Earth-Kind®
Texas AgriLife Extension Service

Landscape Fertilizers:

Selection, Handling, Application and Storage...

Lawn and garden experts have long-known that plants, especially turfgrass, benefit from the regular application of supplemental fertilizers. Recently, however, there are increasing concerns about ecosystem contamination (i.e. surface and groundwater) from runoff carrying these nutrients. Balancing the benefits of plant fertilizers with their environmental impacts has become an important issue for communities throughout Texas and the US.

Eutrophication, is the term used to describe an increase in the concentration of chemical nutrients entering an ecosystem. Depending on how much eutrophication occurs in surface and groundwater, negative environmental impacts like depleted oxygen levels (anoxia) and decreases in water quality, fish, and other animal populations may occur. Many experts theorize that the inappropriate selection, handling, application, and storage of lawn and garden fertilizers are important contributors to the euctophication process.

When it comes to lawn and garden fertilizers, nitrate, originating from nitrogen (N) fertilizer compounds, is the leading cause of concern. This nutrient (when present in drinking water at levels above 10 ppm) poses a potential threat to human health, especially infants, causing a condition known as methemoglobinemia, also known as “blue baby syndrome”. Deaths are unusual but low-level methemoglobinemia has no symptoms and may go undetected. This condition can affect long-term child development. Chronic consumption of high levels of nitrate has also been linked to other health problems - including cancer.

Phosphorus (P) is another nutrient component of lawn and garden fertilizers creating some concern. Phosphorus is very insoluble and over time, tends to accumulate in soils. This may lead to runoff high in P. Threats to human health and the environment, related to long-term P exposure, are not well documented or understood. However, concentrations of P are on the rise in many surface and groundwater ecosystems throughout Texas and the US.

Earth-Kind uses research-proven techniques to provide maximum gardening and landscape enjoyment while preserving and protecting our environment.

The objective of Earth-Kind is to combine the best of organic and traditional gardening and landscaping principles to create a new horticultural system based on real-world effectiveness and environmental responsibility.

The principal goals of Earth-Kind include:

- ☑ Water conservation
- ☑ The safe use and handling of fertilizers & pesticides
- ☑ Reduction of yard wastes entering urban landfills
- ☑ Landscaping for Energy Conservation

As your interest and knowledge in these areas grows you will have an increased awareness of the many programs, practices and activities that are Earth-Kind. Working together we can make a difference in conserving and protecting our valuable natural resources.

AgriLIFE EXTENSION
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For more information see our Web site:

EarthKind.tamu.edu

There is little question that lawn and garden fertilizers can potentially contribute to eutrophication. However, other nutrient sources represent the greatest nitrate contributors to surface and groundwater contamination. These include, among others, waste water treatment plants, livestock/poultry wastes, fossil fuel emissions, septic systems and domestic animal wastes. Lawn clippings and leaves swept in to the street and entering storm drains pose a similar ecosystem risk.

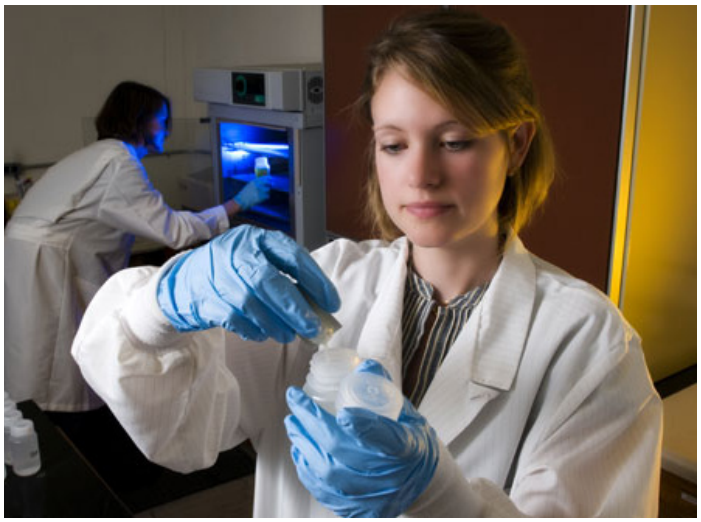
Regardless of the source (i.e. synthetic chemical fertilizers, animal manure, plant derived compost, mulch, etc.) all nitrogen containing materials can potentially contribute to the concentration of nitrate, phosphorous and other nutrients entering an ecosystem. Therefore it is our responsibility to use these materials wisely to create a healthy and sustainable landscape environment. Some individuals approach this challenge by “eliminating” inputs when and where possible. Others address eutrophication by “reducing” inputs to avoid runoff issues. Following are suggestions that take both strategies in to consideration:

A well planned maintenance and care program is essential for keeping plant materials healthy and vigor¬ous. This may include the application of landscape/garden fertilizers. It should be noted that these materials are not a medicine for sick plants nor should fertilizers be expected to over¬come problems caused by the use of non-adapted varieties, improper planting and soil preparation techniques, poor soil drainage, soil compaction or incorrect water¬ing practices. The symptoms or signs indicating the need for fertilization include yellowing (chlorosis) and yellowing between the veins (intervenial chlorosis) lack of terminal growth, mottled leaves, dead branches, stunt¬ed and early loss of leaves, etc.

Many nutrient problems in the landscape/garden are related to pH. Typically high pH levels (i.e. >7.0) tend to limit the solubility/availability of many of the micronutrients – iron most notably. Treating the symptoms of a pH problem (i.e. chlorosis) instead of the problem itself can result in the long-term, excessive application of fertilizer materials which can pose a significant ecosystem threat. Treating a pH problem can be challenging but most often addressed through the addition of organic matter to the landscape/garden.

How Much Fertilizer to Use?

A soil test or analysis is the best way to determine the type and amount of fertilizer to use in a specific landscape/garden situation. Instructions for taking a soil or leaf sample can be obtained from the county Extension office. Results from this test provide the basis for selecting and applying fertilizers in amounts and ratios that minimize nutrient waste maximize efficiency and decrease the potential for contamination.



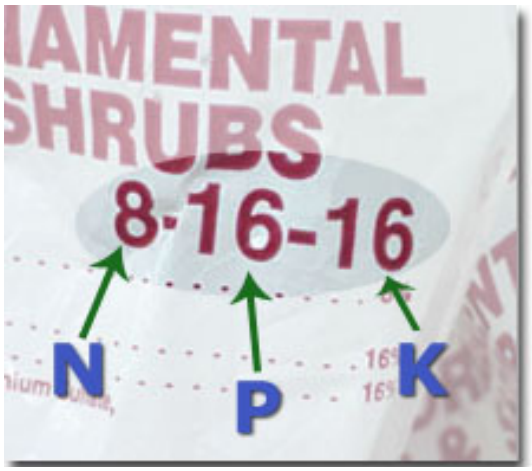
Not all plants require the same level of fertility. Trees need to be fertilized every 2 – 3 years. Shrubs and other woody plant materials can be fertilized yearly, herbaceous annuals and perennials may require more frequent applications (i.e. spring and fall).

In reality, the vast majority of individuals applying landscape/garden fertilizers do so without benefit of soil test data. In the absence of an analysis, a general landscape fertilizer recommendation of 1 - 2 pounds of actual nitrogen per 1,000 square feet per year will typically meet the needs of most landscape plant materials. This rate is significantly lower than those previously considered, by many gardening authorities, as optimum (i.e. 4 – 6 pounds of actual nitrogen per 1,000 square feet, applied twice per year).

When to Apply Fertilizers:

Proper timing of fertilizer applications has a marked effect on the growth of landscape plant materials. In general, the best time to apply fertilizer is in the spring before growth begins. Soil type also affects the timing of fertilizer applications. For sandy or loam soils, apply fertilizer as soil tempera¬tures begin to rise and before growth occurs. For heavy clay soils apply the fertilizer in late fall after leaves have fallen or the plant is completely dormant. The maximum growth response to the fertilizer is obtained if the fertilizer is available in the root zone at or slightly before the start of spring growth. In sandy soils fertilizer moves more rapidly into the root zone, whereas in heavy soils, it takes much longer for the fertilizer to reach the root system.

Generally speaking, do not apply fertilizers from August 1 until late fall (about the time of the average date of the first killing frost). Late summer fertilizing can stimulate an excessive amount of new growth and this tender vegetation can be more susceptible to winter injury. In south Texas where freeze damage is slight, late summer fertilizer applications are beneficial and provide needed nutrients for late fall and winter growth.



What Types of Fertilizers to Use:

Most fertilizers are purchased according to their "analysis." A fertilizers analysis is the percentage of the three major plant nutrients contained – nitrogen (N), phosphorus (P) and potassium (K). The analysis is shown on the bag or container and consists of three num¬bers (i.e., 12-4-8). The first number indicates the percentage of nitrogen (N), the second gives the percentage of phosphorus as phosphoric acid (P205); and the third is the percentage of potassium as potash (K2O). For example - A 50-pound bag of a 12-4-8 fertilizer contains 6 pounds of N, 2 pounds of P205 and 4 pounds of K2O.

The growth of most landscape plant materials is more often limited by a lack of nitrogen rather than by low levels of phosphorus or potassium. For this reason, high nitrogen fertilizers are most often used to supplement plant nutrition. Fertilizers with a 2-1-1 or 3-1-1 ratio are typically used for a broad range of landscape applications. Other common lawn and garden fertilizers include 10-8-6 and 12-6-6.

Because phosphorus is very insoluble, it tends to remain in the soil for extended periods of time. Regular applications of a "complete fertilizer" (a material that contains all 3 nutrients N,P,K) can result in P build-ups in the soil. These accumulations can tie-up other essential plant nutrients and pose an increased potential for ecosystem contamination. For these reasons, many garden experts now recommend the use of No/Low phosphorous fertilizers. These include ammonium nitrate (33-0-0, difficult to obtain because of its explosive properties), ammonium sulfate (21-0-0) and Urea (46-0-0). Although Urea has the highest N content and is typically low-cost, this material requires some unique management to avoid plant damage. As a result, Urea is often mixed with other fertilizers to less than 50% of the total.

Controlled release (CLR) and slow release (SLR) fertilizers offer another means of addressing plant nutrition in the landscape. These products contain fertilizer materials, encapsulated in a special coating, which releases plant nutrients over time. Some of these coatings are regulated by soil temperature, others by soil moisture. The general concept is to match nutrient release with the same conditions that stimulate plant growth (i.e. soil temperature above 70○ F). Although somewhat pricey, CLR's and SLR's tend to maximize efficiency and decrease the potential for ecosystem contamination.

Handling, Applying and Storing Landscape/Garden Fertilizers:
The mishandling, application, and storing of lawn and garden fertilizers poses a significant threat to surface/groundwater resources and the environment. The following suggestions can assist in reducing the potential for ecosystem contamination from these materials.

Select the appropriate fertilizer material and amount used based on the results of a soil test.

Limit the use of phosphorus containing fertilizers.

Purchase only the amount of fertilizer to be used in a single application.

Read all labels carefully.

Sweep up any fertilizer materials that end up on walks, driveways, streets or other hard surfaces.

Water in fertilizer materials after applying (i.e. ¼" – ½" of water) BUT do not over-water, creating a hazard from contaminated runoff.

Store fertilizers in a secure location. Keep bags tightly sealed and stored in a dry area. Avoid storage areas that may be prone to flooding.

When mowing lawns, do not direct clippings into the street.

Clippings not left on the lawn, leaves, and other plant debris should be removed as soon as possible from walks, driveways, streets or other hard surfaces. This plant material can be composted, used in the garden as a mulch or disposed of through appropriate community services.

Definitions:
The application of supplemental plant nutrients to lawns, gardens and landscapes is a timely and complex topic. One of the greatest challenges in addressing this issue is defining the various types and sources of nutrients used in these situations. It is the responsibility of the Texas Feed and Fertilizer Control Service, under the Texas Agriculture Code - Texas Commercial Fertilizer Control Act, to regulate the labeling of materials sold and distributed for the purposes of supplying plant nutrients. The following are defined in chapter §65.00 of the Texas Administrative Code – Agriculture (CommercialFertilizerRules-rev-Sept-2007.pdf).

"Fertilizer material" means a solid or nonsolid substance or compound that contains an essential plant nutrient element in a form available to plants and is used primarily for its essential plant nutrient element content in promoting or stimulating growth of a plant or improving the quality of a crop or for compounding a mixed fertilizer. The term does not include the excreta of an animal, plant remains, or a mixture of those substances, for which no claim of essential plant nutrients is made.

"Specialty fertilizer" means a fertilizer distributed primarily for nonfarm use, including use on or in home gardens, lawns, shrubbery, flowers, golf courses, municipal parks, cemeteries, greenhouses, or nurseries. The term does not include the excreta of an animal, plant remains, or a mixture of those substances, for which no claim of essential plant nutrients is made.

"Inorganic Fertilizer" means a mineral, nutrient source containing less than 5.0% carbonaceous material.

"Natural Material" means an animal, plant, or mineral - found solely in or produced solely by nature which have neither been mixed with any synthetic material nor changed from their initial physical state except by washing, air-drying, chopping, grinding, shredding, or pelleting and not changed in its chemical state except by biological degradation or chemical change initiated solely under normal conditions of aging, rainfall, sun-curing or sun-drying, composting, rotting, enzymatic or anaerobic bacterial action, or any combination thereof.

"Organic." When applied to a product, to a compound, to a mixture of compounds or to a specific constituent used as an ingredient means that the claim of the product, compound, mixture of compounds or constituent to be organic has been allowed or allowed with restriction by the United States Department of Agriculture's National Organic Program or the Texas Department of Agriculture's Organic Certification Program. (Materials described as organic must still conform to the Texas Commercial Fertilizer Control Act if they are used in fertilizer.)

Labeling:
Under the Labeling sub-section of the Texas Commercial Fertilizer Control Act, all materials sold as "fertilizers" must have a label with the following information:

(1) the name and principal address of the person responsible for manufacture and distribution;

(2) the brand, grade, and name under which the fertilizer is to be distributed;

(3) the net weight of the fertilizer in the container;

(4) the guaranteed analysis of the plant nutrients in the fertilizer, listing the minimum percentages of primary, secondary, and micro plant nutrients, and other additives, in accordance with rules of the Service; and

(5) other information that the Service may by rule prescribe. (b) The guaranteed analysis of any unacidulated mineral phosphatic materials and basic slag shall guarantee both the total and available phosphate and the degree of fineness. The guaranteed analysis of bone, tankage, and other organic phosphate materials shall guarantee the total phosphate. All materials included in the guaranteed analysis are subject to inspection and determination by laboratory procedures in accordance with rules of the Service.

Understanding the rules and regulations used to define and label these materials can greatly assist in better managing the supplemental addition of plant nutrients to lawns, gardens and landscapes. The appropriate selection, handling, application and storage of these materials can reduce the volume of nutrients entering surface and groundwater resources – helping to create a healthy and sustainable environment.

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See the Earth Kind Web site for more ways to preserve and protect the environment...

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