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SOIL TEST NOTES

Maintaining Soil Fertility in Vegetable and Flower Gardens

SOIL PREPARATION

The garden should be plowed 6 to 8 inches deep if the soil is heavy; 5 to 6 inches will do if the soil is sandy. Plowing should be done late in the fall just before hard freezes generally occur. In this way cutworms and other insects will be brought to the surface, exposed to natural enemies, and killed by cold weather. Leave surface of the soil rough to catch snow and to increase the mellowing effect of freezing and thawing. Where soil is sandy and likely to blow, delay plowing until early spring unless steps are taken to prevent wind erosion. These might consist of a windbreak on the north and west or a light top-dressing of manure following plowing.

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SOIL FERTILITY

Good quality and high production of vegetable crops and flowers requires good soil fertility and tilth. Most garden soils need commercial fertilizer or barnyard manure, or both, applied annually.

BARNYARD MANURE. Barnyard manure gives excellent results on most garden soils when properly used. It is an excellent source of organic matter and plant nutrients. An annual application of barnyard manure (400 to 600 pounds per 1000 square feet) is recommended. Use half this amount of chicken or sheep manure. Usually, the best time to apply manure is in the fall or winter. The use of manure will increase the supply of nitrogen, phosphorus and potassium available to plants. It also supplies other essential elements, increases water holding capacity and improves the physical condition of the soil.

COMPOSTS. Composted leaves, grass clippings, garden residues and the like may be used instead of barnyard manure and in the same manner. Thin layers of soil in the compost pile, along with a cupful or two of fertilizer, help speed up decomposition of the composted material. See your county extension agent for information on making compost.

MULCH. Leaves, grass clippings, sawdust and other types of plant residues used as mulch will add organic matter to the soil. Commercial fertilizer should be used to speed up decomposition of the mulch and to supply adequate plant nutrients. Mulching also reduces weed growth, reduces evaporation and keeps the soil temperature lower during the hot part of the year.

COMMERCIAL FERTILIZERS. Commercial fertilizers should be used according to soil tests. Higher rates will often be needed when compost or mulch is used rather than barnyard manure. The following recommendations are for irrigated gardens. Use 1/2 to 2/3 as much for non-irrigated gardens.

Phosphate fertilizers will be needed on soils testing medium or lower in available phosphorus. Phosphorus tests will usually be high in soils where manure has been

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used regularly. Two or three times the recommended rate of phosphate any one year will not be harmful and will usually be beneficial the following year also.

Nitrogen fertilizers should be used where soil tests show the need-except where manure is to be applied. On tomatoes, cabbage, onions, sweet corn and lettuce it may pay to sidedress with nitrogen after the crop is up even though manure has been plowed down. Excessive rates of nitrogen may stimulate excessive vegetative growth at the expense of fruit.

Mixed fertilizers can be used where both nitrogen and phosphate are needed. Most of the "garden fertilizers" on the market are mixed fertilizers containing nitrogen, phosphate and sometimes potash. Few Nebraska soils need potash. Small amounts of potash may improve the quality and flavor of some garden crops grown on soils testing medium in available potassium.

Rates of fertilizer to use will depend on the analysis of the fertilizer. The first number in the fertilizer analysis (grade) indicates the percentage of nitrogen (N), the second number, the percentage of available phosphate (P_2O_5) and the third number, the percentage of water-soluble potash (K_2O). For example, a fertilizer with a grade of 10-20-10 contains 10 per cent nitrogen, 20 per cent available phosphate and 10 per cent water-soluble potash. Use the following table to decide what rate of fertilizer material to use. Select the fertilizer that meets the needs indicated by your soil test report, then multiply the pounds of nitrogen or phosphate recommended by the pounds of material listed in the table.

Material	Grade $N-P_2O_5-K_2O$	Pounds of material to use for about 1 pound per 1000 square feet of: Nitrogen	Phosphate
Superphosphate	0-20-0	---	5 pounds
Treble superphosphate	0-45-0	---	2 1/4 pounds
Urea	45-0-0	2 1/4 pounds	---
Ammonium nitrate	33-0-0	3 pounds	--
Ammonium sulfate	21-0-0	5 pounds	--
Mixed fertilizers	21-53-0	5 pounds	2 pounds
	16-20-0	6 pounds	5 pounds
	10-20-0	10 pounds	5 pounds
	10-6-4	10 pounds	17 pounds

There are similar grades of mixed fertilizer available that may also be used.

Method of application. The nitrogen and phosphate fertilizers are best applied in the spring just prior to planting. The fertilizer should be broadcast evenly on the surface and worked into the soil. If manure is used, the nitrogen on tomatoes, cabbage, and sweet corn may be applied as a sidedressing after these plants are up. In this case the nitrogen should be placed in a band about 4 to 8 inches away from the plants and 2 inches deep. If no manure is used, some of the nitrogen fertilizer may be applied before planting the vegetable crop, and the remainder after the plants are up. Too much nitrogen at planting will result in excessive top growth of potatoes and tomatoes.

Lime. Where lime is not needed, as shown by soil test, lime should not be applied. Where the soil test shows a need for lime it should be applied for the most successful growth of vegetable crops. Follow recommended rates as excessive rates can be harmful. Half of the lime should be applied before plowing and the remainder after the garden has been plowed. One application at the recommended rate is good for 5 to 10 years. Liming is more likely to be needed in the eastern one-third of Nebraska than in the less humid regions.

See your county agent for information on disease, insect control and varieties.

Prepared by University of Nebraska Soil Testing Service Cooperating with the Local County Extension Service.