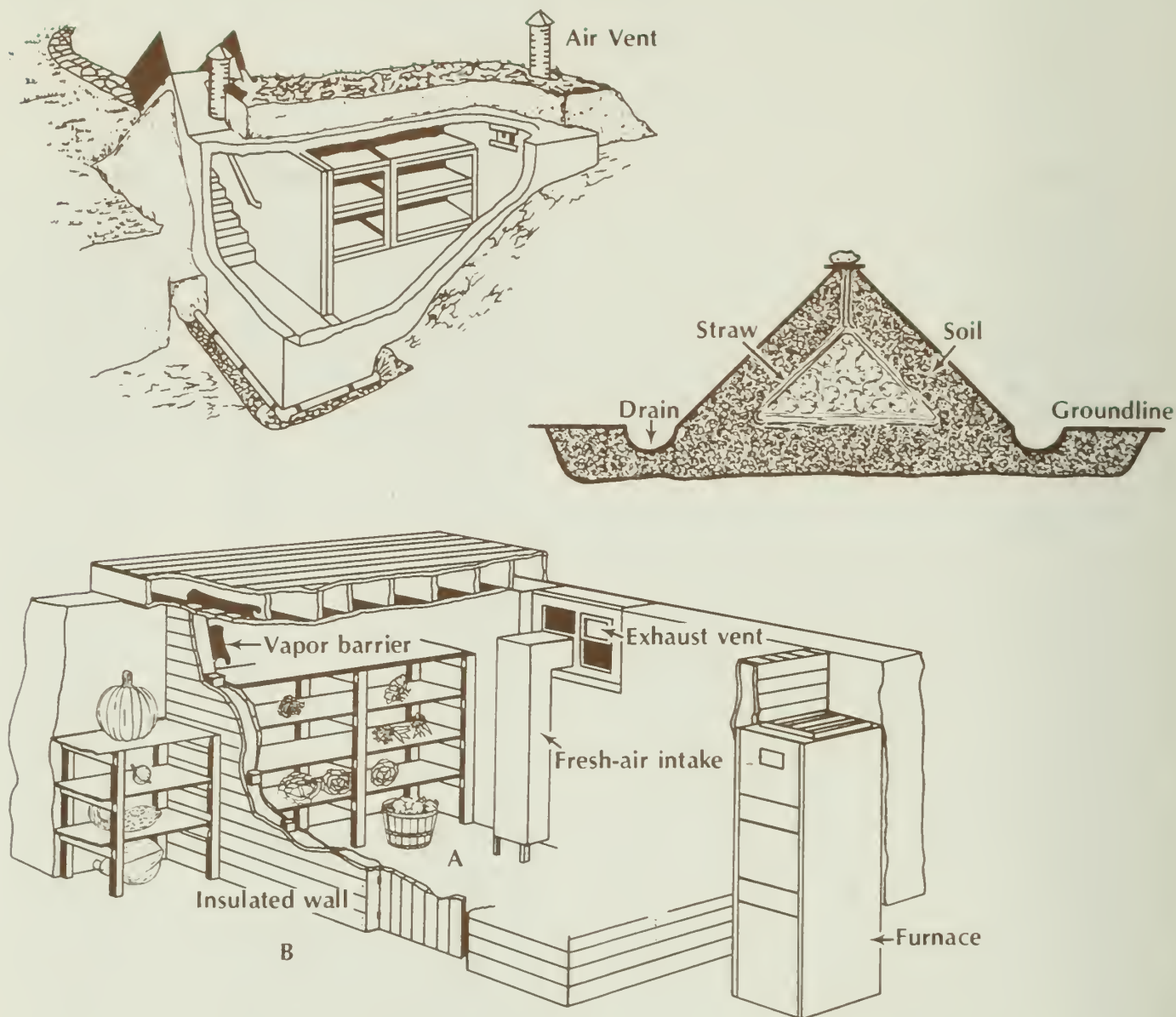
Vegetable	Storage temperature	Relative humidity	Storage period
Cold-moist group			
Asparagus	32° F.	95%	2 weeks
Beet, topped	32° F.	95%	1-3 months
Broccoli	32° F.	95%	3 weeks
Brussels sprout	32° F.	95%	1 month
Cabbage, early	32° F.	95%	3-6 weeks
Cabbage, late	32° F.	95%	3-4 months
Carrot, topped	32° F.	95%	4-6 months
Cauliflower	32° F.	95%	2-3 weeks
Collard	32° F.	95%	2-3 weeks
Corn, sweet	32° F.	95%	4-8 days
Horseradish	32° F.	95%	10-12 months
Kale	32° F.	95%	2-3 weeks
Leek, green	32° F.	95%	1-3 months
Lettuce	32° F.	95%	2 weeks
Onion, green	32° F.	95%	2-3 weeks
Parsnip	32° F.	95%	2-6 months
Radish	32° F.	95%	2-3 weeks
Turnip, greens	32° F.	95%	2-3 weeks
Turnip, roots	32° F.	95%	4-5 months
Cool-moist group			
Bean, snap and wax	40°-45° F.	90-95%	1 week
Bean, lima	40°-45° F.	90-95%	1 week
Cucumber	45°-50° F.	90-95%	10-14 days
Eggplant	45°-50° F.	90%	1 week
Pepper, sweet	45°-50° F.	90-95%	2-3 weeks
Potato, irish (late-crop)	40° F.	85-90%	4-6 months
Potato, sweet (after curing at 80°-90° F. for 10 days)	55°-60° F.	85-90%	4-6 months
Squash, summer	45°-50° F.	90%	7-10 days
Tomato (firm, colored)	60°-65° F.	85-90%	4-7 days
Tomato (mature, green)	60°-65° F.	85-90%	1-4 weeks
Watermelon	40°-50° F.	80-85%	2-3 weeks
Cold-dry group			
Onion, dry	32°-35° F.	60-70%	2-8 months
Onion, sets	32°-35° F.	60-70%	6 months
Shallot	32°-35° F.	60-70%	6-8 months
Cool-dry group			
Pumpkin	50°-55° F.	60-70%	2 months
Squash, winter	50°-55° F.	60-70%	2-4 months

Your vegetables will not improve in quality after they are harvested. For this reason, it is important to harvest them when they are at the proper stage of maturity. See "Major Vegetables," pages 42-112 for information about harvesting specific crops.

To maintain quality after harvest, handle your vegetables carefully. Bruised or damaged vegetables

decay easily. If not eaten immediately, asparagus, peas, sweet corn, and leafy crops should be cooled to below 40° F. as soon as possible after harvest. Root crops (beets, carrots, parsnips, potatoes, salsify, and turnips) should not be washed if they are to be stored for extended periods. Washing may result in the development of soft rot.

Home Storage Facilities for Vegetables



Underground Cellar (top). Vegetables in the cold-moist and cool-moist groups (cabbage, carrots, potatoes, and other root crops) can be stored in an underground cellar. This cellar can also be used as a storm shelter.

Outdoor Pit (middle). Cross-section of an outdoor storage pit used for vegetables in the cold-moist and cool-moist groups. Place straw on the ground and mound the vegetables on the straw. Cover with 6 inches of straw and at least 6 inches of soil. Leave an air vent to prevent overheating and place a 1-inch board on top of the pit.

Basement Storage (bottom). The interior storage area (A) is used for storing vegetables in the cold-moist and cool-moist groups. This area, which is partitioned off from the central heated area, must be insulated and made vaporproof. Vegetables in the cold-dry and cool-dry groups (onions, pumpkins, shallots, and squash) may be stored on shelves outside the interior storage area (B).

Appendix II: Exhibiting Vegetables

Each year more than 200 events (state and county fairs, exhibits, fall harvest days, etc.) are held in Illinois that offer awards for those who excel in growing and exhibiting vegetables. Vegetables that produce over long periods on the same plants (tomato, pepper, eggplant, etc.) should be started at the cor-

rect season. For short-season vegetables, such as radishes (23 to 25 days), green beans (52 to 56 days), kohlrabi (55 to 60 days) and beets (55 to 70 days), you can estimate the planting date by subtracting the number of days to harvest from the date of the show.

Types of Exhibits

Vegetables are usually exhibited *on plates, in a group display, or as a market basket or baskets. Be sure to check the specific requirements for each event that you plan to enter.*

On Plates. The number of specimens of various vegetables usually required for each plate exhibit are as follows:

One Specimen

Broccoli, head
Cabbage, head
Cauliflower, head
Chinese cabbage, head
Eggplant, fruit
Greens (collard, endive, escarole, kale, mustard, swiss chard), one plant
Horseradish, root
Lettuce, one head or plant
Muskmelon, fruit
Pumpkin, fruit
Squash, winter, fruit
Watermelon, fruit

Five Specimens

Beet
Carrot
Corn, sweet
Cucumber, pickling
Cucumber, slicing
Kohlrabi
Leek
Onion, large, dry
Parsnip
Pepper, large fruits (mango, banana, etc.)
Popcorn, ear
Potato, irish, red
Potato, irish, white
Potato, sweet

Rhubarb
Squash, summer
Tomato, slicing
Turnip

Twelve Specimens

Bean, green, pod
Bean, lima, pod
Bean, wax, pod
Herbs, stems or branches
Okra, fruit
Onion, green
Onion, set
Pea, pod
Pepper, small-fruited (chili, cherry, etc.)
Shallot
Southern pea, pod
Tomato, small-fruited

In a Group Display. Five or more different vegetables are displayed together in half-bushel baskets, bushel baskets, or other prescribed containers. The number of specimens of a particular vegetable should be the same as the number required for a plate exhibit. Decorative greenery (parsley, dill, asparagus fern, etc.) does not count as a vegetable unless it is tied and exhibited in bunches.

As a Market Basket or Baskets. The required amount of one vegetable is displayed in a commercial container (usually two quarts or one peck).

Systems of Judging

The two principal systems of judging vegetables in Illinois are the *ranking* (or *first, second, and third*) system and the *dual-merit system* (*Danish system*).

Ranking System. Exhibits are ranked within the class. A suggested method for scoring plates and market baskets is as follows: quality and condition — 60 points; uniformity — 30 points; arrangement

— 10 points. Although the scoring of each characteristic may vary somewhat, a great deal of emphasis is always placed on quality and condition and uniformity. All contestants should be aware in advance of the scoring system used for a particular show.

Dual-Merit System. The quality of the exhibit is recognized, regardless of the number of exhibits in the class. This system is most commonly used in 4-H shows. Blue (A rating), red (B rating), and white (C rating) ribbons are awarded. Any plate may be disqualified for not being in compliance with the rules.

General Characteristics of Vegetables

Quality and Condition. The outstanding characteristics to be considered in a vegetable exhibit are *quality and condition*. Unless otherwise specified (for example, green mature tomatoes), this term refers to the quality and condition of the vegetable when it is ready for immediate use. Snap beans should be fully grown, but they should not be so mature as to show bulges caused by seed development. Extremely large specimens of beets and carrots will probably be coarse and woody, and will grade lower than smaller specimens in prime condition for use. Vegetables of any kind that are not in a stage of development suitable for immediate use (for example, over-mature summer squash, zucchini, and okra) will be graded down on quality and condition.

The vegetables should be free from disease and insect injuries, mechanical damage, and growth cracks. The stems of eggplants, peppers, and vine crops (with the exception of muskmelons) should be left on the fruit. The stems are usually intact on quality fresh-market tomatoes, and are removed for processing. Cabbage should not be over-trimmed, and the wrapper leaves should remain attached on both cabbage and cauliflower. The taproots of the root crops should not be removed. All vegetables should be clean.

Size. The most desirable size for a particular vegetable is based upon the edible qualities (texture, flavor, etc.) of that vegetable. Certain vegetables taste better when they are small, others when they are large. Specimens are ranked highest that correspond to the premium market size (for example, large tomatoes and sweet onions, medium-sized beets and carrots, and small summer squash and okra).

Maturity. All vegetables should be at the proper stage of edible maturity. They should not be wilted, overripe, or shriveled. Some vegetables are most edible when immature.

Uniformity. Specimens should be uniform in size, shape, color, and maturity, and in the distinguishing features of the crop or variety. Even though you may not know the commercial standards for a particular vegetable, you can be sure of having a good exhibit if all of your specimens are as alike as possible. An exhibit that included four average specimens and one exceptional specimen would not score as high as an exhibit of five average specimens.

Variety. Each variety should be true to the characteristics of that particular variety.

Arrangement. Neatness, attractiveness, and the educational value of the display are important. Set up your display according to the rules outlined in the fair or exhibit catalog.

Quantity. If the number of vegetables exhibited is either more or less than that specified in the catalog, the entry will be eliminated from competition. The more specimens of each vegetable in a group display, the higher the score.

Package. The container or rack holding the vegetables should be appropriate, durable, neat, and clean.

Labeling. Labels may be prescribed. The labels should be neat, clean, easy to read, and appropriate in size, and should have educational value. They should be attached to the specimens in an attractive manner, but they should not detract from the display.

Do not use waxes, mineral oils, and dyes on any exhibit.

Characteristics of Specific Vegetables

Bean, snap. The pods should be uniform in size, shape, color, and stage of maturity. They should be free from rust and other imperfections. Do not show large, mature beans in the pod. Pods should be straight.

Beet. Beets should be uniform in size, shape, and color. They should be smooth and free from side roots and blemishes. When the beets are cut, the flesh

should be firm, crisp, and fine-grained. White rings in the cut flesh lower the quality score. Medium to small sizes are preferred. Beets can be displayed with tops, but those without tops will hold up longer. If you cut off the tops, leave ½ to 1 inch of the stems on the beets.

Cabbage. A single cabbage head usually constitutes an exhibit. The head should be solid, as determined by weight and pressure, and not too large. There should not be any damage from cabbage worms. Wrapper leaves should remain on the head.

Carrot. Carrots are usually divided into four groups in an exhibit — Finger, Half-long, Nantes, and Imperator. Your specimens should be typical of their group. They should be smooth, clean, fresh (not withered), free from greening, and uniform in color (usually a deep orange), size, and shape. Carrots can be displayed with uncut tops, or with the tops trimmed to ½ to 1 inch long.

Corn, sweet. Sweet corn should be shown with the husks intact.

Onion. The uniformity and maturity of onions are important. Avoid doubles in larger sizes. The onions should be smooth and clean, *not peeled*. They must be mature and solid. Pressure on the neck of the onion will expose softness. The neck should be small and well cured. The color must be typical for the variety, and the top should be 1 inch long.

Pepper. Peppers should be deep in color, fresh, firm, and symmetrical, with the same number of lobes. In close competition, the advantage is given to uniformly colored specimens.

Potato. The specimens must be uniform in size. The tubers must be free from skin diseases, insect and mechanical injury, and foreign material. It is best to clean potatoes with a soft brush or cloth, although they can be washed. Defects such as second growth, growth cracks, and sunburn will disqualify an entry. The tubers must be typical of the variety in all respects. Early potatoes should weigh from 7 to 9 ounces, and late potatoes should weigh from 8 to 10 ounces.

Pumpkin. Uniformity of varietal type, size, and color are important. The specimens must be free from insect and mechanical injury. They should be mature, as indicated by the hardness of the skin. The stems should be attached.

Squash. Maturity, as indicated by the hardness of the skin, is especially important for winter squash. Single specimens constitute an exhibit. The specimens should be uniform in color, weight, and type, and free from blemishes. The stems should be attached. The vegetable marrow and summer squash should be immature, as indicated by the softness of the skin (immature specimens can be pierced with a fingernail).

Tomato. Specimens should be selected for varietal type and uniform size, color, and maturity. They must be firm and free from cracks, insect damage, and mechanical injury. Ripe tomatoes should be in prime condition for slicing, without green streaks. Green tomatoes should be entirely green, with no red showing, and in the best stage of maturity for the intended purpose.

4-H Club Garden Projects

Because of the areas in which they live, many 4-H Club members have limited space for growing vegetables. A member may enter any of the following garden projects, depending upon the space he or she has available:

Minigarden. A minigarden can be grown in pots, boxes, containers, beds, or in a small garden (less than 200 square feet). A member should grow three different kinds of vegetables. Only a single variety of each kind of vegetable can be shown.

Town Garden. A town garden must be at least 200 square feet. A member should grow a minimum of five different kinds of vegetables.

Family Garden. A family garden must be at least 750 square feet. A member should grow a minimum of eight different kinds of vegetables.

Commercial Garden. A commercial garden is usually ¼ acre or larger. The garden may be smaller than ¼ acre if it is a commercial enterprise of equivalent value. For example, a small garden of potherbs or green onions may be equal in commercial value to ¼ acre of potatoes or sweet corn. A member may show one kind of vegetable in a commercial pack (usually between one peck and one bushel). Many varieties and kinds of vegetables may be grown, and a member may operate a roadside stand or deliver vegetables on a neighborhood route.

List of Publications

The publications listed below contain additional information that may be useful to the home gardener. All publications are free except those for which prices are shown. Prices and availability are subject to change. U.S. Department of Agriculture (USDA) publications may be obtained by writing to Superin-

tendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. University of Illinois College of Agriculture publications may be obtained by writing the Office of Agricultural Publications, 123 Mumford Hall, Urbana, Illinois 61801.

General

Gardening for Food and Fun

USDA 1977 Yearbook of Agriculture. 392 pages (\$6.50).

Growing Tomatoes at Home

Illinois Cooperative Extension Circular 981. 12 pages.

Growing Vegetables in the Home Garden

USDA Home and Garden Bulletin 202. 50 pages (95¢).

Growing Vegetable Transplants

Illinois Cooperative Extension Circular 884. 32 pages.

Minigardens for Vegetables

USDA Home and Garden Bulletin 163. 12 pages (35¢).

Greenhouses and Hotbeds

A Simple Rigid Frame Greenhouse for Home Gardeners

Illinois Cooperative Extension Circular 880. 8 pages.

Electric Heating of Hotbeds

USDA Leaflet 445. 8 pages (35¢).

Home Greenhouses

Illinois Cooperative Extension Circular 879. 32 pages.

Pest Control

Controlling Tomato Diseases

USDA Farmers' Bulletin 2200. 12 pages (35¢).

Controlling Weeds in the Home Garden

Illinois Cooperative Extension Circular 1051. 12 pages.

Insect Pest Management Guide: Home, Yard, and Garden

Illinois Cooperative Extension Circular 900. 8 pages.

Insects and Diseases of Vegetables in the Home Garden

USDA Agricultural Information Bulletin 380. 50 pages (\$1.20).

Recommendations for Controlling Diseases in the Home Vegetable Garden

University of Illinois Department of Plant Pathology Report on Plant Diseases No. 900. 6 pages.

Plant Hobbies

Hydroponics as a Hobby: Growing Plants Without Soil

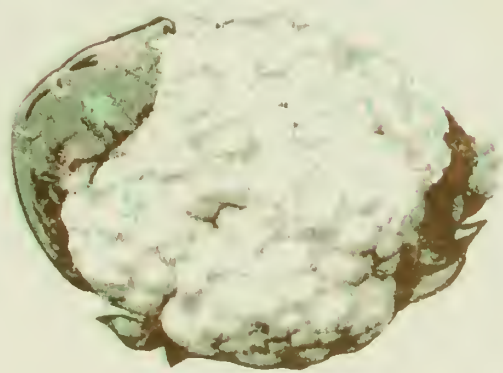
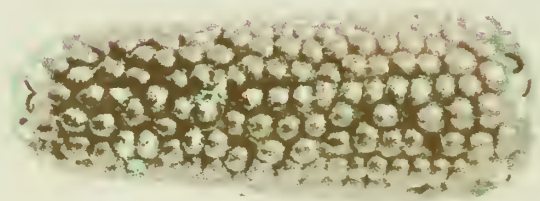
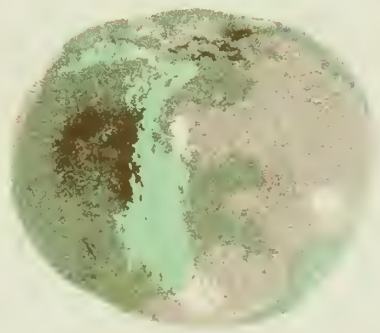
Illinois Cooperative Extension Circular 844. 16 pages.

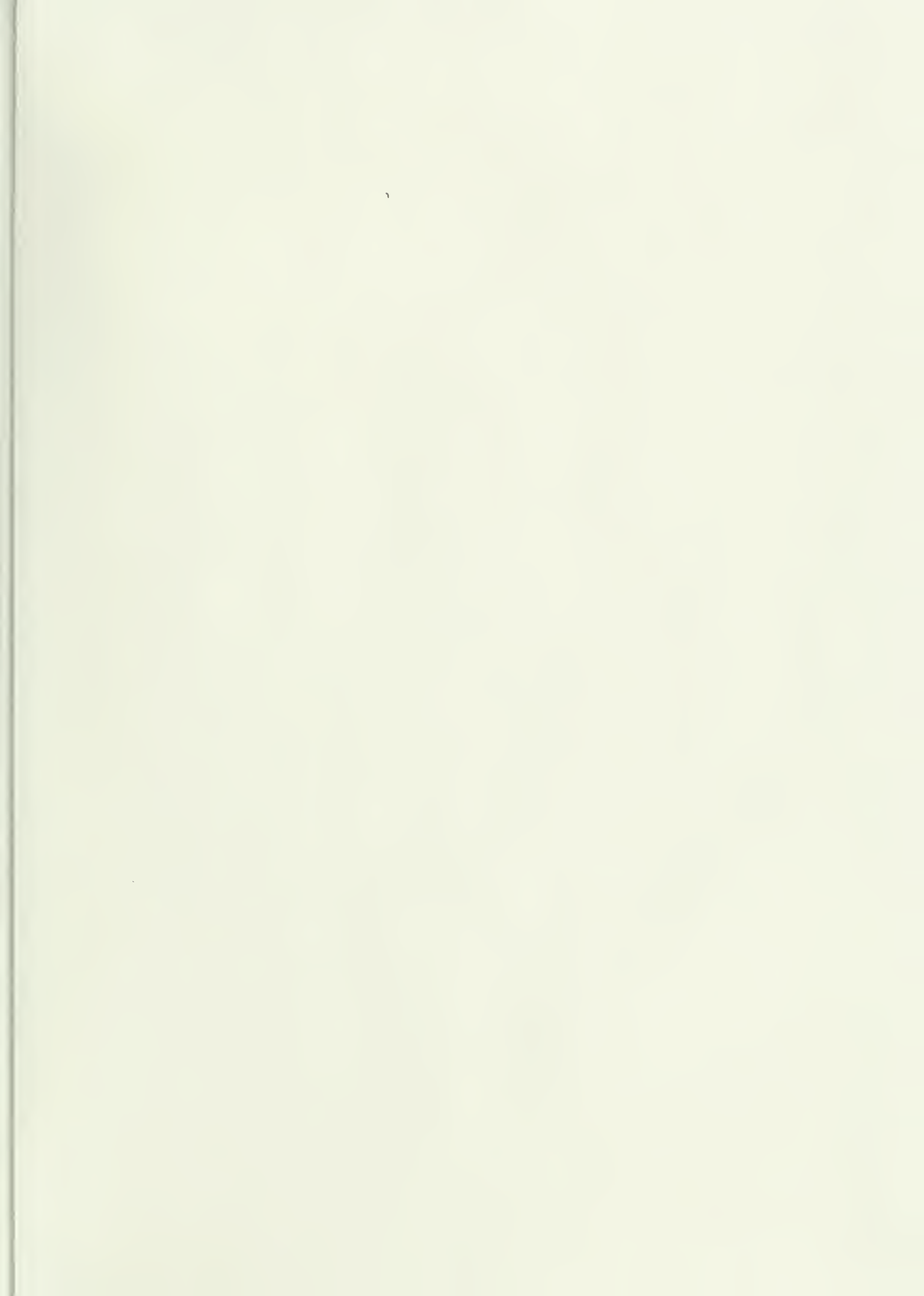
Plant Breeding as a Hobby

Illinois Cooperative Extension Circular 817. 32 pages.

Plant Regulators: Their Use as a Hobby

Illinois Cooperative Extension Circular 886. 15 pages.







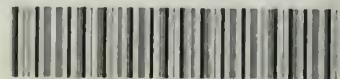


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