NITROGEN

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Have you ever wondered about the colorless, gaseous, tasteless, and odorless element that makes up four-fifths of the atmosphere by volume and is a constituent of all living tissue. Whether we use the element to stimulate grass growth, or manufacture compounds of it, or produce machinery, or materials related to turf maintenance, all are dependent upon it in a large measure.

Nitrogen is essential to all living things — plant and animal. It forms a vital part of tissues that grow and reproduce and is needed in greater quantities than any other element.

Eternal Supply

If so much is needed, where does it come from? Regardless of the pros and cons of organic nitrogen versus inorganic nitrogen, or whether it occurs as plant or animal protein, or any other nitrogen compound, every atom of nitrogen originally came from the atmosphere. Approximately 75% of the air by weight and about 79% by volume is elemental nitrogen. Above every acre on earth is approximately 150,000 tons.

Plants and animals are literally bathed in nitrogen constantly but may be dying for lack of it. It is somewhat comparable to a man swimming at sea and dying of thirst. Elemental nitrogen cannot be used by plants or animals.

Among the other elements it is somewhat a loner. It is not very soluble in water and does not combine easily with other elements. Great amounts of energy are required to trap it in compounds. For example, during lightning flashes and thunderstorms, small quantities of nitrogen oxides are formed which are then brought down in rain. From this source, each acre of the earth's surface receives 2 to 8 lbs. of N each year.

Certain soil-inhabiting bacteria are able to fix nitrogen from the air. Other bacteria which form nodules on legume roots are able also to convert this element into a form useable by themselves and their host plant. Once captured, it might not be held for long, since each time nitrogen is converted from one form to another, it struggles to escape.

The Nitrogen Cycle

As nitrogen is captured, used and released by plants and animals, part of it is constantly returning to the atmosphere from where it originated. This process from start to finish is commonly called the nitrogen cycle.

From the beginning of time, men have always seemed to know that the addition of certain things to the soil made their plants grow better. However, until modern times, they din't know why. As the sciences of biology and chemistry advanced, the importance of nitrogen in plant nutrition became well established. It then became obvious that the natural cycle of nitrogen was not sufficient to supply the ever increasing demands for plant production.

Ammonium Sulfate Era

Long before turf grass management had grown to the sizeable industry as we konw it, the use of commercial fertilizer for farming had become big business. During the "Roaring 20's" ammonium sulfate was the big thing in turf fertilizer. Research in England and in the eastern part of the United States had determined that ammonium sulfate was excellent for controlling weeds in turf as well as feeding the grass and it was applied to putting greens in great quantities. As the soil acidity increased with repeated applications of ammonium sulfate, the grass was less able to withstand stresses, particularly drought. A lot of grass was lost in 1928 and when the great depression started in 1929, the ammonium sulfate era was over.

Versatile Minerals

As we gained experience with nitrogen bearing materials for turf fertilization, three classes of compounds evolved. These were determined by the rate of availability of the nitrogen in the material.

First were the inorganic chemical compounds such as ammonium sulfate and ammonium nitrate and synthetics like urea and cyanimid. These materials are highly water soluble and the nitrogen in them is rapidly converted into ammonia and nitrates which are quickly absorbed by the grass roots. The nitrogen in the synthetic solubles — urea and others — require some conversion in the soil and are therefore not as rapidly available as that in the ammonium compounds.

Because they are highly water soluble, they pass through the soil rapidly during periods of excess moisture. They are also more likely to cause problems such as burning if improperly handled. However, they are highly concentrated sources of nitrogen.

Second are the natural organics such as processed sewage sludges, tankages, seed meals, and leather waste. The nitrogen content of these materials is lower than the first group. Most of the nitrogen released from the organics is dependent upon microbial action in the soil and therefore is affected somewhat by moisture, temperature, and soil characteristics. Ease of handling, less chance of problems, and slower availability tend to offset the lower nitrogen content of the materials.

The third class can be called the synthetic organics or plastic type materials. The most common one in this category is urea-formaldehyde. U-F has some of the characteristics of the first class and some of the second class. From 20% to 30% of the nitrogen in U-F is soluble and therefore rapidly available. The rest is insoluble and the nitrogen becomes available at about the same rate as that in the natural organics. Polymerization, a molecular change within a compound, sometimes alters the nitrogen efficiency of U-F compounds.

Other urea-aldehyde combinations offer promise of becoming additional controlled nitrogen bearing compounds for turf feeding in the future.

Organic versus Inorganic

For many years there has been a controversy between the users of organic and inorganic (chemical) fertilizer. Claims have been made by the organic supporters that plant food elements coming in from man-made chemicals are not as good for plants and people as those coming from natural sources. A difficulty arises in defining organic and inorganic. Any product that has carbon atoms in it is considered organic by a chemist. This includes urea, which was originally discovered in urine. The urea extracted from urine cannot be distinguished from that which

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WANTED: BARTER - EXCHANGE - SELL

This section will be used whenever any one who wishes to dispose of, swap, sell or buy any thing of value.

For Sale: One inch irrigation hose in 50 and 100 foot length at 20¢ a foot. Contact Mr. Wes Updegraff, Supt. Oak Park C.C., Oak Park. Illinois.

For Sale or Trade: Baughman fertilizer spreader with 10 H.P. Wisconsin engine. 1960 Jeep model FG 150 with 7 foot snow plow. The following implements for a Farmall Cub, front end loader — cultivator - corn planter and seeder. Contact Fred Opperman, Supt. Elmhurst Country Club, Wooddale Rd., Elmhurst, Illinois.

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is produced sythetically. Those favoring organic materials will accept urine but not urea.

Plant foods or nutrients, regardless of their origin, are continually undergoing changes in the soil. Nitrogen enters the plant as the ammonium ion (NH4) or the nitrate ion (NO3) and the root hairs have no way of knowing whether those ions came from organic or inorganic materials and could care less.

Nitrogen Management

There is no one type of nitrogen material that has all the desirable features or all of the undesirable features. A knowledge of all types and how to integrate their good features will in the long run tend to produce the most desirable results. Turf of good color that starts early, grows moderately and steadily, strong and durable, throughout the entire season, is a worthy goal.