

Planting a Successful Home Vegetable Garden

by Cheryl Moore-Gough, Extension Horticulture Specialist and R.E. Gough, Professor of Horticulture

This guide covers basic garden planning and growing transplants, plus includes a table with days to maturity, planting depth and spacing, projected yields and germination temperatures for 40 common vegetables.

MT199502AG Reprint 3/08

HAVING A SUCCESSFUL VEGETABLE GARDEN

depends not only upon how you garden but upon planting enough of the right vegetables at the right time to supply your family's needs.

Plant at the right time. This will vary with air temperature, soil temperature and the needs of individual crops. Hardy crops like cabbage tolerate frosts and can be planted in early spring; tender crops like peppers don't tolerate frosts and need more heat to mature properly, so plant them when the soil has warmed to 60° F.

How you organize crops in the garden is also important. Plant tall vegetables like corn on the north or northeast side of the garden to reduce shading. Orient all rows in a north-south direction to take advantage of the best sunlight distribution. Plant vegetables that need heavy watering in the fall away from those like onions, potatoes, and other root crops, which need to be dry to be stored properly. Proper spacing between plants is also important.

The table on pages 2 and 3 contains information about average days to maturity, plant spacing, planting depth, average yields, and planting dates for common vegetables.

Cultivars

Note the number of "days to maturity" on the seed packet to be sure the cultivar will have time to mature before the end of the season. To determine your frost-free period, contact your county Extension agent or use MSU MontGuide *Can I Grow That Here?* (MT199308AG) or *A Montana Gardener's Book of Days* (EB165). The dates given for your locality represent average length of growing seasons and the real season length can vary by plus or minus two weeks from the length given.

Growing Transplants

Many tender vegetables can't mature in our short seasons; start plants indoors or buy transplants from a local nursery or garden center.

If you grow your own transplants, give them adequate light. The windowsill may appear bright enough but it isn't. Use a combination of warm and cool white fluorescent bulbs to provide supplemental light or grow lights, which provide the full spectrum of light waves. Space light bulbs about 2 inches apart, center to center, and no higher than 18 inches above the plants. Leave them on from 12 to 16 hours each day after the seedlings have emerged.

Grow peppers, eggplants, and tomatoes in flats and transplant them to the garden bare-root. Plant cell packs may also be used. Cucumber, squash, muskmelon and watermelon do not transplant well bare-root, so grow them in peat pots or jiffy pellets and transplant them to the garden with an intact soil ball. Grow cabbage, cauliflower, Brussels sprouts, broccoli, lettuce, and onion transplants either in flats or in containers.

If you use peat pots for transplanting, **be sure the entire pot is buried** to prevent water loss from soil around the plant through the "wick" action of the peat pot rim being exposed to the air. You can use Styrofoam cups as growing containers if **you punch drainage holes in their bottoms**. Remove these containers at planting.

Purchase a good soilless grow mix in which to raise your transplants or make one yourself by mixing equal parts ground sphagnum moss and horticultural vermiculite or perlite. If the foliage of your seedlings turns yellow-green, water your plants with a solution of 2 tablespoons of a fertilizer such as 20-20-20 in a gallon of water.

Sow seeds of warm season vegetables $\frac{1}{4}$ inch deep in rows at the rate of 1 seed per inch of row if in flats, or 1-2 seeds per container. Wet the planting medium and allow excess water to drain before planting. **Don't over-water your seedlings.**

Seeds of warm season crops such as eggplant and peppers germinate fastest at 80°-90°F while those of other vegetables germinate better at 60°-80°F. After emergence, reduce the growing temperature to 60°F at night and 70-75°F during the day for most warm season crops. Cool season crops and tomatoes do well with 68° F day temperatures and 45° to 50° F night temperatures.

Table 1. Garden vegetable planting guide

Crop	Days to maturity (range)	Seeds/plants per 100 ft. row	Planting depth (inches)	Spacing in row (inches)	Spacing between rows (inches)	Average yield per 10 ft. row*	Germination temperature	
							Minimum °F.	Optimum °F
VERY HARDY TO HARDY¹								
Asparagus	Perennial	65 plants	plants, 10	18	40-48	6 plants	2 year old crowns	
Beet	60-65	1 oz.	1	2-3	18	4 lb. greens 10 lb. roots	40	50-85
Cabbage	60-70	50 plants		20-24	30	8 lb.		Transplants
Carrot	65-70	1/2 oz.	1/2	2-3	18	10 lb.	40	45-85
Chard, Swiss	50	1/2 oz.	1	12	24-30	10 plants	40	50-85
Chives	Perennial			12-18	8-10	10 plants		Plant division
Endive	65	1/2 oz.	1/2	8	18	8 heads	35	40-80
Horseradish	Perennial			18	18	varies		Plant division
Jerusalem Artichoke	Perennial	Plants, 65	2-3	18	24	varies		Plant tubers
Kale	50-55	1/4 oz.	1/2	18	24	7 lbs.	40	45-85
Lettuce, Leaf	40-45	1/4 oz.	1/2	3-6	12-18	5 lbs.	35	40-80
Lettuce, Head	70-80	1/4 oz.	1/2	12	18	10 heads	45	40-80
Onion, bulb	100	300 transplants		4	18	10 lbs.		Sets or plants
Onion, Bunching	60-80	1/2 oz.		1	12	10 lbs.		Plants
Parsnip	85-120	1/2 oz.	1/2	3-4	18	7 lbs.	35	50-70
Peas (fresh)	50-65	1/2 oz.	1 1/2	2	18-30	2 lbs.	40	40-75
Rhubarb	Perennial	30 plants		30	40-48	4 plants		Crown division
Rutabaga	90	1/4 oz.	1/2	6	18	15 lbs.	40	55-80
Turnip	50-60	1/2 oz.	1/2	3	18	5 lb. roots	40	60-105
HALF HARDY²								
Broccoli	70	50 plants		18	30	7 lbs.		Transplants
Brussels Sprouts	90-100	50 plants		18-24	24-30	5 lbs.		Transplants
Cauliflower	50-55	50 plants		18	30	8 lbs.		Transplants
Celery	85-100	200 plants		48	30-36	10 plants		Transplants

Crop	Days to maturity (range)	Seeds/plants per 100 ft. row	Planting depth (inches)	Spacing in row (inches)	Spacing between rows (inches)	Average yield per 10 ft. row*	Germination temperature	
							Minimum °F.	Optimum °F.
Chinese Cabbage	70	1/4 oz.	3/4	10-12	24-36	6 heads	Transplants	
Kohlrabi	55	1/2 oz.	1	4-6	18	5 lbs.	40	45-85
Parsley	70	1/2 oz.	3/4	6	18	varies	40	50-84
Potato	80-120	12 lbs.	4	10-20	36-40	varies	Seed pieces from tubers	
Radish	20-30	1 oz.	1/2	1	12-18	10 bunches	40	45-90
WARM SEASON³								
Beans, Bush	45-50	1/2 lb.	2	4	18-24	8 lbs.	60	60-85
Beans, Pole	60-65	1/2 lb.	2	4	18-24	15 lbs.	60	60-85
Corn, Sweet	65-80	1/4 lb.	2	12-36	36	10 ears	50	50-95
Cucumber	50-60	1/2 oz.	3/4	36-48	40-48	12 lbs.	60	60-95
Eggplant	60-80	65 plants	1/2	18	25	7 lbs.	Transplants	
Muskmelon or Cantaloupe	85-120	1/2 oz.	1-2	3-6	48-84	10 fruits	60	75-95
Okra	55-65	1/4 oz.	1/2	12-15	36	varies	60	70-95
Pepper	70-80	80 plants	1/2	15	24	5 lbs.	Transplants	
Pumpkin	100	1 oz.	1	48	48-60	25 lbs.	60	70-90
Squash, Summer	55-65	1 oz.	1	40-50	48-60	20 lbs.	60	70-95
Squash, Winter	55-105	1 oz.	1	40-50	48-72	15 lbs.	60	70-95
Tomato	60-85	40 plants		30	36-40	15 lbs.	Transplants	
Watermelon	100-130	3/4 oz.	1-2	72-96	72-96	7 fruits	60	70-95

¹ These vegetables survive hard frosts and can be planted 2-3 weeks before the average date of the last 32 degree temperature in spring.

² These vegetables withstand light frosts and their seeds germinate at low soil temperatures. Plant them 2 weeks before the average date of the last 32 degree temperature in spring.

³ These vegetables do not withstand frost and their seeds will not germinate in cold soil. Plant them at about the average date of the last 32 degree temperature.

*Yields will vary with local conditions.

Transplant bare-root seedlings into cube trays or individual planting pots when they've reached an inch in height. Moisten the medium and, with a pencil, punch a hole in the medium deep enough to accommodate the root system without crowding. Lift the seedling from the original container with a pencil, set it into the hole, and firm the medium around it with the pencil.

Sow large-seeded vegetables like cucumber and pumpkin into individual containers by pushing the seeds into the mix with a pencil eraser.

Water the transplants until water exits through the drain holes or through the peat pot. Then don't water again until plants just begin to wilt. Test the need to water by squeezing a small amount of medium from the upper half of the container between your fingers. If no water appears, it's time to water. For soilless mixes such as peat moss, perlite or vermiculite, don't water if water drips from the mix.

Harden transplants before setting them to the garden. Slowly reduce the temperature, reduce watering, and increase light levels. Placing plants outside during favorable weather for two to three weeks before transplanting is a good way to harden them to outside conditions. Bring plants indoors each night when frost is expected.

For warm season crops such as cucumber, tomato, pepper and eggplant, plastic mulch or the newer geotextile fabric mulches help warm the soil and reduce weed competition. Set plants through flaps cut in the plastic sheeting or fabric. You can seed cucumber and squash directly into the soil beneath flaps that you cut into the material.

Pest Control

You can eliminate many pest problems if you use artificial soil mixes or sterilize garden soil prior to seeding. Buy disease resistant cultivars, space the plants properly to allow circulating air to dry the foliage and never water at night.

Rotate vegetable crops each year and clean up debris at the end of each season.



To order additional publications, please contact your county or reservation MSU Extension office, visit our online catalog at www.msueextension.org/publications.asp or e-mail orderpubs@montana.edu

Copyright © 2008 MSU Extension

We encourage the use of this document for nonprofit educational purposes. This document may be reprinted for nonprofit educational purposes if no endorsement of a commercial product, service or company is stated or implied, and if appropriate credit is given to the author and the MSU Extension. To use these documents in electronic formats, permission must be sought from the Extension Communications Coordinator, 115 Culbertson Hall, Montana State University, Bozeman MT 59717; E-mail: publications@montana.edu

The U.S. Department of Agriculture (USDA), Montana State University and Montana State University Extension prohibit discrimination in all of their programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Douglas L. Steele, Vice Provost and Director, Montana State University Extension, Bozeman, MT 59717.