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## Organic Fertilizers for the Garden

With the increased interest in organic gardening, people want to know about appropriate fertilizers and soil amendments. To be approved for organic use, materials must occur naturally and not be manufactured. For example, fertilizers such as super phosphate and ammonium nitrate are manufactured and are not approved as organic, but bone meal and rock phosphate are allowed.

Nitrogen (N), phosphorous (P) and potassium (K) are the most commonly applied plant nutrients. Approved organic sources of N include compost, manure, legume cover crops, blood meal, Chilean nitrate (sodium nitrate) and alfalfa meals. Manure can be an excellent source of N and other nutrients, but may contain human pathogens such as *E. coli* bacteria. For safety, manure should be applied at least 120 days before harvesting food crops. To accomplish this, manure should be applied in the fall, but a winter cover crop should be planted to prevent the N from leaching away over the winter. Manure should also be promptly turned into the soil to prevent volatilization loss of N. Compost is an excellent soil amendment, but it releases N more slowly than other sources.

It is difficult to build up phosphorous (P) levels in the soil with most of the materials available to organic gardeners. The phosphorous in rock phosphate is released quite slowly. Some people feel that even in the long run, it makes little contribution to soil P levels. Bone meals are more expensive than rock phosphate, but the P is released more quickly. Because of its expense, bone meal may best be applied in a band about two inches away and two inches below the seed or transplants. Dairy manure can make significant contributions to soil P levels in a few years when applied at typical rates of 15 to 20 bushels per 1,000 sq. ft. With poultry or dried cow manure, apply about six to eight bu. per 1,000 sq. ft. Phosphorous levels may become excessive after several years of manure application. Compost will supply P, but several years are usually necessary to see a significant increase.

Green sand can supply potassium (K), but very slowly. Many people feel that it is not worth the cost. Manure and compost also supply K. Two fertilizer products, if they are of natural origin and not synthetic, are approved for organic production: potassium sulfate (also called sulfate of potash) and sul-po-mag. They both supply K and sulphur and the latter also supplies magnesium. The nutrients in these materials are readily available to crops.

Calcium (Ca) and magnesium (Mg) are most economically supplied by lime. Most lime in Massachusetts is dolomite, which supplies both these elements, but over time will increase Mg more than Ca, causing an imbalance. Calcitic lime, if available, should be used about half the time to maintain a proper balance of Ca and Mg. Gypsum can be used to increase Ca levels and will not affect soil pH. Ground limestone and gypsum are approved for organic gardening; hydrated lime is not. Routine compost use may maintain proper soil pH as well as supply adequate amounts of Ca and Mg.

Compost can supply much and perhaps all of the nutrient needs of a garden. It is somewhat slow to work and may take several years for its benefits to be fully realized. Some of the other sources mentioned here may be helpful in the short run. Besides supplying nutrients, compost is an excellent soil conditioner and helps improve the moisture and nutrient holding capacities of soils as well as drainage. It provides food and an improved environment for beneficial soil organisms and improves overall physical properties. But even compost can be overdone. Heavy continuous use of compost can lead to imbalances or excess levels of some nutrients after a number of years. As with any soil amendment, it is advisable to periodically test your soil for nutrient levels, pH and organic matter and adjust your program accordingly.

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