

Soil test reveals turf nutrition needs

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Plants require varying amounts of many different nutrients. Nitrogen, potassium and phosphorus, for example, are usually needed at higher rates than micro-nutrients such as iron, zinc or copper.

Table 1 shows the source of turfgrass nutrients.

Not all soils are capable of furnishing the same nutrients or the same amount of a given nutrient, so when managing a landscape, it makes sense to take advantage of the nutrient levels already present in the soil.

If a plant needs more of a nutrient than the soil can furnish, then a fertilizer containing that nutrient must be used. It is always desirable to make sure the landscape has an optimum supply of all the nutrients it needs. This way, all the plants will perform to their best ability.

The best way to monitor the nutrient status of any landscape is through periodic soil testing, a valuable tool in developing the landscape fertility program. It makes little sense, economically and environmentally, to apply unneeded nutrients to the landscape.

Research has estab-

lished or identified the amounts of each nutrient that must be available in the soil for good plant growth (Table 2).

Is soil ready for growth season?

The best time of the year to gather soil for testing is during the landscape's dormant period. This may be in late fall or during the winter months when the fertility status of the soil is fairly stable. Soil nutrient levels constantly change during the growing season. Soil organisms as well as plants use up nutrients. The breakdown of organic matter and soil minerals continuously apply certain nutrients. A heavy rain may leach nutrients down through the rootzone. Taking a soil test too soon after a fertilizer application may produce a false result. The dormant period is the best time to test.

Soil submitted for testing should come from around the root system of the plant. The sample should be free of roots. Do not sample too deeply. Plant roots are typically only a few inches deep.

Soil may vary

The soil found in the front yard of a home may be different than a sample taken from the back yard. Soil samples may also vary from one golf course fairway to another. The larger the area, the greater the chance that the soil may vary, but the only way to know for sure is by taking several "sub-samples."

In a home lawn, take three or four sub-samples from the front and back yards. Put all of them in a container and mix thoroughly. Take the final sample for the analysis from the mixture. This way, the lab results and any subsequent recommendations

Table 1. PRIMARY PLANT NUTRIENTS AND THEIR SOURCE

Macro-nutrients	Primary source
Nitrogen (N)	Fertilizer & soil
Potassium (K)	Fertilizer & soil
Phosphorus	Fertilizer & soil
Sulfur (S)	Soil
Magnesium	Soil
Calcium (Ca)	Soil
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Micro-nutrients	Source
Iron (Fe)	Soil
Manganese (Mn)	Soil
Zinc (Zn)	Soil
Copper (Cu)	Soil
Molybdenum	Soil
Boron (B)	Soil
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Others	Sources
Oxygen (O)	Water, carbon dioxide
Hydrogen (H)	Water
Carbon (C)	Carbon dioxide

SOURCE: TEXAS A&M SOIL TESTING LAB

Table 2. TYPICAL CRITERIA FOR SOIL NUTRIENT LEVELS IN PARTS PER MILLION (PPM)

Nutrient	Low	Moderate	High
Nitrogen (N)	0-10	16-20	21-30
Phosphorus (P)	6-10	11-20	21-40
Potassium (K)	70-119	120-174	175-300
Calcium (Ca)	180-459	460-749	750-3560
Sodium (Na)	99-399	400-999	1000-3000
Magnesium (Mg)	50-99	100-150	more than 150
Sulfur (S)	8-15	16-24	more than 25
Manganese (Mn)	0-0.99	1.00-1.49	more than 1.49
Copper (Cu)	0-0.10	0.11-0.15	more than 0.16
Boron (B)	0-0.39	0.40-0.59	more than 0.59
Iron (Fe)	0-3.19	3.20-4.19	more than 4.19

Nutrient	None	Slight	Moderate	High	Very high
Salinity (ppm)	0-600	601-1200	1201-2000	2001-3000	3000+

Some of the nutrients applied to turfgrass are used in small quantities. It is best to keep the level of all nutrients in the medium and high categories.

will apply to the entire lawn.

It might make sense to take two or three sub-samples from each of the 18 golf course fairways so that a single recommendation can be used for all the fairways, rather than try to treat each fairway differently. Sub-sampling accounts for any variation in the soil over any size area.

Extension or private labs

Several different kinds of soil testing services are available. Some fertilizer companies will run soil samples as a way to prospect for new business. In every state, the local agricultural university offers soil testing for a fee through the cooperative extension service. Your local county extension agent can provide details. Private labs also test soil samples. If you live in a large city, check the Yellow Pages for these labs.

Choose a lab that you trust and stick with it. If you send a sample of the same soil to each of several labs, the results may differ. Not all labs use the same analytical procedures, which accounts for some variation in results. Someone at the lab must evaluate the results and convert them into a recommendation you can use. Just how

good the recommendation turns out to be depends a great deal on the experience of the person making the recommendations. Make sure the lab has had experience in dealing with lawn or ornamental plant soil samples.

Test regularly, watch for changes

A single yearly soil sample can provide valuable information, but one of the true values in soil testing is to track soil nutrient levels over an extended period. In other words, it's important to soil test every year at about the same time.

Make note of any changes from one year to the next. While it's important to know what the soil level of a particular nutrient is, it also is very important to know if those levels in the soil are increasing or decreasing over the years. Most labs will report soluble salt levels. If you're in a part of the country that has possible salt problems, they may show up on the soil test result sheets before you notice symptoms. That gives you time to adjust the management program before any permanent damage is done. **LM**

How to take a soil sample

1. Soil samples should not include any sod or surface debris. Scrape away the $\frac{1}{4}$ to $\frac{1}{2}$ inch of plant debris that occurs at the soil surface before taking a sample.

2. The final sample sent to the lab should represent the soil from the whole lawn. Since urban soils tend to be variable, a series of small samples should be taken from selected sites around your home. If there is a great difference between the front and back yards, you may wish to sample them separately.

3. Remove a small sample of soil from each of the selected sites. There's no need to go deeper than about 6 inches.

4. Mix all the soil from the selected sites together in a plastic bucket forming one large sample. Fill the plastic sample bag with about one cup of soil.

5. Fill out the soil sample information sheet completely. □

Soil textures

Clay: Smaller soil particles with wafer-like shapes that provide greater surface area and higher water holding capacity.

Silt: Between clay and sand in particle size; spherical and cubical in shape.

Sand: Largest particle size; spherical and cubical shapes that provide smaller surface-to-volume ratio and therefore a soil that is better aerated and easier to work. Sand has the lowest water-and-nutrient holding ability.

Loam: A combination of all particle sizes, with the desirable attributes of each. □

SOIL TEXTURE SOURCE: TREE CITY USA BULLETIN