

FERTILIZER SELECTION AND APPLICATION

Excerpt from:
**HEALTHY LAWN CARE PROGRAM FOR
OAKLAND AND WAYNE COUNTY RESIDENTS**

Updated by **SOCWA** in cooperation with the
Healthy Lawn and Garden Technical Advisory Committee

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Basic Fertilizer Selection

Fertilizer is important to the health and vigor of turfgrass. The type of fertilizer selected by the lawn owner, however, is a matter of choice. Many good fertilizers and choices are available at local hardware stores, garden centers, and builder supply stores.

A *fertilizer*, by definition, is any material or mixture used to supply one or more of the essential plant nutrient elements. Sixteen nutrients are essential for plant growth and development. Of the major nutrients, nitrogen, phosphorus, and potassium are required in relatively large amounts. Calcium, magnesium, and sulfur are also required in relatively large amounts, but are less likely to be deficient in the soil system. Micro-nutrients (such as iron, chlorine, manganese, boron, etc.) are essential to plants in relatively small amounts.

Nitrogen (N) is important because it promotes vigorous plant growth, increases top growth, and is a building block for protein. *Phosphorus (P)* promotes cell division and stimulates healthy root growth and is essential for seed germination. *Potassium (K)*, also labeled as "potash", is an essential nutrient for photosynthesis which also promotes fruit formation and imparts disease resistance and winter hardiness.

The purpose of fertilization is to provide nutrients (minerals) to the grass roots. Grass blades then manufacture their own food. Some fertilizers, however, have important benefits for the soil system -- especially if they contain organic matter which helps build soil life and better soil structure.

All fertilizers are labeled with 3 numbers (i.e., 12-3-9 or 10-10-10), giving the percentage by weight of nitrogen (N), phosphate (P), and potash (K). These numbers are called the "guaranteed analysis".

A *complete fertilizer* provides some quantity of all three of these nutrients.

The amount of nitrogen needed is determined, in part, by the type of grass, soil health, site conditions, maintenance practices of the lawn owner, and goals of the owner.

The standard fertilizer application rate listed on the bag is one pound for every 1000 square feet of lawn – for each application. The amount of fertilizer applied over the course of the year – not the total amount applied at each application time – is usually the focus of discussion.

The Healthy Lawn Care program recommends 2 to 4 pounds of nitrogen per year, spread out over 2, 3, or 4 applications during the growing season.

Despite the attention given to N-P-K ratios in fertilizers, one of the most important recommendations for healthy lawn care is to select a slow-release fertilizer. As described below, slow-release fertilizers provide for steady growth and water quality protection -- a winning combination!

Organic vs. Synthetic Fertilizers

The choice of organic vs. synthetic (man-made) fertilizers is an individual one. There are excellent organic fertilizers and excellent synthetic fertilizers. The nutrients are the same after they are released into the soil system.

An organic fertilizer, by definition, contains nutrients which are derived solely from the remains of (or are a by-product of) once-living organisms. Examples of organic fertilizers include cottonseed meal, blood meal, composted manure, and bone meal. Urea is sometimes organic and sometimes synthetic in form.

In general, organic fertilizers release their nutrients slowly over a fairly long time. (Note: synthetic fertilizer can also be made to release nutrients over a long period of time.) Organic nutrients depend on microbial organisms in the soil to break down the material and make it available to plant roots.

On the other hand, organic fertilizers may not have nutrients immediately available to plants at times of transplanting, and organic products may be more expensive than synthetic products. In general, a large quantity of organic fertilizer is needed to provide a given level of nutrients - - at least when compared with formulated bags of synthetic fertilizers.

A number of fertilizers formulated with a combination of organic and synthetic materials are available for purchase. These products attempt to combine the advantages of both types.

Soil Nutrient Testing – An Essential Step in Fertilizer Selection

Soil nutrient testing is important for healthy plants and clean water. A soil test is the best way to begin to learn about the nutrient needs of the lawn. A soil test indicates nutrient levels already in the soil – a first step in determining how much and what type of fertilizer is needed for the lawn.

Since plants take up nutrients from the soil, nutrients (contained in fertilizer) need to be replenished from time-to-time. Over-application of fertilizers can pollute water resources, ruin plants, and waste money. Why take the chance of making a mistake?

The MSU soil testing laboratory analyzes the soil sample for pH, lime requirement (if any), phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg). A written report is mailed to the customer with an interpretation of the results and fertilizer recommendations—based on the plants being grown.

A recommendation for nitrogen is provided in the soil test results. The nitrogen component of the soil test recommendation reflects a computerized data base – not the actual soil sample – because nitrogen does not stay in the soil long enough to be effectively tested.

Fertilizer as a Source of Nitrogen and Phosphorus in Lakes, Streams, and Groundwater

The nutrient cycle in a managed lawn is complex, consisting of many interacting inputs, outputs, and storage components. Atmospheric deposition, irrigation water, and grass clippings – as well as fertilizer – can be sources of nitrogen and phosphorus to the soil system.

When quantities of phosphorus and nitrogen reach lakes, the growth of algae and aquatic weeds is stimulated. Nitrogen is particularly a concern for groundwater used for drinking, especially when found in concentrations above 10 parts per million.

Phosphorus is an even greater concern for rivers, lakes, and ponds. In most lakes, for example, the amount of phosphorus determines the amount of algae and aquatic plants.

Many different land uses, including streets, lawns, and farmland, may be sources of nitrogen and phosphorus in small watersheds. The contributions from each small watershed vary, reflecting the natural characteristics of the site and types of uses. Recognizing that lawn fertilizers can easily be misapplied, over-fertilization is considered by many water quality experts to be a likely pollution source.

- Fertilizer may fall onto the sidewalk or driveway and be carried to storm drains or the river;
- Excessive fertilizer use on sloped lawns or “thin” lawn may lead to polluted runoff;
- Quick-release fertilizer applied before a heavy rainstorm may move through soil or runoff the surface of the ground.

Each site has its own characteristics that add to pollution risks.

Of particular note is the natural ability of thick, dense turf (e.g., a healthy lawn) to absorb and break down pollutants. Grassed swales and grass-lined storm water retention basins have important benefits for water quality.

Slow-Release Fertilizer for Steady Growth and Water Quality Protection

Slow-release fertilizers are recommended for all varieties of lawn grasses. A slow-release fertilizer will promote steady, uniform growth and help protect water quality -- while providing the nitrogen (and other nutrients) necessary for healthy grass growth.

Slow release fertilizers are used by many professionals -- on golf courses and home lawns. Citizens participating in the Healthy Lawn Demonstration Program (1996 to the present) have found slow-release fertilizers to be useful for creating a low-maintenance, attractive green lawn.

Environmental Benefits from Slow-Release Fertilizers

University specialists recommend slow-release fertilizers for the following reasons:

- (a) To protect lakes, streams, and groundwater, reducing high-nitrogen runoff or leaching
- (b) To promote steady, natural uniform grass growth, avoiding "spurts" of growth.
- (c) To provide essential nitrogen, a building block for protein in the grass blades and stems.
- (d) To reduce the danger of over-fertilization, including salt buildup or burning of lawn.
- (e) To save time and money in the long run. Slow-release fertilizers typically last more than 2 - 3 months. These products may appear to be more expensive, but actually be less expensive, since fewer applications are needed.
- (f) To protect soil microbial life and earthworms.

Slow-release fertilizers are often more expensive than quick-release products, but they last longer and fewer applications are needed. Slow-release fertilizers which are natural organic products (with organic matter) contribute to the general healthy of the soil. Healthy soil with diverse micro-organisms naturally resists pests and diseases.

Definition of Slow-Release Nitrogen Fertilizer

Slow release fertilizers include:

- Organic fertilizers (nitrogen released through microbial action); and
- Fertilizers with 50% or more of their nitrogen in a water insoluble form (W.I.N., or the equivalent.)

Slowly-available nitrogen materials release a major portion of their nitrogen over relatively long periods of time. The standard of 50% or more slowly-available nitrogen is recommended by Healthy Lawn and Garden Technical Advisory Committee for Oakland and Wayne Counties. Two important reasons support this standard: (1) this type of slow-release fertilizer is available to landscape companies and to citizens; and (2) it protects water quality. A number of Eastern states are using 40% or 50% or more W.I.N. as their standard for slow-release nitrogen.

Not all slow-release fertilizers have the low-phosphorus characteristics needed for a high level of water quality protection. Fertilizers which are both slow-release nitrogen and low-phosphorus are recommended (see the section which follows).

EARTH-FRIENDLY FERTILIZERS: Updated April 2007

**RECOMMENDED FOR
LAKE AND RIVER WATER QUALITY PROTECTION,
SOUTHEAST MICHIGAN**

**Recommended by the
Healthy Lawns and Gardens Technical Advisory Committee**

Criteria for designation as an earth-friendly fertilizer:

Slow-release nitrogen:

- Natural organic fertilizer; or
- Synthetic fertilizer with 50% or more W.I.N. or controlled-release component

Low-phosphorus or no-phosphorus:

- Ratio of nitrogen-to-phosphate is 5:1 or greater

Free of all pesticides (including herbicides); no weed-and-feed.

BRAND NAME	N-P-K	% Slow-Release Nitrogen
Corn Gluten Products	9-0-0	85%
Clean Green Soy Fertilizer	7-0-0	High
Fertrell Lawn Fertilizers	9-1-4 or 8-1-8	70% - 85%
Lesco Professional Turf Fertilizer	32-0-10	67%
Ringer Lawn Restore	10-2-6	76%
Scotts Organic Choice Lawn Food	11-2-2	91%
Soil Science	5-0-7	High
Sustane (Lesco product)	18-1-8	79%
Turf Nurture	15-2-7	75%

Other products meeting these criteria may be available. If you are aware of other products, please contact the Southeastern Oakland County Water Authority at 248-288-5150 or LFDean@aol.com. See also www.HealthyLandscapes.com for healthy lawn care tips and store locations.

The fertilizers listed here meet the standards recommended by the Healthy Lawn and Garden Technical Advisory Committee. Please note that it is not necessary to have extremely high percentages of slow-release nitrogen in order to be effective. Almost all of the fertilizers listed above exceed the threshold of 50% slow-release nitrogen – sufficient to protect water quality.

Increasingly, garden centers and hardware stores in Oakland County and Wayne County are stocking slow-release, low-phosphorus fertilizers to help their customers protect water quality. For a list of stores participating in the slow-release fertilizer bag sticker program, contact SOCWA (248-288-5150) or the Wayne County Department of the Environment (734-326-3936).

Check with your local hardware store or garden center for availability and price.

When reading the labels of fertilizer bags, always check for the presence of herbicides and pesticides. So-called “weed-and-feed” combination products are sometimes hard to separate from plain fertilizer. **Weed-and-feed products are not recommended** because they typically lead to excessive quantities of pesticides applied in the wrong place on the lawn. Spot treating for specific weeds (or hand weeding) are more effective approaches which are compatible with IPM – Integrated Pest Management.

How to Determine Fertilizer Quantities

The application rate listed on the fertilizer bag is correct for most lawns: one pound of N for each 1000 square feet of lawn, for each application. It is the number of applications, not the amount of nitrogen per application that should be varied according to the type of lawn, condition of soil, lawn maintenance practices, etc. The Healthy Lawn Program recommends 2, 3, or 4 fertilizer applications over the course of the growing season. This number of applications translates into a total of 2 pounds, 3 pounds, or 4 pounds of nitrogen per thousand square feet of lawn – for the entire year.

Lawn owners are encouraged to “take charge” of their own lawn and determine the number of fertilizer applications (and the total amount of fertilizer) needed. The following guidelines are useful in making the determination:

1. If clippings are left on the lawn after mowing, fertilizer quantity can be reduced by 25% or more.
2. If the lawn is in partial shade, fertilizer applications can be reduced by 25% or more.
(Note: It is difficult to grow healthy grass in dense shade. Natural organic mulches are a better choice).
3. Different types of grasses need different amounts of nitrogen to keep them healthy. Of the grasses common in Southeast Michigan, Kentucky bluegrass typically requires the most nitrogen (4 or more pounds of nitrogen per thousand square feet). Fescues (tall fescue, red fescue, mixed fescue, etc.) and ryegrasses (annual; perennial, etc.), and grass mixtures, require less nitrogen fertilizer.
4. Older lawns (vs. newly-established lawns) typically require less nitrogen fertilizer.

5. Soils with a “healthy” amount of organic matter (more than 5% by volume) may be able to reduce nitrogen fertilizer quantities. Organic matter contributes some nitrogen to the soil system as it decomposes.

Time and money may also influence lawn owner decisions.

If residents are extremely concerned about the potential for fertilizer leaching or runoff, the fertilizer application rate can be reduced in half – and the number of applications doubled.

Finally, it should be remembered that it is fine to apply no fertilizer at all to the lawn. The only consequence of not applying fertilizer at all is the potential for thin grass, weeds, and a stressed lawn that is prone to disease. Although the first year of a “no fertilizer” lawn may be fine, the second and third year may lead to an unsightly appearance which drives the lawn owner to apply herbicides and insecticides – adding to environmental impacts rather than reducing them.

Timing of Fertilizer Applications – Spring, Summer and Fall

A little bit of nitrogen goes a long way to make grass green and healthy. When “too much” fertilizer is applied, grass grows fast and the potential for disease is increased. The fertilizer application selected by the homeowner should match the type of grass, the soil, lawn care style, and other personal choice factors.

Many citizens follow the “4 step” program recommended by some fertilizer companies. The “standard national” recommendations are not appropriate for all regions of the country...or all lawns. For an easy-care, low-maintenance lawn, a single application of slow-release fertilizer in the fall may be sufficient. For others who enjoy yard work and are looking for a thicker turf, two, three or four applications of fertilizer may be selected.

In all cases, fertilizing during hot, dry weeks should be avoided. At such times the lawn requires water – not fertility.

Professional turfgrass specialists can tell when lawn needs fertilizer by its “look and feel.”

The Healthy Lawn and Garden Technical Advisory Committee for Oakland and Wayne Counties, Michigan has identified three options which are often considered. The type of grass and other maintenance factors affects which one is selected. Each option is outlined below.

Option #1 - Two fertilizer applications *(usually with clippings left on the lawn)*

- One pound of nitrogen for every 1000 sq. ft. of lawn in the **late spring** -- generally late April or May.
- One pound of nitrogen for every 1000 sq. ft. of lawn in the **fall**.

Option #2 – Three fertilizer applications

(especially for sodded lawns where the clippings are left on the lawn):

- One pound of nitrogen for every 1000 sq. ft. of lawn in the **late spring** (Memorial Day)
- One pound of nitrogen for every 1000 sq. ft. of lawn in the **early fall** (Labor Day.)
- One pound of nitrogen fertilizer for every 1000 sq. ft. of lawn in **mid-fall** (October).

Option #3 -- Four fertilizer applications

(especially newly-sodded lawns when the clippings are removed)

- One pound of nitrogen for every 1000 sq. ft. of lawn in the **late spring** (Memorial Day).
- One pound of nitrogen for every 1000 sq. ft. of lawn in **early summer** (4th of July).
- One pound of nitrogen for every 1000 sq. ft. of lawn in the **early fall** (Labor Day.)
- One pound of nitrogen fertilizer for every 1000 sq. ft. of lawn in **late fall** (Thanksgiving).

Note: The advisability of EVER fertilizing in early summer is questioned by some experts. If late June/early July weather is dry and hot, fertilizer should not be applied.

None of these options includes fertilizing lawns in the early spring. There is no need to fertilize when the grass is rapidly growing. Early May is the earliest time recommended for do-it-yourself lawn keepers.

The timing may be different, however, for fertilizers applied by lawn care services. Private landscapers point out the pressure and requests they receive from customers who want their lawn to be fertilized in the early spring. From an operational standpoint for these companies, it is efficient for them to offer services in mid-April, assuming that the ground is not frozen. The Healthy Lawn and Garden Technical Advisory Committee, therefore, recommends mid-April as the time to be specified in municipal policies and ordinances.

Fall is the most important time to fertilize. Fall fertilization promotes root growth rather than top growth. Strong roots store food produced in the grass blades for use in the early spring. Some lawn care programs in Michigan and the Midwest recommend applying 70% or more of the total nitrogen fertilizer for the year during the fall ... spread out over 2 or 3 applications.

Note: Many soils in Southeast Michigan are somewhat or extremely alkaline. Typically, lime is not needed. However, in Eastern states, lime is often needed to increase the pH of the acid soil and make it more suitable for growing turf grasses.