

Fertilizing small fruits in the home garden

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Perennial small fruits crops—such as strawberries, raspberries, blueberries, grapes, currants, or gooseberries—grow in the same location for several years. Because of this, you should assess and improve soil fertility before planting them. Taking steps to improve soil tilth and fertility before planting will result in better plant growth and greater fruit yields later.

While lime, organic matter, and fertilizers can improve soil tilth and fertility and enhance plant growth, they cannot compensate for poor soil moisture drainage, poor cultivars, uncontrolled disease, insect infestations, or drought stress. Before investing time, effort, and money in a small fruit planting, you should learn about the cultural and pest management requirements of the specific crop. See the Extension publications listed on the last page for detailed information on cultural practices.

Determining pre-plant fertilizer needs

Small fruits need fertile, well-drained soils. To determine initial soil fertility, have the soil tested. A soil test will tell you how much, if any, lime, organic matter, and fertilizer your soil needs.

Sample the soil during the summer or fall before planting. Randomly take four or five samples from the area where you intend to plant small fruits, so the samples represent the entire area. Use a trowel or small shovel to collect soil to a depth of 6 inches. Take the samples to your county Extension office, which can send them to the University lab or provide you with a list of private labs. You should receive the results of the test from the lab within 10–14 days. The soil test report will guide you in improving the soil prior to planting. A routine soil test will provide four critical pieces of information:

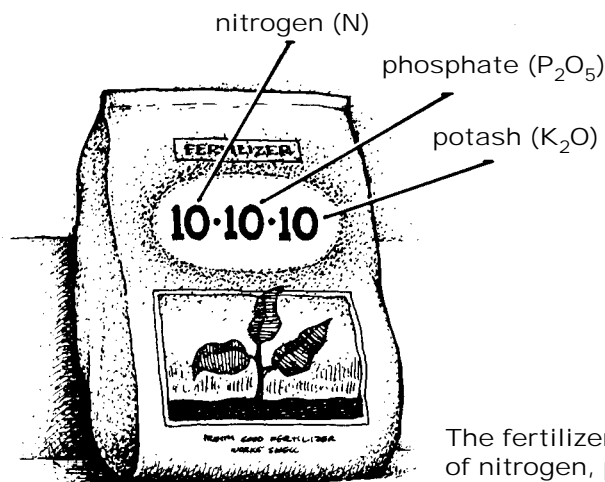
soil pH, percent organic matter, and an estimate of plant-available phosphorus and potassium.

Soil pH

The soil pH is a measure of soil acidity. A pH of 7.0 is neutral, a pH below 7.0 indicates an acid soil, and a pH greater than 7.0 means that the soil is alkaline. The ideal pH range for most fruit crops is 6.0–6.5. Only the blueberry differs—it grows best in acid soils (pH 4.0–5.5).

If a soil test shows that your soil is too acid, you will need to add lime. Lime will raise the soil pH and supply needed calcium or magnesium. Do not add lime, however, unless a soil test recommends it. An excessively high soil pH can reduce the availability of phosphorus, boron, zinc, iron, and manganese.

Reducing soil pH is more difficult. Adding sulfur to the soil will reduce soil pH unless the soil has a high carbonate content. Soils in eastern Wisconsin tend to contain high amounts of carbonate, and reducing the pH of these soils is difficult. If you choose to grow blueberries in very alkaline soils, it is best to remove and replace the soil in the root zone with peat moss or other low pH organic matter.



The fertilizer analysis number indicates the percentage of nitrogen, phosphate, and potash by weight.

Organic matter and mulches

Adding organic matter to the soil also benefits small fruit crops. Organic matter supplies some plant foods; gives heavier, "hard-to-work" soils a looser texture; and enables sandy soils to hold more water. If the soil test reveals that organic matter is below 2%, plan to add organic matter before planting small fruits. Blueberries, in particular, benefit from the addition of organic matter to the soil. A variety of materials will add organic matter to the soil, such as lawn clippings, fallen leaves, chipped prunings, and compost. Work the organic matter into the top 6 inches of the soil.

If well-rotted manure is available, apply 1,000–1,500 lb per 1,000 sq ft the summer or fall before planting. It supplies 5–7½ lb nitrogen (N), 2½–4 lb phosphate (P₂O₅), and 4–7 lb potash (K₂O). You can subtract these phosphate and potash amounts from the amounts recommended by your soil test.

If you use organic materials such as sawdust, wood chips, or shredded bark to mulch small fruits, thoroughly mix ¼–½ cup ammonium nitrate, urea, or a high analysis lawn fertilizer such as 27-3-3 with each bushel of mulch. If you use lawn fertilizer, be sure it does not contain herbicides (weed killers). The herbicides sometimes included in lawn fertilizers will severely injure or kill small fruit plants. Check the fertilizer bag label for the ingredients.

Add nitrogen for the first two years that you establish mulching. By the third year, decay processes are usually well underway, and nitrogen is being released into the soil. At this point, you can reduce or omit mixing nitrogen in with the mulch.

Phosphorus and potassium

If recommended by the soil test, phosphorus and potassium can be added to and worked into the soil during the fall or spring prior to planting. Soil test levels should be 25 parts per million (ppm) phosphorus and 100 ppm potassium. Do not add these nutrients if the soil test verifies sufficient amounts are already in the soil. Phosphorus is a potential pollutant, so only add it in quantities sufficient to assure proper plant growth.

Fertilizer analysis

Any material sold as a fertilizer must have the amount of the nutrients listed on the package. Usually the nutrients are listed as three numbers, such as 27-3-3. The first number represents percent nitrogen; in this case, the fertilizer is 27% nitrogen. The second number is phosphate; in this case, 3% phosphate (not phosphorus). The third number is potash; in this case, 3% potash (not potassium). Organic fertilizers are also suitable for small fruit production. Check the package label, and apply enough of the fertilizer to equal the recommendations provided here for chemical fertilizers.

Calculating fertilizer needs

For blueberries, currants, and grapes, the soil test report will recommend the amount of fertilizer needed *per plant*. In contrast, for raspberries and strawberries, the test will give fertilizer recommendations *per 100 ft of row*. Lime recommendations, regardless of the fruit, are given in pounds of lime *per 100 sq ft*.

To use these recommendations, you must calculate the amount of fertilizer needed for your size fruit garden plot. For blueberries, currants, and grapes, simply multiply the number of plants you have or intend to plant by the recommendation per plant. For raspberries or strawberries, add up the total feet of row, divide by 100, and multiply this result by the amount of fertilizer recommended.

For example, suppose you want to fertilize a single 10-ft row of raspberry plants, and the fertilizer recommendation is 3 lb ammonium nitrate and 2 lb of potassium chloride per 100 ft of row. You would need 0.3 lb ammonium nitrate and 0.2 lb of potassium chloride for your 10-ft row:

$$(10 \text{ ft} \div 100 \text{ ft}) \times (3 \text{ lb ammonium nitrate}) = 0.3 \text{ lb ammonium nitrate}$$

$$(10 \text{ ft} \div 100 \text{ ft}) \times (2 \text{ lb potassium chloride}) = 0.2 \text{ lb potassium chloride}$$

Applying fertilizer to small fruits

If you have prepared the soil prior to planting by correcting soil pH, adding organic matter, and adding any recommended phosphate and potash, you should only have to apply light amounts of nitrogen throughout the life of the planting. If you suspect a deficiency after planting, you can verify it through tissue testing. More information about tissue testing is available from your county Extension office, listed in the blue pages of the phone book.

Incorporate fertilizers into the soil after application. Irrigation will integrate granular fertilizers. Shallow tilling with a rake or hoe will incorporate manure and other organic soil amendments.

Strawberries

First growing season

Vigorous plant growth during the first growing season is essential for maximum fruiting the next growing season. With June-bearing cultivars, apply $\frac{3}{4}$ – $1\frac{1}{2}$ lb ($\frac{1}{2}$ –1 cup) of ammonium nitrate or $\frac{1}{2}$ – $\frac{3}{4}$ lb ($\frac{1}{3}$ – $\frac{1}{2}$ cup) urea per 100 ft of row when the plants begin to form runners about mid-June. In the hill system, use 1 teaspoonful of either fertilizer per plant. Apply the same amount of nitrogen again in early August to help flower bud formation.

For everbearing cultivars, apply 1 teaspoon of ammonium nitrate or urea around each plant about 3 weeks after planting and again in mid-July. Apply fertilizers when foliage is dry, and brush fertilizer off leaves with a broom or rake to avoid fertilizer burn to foliage. Be careful not to overfertilize—too much fertilizer can injure roots or cause excessive growth! Both of these problems reduce yields by increasing the plant's susceptibility to fruit and leaf diseases and winter injury.

The bearing years

Do not apply a complete fertilizer during the spring of the fruiting year unless the plants lack vigor. Too much nitrogen may stimulate excessive vegetative growth, resulting in reduced yields, and poorly colored and soft berries susceptible to fruit rot.

However, if plants lack vigor, apply $\frac{1}{2}$ lb (1 cup) of ammonium nitrate or $\frac{1}{3}$ lb (1 cup) of urea per 100 ft of row immediately after blossoming.

Promptly after harvest, you can renew the planting for another year if it is reasonably free of weeds and disease and is still vigorous. Sidedress or broadcast $\frac{1}{2}$ lb ($\frac{1}{2}$ cups) of urea or $\frac{3}{4}$ lb (1 cup) of ammonium nitrate per 100 ft of row, and water the planting

thoroughly. Repeat the same application in early August. Do not fertilize strawberries after Labor Day.

Raspberries

First growing season

After your plants are well established (mid- to late June), broadcast $1\frac{1}{2}$ lb (2–3 cups) of ammonium nitrate or $\frac{3}{4}$ – $1\frac{1}{2}$ lb (2–3 cups) urea per 100 ft of row. For hills, scatter $\frac{1}{4}$ cup in a band 18 inches wide around each hill. If plants do not show desired vigor, repeat the application at half the rate in late July.

Succeeding years

After the first season, add $\frac{3}{4}$ lb (1 cup) ammonium nitrate or $\frac{1}{2}$ lb (1 cup) of urea per 100 ft of row. In hill plantings, apply $\frac{1}{4}$ cup around each plant. Repeat the application in late May to early June. You can also use manure to fertilize established raspberries. Apply 150 lb of well-rotted cow manure per 100 ft of row. If using poultry manure, reduce the application rate to 75 lb for each 100 ft of row.

Apply fertilizer or manure in early spring before growth resumes to encourage maximum growth during the growing season. Fertilizing with nitrogen in late summer or early fall, on the other hand, will stimulate late-season growth that is more susceptible to winter injury.

Blueberries

Before planting

Most garden soils are not suited for growing blueberries and must be modified before planting. Blueberries grow best in soils that are well-aerated, high in organic matter, and acidic (below pH 5.5). Before planting blueberries, a soil test is essential to determine pH and soil nutrient levels. *Never* add lime to soils where you are going to grow blueberries.

First growing season

Two to four weeks after planting, scatter 1 oz (2 tablespoons) of urea or ammonium sulfate in a circular band 12–18 inches from each plant's base. Blueberries prefer nitrogen in an ammonium form over a nitrate form.

Succeeding years

Apply fertilizer each year when growth starts or blossoms appear. Apply 2 oz ($\frac{1}{4}$ cup) of ammonium sulfate per plant. Increase the amount of ammonium sulfate by 1 oz per year up to the fifth year. After the fifth year, do not exceed 4 oz ($\frac{1}{2}$ cup) of ammonium sulfate per plant annually. In years when organic mulches are applied, increase the recommended amount by one half.

Grapes

Grapes are heavy potassium users. Make sure to add the recommended amount of potash to the soil before planting. Once grape vines begin to bear, add 1 tablespoon of a high-potash fertilizer (potassium chloride 0-0-60 or potassium sulfate 0-0-50) to each plant each year.

First growing season

Scatter 1 oz (2 tablespoons) of ammonium nitrate or urea in an 18-inch circle around each plant 2–3 weeks after planting. If well-rotted stable or barnyard manure is available, apply 20 lb around each vine after planting. Spread the manure in a 4-ft circle around each plant, keeping the manure at least 1 ft away from the vine base.

Succeeding years

In the second growing season, before buds begin to swell, broadcast 2 oz ($\frac{1}{4}$ cup) of ammonium nitrate or $1\frac{1}{2}$ oz ($\frac{1}{4}$ cup) of urea, and the grade and amount of fertilizer recommended by the initial soil test report. Increase the amount of ammonium

nitrate by 1 oz each year up to a maximum of 5 oz (approximately $\frac{2}{3}$ cup) per plant annually.

If there is too much vine growth, reduce the amount of nitrogen that you apply the following season. If the vines suffer frequent bloom loss from frost and excessive growth is likely, split the nitrogen into two applications. Apply half of the nitrogen when growth begins and the other half in early to mid-June only if fruit set has occurred. If your grape planting is next to or part of a well-fertilized garden, you usually will not need to apply additional nitrogen fertilizer.

Currants and gooseberries

Before planting

As with other small fruits, it is a good idea to prepare the soil and apply manure before planting. If a soil test shows that the soil needs potassium, use potassium sulfate instead of muriate of potash (KCl) because chlorides injure currants. These recommendations are also suitable for other bush fruits such as juneberries and viburnum.

First growing season

Sidedress or broadcast 1 oz (2 tablespoons) of ammonium nitrate in an 18-inch circle around each plant 3–4 weeks after planting.

Succeeding years

In the second growing season, apply an additional 2 oz ($\frac{1}{4}$ cup) of ammonium nitrate or $1\frac{1}{2}$ oz ($\frac{1}{4}$ cup) of urea per plant. Increase ammonium nitrate or urea by 1 oz per plant each following year, up to a maximum of 5 oz per plant annually. Apply the fertilizer in the spring just as new green growth begins to emerge from the buds.

You can use manure instead of ammonium nitrate. In early spring, apply 10 lb of well-rotted stable or cow manure in a circle around each plant, keeping the manure at least 1 ft from the base of the plant.

Other fruit crop publications

For more information about growing small fruits, contact your county Extension office for the following Extension publications:

Growing Currants, Gooseberries, and Elderberries in Wisconsin (A1960)

Growing Grapes in Wisconsin (A1656)

Growing Raspberries in Wisconsin (A1610)

Growing Strawberries in Wisconsin (A1597)

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