UNIVERSITY OF FLORIDA
IFAS EXTENSION

Florida Yards Program
Learn-By-Mail Course
Principle 3 - Fertilizer Basics

Fertilizer is not "plant food." Plants manufacture their own food sugars during photosynthesis which occurs in the leaves. During photosynthesis, the plant uses the nutrients in fertilizer. When overused, fertilizers can increase disease and insect problems in the landscape. Too much fertilizer can cause excessive growth resulting in higher maintenance. Fast growing plants are more likely to suffer wind damage and may be shorter lived. Excessive fertilizing can run off into our waterways, leach into aquifers, and pollute drinking water.

To use fertilizer safely and effectively, consider the following questions:

Why should I use fertilizer?

Most plants in nature grow quite well without fertilizer applications. It is not always the answer for plants that are yellowing, wilting or "doing poorly" . These signs may indicate a need for more or less light or water. A fertilizer application will not help them. However, botanists have found that certain nutrients applied to the soil sometimes cause plants to produce more fruit or flowers, faster growth, or better color. Before applying fertilizer, we need to know what we want to accomplish and if the fertilizer we are using is actually producing that effect. Remember you may not be rewarded with more fruit or flowers if a fertilized plant is using energy to produce a flush of new growth. Faster growth is not always desirable, especially in turf grass during the summer months.

Fertilization may NOT be required:

- if you are pleased with the appearance of your landscape plants
- if plants are established
- if plants are flowering or fruiting, since exposure to high nitrogen at this stage may cause fruit or flowers to drop
- for trees, unless nutrient deficiencies exist

What fertilizer should I buy?

There are 18 nutrients essential for plant growth. Plants get some nutrients, like carbon, hydrogen and oxygen, from the air and water. Others are available in the soil or in fertilizers. Many fertilizers contain a number of different nutrients. Buy only the nutrients that you need to achieve the desired results.

There are six macronutrients that are needed in relatively large quantities and are supplied in fertilizers. The three needed in the largest quantities (nitrogen, phosphorous, and potassium) are sometimes called primary nutrients.

Nitrogen is the nutrient needed most often as a fertilizer. Plants use large amounts of nitrogen and our sandy soils don't supply adequate amounts for satisfactory performance. Nitrogen is the element most often associated with a bright green color in plants and turf grass.

Phosphorus is readily available in Florida soils, so unless your soil has been tested and shown deficient in phosphorus, there is usually no need to add more of this nutrient. Phosphorus is most often responsible for root growth.

Potassium helps the plant regulate photosynthesis. Without sufficient potassium, leaves may curl and margins of leaves may die.

The other three macronutrients, often referred to as secondary nutrients, (calcium, magnesium and sulfur) help plants develop properly and are needed in smaller quantities than the previous macronutrients. These are available in lime and fertilizers. Deficiency symptoms may include flattened tops, die-back of the growing tip and distorted and discolored leaves.

Micronutrients (iron, copper, manganese, molybdenum, zinc, boron, cobalt, nickel, chlorine) are essential to growth and appearance, but are only required in very small amounts. These are often supplied by the soil but sometimes the soil doesn't have enough of one of these nutrients.

A nutrient is deficient if its addition to the soil as fertilizer produces a desired plant response.

In summary, the 18 essential nutrients and their chemical symbols are as follows:

(1) Atmospheric Elements that plants get mostly from air and water:
- Carbon (C)
- Hydrogen (H)
- Oxygen (O)

(2) Macronutrients needed by plants in larger quantities are
- Nitrogen (N)
- Phosphorous (P)
- Potassium (K)
- Calcium (Ca)
- Magnesium (Mg)
- Sulfur (S)

(3) Nine micronutrients needed by plants in very small quantities are
- Iron (Fe)
- Manganese (Mn)
- Zinc (Zn)
- Copper (Cu)
- Boron (B)
- Molybdenum (Mo)
- Cobalt (Co)
- Nickel (Ni)
- Chlorine (Cl)

Fertilizer labels usually show 3 numbers. For example: 6-6-6; 15-0-15; or 16-4-8. The first number shows the nitrogen content, the second, phosphorus and the third, potassium. Other nutrients are listed in other places on the label. These numbers represent the percentage, by weight, of each element in that particular fertilizer mixture.

A 100 pound bag of 16-4-8 has 16% nitrogen (N), 4% phosphoric acid, 8% potash or 16 pounds of nitrogen, 4 pounds of phosphorous, and 8 pounds of potassium. A 50 pound bag would contain 1/2 those amounts. So what makes up the rest of a bag of fertilizer? The remainder is made up of conditioners and fillers that keep the material

in a granular, easy-to-spread form. Dolomite, sand, or raw phosphate are often used as fillers.

For lawns and most ornamental plants, the first and third numbers (nitrogen and potassium) should be the same and the middle number (phosphorus) should be no more than half of the first and third. Recommended blends for Florida yards include 10-5-10; 16-4-8; and 15-0-15.

It may be necessary to buy a specialty blend fertilizer for plants like azalea, gardenia, and camellia which require an acid-forming fertilizer with additional iron. Citrus, pecan, palms, and peaches are other examples of plants needing specific blends.

The label will also indicate in what form the nutrients are available: water soluble or water insoluble. It is best to buy fertilizer that is 30-50% water insoluble or "controlled release." In this form, the nutrients are available to the plant over a longer period of time and less nutrients are wasted or lost as run-off. Look for these terms on the bag:

- timed-release, slow release or controlled release

- water insoluble nitrogen, activated sludge, sulfur coated urea (SCU), IBDU, urea form (UF), nitroform, or polymer/ plastic/resin-coated urea.

Some fertilizers claim to be 100% organic. This usually refers only to the nitrogen in the bag. Nitrogen can be derived from natural products such as manure or dried blood. Nitrogen compounds are also available chemically. Claims as to which is better, organic or inorganic, are not as important as is the water soluble/insoluble form. Organic and inorganic are both the same to the plant.

Many fertilizer products for lawns are sold as "Weed and Feed" applications designed to fertilize and kill weeds in one application. They contain both fertilizers and herbicides. These products do not allow homeowners to spot treat weed problems but forces the homeowner to treat the entire yard. Typically, the two materials should not be applied at the same time. For example, the best time to control crabgrass with a preemergent is in mid February (based on soil temperatures) and the best time to fertilize lawns is in early to mid-March. Weed and insect problems should be handled with more environmentally friendly methods and if these options fail, chemicals should be applied only on the affected areas, not the entire lawn .

How should I effectively use fertilizers in my yard?

Lawns: Apply a maximum of 1/2 pound of water soluble nitrogen per 1000 square feet of lawn on each application. If the fertilizer is a timed-release or water insoluble nitrogen, the rate may be increased to 1 pound nitrogen per 1000 square feet of area, depending on the product. Many lawns can get by with two applications of the controlled release products, one in mid February and a second in early October. If using a water soluble nitrogen, additional

applications may be needed. Two to four pounds is the minimum to maximum rate of nitrogen that should be applied per year. If the grass needs "greening up," in July, apply iron (ferrous sulfate or chelated iron) instead of nitrogen fertilizer.

To calculate the number of pounds of nitrogen in a bag of fertilizer, take the total weight of the bag and multiply by the percentage of nitrogen listed on the label. For example:

50 pound bag of 10-5-10 fertilizer
equals 5 pounds of nitrogen
50 x .10 (10%)= 5

This bag will cover 5000 square feet of lawn area at the 1 pound N/1,000 square foot rate or 10,000 square feet at the 1/2 pound N/1,000 square foot rate.

Trees and Shrubs: Trees and shrubs can be fertilized 4-6 weeks after planting. Most established landscape plants grow well with two fertilizer applications per year (Spring and Fall). Established trees 3-5 years of age do not need additional fertilizer. The same rate may be used as for lawns. **Never use weed and feed products around trees and shrubs.**

Palms: Palms require specialized fertilizer mixtures commonly sold under the name "palm special." These contain additional micro nutrients designed to minimize certain palm nutritional disorders. Use a palm special that has an 8N-1P-12K-4Mg ratio. Look for one that has the nitrogen (N), potassium (K), and magnesium (Mg) in a water insoluble form, if possible. Follow recommendations on amounts and frequency of applications listed on the package. Palms should not be fertilized with a high nitrogen fertilizer like a 16-4-8.

When fertilizing, irrigate with 1/4 inch of water following fertilization to avoid the loss of nitrogen and increase uptake efficiency. **Never apply fertilizer when heavy rains are predicted.**

Before applying any fertilizer or lime product, know why you are using it. Apply nutrients to achieve an objective, such as the following:

- to increase shoot growth, root growth, flowering or fruiting
- to establish newly planted trees and shrubs
- to enhance foliage color and plant appearance
- to correct or prevent nutrient deficiencies

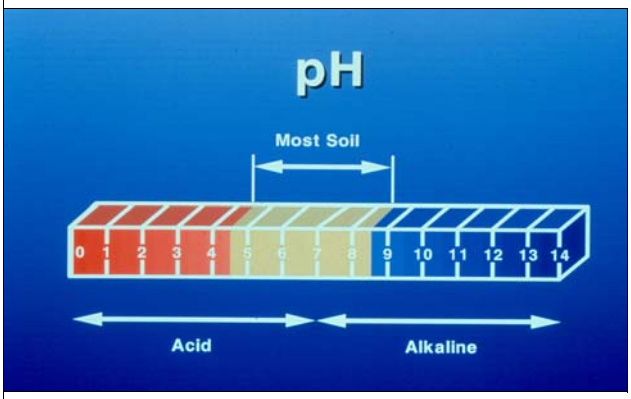
<u>What about lime?</u>

Soil pH is a measurement of the amount of acidity or alkalinity in a given soil. The pH scale is from 0 to 14 with 7 being neutral. Anything below 7 is acid and anything above 7 is alkaline.

Soil pH is important because it determines the solubility of fertilizers. Alkaline soils tie up micronutrients and make them unavailable to the plants. In very acid soils,

some nutrients are so soluble they become toxic to plants.

Indiscriminate liming of Florida soils is not recommended. Once the soil has become overly alkaline (high pH number), it is very

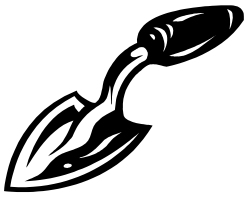


difficult to return the soil to normal levels.

Florida landscape plants are tolerant of a wide range of soil pH. Most prefer a slightly acid soil with a pH between 5.5 to 6.5. Azalea, blueberry, blue hydrangea, phlox, ixora, and bahiagrass are exceptions and like a more acid soil below a 5.5 pH.

If you think your yard may need lime, collect a soil sample and take it to your local County Extension Office for testing. This service costs $1.00 for three samples. Results along with recommendations will be mailed to you usually within a week.

How to Take a Soil Sample:



1. Proper sampling tool is important. A sampling tube or auger is best. If using a shovel or trowel, dig a V-shaped hole in the soil 6 inches deep, and slice 1-inch slab off one side of hole. Lift out and save center 1-inch wide strip of soil.

2. When testing a large area where the soil is mostly uniform , take four or five samples and combine them together in a bucket. Mix it all up and take out about a cup of soil for analysis.

3. If you have a problem area, take the sample from only that area and label it as such.

4. Identify samples by letter or number. Make a sketch or record of some kind so you will know which sample came from which area.

5. Fill out an information sheet and include it and payment in box with samples.

6. Bring the samples to the Extension Service where they will be tested for pH and soluble salt.

7. Consult with county agent or Master Gardener if help is needed with interpretation of test results or fertilization recommendations.

If a more in-depth test is needed, submit samples to the University of Florida Soil Lab. Separate samples should be taken for turf grass areas, specific bedding plants, and vegetable gardens as each could have different lime needs depending upon the plants that are growing in each area. Label each bag with the type of plant you are trying to grow.

For more information, refer to **Landscape and Vegetable Garden Soil Test Information Form** (Fact Sheet SL-136). Forms may be downloaded from the University of Florida website at http://edis.ifas.ufl.edu/SS187 or most County Extension Offices have forms available.

Acknowledgments

The Florida Yardstick Workbook; ed. Billie Lofland. University of Florida Cooperative Extension Service, Bulletin 325.

A Guide to Environmentally Friendly Landscaping, Florida Yards and Neighborhoods Handbook; Allen Garner, John Stevely, et.al. University of Florida Cooperative Extension Service, 1996.

Summary of Florida Green Industries, Best Management Practices for Protection of Water Resources in Florida, University of Florida Cooperative Extension Service, June 2002.

Documents from the Florida Cooperative Extension Service:

- Fertilization Recommendations for Trees and Shrubs in Home and Commercial Landscapes. Circular 948, 1991.
- The Florida Fertilizer Label. SL-3, 1991.
- Fertilizing Your Florida Lawn. ENH20, 2000.
- Plant Nutrients and Fertilizers for the Non-farmer. Fact Sheet SL-60, 1996
- Evaluation of Slow-release Fertilizers in Florida. ENH 136, 1999.
- Web site for the University of Florida, Institute of Food and Agricultural Sciences http://edis.ifas.ufl.edu