



Cooperative Extension Service

NORTH DAKOTA STATE UNIVERSITY
FARGO, NORTH DAKOTA 58105

UNITED STATES DEPARTMENT OF AGRICULTURE
COOPERATING



PLANT SCIENCE SECTION

CIRCULAR H-595 (Rev.)



MARCH 1983

Fertilizing Gardens

NORTH DAKOTA
STATE UNIVERSITY

W. C. DAHNKE
Soil Testing and
Department of Soils

ROBERT G. ASKEW
Extension Horticulturist

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GARDEN SITE AND SOIL

Many gardeners do not have a choice of garden sites if they want a garden in the back yard. If you have a choice, select a site that is away from large shade trees, has a nearby source of water and has fertile, well-drained soil.

Soil types in North Dakota vary in texture from sandy (coarse texture) to loam (medium texture) to heavy clay (fine texture). Coarse-textured soils, such as sandy loams and sands, seldom present a tillage problem since they can be worked when wet or dry without harming their physical structure. These soils also warm up early in the spring and can be planted earlier than fine-textured soils.

Fine-textured soils, such as silt loams and clays, are often a problem because they cannot be worked when too wet or too dry without forming clods. If these soils stick to the spade or plow, they are too wet to work. Fall plowing of fine-textured soils is usually best because freezing and thawing during winter helps break down clods in the soil.

Loam, medium-textured soils, are ideal for raising vegetables since they are easy to cultivate, do not easily become compacted and are capable of holding large amounts of water (for plant growth) without becoming waterlogged.

14.3
9
8
5.95
183

Although all garden soils can be improved by adding large amounts of organic matter, such as well-rotted barnyard manure, compost or peat, the heavy clays and very sandy soils are in most need of organic matter.

In addition to improving the physical condition of both sands and clays, organic matter supplies food

and energy for soil bacteria and acts as a reservoir for nitrogen and other plant nutrients. These nutrients are then readily available for the plants to use as the organic matter decomposes in the soil. Organic matter helps to stabilize sandy soil (prevents wind action) and helps hold moisture for plant use.

Clay soils tend to form hard crusts which make it difficult for seedling vegetables to emerge after heavy rains. The addition of large amounts of organic matter on clay soils makes them more friable and easily tilled since it causes them to crumble and break-up into a granular condition.

MANURE AND FERTILIZER FOR GARDENS

The words "manure" and "fertilizer" are often used interchangeably. However, a commercial (bagged) fertilizer should be considered as a substance that supplies a more concentrated source of nutrients than animal manures. A fertilizer is used primarily as a source of nutrients and a manure as a source of nutrients as well as for the soil building qualities of its organic matter.

Well-rotted manure is one of the best sources of nutrients and organic matter for garden soils. For best results, manure should be applied annually at the rate of one-half ton per 1,000 square feet of garden (32 feet x 32 feet) before the soil is plowed, roto-tilled or spaded.

If manure is not available, compost can be made from leaves, grass clippings and waste plant material from the garden. The ideal way to make compost is to use two bins made of wire mesh, wood or blocks. Fill one bin with alternate layers of organic material 6 to 12 inches thick and of garden

soil about 1 inch thick. To each layer of organic material, add one-half cup of a complete fertilizer (such as 10-20-10) per bushel of organic material. Moisten the organic material thoroughly. Repeat this layering process until the bin is full or you run out of organic material. Make the sides of the pile higher than the middle so the water does not run off. After three to four months of warm weather, begin turning the material by moving it from the first bin to the second one. If you do not have a supply of manure or compost, you can use commercial fertilizers.

FERTILIZER APPLICATION

Fertilizer may be applied in various ways with good results. One of the best ways is to broadcast it before plowing or spading so that it becomes mixed with the soil. It may be applied in the fall or spring before working the soil by spreading it evenly over the soil surface. Follow label directions or spread 1 pound of 15-30-15 per 100 square feet of garden area. The average gardener may not need a soil test. However, problem soils should be analyzed. If you suspect a nutrient problem and do not have an available supply of manure or compost, have your soil tested to determine the grade and amount of fertilizer to apply to correct the problem.

The grade of fertilizer to use will depend on the results of a soil test. The grade of fertilizer is indicated by the numbers on the container. For example, a "10-20-10" grade is a fertilizer containing 10 percent of available nitrogen (N); 20 percent phosphorus, expressed as phosphate (P_2O_5); and 10 percent potassium, expressed as potash (K_2O). Ten pounds of a 10-20-10 contains the same amount of available nutrients as 20 pounds of a 5-10-5. All fertilizers should be used carefully as they can produce unwanted effects when too much is applied. Overdoses can cause serious wilting, even death, of plants. The same harmful effects can result from applying too great an amount of fresh manure.

STARTER SOLUTIONS

Available nutrients, particularly phosphorus, close to the root systems of newly set plants are important. Phosphorus stimulates rapid, early root growth. In spring, when the soil is cool, root growth is restricted so absorption of phosphorus and other nutrients is greatly reduced. Early growth can often be stimulated by applying a starter solution made with fertilizer containing a large amount of soluble phosphate. This mixture of water and fertilizer can be applied as the plants are transplanted. A starter solution can be prepared by adding 2 to 3 tablespoons of the dry but soluble fertilizer to one gallon of water. Use a complete fertilizer, such as 10-20-10, that is high in phosphorus. One cup of the solution is applied around each plant after transplanting.

COMMON GARDEN SOIL PROBLEMS

The most common garden soil problem is a hard, cloddy soil structure caused by working the soil when it is too wet. A second common problem is saline soil. A saline soil is one that contains high amounts of dissolved salts. The application of poor quality well water containing soluble salts (dissolved salts of calcium, magnesium or sodium) on moderately saline soils merely makes the problem worse. It causes the soil to become stickier when wet and harder when dry. Avoid the use of water that is high in dissolved salts, particularly sodium, for irrigation. This definitely means do not use "softened water" for irrigation. The buildup of soluble salts may become high enough to prevent germination.

If you have your garden soil tested, you will receive a fertilizer recommendation stating the rate of fertilizer and the fertilizer analysis to apply. In addition, you will receive a report on the soluble salt level of your soil sample. The soluble salt content of the soil is measured by the rate that an electrical current passes through a suspension of the soil sample. The rate of electrical conductivity is recorded from zero through 8. The smaller the reading, the lower the quantity of soluble salts in your soil and the better it is for your garden.

If the electrical conductivity reading of your soil sample is between 1 and 4, you may have problems growing sensitive vegetables, such as radishes, celery and green beans. A reading between 4 and 7 may affect the growth of tomatoes, cabbage, lettuce, potatoes, cucumbers, beets and spinach as well as radishes, celery and beans. A reading above 7 limits the vegetables that can be grown to only the most salt tolerant kinds, such as beets, spinach and asparagus.

If your garden is moderate to high in soluble salts, you may have to move your garden to another site. Application of large amounts of well-rotted manure and improvement of surface drainage may alleviate the problem to some degree.

Another common gardening problem is poor growth of vegetables caused by competition from trees and shrubs that are too close to the garden. Trees and shrubs rob the vegetables of nutrients, water and sunlight.

SPECIAL NOTE: For complete information on soil sampling please refer to NDSU Extension Circular A-336 Rev. "Soil Test for Profit — The Key to More Efficient Fertilization" available from your County Agent.