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EC1274 Garden Vegetables

Wayne Whitney

Wilber Ringler

Robert Helm

John Weihing

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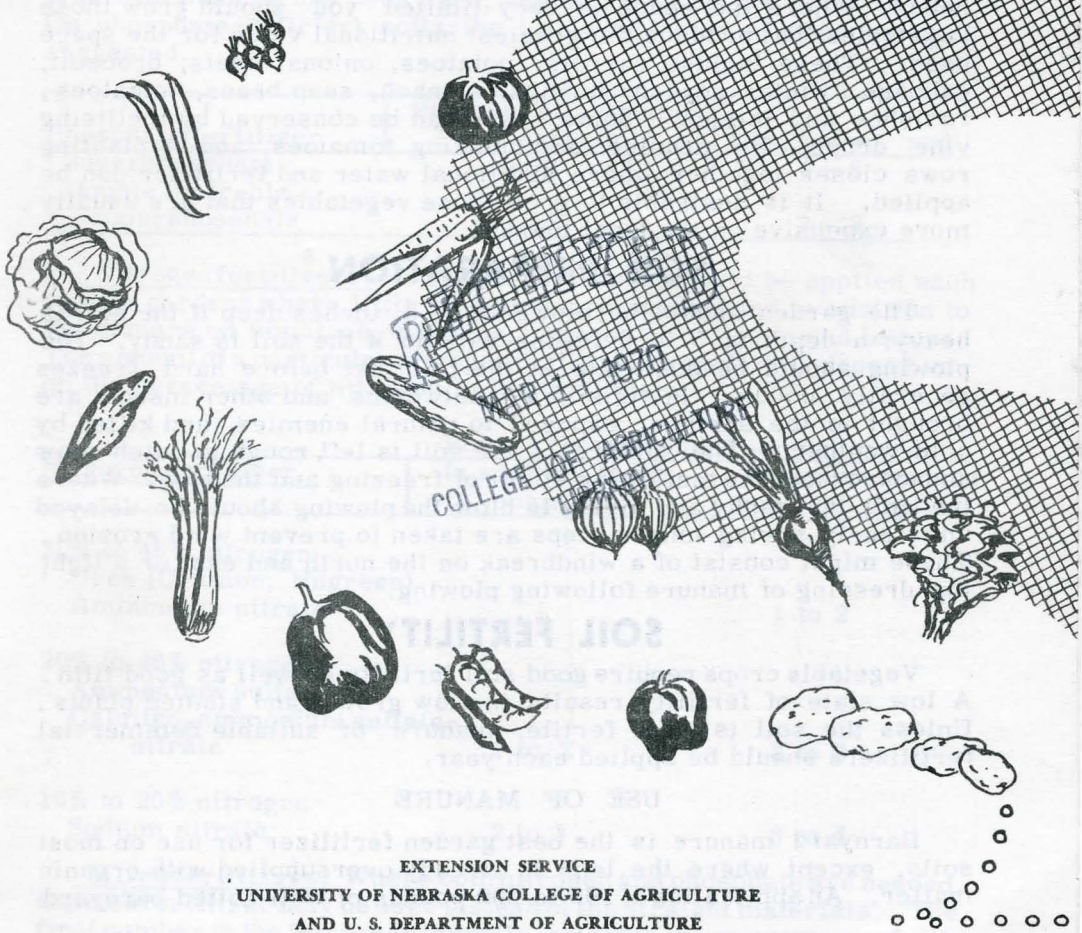
GARDEN VEGETABLES



COLLEGE OF AGRICULTURE

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U. S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

GARDEN VEGETABLES

Wayne Whitney, Wilber Ringler, Robert Helm and John Weihing 1/

A good garden is the result of careful planning and much work. The garden should be of a size that can be cared for properly. You can have more vegetables from 100 square feet of garden that is given good care, than from several hundred square feet of garden that is neglected. A well planned garden of adequate size results in benefits that can be enjoyed throughout the year. It is desirable to locate a small garden near the house, where spare time can be used in its care. If the garden is near the house it is also easier for the housewife to procure fresh vegetables for each meal.

In planning the garden, include only those vegetables the family will use, and plant only enough of a given kind to satisfy the family needs. Where the space is very limited you should grow those vegetables that produce the greatest nutritional value for the space used. These include carrots, potatoes, onions, beets, broccoli, cabbage, winter squash, turnips, spinach, snap beans, tomatoes, radishes and lettuce. Some space can be conserved by trellising vine crops, by pruning and staking tomatoes, and by planting rows closer together where additional water and fertilizer can be applied. It is desirable to grow those vegetables that are usually more expensive on the local market.

SOIL PREPARATION

The garden should be plowed 6 to 8 inches deep if the soil is heavy; a depth of 5 to 6 inches will do if the soil is sandy. The plowing should be done late in the fall just before hard freezes generally occur. In this way cutworms and other insects are brought to the surface, exposed to natural enemies, and killed by cold weather. The surface of the soil is left rough to catch snow and to increase the mellowing effect of freezing and thawing. Where the soil is sandy and likely to blow the plowing should be delayed until early spring unless steps are taken to prevent wind erosion. These might consist of a windbreak on the north and east or a light top-dressing of manure following plowing.

SOIL FERTILITY

Vegetable crops require good soil fertility as well as good tilth. A low state of fertility results in slow growth and stunted plants. Unless the soil is quite fertile, manure or suitable commercial fertilizers should be applied each year.

USE OF MANURE

Barnyard manure is the best garden fertilizer for use on most soils, except where the land is already oversupplied with organic matter. An application of 100 to 200 pounds of well rotted barnyard

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manure per square rod (8 to 16 tons per acre) per year is recommended, or about half this amount of chicken manure or sheep manure. The time of applying the manure will vary, but as a rule it should be spread in fall or winter. The manure will increase the supply of available nitrogen, phosphorus, and other necessary elements in the soil, add to the water-holding capacity, and improve the physical condition of the soil. Excessive use of manure should be avoided.

USE OF COMMERCIAL FERTILIZERS

On gardens where no manure has been used or where the manure is of low quality, commercial fertilizers are recommended.

Phosphate fertilizers. Where manure has been used regularly there will be adequate phosphate in most soils for the garden crops. Where no manure has been used, the soil may be low in phosphate. On phosphate-deficient soils the following rates of phosphate are suggested.

Phosphate fertilizer	Per cent of available phosphate	Lbs. per sq. rod
Superphosphate	20	4 - 6
Double or treble superphosphate	45	2 - 3

Nitrogen fertilizers. Nitrogen fertilizer should be applied each year or gardens where little or no manure is used and in addition to the manure on tomatoes, cabbage, onions, sweet corn and lettuce. The amount of a particular nitrogen fertilizer to apply will depend upon the percentage of nitrogen in the fertilizer.

Nitrogen fertilizer	Pounds recommended per square rod	
	In addition to the manure	Where no manure has been applied
30% to 40% nitrogen		
Urea (Uramon, Nugreen)		
Ammonium nitrate	1	1 to 2
20% to 30% nitrogen		
Ammonium sulfate		
Calnitro, ammonium sulfate-nitrate	1 to 2	2 to 3
10% to 20% nitrogen		
Sodium nitrate	2 to 3	3 to 4

Mixed fertilizers. Where both nitrogen and phosphate are needed. a mixed fertilizer may be used instead of the straight materials. The first number in the fertilizer formula indicates the percentage of nitrogen, the second the percentage of available phosphate, and the third the percentage of water-soluble potash. For example, a 10-20-10 mixed fertilizer would contain 10 per cent nitrogen, 20 per cent available phosphate, and 10 per cent water-soluble potash.

Rate of application for some of the more common mixed fertilizers:

Mixed fertilizer formula	Lbs. per square rod
16-20-0	2 - 3
10-20-0, 10-10-5, 9-7-4	4 - 6
6- 2-0, 6-10-0, 6-9-7	6 - 8
4-16-0, 5-10-5	8 - 10
4- 4-4	10 - 12

Method of application. The nitrogen and phosphate fertilizers are best applied in the spring just prior to planting the garden. The fertilizer should be broadcast evenly on the surface and worked into the soil. If manure is used, the nitrogen on tomatoes, cabbage, and sweet corn may be applied as a side-dressing after these plants are up. In this case the nitrogen should be placed in a band about 4 to 8 inches away from the plants and 2 inches deep. If no manure is used, some of the nitrogen fertilizer may be applied before planting the vegetable crop, and the remainder after the plants are up. Too much nitrogen at planting will result in excessive top growth of potatoes and tomatoes.

ACID SOILS

Gardens, particularly in eastern Nebraska, may be acid in reaction and need lime for the most successful growth of vegetable crops. The only way to find out whether lime is needed is to have your soil tested. Some soils already contain an excess of lime and the application of more lime would be harmful. Send soil samples to the Soil Testing Service at the College of Agriculture. There is a charge of a dollar per sample for testing. More information on soil testing and soil cartons may be obtained at your county agent's office.

Limy or alkaline soils are usually very deficient in available phosphate. A commercial fertilizer should be used each year on these soils. Iron deficiency may also occur on alkaline soils, resulting in yellow chlorotic plants, particularly in strawberries and tomatoes. Chlorosis can be corrected by spraying the plants with a dilute solution (1 level teaspoon in a gallon of water) of ferrous sulfate (copperas).

RECOMMENDED VARIETIES FOR NEBRASKA

Following is a list of the varieties of vegetables found to be the most satisfactory over the state.

Other varieties have done well in some localities, so if you have one that has been satisfactory, continue to use it. Perhaps some of the suggested varieties would be superior to your local varieties, and hence should be included for trial in future plantings.

ASPARAGUS

*Mary Washington
*Paradise

BEANS
(Bush-green)
*Contender
*Top Crop
Giant Stringless Greenpod
Logan

(Bush-wax)
*Pencil Pod Blackwax
*Cherokee
*Top Notch

(Pole-green)
*Improved Kentucky Wonder
*Blue Lake

LIMA BEANS

*Fordhook Bush Lima
*Peerless Bush Lima
*Henderson Bush Lima
*Triumph

BEETS

*Asgrow Wonder
*Crosby's Egyptian
*Detroit Dark Red

BROCCOLI

*Italian Green Sprouting

CABBAGE

Marion Market (Yellows-Resistant)
Wakefield
Golden Acre
Copenhagen Market

CHINESE CABBAGE

Chihili
Michihili

CARROTS

French Forcing (early)
Chantenay
Nantes
Danvers Half Long

CAULIFLOWER

*Snow Ball
*Dwarf Erfurt

CHARD

*Lucullus

CUCUMBERS
(Pickling)
Chicago Pickling
National Pickling
(Slicing)
Burpee's Hybrid
Sure Crop Hybrid

EGGPLANT

Black Beauty
Extra Long Purple

KOHLRABI

White Vienna
Purple Vienna

LETTUCE
(Leaf)
Early Curled Simpson
Prizehead
Grand Rapids
Black Seeded Simpson

(Head)
Penn Lake
Premier Great Lakes
Cosberg

MUSKMELONS

Honey Rock
Iroquois
Early Sunrise
Hearts of Gold

ONIONS

Hybrids (x)
Utah Sweet Spanish
Early Grano

PARSNIPS

Hollow Crown

PEAS

Alaska
*Little Marvel
*Thomas Laxton
*Laxton's Progress

PEPPERS

Ruby King
California Wonder

POTATOES
(Eastern Nebraska)
Red Warba
White Cloud
Irish Cobbler

(Western Nebraska)
Progress
Triumph

RADISHES

French Breakfast
Scarlet Globe
White Icicle

RUTABAGAS

American Purple Top

SPINACH

*Bloomsdale Savoy (very early)
*Nobel
*Kind of Denmark
*New Zealand

SQUASH & PUMPKINS
(Winter)
*Table Queen
*Buttercup
*Butternut
Hubbard
Uconn (bush type)
Cheyenne (bush type)
(Summer)
*Early Summer Crockneck
*Early White Bush Scallop

SWEET CORN (arranged by season)
*Golden Cross Bantam
*Golden Bantam
*Golden Bounty
*IoChief
*Ioana

POPCORN

K4
Purdue 31
Purdue 32

SWEET POTATOES

Ranger
Orange Little Stem
Nancy Gold
Yellow Jersey

TOMATOES

Red Cloud (early)
Sioux (midseason)
Rutgers (late)
Hybrids (X)

WATERMELONS
Early Kansas
Hybrids (X)
Dixie Queen
Winter Queen

(X) Some hybrids may be very well adapted for Nebraska conditions, but it is not possible to recommend specific hybrids because of the lack of adequate tests.

* Varieties that freeze well.

CONTROLLING GARDEN DISEASES

CAUSE OF PLANT DISEASES

A large portion of our diseases are caused by very small, difficult-to-see, living plants that do not have the ability to synthesize food from the natural elements as do green plants. Therefore, they must rely upon an already manufactured food source. Some go to plants for this prepared food. Those that do are called parasites. The parasitic effects seen upon the green plant are termed "disease symptoms". There are two types of these very small organisms - fungi, and bacteria. Since they are living, they can sometimes be controlled by the use of toxic chemicals.

Another type of organism, which we call virus, causes disease. Because these organisms are so extremely small, viruses are difficult to see. Consequently, until more is known about viruses they can be combated only indirectly.

METHODS OF CONTROLLING GARDEN DISEASES

Seed treatment. Treat all garden vegetable seed. Seed treatment aids in controlling, for example, bacterial spot and speck of tomato, bacterial blight of beans, black rot of cabbage, and root rots of peas. Spergon and Arasan are two good chemicals for treating vegetable seeds.

Dusting and spraying. These aid in controlling the leaf-spot diseases. Fixed copper dusts or sprays, such as Cuprocide, Copper-hydro, Kopper King, C-O-C-S, Tribasic, Coposil, Bordow, Copper A Compound, Basicop, etc., are most effective.

Cultural practices. Our best method for combating garden diseases is through good cultural practices.

1. Plant disease-free seed. Obtain the seed from reliable seed concerns.
2. Plant those varieties known to be resistant to some of the common diseases, as for example, wilt-resistant tomatoes and watermelons and mosaic-resistant beans.
3. Rotate the different vegetables by groups - (carrots, beets, radishes, etc.) (Cauliflower, cabbage, lettuce, etc.) (Cucumbers, watermelons, muskmelons, etc.) - within the garden area each year. If possible rotate the garden area itself. This will aid in controlling those diseases carried over winter in the decaying plant parts.
4. Garden soil should be well drained. This will help control root-rot diseases.
5. Thin seedlings to proper spacing while they are small. This allows proper airing and will help reduce leaf-spot diseases.
6. Destroy weeds. Weeds sometimes may be overwintering hosts of the common garden diseases.

7. Keep the vegetables well watered and fertilized so that they grow vigorously. A weak plant is more susceptible to disease than a healthy one.

Controlling insects. Insects can spread disease. In some instances they are the main spreaders of disease, as in the case of certain virus diseases.

INSECT CONTROL

If the uninitiated gardner should read one of the more complete bulletins on pests and diseases of vegetable crops, he might conclude that the plant enemies are so numerous and the control measures so complex as to make gardening altogether unprofitable. Fortunately, this is not true. Many of these troubles are seldom important in the home garden. Practical control measures are available for the ones that are likely to be damaging. How many of the common important troubles the home gardener will encounter depends on the crops grown, the locality, the weather, and the carry-over of pests from the previous year.

WHAT CROPS NEED PROTECTION

Garden crops that commonly require protection from diseases and insects are beans, cabbage and related plants, celery, cucumbers, melons, potatoes, squash, sweet corn, and tomatoes.

The following crops so rarely suffer any severe damage from pests that control measures are seldom necessary: beets, chard, endive, leeks, lettuce, onions, parsley, parsnips, peppers, and turnips.

WHEN TO TAKE ACTION

Most insects are readily controlled after they appear on the plants. To save insecticides, time, and labor, you should learn to recognize the important pests, watch for them, and apply control measures promptly if they appear.

HAND-PICKING INSECTS

In small gardens, hand-picking is a practical way to control such insects as bean beetle, cabbage worm, tomato worm, squash bug, cucumber beetle, Colorado potato beetle, and asparagus beetle. Many of these insects are on the underside of the leaves. Egg masses and clusters of newly hatched insects can be easily crushed on the leaves by squeezing or rubbing them between thumb and forefinger. This method works fairly well also against the numerous small-bodied aphids, or plant lice, that cluster on young shoots. Larger insects can be crushed or picked off and killed by dropping them into a can of water containing a little kerosene or turpentine. Bean beetles and potato beetles drop readily when disturbed and can be collected more rapidly by slapping the plants sharply with the hand or a wooden paddle to jar them into a wide pan. Active, flying insects, such as

cucumber beetles, are most easily caught in the cool of the morning when they are sluggish. Although hand-picking is not practicable for all insects and is laborious, it is surprisingly effective if done persistently. Success requires constant watching so that the insects are killed before they become too numerous.

Serious trouble often results from allowing insects to develop in large numbers on plants that have finished cropping. These plants should be removed promptly.

INSECTICIDES

In the average-sized garden, the use of insecticides is the best way to control most insect pests. Insecticides are applied with a duster or are diluted in water as a spray and applied with a sprayer. For dusting, the insecticides come already diluted to the proper strength with talc or some other powdered material, and are ready to use. For spraying, the insecticides are sold in concentrated liquid or powder form to be mixed with water in the proper proportion before applying. The most useful insecticides are rotenone, pyrethrum, nicotine, and methoxychlor.

Rotenone is the best general-purpose insecticide for vegetables. It is effective against most of the important pests, including bean beetle, cabbage worms, flea beetles, cucumber beetles, squash borer, corn borer, asparagus beetles, potato beetle, and most aphids. As applied to plants it is practically nonpoisonous to man and safe to use on any vegetable at any time.

Pyrethrum is safe to use on any vegetable at any time. It is effective against a number of the common pests but is not so good a general-purpose insecticide as rotenone.

Nicotine for sprays is sold mainly as liquid nicotine sulfate containing 40 per cent of nicotine. Nicotine is used principally to control aphids, at a dilution of 1/2 teaspoonful to 1 quart of warm, soapy water, or 2 teaspoonfuls to 1 gallon. At double this amount it is fairly effective against squash borers, young squash bugs, cucumber beetles, and flea beetles. Nicotine dust comes in several strengths. One containing 3 per cent of nicotine is recommended for the same purpose as the sprays. It must be kept in a closed container. Nicotine in concentrated form is a violent poison, but most of it quickly disappears from sprayed or dusted plants. It is well to wait two or three days before using green vegetables that have been treated with nicotine. The vegetables should be washed well.

Methoxychlor is becoming increasingly popular as a garden insecticide. It is as safe to use as rotenone or pyrethrum and will control a large number of pests such as bean beetle, many leafhoppers, flea beetles, cabbage aphid, cabbage worms, melon aphids, pea aphids, most of the potato insect pests and many others. It has the advantage over the other garden insecticides because it has a residual effect that protects the plants for a longer time when this is necessary.

EQUIPMENT

Many insects live and feed mainly on the underside of leaves. To be most effective, insecticides must be applied with equipment that will cover the under as well as the upper surface of the foliage. Dusting is increasingly popular because it is much quicker and easier than spraying and about as effective.

Dusters. The best duster for the average home garden is an all-metal, plunger type of hand duster of 1- or, preferably, 2-quart capacity.

If a duster is not available, a cloth bag serves fairly well as a substitute in small gardens. A small bag or a foot-square piece of old sugar- or flour-sack cloth or some similar material is suitable. A double thickness of cheesecloth is also satisfactory. The bag duster is shaken over the plant for uppersurface dusting and is swished back and forth through the foliage of plants such as beans to coat the under surface. Shaker-top cans are inefficient and wasteful.

Sprayers. The best type of sprayer for the average-sized garden is a compressed air sprayer, equipped with an extension rod and angle nozzle for spraying the undersurface of the foliage. Sprayers of 2- to 3-gallon capacity are the most practical. Fair results in small gardens can be obtained with the type of hand sprayer that gives a continuous spray and that has a two-way, or adjustable, nozzle to direct the spray upward. This requires working in a stooped position. These sprayers hold from 1 to 3 quarts. The small, single-action atomizer type of hand sprayers, such as those used for fly sprays, are unsatisfactory.

PLANTING TABLE FOR THE VEGETABLE GARDEN

Kind of vegetable	Feet of row	Distance apart in row	Depth of planting	Amount of seed *
Asparagus	150	2 ft.	5–6 in.	75 roots
Beans—greenpod	100	3 in.	1–3 in.	1 lb.
Beans—wax	150	3 in.	1–3 in.	1½ lb.
Beets	150	4–5 in.	½–1½ in.	1½ oz.
Cabbage early	50	18 in.	½ in.	1 pkt.
Cabbage midseason	50	18 in.	½ in.	1 pkt.
Cabbage late	150	2 ft.	½ in.	1 pkt.
Carrots early	75	3–4 in.	½–¾ in.	¼ oz.
Carrots late	75	4–6 in.	½–¾ in.	¼ oz.
Cauliflower	50	18 in.	¾ in.	1 pkt.
Celery	150	6 in.	¼ in.	½ oz.
Cucumbers	38	5 ft.	1–2 in.	1 pkt.
Eggplant	75	18 in.	½ in.	1 pkt.
Horse radish	19	18 in.	4–6 in.	10 roots
Kohlrabi	150	4–6 in.	½–1 in.	⅛ oz.
Lettuce	75	6 in.	½–¾ in.	½ oz.
Muskmelon	50	5–7 ft.	½ in.	1 pkt.
Onions early (seed)	150	3 in.	2–3 in.	3 lbs. sets
Onions late	150	3 in.	½ in.	1½ oz.
Parsley	10	3–6 in.	¼ in.	1 pkt.
Parsnips	75	6 in.	½–1 in.	½ oz.
Peas, early	75	1–2 in.	1–3 in.	¾ lb.
Peas, medium	75	1–2 in.	1–3 in.	¾ lb.
Peas, late	150	1–2 in.	1–3 in.	1½ lb.
Peppers	38	18 in.	½ in.	1 pkt.
Potatoes, early	150	8–15 in.	3–4 in.	15 lbs.
Radishes	75	2–3 in.	½–1 in.	¾ oz.
Rhubarb	102	2 ft.	5–6 in.	50 roots
Salsify	65	4–6 in.	½–1 in.	¾ oz.
Spinach	150	6 in.	1–1½ in.	1½ oz.
Squash, summer	50	10 ft.	1–2 in.	½ oz.
Squash, winter	50	10 ft.	1–2 in.	½ oz.
Sweet corn (drilled)	900	8–12 in.	1–2 in.	2 lbs.
Swiss chard	50	6–12 in.	½–1½ in.	2 pkt.
Tomatoes	150	4–5 ft.	¼ in.	1 pkt.
Turnips	200	4–6 in.	½–¾ in.	2¼ oz.

* These seed quantities, except with potatoes, onion sets and perennial crops, are somewhat excessive when soil conditions are ideal and the seed germinates well.