TECH CENTER

Fall fertilization:
going beyond N, P and K

Provide a solid base for next year's fertility program by giving attention to elements related to soil structure, not just turfgrass growth.

by Dave Wilber

■ Fall is the time to examine, evaluate and, if necessary, make changes to your turf fertilization program.

Fall fertility regimens are different in that they do not always have to do with the common fertilizers we may use to stimulate plant growth during the growing season. Late season fertilization means that we are in a position to feed and work on the soil.

As the summer heat winds down, turfgrass managers naturally take a breather from the dog days that have had them cornered during the past few months. Turf recovery is evident, and in most cases, the problems of the summer can disappear as the cooler nights set in.

Fall is the time to test and evaluate. Take a soil test of areas that were good and areas that were poor during the season, perhaps in addition to your regular testing program. The analysis is important as a first look at the balance of the soil after the past season's fertilization and irrigation.

The favorite test during this time looks at exchangeable rather than extractable nutrients. The difference is in the testing methods, but it leads to a more long term look at the soil profile. Exchangeable testing (reporting the standard soil test numbers, focuses on plant food nutrients called cations. The positive charged cations we are most concerned with are:

- calcium
- magnesium
- potassium
- sodium.

Hydrogen and dome other base elements in small quantity also figure into calculation of base saturation.

The importance of balance—Base saturation is by far the most informative reporting standard. As testing and reporting evolved there was work done to support the concept of nutrient balance. It was easy to see that when a soil was in balance it is able to support plant life to the greatest extent that nature will allow.

Potassium, rarely found in excess, can be overlooked during fall applications.

In the early 1950's, Dr. William A. Albrecht, a soil science professor from the University of Missouri, announced that a balance of the following nutrients was the optimum formula, based on his extensive work on the subject:

- calcium—65%
- magnesium—12%
- potassium—5%
- sodium—1%
- hydrogen—10%

The remaining 7 percent is found in other base soil elements.

The fall soil test may and probably will show a difference in soil cations, other than what is listed above.

Fall is the perfect time to adjust these numbers. Adjustment is based on the cation exchange capacity of the soil (CEC). A low CEC soil needs fewer actual pounds of soil fertilization than a high CEC. Over application may hurt, and under application may not be sufficient. A soil with a CEC of 4 may hold only 1600 lb./a of calcium as opposed to the 20 CEC soil that holds 8000 pounds of the same calcium.

Always ask if the recommendations are leading toward balanced soils. If they ar not, then ask what the goal may be. A good program will move toward improvement.

The importance of lime— A soil low in calcium should be limed. Lime is misunderstood, and should be viewed as more than just a pH adjuster.

The pH of a soil can be raised by applying any positively-charged material. Lime was used in the early days of agriculture to raise the pH of soils sufficient in calcium.

Dolimitic lime supplies both calcium *and* magnesium. Simply using pH as a guide to soil amendments is not enough, and fails in most cases to bring a soil to balance. In his work, Dr. Albrecht found that a balanced soil also had a pH of 6.2 to 6.8, regardless of where it came from.

Excessive sodium can lead to a high pH. If calcium is low, lime and gypsum can be used to remove sodium from the exchange sites. In this case, we lime the high pH soil to balance the soil.

Potassium is rarely found in excess and can be one of the most overlooked materials available for fall application. During the season, most fertilization has a goal of an equal amount of potassium and nitrogen applied. This may not offset a deficient condition and require additional potassium. The resulting cold and heat tolerance are well worth the money spent.

Late-season fertilization should be focused on the development of a solid base to support the efforts of fertilization during the following season. This may mean looking at fertilizer elements that are related to soil structure and not just turfgrass growth. There should be no guesswork with good soil testing.

Examine the soil carefully. The time spent will pay off in the early days of spring and the hot days of next summer.

—The author is an independent consultant specializing in soil and plant nutrition. A former golf course superintendent, Wilber is a member of the Brookside Laboratory Association. He writes from Grass Valley, Calif.

Turfseed breeders embrace endophytes

■ They're so tiny you need a powerful microscope to see them, but they're a big hit with turfseed buyers.

Virtually all seed producers are accelerating efforts to put endophytes into as many varieties as they can.

The result: even more varieties of endophyte-enhanced turfseed coming to market, which seems to be fine with turfseed end users.

Turfseed-buying professionals have evidently taken to the idea that endophytic fungi—barely known just a decade ago—provide turfgrass with enhanced insect resistance (aboveground insects) and, more recently discovered, disease resistance. Turfgrass experts feel this translates into reduced use of traditional chemical controls, and hardier turfgrass.

"The seed companies aren't driving the end users," says Eric K. Nelson, research director for Medalist America. "The demand is coming from the customers. This is something they want. Its time has come."

Adds Dr. Fred Ledeboer of Turf Merchants, Inc., "All new germplasm of tall fescue, perennial ryegrass, and fine fescues that enter our breeding program is screened immediately for endophytes.

"Plants that do not contain endophytes are channelled into a branch of the program to introduce endophytes, while endophyte-infected plants are moved immediately into the breeding program."

Suichang Sun, a researcher who came to Jacklin Seed this past March after six years at Rutgers University, says endophyte-infected varieties originate from naturally infected plants that were selected from a nursery. Or breeders select good looking plants that are then artificially inoculated.

He says researchers are studying an *Acremonium* endophyte that will be artificially inoculated into fine fescues. But studies at Rutgers have shown an inhibition to *Acremonium* endophyte in Kentucky bluegrass varieties.

To develop a variety of Kentucky bluegrass containing endophytes, researchers will either have to find a type of endophyte that will not be rejected by Kentucky bluegrass, or cross endophyte-infected plants of neighboring *Poa* species with Kentucky bluegrass.

Actually, it's not the endophyte itself that provides insect resistance, it's the alkaloids that the endophyte produces, the reason why endophytes are undesirable in forage grasses.

—Ron Hall

'Topping' trees is a likely mistake

■ Tree "topping" occurs when the crown of a tree is cut. It's not only aesthetically unpleasant, it can cause the tree to become infected or die.

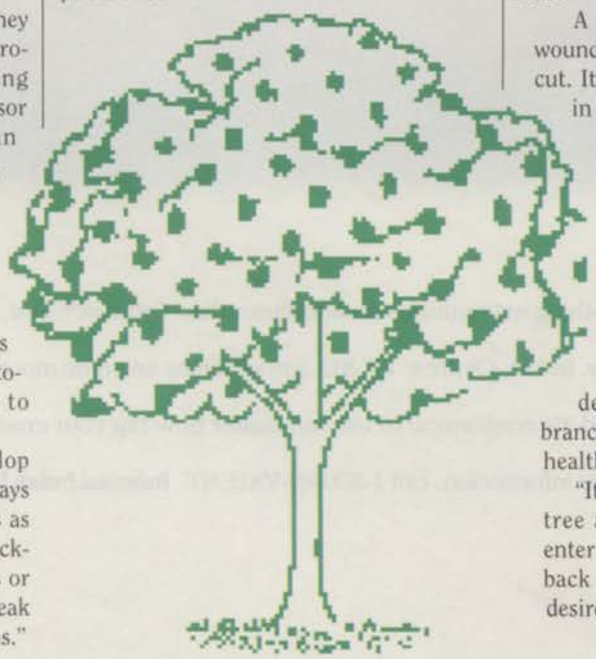
"Many homeowners assume that if they top a large tree, it will compensate by producing a new, healthy, lower-growing crown," says Dr. J. Robert Nuss, professor of ornamental horticulture in Penn State's College of Agricultural Sciences.

According to Nuss, removing the central trunk and the tops of main branches permanently destroys a tree's form and causes unnatural growth."

Removing too many leaves weakens the tree. Without enough leaves to photosynthesize, the tree slowly starves to death.

When trees are topped, they develop bristling "water sprouts," or suckers," says Nuss. "To the untrained eye, this looks as though the tree is rejuvenating, but suckers don't develop into substantial limbs or produce enough leaves. They remain weak and spindly, and snap off easily in storms."

Nuss says a topped tree might develop a double leader, or trunk. This new trunk often is weaker than the original and is prone to splitting. The massive root system also is weakened because it no longer receives adequate nourishment from the crown. Trees in this condition are more likely to split or blow over in a storm.



"A mature tree with a healthy root system is much less likely to blow over than a weak one with damaged roots," advises Nuss.

A topped tree also causes large wounds where the crown and limbs are cut. It takes years for these to heal, and in the meantime can invite insects, disease and decay.

Before you prune a tree, Nuss says, consider what you want to accomplish.

Consider the tree's natural form, growth habit, growth rate, height and spread.

"Pruning is meant to remove dead, damaged or insect-infested branches and deep the rest of the tree healthy," says Nuss.

"It's also used to open the center of a tree and allow more air and light to enter. All pruning cuts should be made back to side branches pointing in the desired direction."