

GROWING GREAT

VEGETABLES

In North Dakota

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There is more to vegetable gardening than putting seed in the ground. It involves seedbed preparation, selecting seeds of varieties that everyone in the family will enjoy, and deciding what will get planted where and when, what to seed and what to be set out as transplants. These and other decisions are all part of realizing a successful vegetable gardening season.

Know The Soil Fertility – Test It First

The initial step with first time vegetable gardeners is to have the soil tested. The same advice holds true for experienced gardeners who have not had the soil tested for several years or are not getting the growth response expected from a particular crop. NDSU's Soil Testing Lab provides that service for a nominal fee. A basic test runs from \$20 to \$30 and should include pH, organic matter content, phosphorus, potassium, and soluble salt content. Although nitrogen is often not tested because of mobility in the soil, it is suggested that this test be included, as high nitrogen levels from excessive fertilizer applications are often the cause of poor crop performance.

One of the hallmarks of a successful vegetable garden is the tilth or workability of the soil. Good tilth equals good drainage, and with good drainage increases the chances of crop success significantly. One thing that always helps improve soil condition is the addition of organic matter like sphagnum peat moss. Working organic matter in each

year assures good tilth, a buffering action against temperature extremes, and more efficient water use.

Ideally, if the soil can be turned over in the fall, it would be subject to the freezing and thawing action in the spring that would help to break up the clods. All that is required in the spring is to level the soil. If the soil cannot be worked until spring, then take care to not work it too early when it is still wet. Doing so will destroy the structure of the soil, which could ruin any good drainage qualities the soil may have originally had.

Selecting Seeds

One way to shorten North Dakota's winters is go through the numerous gardening catalogs that arrive during those frosty months. The photos and descriptions of our favorite veggies make us long for the planting season to arrive. Many of us purchase more seed during this time than we would ever have time or space to plant in a single season, so make up a selective list, basing it on what you know your family will consume fresh, plus some more for preserving, if that is your intent. Refer to the "Vegetable Planting Guide" chart in this circular.

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Many gardeners try to save seed from their crops each year to replant the following year, or attempt to look for “Bargain Basement Specials” in seed purchases. Generally both are bad ideas, since the average home gardener does not have proper seed storage facilities, and bargains may end costing you more in frustration in the long run. Most well-known seed companies go to a great deal of effort and expense to provide the cleanest and most viable seed possible. Overall, the seed that is purchased will be the smallest part of your investment in vegetable gardening. It is worth the price to pay for top quality seed.

Vegetable Types

There are classifications of vegetables every gardener should be aware of. The following is a brief summary of those classes, with some examples, so that selections can be made based on interest and space available.

Annuals: These are the vegetables most gardeners are familiar with, including beans, broccoli, Chinese cabbage, eggplant, lettuce, mustard, okra, peas, pumpkin, spinach, squash, sweet corn, tomato, and watermelon. Planted from seed or transplants, they complete their life cycle in one growing season.

Biennials: These vegetables will require two seasons to complete their growing season, although most of the time that is not the objective of the gardener. Hence, they are grown as annuals, with their edible part being harvested sometime during the growing season. These would include beet, Brussels sprouts, cabbage, carrot, cauliflower, chard, collard, endive, kale, kohlrabi, leek, onion, parsley, parsnip, salsify, turnip.

Sometimes these plants will do what is known as “bolting,” where they will go through a sufficient enough cold period in the growing season to get

into their reproductive cycle and produce seed the first season.

Perennial: These are vegetables that are around for several years without replanting. These are asparagus, chives, top multiplier onions, and rhubarb. Because of their permanence, any planting of this class of vegetable should be well thought out in reference to getting into and out of the garden area, access to water, and ample sunlight for many years to come.

Root, Stem, and Bulb: Root vegetables are those with thickened roots that are consumed either fresh or cooked. These are beet, carrot, celeriac, parsnip, radish, rutabaga, salsify, sweet potato, and turnip.

Fruit: Botanical reality classifies some vegetables as fruits. These are snap beans, cucumber, eggplant, edible gourd, melons, okra, edible-pod pea, pepper, pumpkin, squash, sweet corn, and tomato.

Herb: Depending on how the plant is going to be used, many can come under this classification. For culinary, aromatic, or some form of physical therapy purposes, the definition of herbs here will be confined to those crops that remain herbaceous where they can be used for one of the mentioned purposes. Many herbs abound in American gardens these days, including basil, borage, caraway, chive, dill, oregano, rosemary, sage, parsley, sweet marjoram, and thyme.

Cultivar Selection

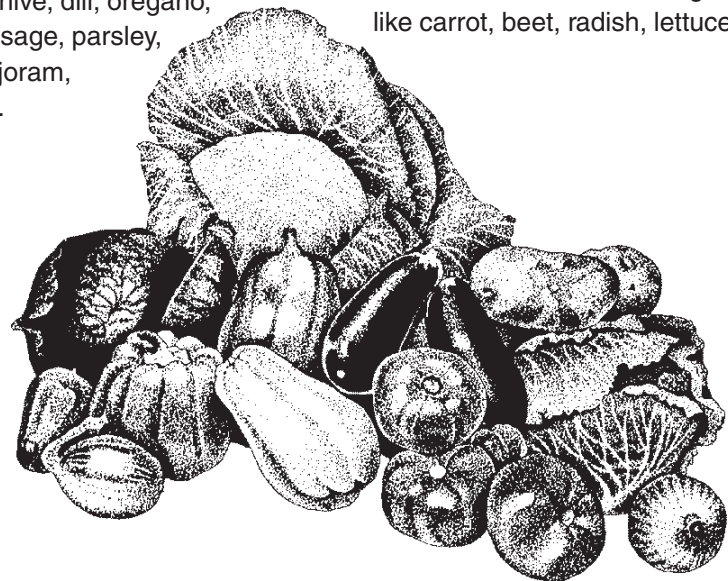
This is one of the fastest moving targets in vegetable gardening. It is not the intent of this circular to begin naming any particular vegetable cultivars, as there are literally hundreds introduced each year. NDSU runs continuous trials on many of the new introductions each year at the various experiment stations around the state. Gardeners interested in particular cultivars should check with local NDSU Extension agents to see if that one has been trialed locally. Otherwise, gardeners are advised to make selections that would mature within our normal gardening season, something under 120 days, and likely less than 100 days in the northern part of the state.

Many All-America Selections are grown each year at the NDSU Experiment Stations and, for the most part, provide success for both the beginning and experienced gardener.

Planting Layouts

There are four basic vegetable gardening layouts the gardener can follow, depending on the space available, ambition, and the volume of harvest desired.

Wide Row Spacing: These are usually planted on 4-inch to 24-inch wide bands where small vegetables like carrot, beet, radish, lettuce, snap



bean, and onion can be scattered and not planted in single rows. This reduces somewhat, the need for thinning, although some is still necessary. What is saved in thinning time is usually made up in weeding time.

Furrows: This is the most common method of backyard gardening, where crops are planted in straight row furrows. Mark the rows between two stakes with twine attached, pulled taut, with either a stick or the edge of a hoe, depending on the seed size. This method can be set up for between row cultivation based on the gardener's tiller width, which would save time in weed control. It also has aesthetic appeal to many gardeners, in addition to making it easier to control insect and disease problems.

Square Foot Gardening: This method divides the garden into 4-foot by 4-foot squares using brick, used railroad ties, landscape ties, or any other convenient hardscape material. Within those squares, each square foot will hold one, two, three or more plants, depending on the variety being selected. For example, one 4-foot x 4-foot square would hold four tomato plants. This method results in high production per unit area, makes weed control relatively easy, and allows access to the garden even after a heavy rain.

Hill Planting: This term, "hill," leads to confusion with beginning gardeners. It simply means planting in a circle, not in a raised mound. Mound planting is not recommended because the soil tends to dry faster than if it were level.

Hill planting is used for vine or large vegetables, such as squash, melons, and cucumbers. This gives both the root system and aerial portion of these plants greater access to space, water, and nutrients. The seeds are planted in a rough 12-inch circle, and later thinned to three or four plants. Be sure to leave 24-30 inches between hills.

Transplants

Tomatoes, pepper, cabbage, eggplant, and sometimes melons are grown as transplants rather than direct seeding.

Unless the home gardener has adequate space, light, and proper temperature control, it is far easier to purchase plants from a local garden center that specializes in growing them. If purchasing transplants, select the healthiest looking plants, that are free of any visible insect or disease damage.

Ask the garden center operator if they have been properly "hardened off," a term that means the plants have been conditioned to the outdoors for at least two weeks before setting them into the garden. If not, then the task is yours to do. This involves moving the plants outdoors during the daytime and back in at night, gradually increasing their exposure to sunlight over this period of time and withholding water slightly. Try to avoid excessive exposure to wind.

Planting and Transplanting

Seed packets and seed catalogs provide ample information on how to plant the vegetable variety within. Following those carefully thought-out directions is an easy step up the ladder to success.

With transplants, avoid root disturbance as much as possible. If the plants are in a peat pot or pellet, be sure the edges of the pots are below the soil surface or they will act as a wick and dry out the root ball. Try to plan the transplanting in the late afternoon or early evening, or on a cloudy day, when the shock of transplanting will be lessened somewhat. Greater success can be realized if a cup or two of a nutrient solution can be given to each plant immediately after setting it into the soil.

Weed, Disease and Insect Control

Many available cultivars have disease and insect resistance bred into them. Select such cultivars whenever possible. This not only saves time, it reduces inputs that have a negative impact on the environment. Often diseases can be controlled simply with good cultural practices: drip irrigation instead of overhead watering, proper plant spacing, roguing plants that show the first symptoms of disease, and maintaining a proper nutrient balance. Damaging insects can be controlled by practicing integrated plantings of flowers and vegetables. Plantings of asters, mums, cosmos, coreopsis, nasturtiums, and marigolds throughout the vegetable garden not only add to the aesthetics of the setting, but help deter the activity of damaging insects on the vegetable crops.

Weeds will be the major nemesis for most gardeners. Daily visits to the garden will provide some beneficial exercise to keep the sprouting weeds under control. If that is not part of your plan, then planting in a synthetic mulch such as black plastic, or mulching with a clean organic material such as flax straw, will keep the weeds under control.

If synthetics must be used in any pest control problem, try to select the material that is least toxic to the environment. *Bacillus thuringiensis* (Bt), insecticidal soap, and neem oil are examples of pesticides that are approved for organic gardening practices.

All-America Selections For 2000

Cabbage – F1 'Savoy Express'
Pea – 'Mr. Big'
Pepper – F1 'Blushing Beauty'
Sweet Corn – F1 'Indian Summer'

All were trialed at either the Fargo or Dickinson research sites, and performed satisfactorily.

Vegetable Planting Guide

Vegetables	Seeds or Plants for each 10 ft of Row	When to Plant*	Inches between Plant	Inches between Rows	Days until Edible	Yield per 10 ft. of Row
Asparagus	7 crowns	1	16-24	36-38	1-2 years	3-4 lb
Beans, bush	1½ oz.	3,4,5	2-3	24	50-70	6 lb
Beans, lima	1½ oz.	4	4-6	24	65-90	2 lb
Beans, pole	1 oz.	4	4-6	24	45-65	3-4 lb
Beets	½ packet	1,2,3,4	2-3	12-18	60-110	10 lb
Broccoli	5-7 plants	1,5	18-24	24-30	60-80	10
Cabbage	7-10 plants	1,2,5	18-24	20-28	60-100	10 heads
Carrots	½ packet	1,2,4,5	2-3	12-18	60-100	10 lb
Cauliflower	5-10 plants	1,5	18-24	24-30	60-80	10 lb
Celery	20 plants	2,5	6	20-24	120-150	8-13 lb
Chinese Cabbage	7-10 plants	6	12-18	20-24	80-100	10 heads
Corn, sweet	1 packet	3,4,5	8-12	30-36	65-100	11-13 ears
Cucumbers	½ packet	4,5	15-18	48-60	50-80	10 lb
Eggplant	6-8 packets	4	18	24-30	75-85	20 fruits
Endive	1 packet	1	6	12	85	6 lb
Kale	1 packet	1,6	4	12-18	60-70	2-5 lb
Kohlrabi	⅓ packet	1,2,3	4-6	15-24	50-60	8 lb
Lettuce, leaf	1 packet	1,2,3,6	—	6-15	40-60	5 lb
Muskmelon	1 packet	4	18-24	48-60	90-120	10 melons
Mustard	1 packet	1,2,3,6	4	12-18	40-60	4-8 lb
Okra	¼ oz.	3	12	18-24	70-90	5 lb
Onion seed	1 packet	1,2,3	2-3	12-15	100-140	10 lb
Onion sets	60 sets	1,2	2-3	12-15	90-100	10 lb
Parsley	1 packet	1,2,3	4	12-18	80-100	½-1 lb
Parsnips	1 packet	1,2	3	18-24	140-160	10-12 lb
Peas	1½ oz.	1,2	1-2	6-12	45-90	3 lb
Peppers	5-7 plants	4	18	18	70-75	80 fruit
Potatoes, Irish	10 pieces	1,2,3	12	24-36	14-150	30 lb
Potatoes, sweet	10 sprouts	4	18	36-48	140-150	12 lb
Pumpkins & winter squash	1-2 hills	4	4	60-72	90-120	40
Radishes	1 packet	1,2,6	1-1½	6-12	30-60	10 bunches
Rhubarb	3 crowns	1	36-72	36-60	1 year	12 lb
Spinach	1 packet	1,2,6	3	12-18	50-70	5 lb
Squash, summer	½ packet	4	4	24-30	60-75	60 fruit
Swiss chard	8 plants	1,2	6-8	15-18	50-75	12 lb
Tomatoes	2-5 plants	4	24-36	24-48	70-100	60 lb
Turnips	⅓ packet	5,6	18-24	18-24	60-90	10
Watermelons	¼ packet	4	60-84	60-84	90-130	4-10 melons

* Planting Date Code Numbers:

1. As soon as soil can be worked without becoming cloddy, generally mid to late April
2. Approximately 10 days later than number 1
3. Approximately 20 days later than number 1
4. After all danger of frost is past
5. Early June plantings of longer season vegetables for fall crops
6. Late June-early July planting of shorter season vegetables for fall consumption

For more information on this and other topics, see: www.ag.ndsu.edu

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References and Resources

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Riotte, L., 1983, *Roses Love Garlic; Secrets of Companion Planting with Flowers*, The Alpine Press, Special McKenzie Edition, December 1988.

_____, 1992, *Rodale's All-New Encyclopedia of Organic Gardening*, Rodale Press, Emmaus, PA

W. Atlee Burpee Company
300 Park Avenue
Warminster, PA 18974

Farmer Seed & Nursery Co.
Faribault, MN 55021

Henry Field Seed & Nursery Co.
Shenandoah, IA 51602

Gurney Seed & Nursery Co.
1448 Page Street
Yankton, SD 57059

Harris Seeds
Moreton Farm
3670 Buffalo Road
Rochester, NY 14624

Johnny's Selected Seeds
Foss Hill Road
Albion, ME 04910

Liberty Seed Co.
P.O. Box 806
New Philadelphia, OH 44663

Stokes Seeds
Box 548
Buffalo, NY 14240

Otis S. Twilley Seed Co.
P.O. Box F65
Trevose, PA 19047