Flowering Trees

Management Highlights

- Target pH: **6.0**
- Fertilize flowering trees in late fall after trees become dormant or in early spring (February or March) before trees leaf out. The use of slow-release fertilizers helps to ensure that nutrients will be available for growth when needed by the tree.
- Do not fertilize in late summer since it may stimulate succulent growth which is subject to frost damage or winter-kill.
- New trees should **not** receive any inorganic fertilizer at planting.

Introduction

Flowering trees include such plants as flowering crabapple, flowering cherry, magnolia and dogwood. These plants are grown for their flowers as well as their foliage. With proper management, these trees contribute greatly to the beauty of the landscape.

Soil pH and Liming

The target pH for flowering trees on most Delaware soils is **6.0.** A lower target pH (**5.6**) is used on black, high organic matter soils (soil OM>6%) since organic matter moderates some of the negative effects of soil acidity. The lime recommendation is calculated from the soil pH and buffer pH measurements using the steps outlined in ***Calculating the Lime Requirement -- Chapter 4, Section 4.4.*** Avoid overliming in order to encourage good plant growth and prevent deficiency of micronutrients such as iron.

In most cases, the lime requirement can be met by either calcitic or dolomitic limestone. ***Dolomitic limestone*** is recommended if:

- soil test Mg is less than 50 FIVs, or
- soil test Mg is between 50 and 100 FIVs ***and less than soil test Ca.***

Calcitic limestone is recommended if:

- soil test Mg is greater than 100 FIVs, or
- soil test Mg is between 50 and 100 FIVs ***and greater than soil test Ca.***

Lime should be applied in the fall. Do not spread more than 50 lbs lime/1000 square feet at a time. If more than 50 lbs/1000 square feet has been recommended, make two or more treatments of 40-50 lbs each several months apart until the full rate has been applied.

Nutrient Recommendations

Nitrogen is the most important element for tree response. Most soils found in the garden or landscape contain sufficient phosphorus and potassium to support the accelerated growth associated with nitrogen application. For sites where soil test P and/or K are less than optimum, a slow-release, high-nitrogen complete fertilizer such as 14-14-14 or 18-6-12 should be used.

Nutrient recommendations for flowering trees are based on several factors:

- the desired rate of growth for the tree
- the soil test P and soil test K level in the soil around the tree.
- the spread of the tree's rooting zone.

The rate of tree growth is directly related to the rate of nitrogen (N) applied to it. Recommended rates of N range from 2.5 lbs to 5.0 lbs N/1000 square feet. A young tree that is growing rapidly requires 5 lbs N/1000 square feet per year split into two or more applications. An older, established tree requires an application of 2.5 lbs N/1000 square feet every 2-3 years to sustain vigor. An application rate between these two will encourage a rate of growth between these two extremes.

The N source selected is dependent upon the soil test P and soil test K values for the site as shown on the soil test report form (see Figure 4-2). When the soil test P and/or K values are 100 FIVs or less, use a complete, slow-release, high N fertilizer such as 14-14-14 or 18-6-12. When soil test P and K are both 101 FIVs or higher, ammonium nitrate (34-0-0) or urea (46-0-0) are good fertilizer choices.

The total quantity of fertilizer applied should be based on the spread of the tree's root system rather than on the diameter of the trunk. The fibrous root system of most trees extends far beyond the tree's crown or drip line. Soil sample the area to determine the extent of the root zone. Surface broadcasting of fertilizers over the entire area of the root system is an effective and efficient method of application. About 80% of all fibrous roots are located in the top 12 inches of the soil surface, with many of those found in the top 6 inches. As a result, a surface broadcast application can easily reach a majority of the root system.

Once all these factors have been determined, the ***Universal Tree Fertilization Computation Formula*** (***UTFCF***) can be used to calculate the amount of fertilizer needed per tree. The ***UTFCF*** combines the 3 factors described above to calculate the total quantity of fertilizer required per tree. The ***UTFCF*** is defined as follows:

$$FR = \frac{(R^2 \times RNR)}{(3.5 \times FNC)}$$

where:

FR	=	the amount of fertilizer required in lbs
R	=	the distance from the trunk to the edge of the root system
RNR	=	the recommended N rate in lbs/1000 square feet (from 2.5 to 5.0 lbs N/1000 square feet dependent upon the rate of growth desired)
3.5	=	***UTFCF*** conversion constant
FNC	=	the N content in the fertilizer as a percentage (e.g., 34% for 34-0-0)

Table 1 show the amount of two common fertilizers (34-0-0 and 18-6-12) needed to provide 5 lbs N/1000 square feet to trees with root zones ranging from 4 to 40 feet in diameter (e.g., 2 to 20 feet radius) as calculated by the ***UTFCF. To determine the quantity of each material required to supply a rate of 2.5 lbs N/1000 square feet, divide the amounts shown in Table 1 by 2.***

Table 1. Quantity of fertilizer materials required to supply 5 lbs N/1000 square feet per tree as a function of fertilizer material and root zone radius.

Root System Radius (feet)	Quantity of Fertilizer Required	
	18-6-12	**34-0-0**
2	5 oz	3 oz
4	1 lb 4 oz	11 oz
6	2 lbs 13 oz	1 lb 8 oz
8	5 lbs 1 oz	2 lbs 13 oz
10	8 lbs	4 lbs 5 oz
12	11 lbs 8 oz	6 lbs 4 oz
14	15 lbs 8 oz	8 lbs 8 oz
16	20 lbs	11 lbs
18	25 lbs 8 oz	14 lbs
20	32 lbs	17 lbs 8 oz

Note: 8 oz. of fertilizer equals approximately 1 cup.

CAUTION: Newly planted trees should not be fertilized at planting.

Recommended Time of Application

Fertilize trees any time from November 1 to April 1. If a tree is suffering from nutrient deficiency, apply needed fertilizer any time before mid-July. After mid-July, avoid fertilization which would stimulate excessive growth that might not harden off properly before winter.

To ensure that nutrients are available when needed for growth, apply slow-release materials in mid-fall (after trees have dropped their leaves), in winter or very early spring before growth has resumed. Soluble materials such as ammonium nitrate (34-0-0), which are quickly-available, should be applied only in the spring.

CAUTION: If the root zone area is planted with groundcovers, grass or other plants sensitive to high N levels, thoroughly water in the fertilizer to prevent plant injury. If the tree is planted in a lawn area, split the fertilizer application into two treatments two weeks apart to prevent injury to or overstimulation of the lawn.

Additional Information

See Soil Test Notes 1 and 13 (Appendix APP-7) Extension Bulletin #154: ***The Care of Ornamental Plants -- Delaware Home Gardeners Manual*** for additional information about nutrient management of flowering trees.