



## Department of Horticulture

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Purdue University Cooperative Extension Service • West Lafayette, IN

# Fertilizing Small Fruits

*Bruce Bordelon*

Small fruits perform best on a fertile sandy loam or silt loam soil which is high in organic matter and well-drained. Surface water drainage and air drainage away from the planting are also important.

Small fruits have a high requirement for all the nutrient elements and usually will respond well to application of fertilizer materials. Since nutrients other than nitrogen do not move readily through the soil, the level of these elements in the root zone is best raised before the plants are set. Where soils are low in organic matter content, a soil building program prior to planting will be beneficial. Further, as a part of the soil building program, the soil pH should be corrected throughout the plow layer. Subsurface and surface drainage problems should also be corrected prior to setting the plants. Air drainage should also be considered at the time of site selection.

## Pre-Planting Soil Building Program

A pre-planting soil building program can be very beneficial for small fruit production. Such a program will benefit from rotation of crops in blocks so that berries need not be planted immediately after berries. Where a planting will be in the ground a long time, as in the case of raspberries or grapes, deficiencies in the soil can be a long-term problem.

A suggested soil building program: One or two years prior to planting, a soil test should be taken to provide information on soil pH and phosphate and potash levels. Soil pH should be corrected to bring it to 6.0 to 6.5 range.

*Note: Blueberries require an acid soil of pH 4.5 to 5.2. They also have somewhat specialized fertilizer requirements. For more information, see HO-65: Fertilizing Blueberries.*

Green manure cover crops should then be grown, using good agronomic practices, including fertilizing to bring the levels of phosphate and potash to the high range. This cover crop should then be plowed under with enough 1-1-1 ratio fertilizer to supply 1 pound of nitrogen (N) per

1,000 sq. feet (e.g. 20' x 50'). A winter cover crop such as wheat or rye should be seeded in the fall with adequate fertilization for the crop (complete fertilization to supply 1 pound of N per 1,000 sq. feet). If another season is available, repeat the procedure, allowing the winter crop to develop no later than the 'boot' stage (when the seed heads begin to form). In the season when small fruit plants are set, plow under the winter cover crop as soon as possible to allow for partial decomposition of the organic matter before the plants are set. A complete fertilizer should be plowed under with the cover crop in an amount to supply 1 pound of N per 1,000 sq. feet.

Additional fertilizer applications may be made at this time, depending on the crop to be planted and soil test results. For example, strawberries will require additional fertilizer, while the brambles or grapes will usually require only sidedressing during the growing season.

## Nutrient Elements

**Nitrogen.** Nitrogen is necessary for vigorous vegetative growth of the plant, fruit bud initiation, and fruit set. Small fruit plants respond readily to application of this element and annual applications are necessary. Too little nitrogen results in poor growth, spindly plants and poor yields. Too much nitrogen, on the other hand, results in excessive shoot and foliage growth, and soft, poorly colored fruit which may be more susceptible to rot.

The actual amount of nitrogen to be applied depends on the crop and growing conditions, but should be in the range of 1-3 pounds per 1,000 sq. feet. See specific crop publications for more detailed recommendations.

Nitrogen tends to leach from the root zone, so it should be applied as split applications. That is, if 2 pounds of actual N per 1,000 sq. feet are required for a crop, it is usually best to apply 1 pound in early spring, followed by an additional pound a month or so later, or .75 pound can be applied across three application dates approximately one month apart. First applications are usually made as growth begins in the spring.

**Phosphorus.** Small fruit plants benefit from adequate levels of phosphorus (P) in the soil. Since phosphorus does not move readily down through the soil and into the root zone, surface applications are not too effective, except as a maintenance program or for very shallow-rooted plants. Ideally, phosphate fertilizers should be plowed under or worked into the soil before the crop is planted, as described in the preplanting soil building program. Levels should be built up until the soil test results show 'High.' This is usually shown on the report form as 40-50 pounds per acre.

**Potassium.** Small fruits, especially grapes, require high levels of potassium (K) in the soils. Potassium levels should be built up prior to planting until the soil test shows 'High.' This is usually shown as 250 to 300 pounds per acre on the report form. Annual applications are then made as a part of the complete fertilizer program, applying the same amount of potassium as nitrogen.

**Calcium.** Calcium is a plant nutrient normally available in adequate amounts in soils that are in the pH range desirable for small fruit culture (5.5 to 6.5 except for blueberries). Lime applications will supply calcium where necessary, and it is not usually necessary or desirable to make annual applications. A soil test for pH should always be used as the basis for making lime applications.

**Magnesium.** Magnesium (Mg) is an essential nutrient, usually available in adequate quantities (usually shown as 200 to 300 pounds per acre) in soil of proper pH. Where Mg deficiency is a problem, dolomitic (high Mg) lime may be applied. In situations where pH is high, magnesium sulfate (epsom salts) can be used to correct deficiency. The symptoms of Mg deficiency, as well as some of the micro-nutrients, look much like virus disease symptoms.

**Micro-nutrients.** These are elements needed in only small quantities for normal plant growth, but they are essential, nevertheless. Deficiencies of these are relatively rare where soil pH and fertilization are optimal. Deficiencies are more likely to occur in sandy soil or in some high organic soils. These can usually be corrected by soil or foliar applications of the nutrient, or by adjusting pH. Care must be taken that excessive amounts are not applied, since they can be toxic to plants. Boron and Zinc are the most common micro-nutrient deficiencies encountered. Iron can be low in some plants such as blueberries, but this is more likely a result of high soil pH rather than iron deficiency in the soil.

**Nutrient sprays.** Foliar application of fertilizer materials is not a suitable substitute for adequate soil preparation and soil fertilization. In addition, foliar applications are more expensive and are generally less effective than soil applications. Exceptions occur, however, when specific problems arise requiring immediate diagnostic or corrective measures or where specific supplemental nutrients are desired for a short term effect.

**Mulches.** Mulches may be used in small fruit plantings with very positive results, especially in the home garden. Care should be taken to provide for extra nitrogen to aid in mulch material decomposition.

**Publications of related interest:**

- HO-9 Growing Cherries in Indiana
- HO-17 Currants and Gooseberries
- HO-44 Raspberries
- HO-45 Growing Grapes
- HO-46 Growing Strawberries
- HO-65 Fertilizing Blueberries
- HO-221 Grape Varieties for Indiana

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For more information on the subject discussed in this publication, consult your local office of the Purdue University Cooperative Extension Service.

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