GRAU'S Answers to Turf Questions

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Food Reserves for Survival and Re-growth

During the waning days of summer and the early days of autumn nature provides conditions whereby plants start to prepare for winter. Some plants will go into dormancy so deep that no growth will be evident. Others simply slow their growth processes while retaining green color in leaves. One of the important factors that influences winter survival and successful re-growth in the spring is that of *food reserves* in various plant parts.

Scientists freely admit to an incomplete knowledge of how and in what form the food reserves are stored in various plants. One point of agreement is found in the role played by nitrogen. Every known organic compound found in food reserves in plants is associated with the nitrogen supply, supplemented by other essential nutrient elements.

Encourage Fall Fertilization

For many years, agronomists have encouraged fall fertilization of turfgrass areas even though they have not always spelled out how the plants benefit. Basically, we try to provide *adequate* supplies of nitrogen, phosphorus and potash at the time when grasses most effectively can use these "building blocks" for the creation of food reserves. Nature, in her own way, builds the proteins and amino acids which will assure winter survival and vigorous new growth in the spring. Apparently the process is virtually identical in both warm-season and cool-season grasses.

Weeds Can't Use Nutrients

Aside from the highly-essential factor of building needed food reserves, fall fertilization is good practice because annual summer weeds have run their course and thus can't utilize the nutrients designed for the grass. Cool nights and warm days favor food formation in leaves and subsequent transfer to storage organs. Rainfall can be expected to be more favorable for grass growth and utilization of fertilizer. Most turf species tend to produce less topgrowth and denser bottom growth during the fall period. Seedhead formation has occurred weeks before so there is less tendency to produce upright growth for seedhead support.

When we stress fall fertilization we do not mean to imply that some feeding at other times of the year is unimportant. The high rate of nitrogen consumption by many turfgrasses demands fertilization other than in the fall.

May Need Complete Feeding

On some turfgrass areas soil tests indicate that complete feeding is required. By this is meant N-P-K. The proportions of N to P to K should be adjusted according to the need as indicated by the soil test results. The guiding principle should be adequacy, not excess.

Soil tests may indicate that on some areas only one or two nutrient elements

Mercury: Symbol, Hg. (Often called quicksilver.) Atomic weight 200.61 (compared to hydrogen, atomic weight 1.008). It is said to be the most unpredictable element in kinds and properties of compounds it forms. Hg played an important part in the alchemy of the Middle Ages. It is a potent poison. Pure Hg is a silvery liquid at ordinary temperatures. "Quick-silver" means "alive and moving silvery metal." It conducts electricity, is used in thermometers, barometers and in alloys with other metals. Gold and silver dissolve in mercury.

In nature, Hg is found as cinnabar, a red sulfide associated with drops of native metal. Most mercury is produced in Italy, Spain, Calif. and Tex. It is marketed in iron flasks of 75 lbs. each. Annual production is about 24,000 tons. The United States produces 9 per cent of the world total.

Mercury long has been used as a fungicide. Bichloride of mercury ($HgCl_2$) is used as a vermicide (worms) as well as a control for brown-patch. Calomel (HgCl) is used in human medicine and is a widely-used fungicide (dollarspot). Calomel goes into water solution with great difficulty, is helped by the addition of an equal amount of common table salt.

Solubilized organic forms of mercury are used to reduce bacteria, slimes, algae and other organisms in paper making. Phenyl-mercury acetate is used for certain weed as well as disease control.

Best-known antidote for mercury poisoning is white of egg (albumin) with which it combines directly. Action of Hg may be so fast that no antidote may be entirely successful.

Primers for cartridges are prepared with mercury fulminate, an extremely explosive substance, made from mercury and nitric acid in the presence of alcohol.

are needed. If, for example, P and K are shown to be adequate, then nitrogen only need be applied for satisfactory preparation for winter. If P is adequate, with K deficient, then N and K should be used. Potash is especially important in preparing for winter because of its influence on the winter hardiness of plants.

Kind, Amount Important

Fall use of nitrogen deserves careful consideration. Both the kind and the amount of nitrogen are important. Soluble sources (urea, nitrates, sulfates) must be used with discretion since their complete, immediate availability may force grasses into undesirable rapid growth, causing them to become so "soft" at the onset of winter that winter survival will be poor. One wonders if this may not have been partially responsible for recent wide scale loss of many warm-season grasses.

Organic sources of nitrogen (ureaform, natural organics) do not force rapid growth by virtue of their manner of release to the plants. Nitrogen release from organics is controlled by soil organisms which are extremely sensitive to environmental changes. In effect, the grass plants will be furnished nitrogen in amounts that closely parallel the needs of the plants.

For this reason then, fall fertilization should be concerned primarily with organic sources of nitrogen (plus P and K as needed) to give grasses the best chance to develop winter food reserves in accordance with their needs. Another sound reason is that fall applications of insoluble nitrogen create a reserve of residual nitrogen which, unleached, unused and unchanged, will be there in the soil ready to be released as soon as microbial

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activity starts in the spring. Start the program early enough in the fall to allow plants to "harden off" for maximum winter survival.

How to Convert

Q. We have a few greens that originally were seeded to Colonial and Highland bents. During a recent attack of dollarspot we nearly lost these greens in spite of a good nitrogen feeding program. Each time we changed cups we would throw away the old plug and use a fresh Penncross plug from the nursery. Not one of those Penncross patches had a single dollar spot. My chairman and I agree that we should convert to Penncross but we are not agreed on the method. We do not want to rebuild and keep the green out of play. Can you help us? (Michigan)

A. To keep the greens in play and to preserve contours, I suggest multiple spiking followed by hydroseeding ½ pound of Penncross seed to 1,000 sq. ft. You can do this twice a year at low cost, using your power sprayer, and gradually convert to Penncross. Space prohibits giving detailed instructions here. Send a self-addressed, stamped envelope for a mimeographed sheet on hydroseeding to GRAU, College Park, Maryland, 20740.

"Seeding" with Algae

Q. Our lakes on the course constitute our water supply. There has been no rain for weeks and the water is low and green with algae. We know that we are "seeding" our greens with algae every time we water but we can't help it. We don't dare try to kill the algae in the lakes because of our wild life. Is there anything we can do to counteract the algae? (Texas)

A. Yes, you can irrigate heavily at the longest possible intervals to keep the greens surfaces as dry as possible. Algae can thrive only with continuous ample moisture. Spiking the dry greens surfaces will let air through the algae crust. Periodic light dusting or spraying with hydrated lime will effectively reduce algae with no harm to the grass. Use one-quarter to one-half pound hydrated lime to 1,000 sq. ft. Apply in late afternoon and allow lime to remain on leaves overnight. Pray for rain. Hook up to city water.

Change in Fertilizer

Q. "For the last several years we have used ureaform (38%) as the principal source of nitrogen on our putting greens. Recently we were advised by some students that this is wrong and that it would be better to make weekly applications of soluble urea (45%). What is your opinion?" (Indiana)

Len Kennett, who is moving from San Gabriel CC, where he has been for seven years, to a new club being built by L.A. county on the Palos Verdes peninsula, was given a testimonial dinner by 200 San Gabriel members at his leavetaking. Len is shown with his wife and Bud Godfrey (r) club president. Club gave Len and his wife a beautiful silver service set and other gifts plus appreciation plaque seen in photo

A. Urea has a price advantage (per pound of N) but weekly treatments will be far more costly in terms of labor. Ureaform builds residual N in the soil which permits you to supply a year's requirement in four applications. Urea must be applied weekly in small doses to avoid burning. Urea creates no reservoir of residual N to let you "coast" through the hot months.

Everything considered you probably should stay on your residual nitrogen program.

Fairy Ring Infestation

Q. "We have fairy rings in several parts of our course. They are unsightly and occasionally we lose grass. The soil always seems dry and it smells like mushrooms. What are your suggestions?" (Ohio)

A. Since a mushroom fungus (one of several) is responsible for your fairy rings, it is quite natural for the soil to look grey and to smell like mushrooms. The hyphae (fungus mycelia) trap air in the soil so that water runs off as off a duck's back. It seems that the best approach is (1) to puncture, spike, aerify or otherwise make a lot of holes in the soil; (2) apply a long-lasting insoluble nitrogen fertilizer to encourage bacterial activity; (3) water gently and frequently to thoroughly wet all parts of the soil. Soon the dry-looking areas will be green and vigorous. They should stay that way if the program is repeated when needed.

Programs of removing soil to a foot in depth and refilling with new soil are expensive and seldom successful. Some attempts have been made with fungicides but so far no firm recommendations have appeared. Wetting agents could be helpful in initial wetting of the fungus-filled soil.