

IMPROVING VICTORY GARDEN FERTILITY

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MOST GARDEN SOILS are not producing highest yields of high-quality vegetable crops. This is mainly because of the poor selection of garden soils and the continuous use of the same garden areas without proper attention to good soil fertility practices. Soils of the home garden can be made to produce greatest yields of a wide variety of high-quality vegetable crops if good soil fertility and management are followed. These practices should include proper cultivation, liming where needed, maintenance of organic matter, the use of manure and commercial fertilizers, and moisture and weed control.

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SOIL AND CULTIVATION

A good seedbed for garden seeds should be fine and firm. Soils well supplied with organic matter generally do not present tillage problems.

Coarse-textured soils—sands and sandy loams—well supplied with organic matter can be plowed, spaded, and cultivated at almost any time regardless of the moisture content without harming the physical condition. These soils can be prepared for early planting since they usually warm up and are ready to be tilled early in the spring. The smallest seeds can emerge from such soils without difficulty if they are planted at the proper depth. These soils have a lower moisture-holding capacity than the finer-textured soils, and garden crops may be damaged by short periods of drouth unless water is available.

The physical condition of fine-textured soils—loams, silt loams, and clay loams—if worked too wet or too dry, may be injured so as to make it very difficult to prepare a satisfactory seedbed during the entire season. Such soils have good water-holding capacity and crops are less apt to suffer from drouth on them.

Heavy clay soils should be prepared for planting when moisture conditions are such that the soil will crumble and break into friable condition. If the soil sticks to your shoes or to the plow or spade, it is too wet to work; or if it breaks up into big, hard clods, it is too dry. Immediately after the soil is plowed, it should be harrowed or raked to prepare it for planting. Garden seedbeds should be plowed or spaded 6 to 10 inches deep so that all residues, manure, and organic material can be properly incorporated.

The seedbed may be firmed by rolling, or by raking several times. The soil over the planted rows may be firmed by gently tamping with the back of the hoe or rake.

MAINTAIN ORGANIC MATTER

Organic matter improves the physical condition of both sandy and clay soils. It supplies food and energy for soil bacteria and is the storehouse for plant nutrients which become available to plants as the organic matter decomposes. Organic matter serves as a sponge by absorbing water when rainfall is plentiful and holding it to be used during dry periods. It acts as a binder, helping to hold and stabilize light sandy soils, while on the other hand it helps to make heavy, clay soils more friable and easier to till. When soils bake and form hard crusts through which seedlings are unable to emerge, they need to be well supplied with organic matter which

will make them crumble and break up into a friable seedbed which will not retard the growth of the smallest seedlings.

Manure is the best source of organic matter for gardens as well as being one of the best forms of garden fertilizer. Manure should be spread at the rate of 15 to 20 tons per acre, or 800 to 1,000 pounds per 1,000 square feet, or 1 pound per square foot, or 1 bushel per 30 square feet (3 feet x 10 feet). It should be spread before the soil is spaded or plowed in the spring or fall. If the manure is spread after the garden has been plowed, it should be thoroughly worked or disked into the surface. When fresh, strawy manure is used, it is advisable to spade or plow it under in the fall. Well-rotted manure is more desirable for use in the spring because it can be worked into the soil easily.

Poultry manure may be used instead of stable manure but the rate of application should be reduced to about one third that of regular stable manure.

Pulverized sheep manure may be used instead of stable manure. This may be spread on the plowed ground at 100 to 200 pounds per 1,000 square feet and then thoroughly worked in.

Peat, shredded or pulverized, may be substituted for manure as a satisfactory source of organic material, although it is not equal to manure as a fertilizer. Apply 50 to 60 bushels per 1,000 square feet.

Green manure crops may be used to increase the organic matter of garden soils. Winter rye should be seeded at 1½ pounds per 1,000 square feet about September 1, on areas from which vegetable crops have been harvested and between rows of late crops. The rye will make a growth of 6 to 8 inches in the fall and make a good winter cover crop that can be plowed or spaded under in the spring.

LIMING MATERIAL

Garden crops grow best on soils which are only slightly acid or neutral. Liming material applied to soils that are medium or strongly acid can increase vegetable production. No attention need be given to liming in Minnesota except in the lime-deficient areas where lime is now being generally used on field crops. The kind of liming material to use depends upon the materials available in your community. Ground limestone, hydrated lime, and marl are the most commonly used. The amount depends upon the reaction of the soil and the material used. The following recommendations are

for soils of medium to strong acidity. Soils of slight acidity will not hinder plant growth.

Amount to use per 1,000 square feet of garden	
Ground limestone.....	75 to 100 pounds
Hydrated lime.....	50 to 75 pounds
Marl.....	2 to 3 bushels

The liming material should be spread evenly over the garden before plowing or spading. If the plowing has been completed, the liming material may be applied afterward and thoroughly worked into the soil by raking or harrowing.

Soils may be tested for liming needs at your local county agent's office or at the Division of Soils, University Farm, St. Paul 8, Minnesota.

FERTILIZATION

Vegetable crops grow best in soils that contain an abundant supply of readily available mineral nutrients. The minerals most likely to be lacking in garden soils are nitrogen, phosphorus, and potash.

Manure is one of the best garden fertilizers. In addition to furnishing the best source of organic material, manure is an excellent source of nitrogen and potash but is low in phosphate. The nutrient balance of the manure can be improved by a supplementary application of superphosphate as recommended below. The recommended rates for application of manure are the same as discussed under organic matter.

Commercial fertilizers should be used when manure is not available and to reinforce light applications of manure. A complete commercial fertilizer carries a combination of nitrogen, phosphorus, and potash and is generally recommended for gardens. Commercial fertilizers will not take the place of essential organic material.

The complete commercial fertilizers formerly used for gardens will not be available for home gardens until after the war, but manufacturers have been authorized to make a "Victory Garden Fertilizer" containing 4 per cent nitrogen, 12 per cent phosphate, and 4 per cent potash (4-12-4). The *broadcast rate* of application of this fertilizer should be 25 pounds per 1,000 square feet, or 2.5 pounds per 100 square feet (10 feet x 10 feet) of garden area. The fertilizer may be spread immediately after the seedbed is prepared and worked into the soil before the seeds are planted, or one half may be applied before the ground is spaded or plowed and the remaining half immediately after and worked into the surface.

If all the commercial fertilizer is applied *along the row* at the time of planting and not broadcast, the rates may vary according to the crop and width between rows. When applied in this way, the fertilizer should be scattered in trenches 2 inches to each side of the seed row and deep enough to allow the placing of the fertilizer 1 to 1½ inches below the planted seed or seed piece. It is a general rule that the fertilizer should not touch the seed. Some seeds suffer little or no injury by contact with the fertilizer but others are very easily injured or killed. The following rates are recommended per 100 feet of row:

Sweet corn	1.5 to 2.0 pounds	4-12-4
Potatoes	3.5 to 6.0 pounds	4-12-4
Cabbage	3.5 to 5.0 pounds	4-12-4
Onions and other vegetables.....	2.0 to 3.5 pounds	4-12-4

If used as a *side dressing* for vegetable crops, apply at the rate of 1 pound (1 pint) per 100 feet of row. When applied in this way it should be scattered in trenches 1½ to 2 inches deep and 2 inches from the side of the row and covered with a cultivator or hoe.

The same amount of superphosphate, 0-20-0, may be substituted for the Victory Garden Fertilizer on silt loam and clay loam soils manured at the recommended rates; 0-20-20 mixed fertilizer may be substituted on sandy, light soils which have been manured as recommended.

MOISTURE CONTROL

A garden soil should have good drainage so that surplus water will not stand on the garden long enough to injure the crops. The available moisture in garden soils can be appreciably increased by building up the organic matter content of the soil. Rain will soak into soils that are well supplied with organic matter more readily than into soils low in organic matter. The amount of moisture which can be held available to plants during drouth periods can be greatly increased, especially in sandy, drouthy soils.

Straw or grass mulches can be used to good advantage in gardens which have been worked sufficiently to kill weeds. A straw mulch not only helps to prevent the surface soil from drying out and cracking but also helps to keep the garden free of weeds. If the garden is watered with the lawn sprinkler, the water should be added only as fast as it can soak into the soil. The watering should continue in one place until the soil is moist to a depth of at least 4 to 6 inches. Avoid watering any more frequently than necessary. Frequent light

sprinkling which wets only a shallow depth tends to produce shallow-rooted, poor-quality crops. Proper watering of the garden will produce deeper-rooted and better-quality crops.

WEED CONTROL

Weeds are soil robbers. If not kept under control they will use as much moisture and plant nutrients as the growing crop. Weed control should begin before the garden is planted. Allow the weeds to make an inch or two of growth, then cultivate and kill them. Repeat until time to plant that part of the garden. Cultivate to control weeds as soon as the rows of seedlings are big enough to be easily seen. Cultivate only enough to keep them under control. On the heavier soils do not cultivate when the soils are too wet and sticky.

COMPOSTING

Artificial manure can be made from straw, leaves, grass clippings, and waste plant material from the garden. Put down a layer one foot thick of the material over an area 6 x 10 feet. Sprinkle over this 1 pound of superphosphate (0-20-0), 2 pounds of any available organic nitrogenous material, and water until all the material is soaked. Add successive layers in this way as material becomes available. When the pile is completed it should be straight-sided and saucer-shaped on top. Continue to add water throughout the season so the pile is kept thoroughly soaked. The pile will decompose into manure, equal to good stable manure, in two or three months.

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