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Home Vegetable Garden
Michigan State University
Cooperative Extension Service
Farm Science Series

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May 1966
5 pages

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HOME VEGETABLE GARDEN

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY

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Important Garden Procedures

1. Plan your garden.
2. Use recommended varieties.
3. Use successive plantings and different varieties to extend the harvest season.
4. Apply a complete fertilizer such as 5-20-20 (20#/1,000 sq. ft.) before planting and add supplemental nitrogen (1# of actual nitrogen/1,000 sq. ft.) around July 4.
5. Plant at the proper time. (See planting chart)
6. Control pests.
7. Use black plastic or other mulch to control weeds and conserve moisture.
8. Water when necessary.
9. Harvest vegetables at the proper stage of maturity.
10. Read pesticide package label—follow directions!

RECOMMENDED VEGETABLE VARIETIES

DAYS** TO HARVEST		DAYS** TO HARVEST		DAYS** TO HARVEST		DAYS** TO HARVEST	
VARIETY	HARVEST	VARIETY	HARVEST	VARIETY	HARVEST	VARIETY	HARVEST
ASPARAGUS		Bush Yellow:		CABBAGE		Fall:	
Mary Washington	2-3 yrs	Cherokee Wax	52	Y. R. Golden Acre	63	Snowball Imperial	58
BEANS, LIMA		Eastern Butter Wax	53	Badger Market	69	Snowball 25	68
Large seeded:		Kinghorn	54	Market Topper	73	Purple:	
Fordhook 242	75	Horticultural:		Greenback	74	Purple Head	85
Small seeded:		French Horticultural	68	Marion Market	75	CELERIAC	
Thorogreen	65	Pole:		Red Acre	76	Large Prague	120
Thaxter	74	Blue Lake*	60	Chieftain (Savoy)	90	CELERY	
Pole:		Kentucky Wonder	64	Savoy King F, Hybrid*	90	Green or Pascal:	
King of the Garden	88	BEETS		Badger Ballhead	98	Tall Green Light	125
BEANS, SNAP		Crosby Green Top	60	Utah 52-70	125	Slow Bolting:	
Bush Green:		Ruby Queen	60	Spartan 162		Spartan 162	
Bountiful	50	Detroit Dark Red	65	Slow Bolting Green #12		CHINESE CABBAGE	
Contender	50	BROCCOLI		Nantes	68	Michihli	70
Greencrop	51	Spartan Early	55	Royal Chantenay (proc.)	70	COLLARDS	
Spartan Arrow	52	Waltham 29	74	Imperator	77	Vates	
Tenderette	52	BRUSSELS SPROUTS		Gold Pak	85	CUCUMBER	
Topcrop	52	Jade Cross	90	CAULIFLOWER		Slicing:	
Executive	53	Long Island Improved	90	Spring:		Burpee Hybrid	60
Improved Tendergreen	53	Catskill	95	Snowball A	60	Challenger	61
Bush Blue Lake	56			Super Snowball	60	Ashley	61
Romano	64						

*New varieties suggested for trial.

**Approximate number of days from planting seeds to harvest.

RECOMMENDED VEGETABLE VARIETIES

VARIETY	DAYS** TO HARVEST	VARIETY	DAYS** TO HARVEST	VARIETY	DAYS** TO HARVEST	VARIETY	DAYS** TO HARVEST
Triumph	62	Transplants:		Russet Burbank		Chefini	51
Spartangreen	63	Sweet Spanish		For Muck:		Greyzini	55
Marketer	65	Seeds:		Arenac		Summer, White:	
Tablegreen	72	Spartan Era	105	Cherokee		Bush Scallop	60
Pickling:		Downing Yellow Globe	112	Chippewa		Winter (storage):	
Spartan Dawn	50	Spartan Gem	130	Katabdin		Gold Nuggett*	85
Hybrid 51 (Crispy)	50	Bunching:		Norland		Table Queen	85
Wisc. SMR 18	53	Beltville Bunching		Sebago		Butternut	95
Wisc. SMR 15	56	White Portugal		Superior		Buttercup	105
EGGPLANT		FARSLEY		POTATO, SWEET		Delicious	105
Black Magic Hybrid	72	Perfection	75	Acadian		Hubbard	105
Black Beauty	80	Curled Dwarf	85	Centennial		SWEET CORN	
ENDIVE		PARSNIP		Copperskin Goldrush		Seneca 60-II	64
Escarole (Smooth leaved):		Model	120	PUMPKIN		Earliking	66
Florida Deep Heart	85	PEAS		Small:		North Star	67
Full Heart Batavian	90	Greater Progress	62	Small Sugar	100	Spring Gold	67
Curled:		Little Marvel	62	Spookie	110	Morning Sun	72
Green Curled	95	Frosty	64	Medium:		Golden Beauty	73
Salad King	98	Perfected Freezer	69	Cheyenne Bush	100	Northern Belle	74
GARLIC		Wando (heat tolerant)	69	Young's Beauty	112	Carmelcross	80
Creole		Edible Podded:		Large:		Gold Cup	80
Italian		Dwarf Gray Sugar	65	Connecticut Field	120	Iochief	85
KALE		PEPPER		Jack-O-Lantern	120	Silver Queen (white)	94
Vates		Sweet:		Very Large:		SWISS CHARD	
KOHLRABI		Vinedale	62	Mammoth	120	Fordhook Giant	60
Early White Vienna	55	Peter Piper	62	RADISH		Rhubarb	60
LEEK		Spartan Emerald	65	Cavalier	24	TOMATO	
American Flag	130	California Wonder	72	Cherry Belle	24	Goldset	62
LETTUCE		Delaware Belle	75	Icicle (white)	27	Fireball	65
Butterhead:		Keystone Resistant Giant	80	Champion	28	Second Early:	
Summer Bibb	62	Yolo Wonder	80	RHUBARB		Moreton Hybrid	70
Buttercrunch	64	Hot:		Canada Red		Heinz 1548	72
Butter King*	70	Hot Portugal	64	MacDonald		Midseason:	
Crisp Head:		Rumanian Wax	70	Valentine		Cardinal	74
Oswego	72	Hungarian Wax	70	Victoria		Campbell 1327	75
Fulton	73	Large Red Cherry	80	RUTABAGA		Fantastic	75
Great Lakes 659	84	POP CORN		Macomber		Heinz 1350	75
Leaf:		White Cloud	95	Alta Sweet		Roma (paste)	76
Grand Rapids	45	White Hulless	95	SALSIFY		Late:	
Salad Bowl	50	POTATO		Mammoth Sandwich		Heinz 1370	77
Romaine:		Early:		Island	120	Big Boy	78
Parris Island	76	Cherokee		SPINACH		Heinz 1439	78
MUSKMELON		Onaway		Long Standing		Yellow:	
Burpee Hybrid	82	Irish Cobbler		Bloomsdale	48	Sunray	80
Harper Hybrid	86	Norland		America	50	Golden Jubilee	83
Gold Star	87	Medium Early:		Not true spinach:		Cherry:	
Supermarket	88	Chippewa		New Zealand	70	Yellow Pear	70
Saticoy	90	Superior		SQUASH		Yellow Plum	70
MUSTARD		Midseason:		Summer, Yellow:		Red Cherry	72
Tendergreen	35	Norgold Russet		Seneca Prolific Hybrid	49	Yellow Cherry	72
Green Wave	45	Ona		Seneca Baby Crookneck	50	Large Red Cherry	75
OKRA		Late:		Seneca Butterbar	51	TURNIP	
Dwarf Green Long Pod	55	Arenac		Early Prolific		Purple Top White Globe	58
Clemson Spineless	56	Katabdin		Straightneck	53	Just Right	60
Emerald	58	Sebago		Summer, Green:		WATERMELON	
ONION		Russet Rural		Zucchinii	48	Summer Festival	88
Sets:		Emmet		Cocozelle	50	Seedless Hybrid	317 90
Ebenzer		Kennebec					
		Merrimack					

*New varieties suggested for trial.

**Approximate number of days from planting seeds to harvest.

Note: Many other excellent vegetable varieties are available through seed catalogs.

rectly on the ear area of sweet corn one week before silking and then every 4 days until the silk begins to turn brown, reasonable control of corn borer and corn earworm may be expected.

Many types of hand-operated equipment are available. Whatever its kind, use it to apply treatments to both the top and underside of the leaves. Anything less than this often gives inferior results.

Spray all parts of the plant to a point of run-off. One quart should cover 50 feet of row when plants are young and about half that distance when full grown. When dusting, apply only a light coating. Approximately one ounce of dust is enough for 50 feet of row early in the season, while 2 ounces or more will be required later.

VEGETABLE PLANTING CHART

Vegetable	Row Length (Feet)	Estimated Production	Amount of Seed	Depth to Plant (Inches)	Distance Between Rows (Inches)	Thin to (Inches)	Planting Times*	Planting Date Indoors
Asparagus	20	6 lb.	12 plants	6-8	60	15-24	1	
Beans, Lima	50	4 lb. shelled	½ lb.	1-2	24-30	6-8	4	
Beans, Snap	15	7 lb.	¼ lb.	1-2	18-24	3-4	3, 4, 5	
Beets	25	25 lb.	¼ oz.	½-1	18-24	2-3	1, 5	
Broccoli	25	10 lb.	12 plants	Plants	30-36	24	1, 5	2/15-3/1
Brussels Sprouts	25	8 lb.	15 plants	Plants	24-30	15-24	2, 5	
Cabbage	12	6 heads	6 plants	Plants	24-30	15-24	1, 2, 5	
Carrots	15	15 lb.	½ pkt.	½-1	18-24	1-3	1, 5	
Cauliflower	10	5 heads	5 plants	Plants	30-36	15-24	2, 5	3/15-4/1
Celery	10	6 lb.	¼ pkt.	1/2	30	6	2	
Celery	15	30 stalks	30 plants	Plants	30-36	4-8	2, 4	1/25-2/10
Chinese Cabbage	10	12 heads	¼ pkt.	1/2	24-36	10-12	5, 6	
Collards	25	20 lb.	½ pkt.	1/2	24-30	6-8	2	3/15
Cucumber	10	6 lb.	½ pkt.	1-2	45-72	12-24	4, 5	4/21-5/1
Eggplant	6	12 fruits	3 plants	Plants	30-36	24-30	4	3/15-4/1
Endive	6	10 heads	10 plants	1/2	12-18	8-12	1, 5	
Garlic	1	4 bulbs	4 cloves	1½	12-18	3	1, 2	
Kale	6	6 heads	6 plants	½-1	18-24	8-15	6	
Kohlrabi	12	24 stems	24 plants	1-1½	18-24	4-8	1, 5	3/15-4/1
Leeks	10	30	1 pkt.	1/2	15-18	1-2	Sept.	3/15
Lettuce (head)	15	15 heads	18 plants	¼-½	15-18	8-15	1, 2, 6	2/15-4/1
Lettuce (leaf)	5	2½ lb.	1 pkt.	¼-½	6-12	6-12	1, 3, 6	
Muskmelon	16	18 fruits	½ pkt.	1-2	48-54	3-6	4	4/21-5/1
Mustard	10	5 lb.	¼ pkt.	1/2	18-24	1	3	
Okra	8	5 lb.	¼ pkt.	1/2	36	12-15	4	
Onion (sets)	10	5 lb.	½ lb. sets	1-2	12-18	2-3	1	
Onion (transplants)	30	25 lb.	120 plants	Plants	12-18	2-3	1	
Onion (seeds)	30	25 lb.	1 pkt.	1/2	12-18	2-3	1	2/20-3/1
Parsley	3 plants	3 bunches	¼ pkt.	¼-½	12-18	6	1	
Parsnip	15	15 lb.	½ pkt.	1/2	24	3-4	2	
Peas	100	28 lb.	1 lb.	1-2	18-24	2-3	1	
Pepper	10	6 lb.	6 plants	Plants	18-24	14-18	4	3/15-4/1
Pop Corn	25--2 rows	1 peck	¼ pkt.	2-2½	30-36	10-12	4	
Potato	50	50 lb.	5 lb. seed	4	24-36	10-12	3, 4	
Potato, Sweet	25	10 lb.	25 plants	Plants	36-48	12-18	4	
Pumpkin	3 hills	30 lb.	½ pkt.	1/2	72-96	72-96	4	
Radish	12	8 lb.	1 pkt.	1/2	6-12	1-2	1, 3, 6	
Rhubarb	9	8 lb.	3 plants	Plants	48	36-48	1	
Rutabaga	15	15 lb.	½ pkt.	1/2	18-24	6-10	5	
Salsify	15	15 lb.	½ pkt.	1/2	15-18	3-4	2	
Spinach	10	5 lb.	¼ oz.	¼-½	12-18	3-6	1, 2, 6	
Squash, Summer	2 hills	24 fruits	½ pkt.	1-1½	36-48	36-48	4	
Squash, Winter	4 hills	10 fruits	1 pkt.	1-1½	60-72	48-60	4	
Sweet Corn	25--2 rows	40 ears	¼ lb.	2-2½	30-36	10-12	3, 4, 5	
Swiss Chard	8	7 lb.	¼ pkt.	1/2	18-24	6-8	2	
Tomato	40	3 bu.	10 plants	Plants	36-48	36-60	4	3/15-4/1
Turnip	20	20 lb.	¼ pkt.	1-1½	18-24	4-6	6	
Watermelon	2 hills	4 melons	½ pkt.	1-2	72-96	72-96	4	4/21-5/1

*Planting times are based on conditions at East Lansing. Change these times to suit your location.

1. As soon as the ground can be worked, usually late March in the East Lansing area (about the time farmers are planting oats).

2. Ten days after Number 1, or the first or second week in April.

3. Twenty days after Number 1, or the third week in April.

4. After all danger of frost is over, or late May.

5. Late June for fall crops.

6. July for fall crop.

Control of Insects, Nematodes, and Diseases

Many garden pests move through the air, coming great distances to the crop they damage. This is particularly true of leafhoppers and aphids, and the spores of the fungus causing late blight of tomato and potato. Some live through the winter on or in living or dead plant materials. However, most bacteria, fungi, and nematodes (microscopic, eel-like worms) and some home garden insects live in the soil from one growing season to the next. These parasites are usually specific, that is, damaging one vegetable but not others. Therefore, by relocating the garden or changing the position of the crops each year, much of their damage may be avoided.

Closely related crops like melons and cucumbers, or tomatoes, potatoes, peppers and eggplant, should not succeed each other, because, in many cases, they are damaged by the same parasites. Usually this is the only practical method of avoiding the wilt and root-rotting diseases. Also, if a garden is to be planted on sod land with high populations of white grubs and wireworms, wait at least two years after breaking the land before planting; otherwise it is necessary to treat the soil with a chemical. (See following instructions.)

Vigorously growing plants with an adequate root system usually are better able to tolerate soil insects, nematodes, and disease organisms than weak and off-colored plants. Manure or commercial fertilizer plus green manure crops promote rapid healthy growth. Barnyard and green manures help conserve the water supply for the plants; however, too much water in the soil resulting in "wet feet" encourages root rot diseases and poor growth. Avoid low-lying, poorly drained soils. Too thick planting in the rows or rows spaced too close together restrict air movement and increase the humidity around the plants. These conditions increase the likelihood of damage from disease, slugs, and some insects.

SEED AND TRANSPLANTS

Since important fungus and bacterial diseases (sometimes virus diseases) may be carried on or under the seed coat, plant only seed bought from a reputable supplier. If possible, use only certified, disease-free bean and potato seed.

Transplants (tomato, pepper, cabbage, cauliflower, broccoli, brussels sprouts, onion sets, melons) grown in pest-infested soil and under unsanitary conditions can bring disease and insect problems into your garden. Accept only vigorous plants of good color, free of spots on the foliage (leaves and stems) and with clean, white roots. Discard those with discolored, rotted, or swollen roots.

CHEMICAL TREATMENT OF SEED AND SOIL

To avoid fungal and bacterial diseases carried on the seed, and maggot damage to the seed of cucum-

bers and sweet corn, put a pinch of *Thiram* and *Capitan* 75% seed protectant, plus a pinch of 40 percent wettable *chlordane* powder in the package and shake the contents, coating all the seeds with the dust. Sift the excess dust from the seed through a fine mesh screen. Do not treat seed already treated by the producer or use treated seed for food. Moldy or spotted peas and beans or seed infested with weevils should not be planted. Buy new seed.

Radish and turnip maggots:—Apply three level tablespoons of 5 percent *chlordane* dust over the seed of a 25-foot row before the furrow is closed.

Onion maggot:—Apply three level tablespoons of 5 percent *chlordane* dust over the seed of a 25-foot row before the furrow is closed.

Cabbage maggot:—The roots of cabbage, cauliflower, broccoli, and other plants of this group are damaged by the cabbage maggot. The maggots are white or dirty gray; when full grown, they are one-third inch long. Their heads are pointed. The adult is a small grayish fly.

Control:—Before planting, dip the roots of cabbage, broccoli, or cauliflower in a mixture of 2 level tablespoons of 50 percent wettable *chlordane* powder to 1 gallon of water. Instead, if desired, pour one-third pint of this same mixture around the roots AT TIME OF TRANSPLANTING. Repeat in 10 days by pouring one-third pint of the mixture on the soil next to the stems.

Note:—Keep the mixture stirred while dipping the roots or when pouring it around the plants. Do not apply *chlordane* to the edible parts of the plants.

Cutworms:—To protect cabbage, cauliflower, broccoli, and brussels sprouts, apply 5 percent *methoxychlor* plus 5 percent *malathion* dust to the soil the same day these pests are set in the garden, preferably in the evening. Sprays of these same materials may be used also (See chart 2.)

White grubs and wireworms:—For control of these insects where land was in sod within the last three years, apply 5 ounces of 40 percent wettable *chlordane* powder (or 5½ teaspoons of a *chlordane* emulsion containing 6 pounds of actual chemical per gallon) to 1,000 square feet of soil surface. Work immediately into 4 inches of soil before the garden is planted. "Working in" means sifting through the soil, not merely turning over or spading.

Nematodes:—These pests, particularly the common types which produce galls (knot-like swellings) and surface wounds on roots, may greatly affect the success of the home gardener. Tomatoes, melons, and cucumbers are especially susceptible to attack. Rotation with less susceptible crops is helpful, but if damage is severe, consider relocating gardens or fumigate soil with *DD* or *Telone* according to manufacturer's

directions. Inexpensive gravity flow applicators are available for applying these chemicals. The smallest units may be used with the garden type cultivating tools.

Wilt diseases:—Tomatoes, potatoes, eggplant, muskmelons, and cucumbers are very susceptible to wilt. In most cases they are caused by fungi which enter through the roots and destroy the plant's ability to take up and transmit water and nutrients to the foliage. As a result of this, wilting occurs. Nematode damage to the roots permits infection. Bacterial wilt of cucumbers, melons, squash, and pumpkins also affects the movement of water and nutrients, but in this case, the organism is carried in the body of the cucumber beetle and is transmitted when the insect feeds on the plant.

Planting resistant varieties, when available, is the most satisfactory control practice. Rotation with non-susceptible crops is useful in the case of the fungus wilts, reducing the population of the organism. Fumigating the soil under a clear plastic cover with highly volatile chemicals, such as *Vorlex*, *Trizone*, or *Vapam* rid the soil of all diseases, insects, and nematodes. Chemicals, plastic covers, and application equipment are purchased through agricultural chemical dealers. When using these chemicals, follow manufacturer's directions carefully.

Scab disease:—Scabby lesions often appear on potato tubers and on beet roots. High soil fertility, adequate soil moisture and acid soil conditions (pH 5.0 or less) reduce scab damage.

Club root:—This disease affects cabbage, cauliflower, broccoli, and brussels sprouts, causing root swelling, dwarfing and yellowing of plants. To control, use lime to neutralize or alkalinize the soil (pH 7.0 or above) and apply one cupful of *Terraclor* (1 oz.

75% wettable powder per gallon) around the roots of the plants when they are set. (Note: If a starter solution is used, *Terraclor* may be combined with this in place of water.)

FOLIAGE AND FRUIT

Vegetables are also damaged by insect and disease-causing organisms during the growing season. When weather and other conditions favor these pests, a large part of a garden crop may be destroyed before harvest. Chemicals applied properly prevent most of these insect and disease losses.

Spray vegetables each week with a fungicide and/or a bactericide, plus one or more insecticides. Start application when the plants emerge and continue through the growing season. Some chemicals have limitations on their use close to harvest. Therefore, read the package label before using any chemical; follow directions carefully.

Fungicide and insecticide dust combinations may be used instead of sprays. Buy dusts ready-mixed. Fungicides and insecticides for spraying may be bought separately or ready-mixed. *Pyrethrum* for sprays is usually available in liquid form, and *Rotenone* either as a wettable powder or as a liquid concentrate. All suggested fungicides and insecticides are available at most agricultural or garden supply and hardware stores.

The above program is for control of the diseases and insects most likely to be a problem in home gardens.

When slugs, corn borers and earworms are special problems in the vegetable garden, consult MSU Extension Bulletin 312, "Chemical Control of Insects and Diseases on Commercial Vegetables". However, if *malathion-methoxychlor* emulsion spray is applied di-

All-Purpose Insecticide-Fungicide Spray Mixtures For Vegetables

CHEMICAL	FOR USE AS:	WETTABLE POWDER (WP)	EMULSIFIABLE CONCENTRATE (EC)
Fixed Copper ¹	Fungicide-Bactericide	2 Tablespoons (53% WP)	
<i>P L U S Maneb² or Zineb³ as follows:</i>			
Maneb	Fungicide	1½ Tablespoons (80% WP)	
Zineb	Fungicide	1½ Tablespoons (76% WP)	
<i>P L U S the following insecticide combination:</i>			
Malathion	Insecticide	5 Tablespoons (25% WP)	or 2 teaspoons (50% EC)
Methoxychlor	Insecticide	2 Tablespoons (50% WP)	or 4 teaspoons (25% EC)
<i>OR one of the following:</i>			
Malathion	Insecticide	5 Tablespoons (25% WP)	or 2 teaspoons (50% EC)
Rotenone	Insecticide	2 Tablespoons (4 or 5% WP)	
Pyrethrum	Insecticide		1 teaspoon (1% EC)

¹Use copper primarily for control of bacterial diseases of tomatoes, pepper, beans, cucumbers, and cabbage; also for mildews on spinach and cabbage. It may be omitted on other vegetables. Fixed copper is sold under the following trade names: TRU-BASIC COPPER SULFATE, COPPER A, BASICOP, COCS, ORTHO COPPER, etc.

²Trade names for maneb—MANZATE or MANZATE D and DITHANE M-22 or M-22 SPECIAL.

³Trade names for zineb—PARZATE, DITHANE Z-78, ORTHO ZINEB, etc.