

FLUF: A LIQUID ORGANIC FERTILIZER

FLUF is a new innovative fertilizer which runs counter to the grain of fertilizer concepts. Traditionally, all granular fertilizers contain 50 to 100% slow release organic nitrogen, while all liquid fertilizers contain inorganic fast release nitrogen with high burn potential and no residual. However, FLUF is combination of the best parts of both types. It has the ease of application of liquid fertilizers, and the slow release organic nitrogen of the granular fertilizers. Another marvelous feature of FLUF is that it can be mixed with fungicides and herbicides and sprayed without watering in, and still not burn the turf.

It does not require much imagination to come to the conclusion that FLUF has got to be the ideal fertilizer for greens and tees during the hot summer months.

Liquid fertilization is rarely used on Northern Golf Courses, and yet it is commonly used on Southern Golf Courses of Florida, California, Arizona. As a matter of fact, fertigation, which is a method of injecting liquid fertilizer through the irrigation system, is a new revolutionary process which is being heralded as the most economical way of fertilizing golf courses in the South where year-round play requires a perennial green turf.

Because of the dormancy experienced on Northern turfgrass, the golf course superintendent, as a creature of habit has always applied a rather heavy fall granular fertilizer to greens and fairways. This is a traditional fertilization treatment.

Come late Spring, he would like to apply another granular fertilization treatment of a slow release nitrogen which would carry him through the summer. But by experience he has learned that no organic fertilizer breaks down so uniformly that he can expect green turf all summer long. The superintendent grapples with the dilemma of whether or not to fertilize in the heat of the summer. If so, with what and how much?

FLUF appears to be the answer. Its chemistry is similar to Nitroform or the organic nitrogen found in the O. M. Scott or Lebanon granular fertilizers. They are all forms of urea-formaldehyde polymers. When urea and formaldehyde are dissolved in water and the solution is acidified, a chemical reaction takes place. They combine to form methyleneureas. If we designate U for urea and F for formaldehyde we can picture the polymers in the following fashion:

| POLYMER | NAME |
|-----------------------|------------------------------------|
| U-F-U | methyleneurea |
| U-F-U-F-U | dimethylenetriurea |
| U-F-U-F-U-F-U | trimethylenetetraurea |
| U-F-U-F-U-F-U-F-U | tetramethylenepentaurea |
| U-F-U-F-U-F-U-F-U-F-U | pentamethylenehexaurea |
| U7F6; U8F7 | hexa and heptamethyleneureas |
| U9F8; U10F9; etc. | octa and nonamethylene ureas, etc. |

WATER SOLUBILITY

Cold Water Soluble (CWS)

CWS

CWS

CWS

Cold Water Insoluble (CWINS)

CWINS

Hot Water Insolubles (HWINS)

Depending upon the acidity and the temperature, a variety of mixtures of CWS, CWINS, HWINS polymers can form. Thus, the dissimilarity of the commercial ureaforms occur. All these forms are slow release organic nitrogen forms which require bacteria to break them down.

Logically, the Cold Water Solubles (CWS) break down first, followed by the Cold Water Insolubles (CWINS), and then by the hot water insolubles (HWINS). A good blend of these three is required for uniform nitrogen release.

The U.S.D.A. has come up with an index as a standard to allow the consumer to know what type of slow release he might expect. It is called the activity index (AI) which is a measure of the percentage of CWINS in each product.

Comparing Nitroform with FLUF we have the following ratings. Nitroform has an activity index of 40, which means that 40% of all the water insoluble polymers are Cold Water Insoluble, the remaining 60% are Hot Water Insolubles. That is why it takes a full year before all of the nitrogen is released from Nitroform. On the other hand, FLUF has an activity index of 75 to 80%, which means that only 20 to 25% of FLUF WINS are not water insoluble. All of its nitrogen is released within 90 to 120 days.

Counting all the water soluble and water insoluble ureaform polymers in FLUF, the liquid dispersion contains 42% ureaform or approximately 4 pounds per gallon. This calculates out to 1.7 lbs. of actual nitrogen per gallon. A pint of FLUF contains approximately 1/4 lb. of N, and 8 ounces contains about 1/8 lb. of N. It is recommended that every time the greens and tees are sprayed with fungicides that 1/2 pint to a pint of FLUF should be added per 1000 sq. ft. If one sprays 10 times, one would be putting on 1.25 or 2.5 pounds of N per 1000 sq. ft. uniformly over the summer months and obtain the most consistent nitrogen release attainable. This is the most ideal way of summer feeding greens and tees. One should also be reminded that small increments of magnesium, iron and potash should accompany the FLUF applications to assure a strong turgid growth. This can be done by adding four ounces per 1000 square feet of TRUGREEN, a chelated blend of all these elements; epsom salts, iron sulfate and potassium sulfate. The growth response has been phenomenal from this program and is delightful to experience.

Paul Sartoretto

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