

## GRAU: Diminishing Water Supply Calls for New Appraisal of Fertilizers



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The 1957 Turf Roundup could well be resolved around a single subject - water. During the year, the northeastern part of the country suffered one of the worst droughts in history. Parts of the southwestern region had seven years of rain dumped on it within a few weeks. In Kansas and Chicago, two months of rain fell in one day, Recently, in Florida, we learned construction work that was started in May couldn't be finished until August because of continuous heavy rains. Other sections in the central area had nearly perfect rainfall - just enough at proper intervals. On the west coast, where they really know what drought is, the 1957 Turfgrass Field Day, sponsored by the S. Calif. Turfgrass Council, featured Water Supply, Water Quality and Water Management.

Mountain springs in Pa. (Fountain on the Mountain) that apparently had flowed unceasingly so long as old settlers can recall, now are bone dry. It is a matter of conjecture if they will run again. Wells in many parts of U.S. have gone dry. Deeper drilling has not been successful in all cases.

It is reported that, by 1975, industry will require 215 billion gals. of water daily. This is a 100% increase over current industrial consumption and more than we now consume for all uses combined.

It is estimated that nearly three-fourths of all water that falls is lost through evaporation. Part of this loss is being reduced by floating a monomolecular layer (1 molecule thick) of cetyl alcohol (hexadecanol) on the surface of enclosed bodies of water (lakes and reservoirs). This cetyl alcohol is tasteless and odorless and can be floated safely on reservoirs being used for drinking. It has been calculated that 70% of the evaporation from a surface of water can be prevented by this thin layer of material.

Experts are working hard on the problem of saving and utilizing the water we have and to trap and hold the rain that falls. It is a task of gigantic proportions. Other scientists are learning how to make fresh water out of salt water. Several methods are feasible and some are in operation but the cost is high.

It also has been proposed to tow iccbergs into a harbor, close the gates and let the bergs melt into usable drinking water. Fresh water floats on top of heavier salt water, thus providing a supply of good water.

In some areas streams are being diverted into deep wells, storing seasonal excesses below ground and recharging the ground water, which often is used 40 times as fast as rain and snow can replenish it by seepage.

In the turfgrass field, attention is naturally being directed to those grasses which can use water efficiently and are drought resistant and drought tolerant. Among these are Bermudagrass, bluegrass, tall fescue, buffalograss, bahiagrass, centipedegrass, red fescue and zoysia. Destruction of bentgrasses during the severe drought periods has been of such magnitude it is doubtful if they will be included in any future seed mixtures for unwatered turf. Poa trivialis, another moisture-loving grass, has perished by the acre. Lawns that have been planted to mixtures containing this grass have suffered severely where water was denied.

Good grasses, well fertilized, turn brown (Continued on page 103)

### GRAU: 1957 Roundup

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too, but they maintain good playing turf and recover quickly when rains come. This represents the wisdom of maintaining high fertility levels to produce good turf and utilize water more efficiently. In many cases, fertilizer has been a "good substitute for water." In Texas, underfed Bermuda required 12 ins. of water to grow enough grass to make one ton of dry hay. When this same grass was fertilized with 600 lbs. of nitrogen to the acre it produced a ton of hay with only a little more than 3 ins. of water.

These gems of research data should be spread far and wide, so that overeager committees, thinking that a water system is the "answer to all problems" may realize that, watered or unwatered, the first principle of growing good turf is adequate fertilization.

The turf plots at Rhode Island University were squarely hit by the drought and they provided magnificent comparisons of various grasses variously fertilized. When the results are in, and are published, they should make "required reading" for everyone in the turfgrass profession. Merion bluegrass stood head and shoulders above all other lawn and fairway grasses when adequately fertilized. Under starvation conditions, it produced ordinary weedy turf. Tall fescue performed well under drought conditions where it was well fed. Red fescue suffered severely over a wide range of fertility levels.

#### Urea-Forms Scrutinized

Ever since K. G. Clark and associates at Beltsville, Md., proved that urea and formaldehyde could be combined to produce solid materials with high agricultural value as an organic nitrogen fertilizer, there has been increased interest in the materials being manufactured and marketed. Experiment Stations have sought to determine their value for various uses, including turf, So far, their practicability on turf has been proved and demonstrated with only minor reservations. Here are some of the reservations:

A single application does not necessarily last a full season on putting green turf. Two or more "split applications" appear to be more practical. On tees and fairways and lawns single treatments have been adequate.

Excessive rates of application can and do cause injury even though the material does not actually "burn" the grass. Applied in "smothering doses," the material has a desiccating effect, which looks like "burn." Not all soils have the capacity properly to nitrify Urea-forms at the first application, especially sandy soils where inorganic fertilizers have been used constantly.

Each Urea-form material is different from



others and is capable of producing different results on turf. It is a source of nitrogen entirely different from any other.

These are some of the features of Ureaform which make it the most significant development in fertilizers technology in the past decade:

Leaching is reduced to a bare minimum. Frequency of application is greatly reduced. Less space is needed for storing. Less labor is required for handling.

Material is dry and free-flowing.

#### Fertilizer Mixtures with UF

1957 marked a sharp increase in the use of complete fertilizers which derived part or all of the nitrogen from solid Urea-forms. The May, 1957, issue of *Golf Course Reporter* carried the first report of its kind, based on the work of Mruk, Wisniewski and De France at the University of Rhode Island, Results indicate that these fertilizers "tailored to turf" are practical and sound.

Fertilizer usage on turf is increasing with continued education and emphasis on weed control and drought resistance through fertilization as well as wide publicity on the size of the turfgrass industry. Grau and O'Donnell, before the American Chemical Society in New York in September, said if all turf in the U.S. received the modest rate of 100 lbs. of nitrogen per acre, it would take 7 million tons of a 10-5-5 fertilizer to do the job. Some turfgrass areas consistently receive many times this amount, some over 1,000 lbs. of nitrogen per acre per year. The new inter-state highway program alone is expected to consume half a million tons of fertilizers just for planting slopes and raw areas.

#### Choice of Grasses

When the question comes to me like this: "What grass would you recommend for my new area?" my first impulse is to ask in return: "How are you going to manage it?" It has been said before, and we will say it again, better to plant a mediocre grass and manage it well than to spend the money for an improved grass and handle it poorly.

Many new greens are being built all over the country and many old ones are being rebuilt. The choice of the grass to plant is a mighty important decision. It is my conviction that greens should be built and planted to produce results with minimum irrigation and maximum fertilization. Water shortages must be reckoned with sooner or later. There is no foreseeable shortage of fertilizers.

Penncross creeping bent seed is desirable for new and rebuilt greens for several reasons. Seed is plentiful and reasonable in price. A recent quotation was in the vicinity of §6 a pound. It is economical, since only one lb. to 1,000 sq. ft. is needed at seeding time. It "adapts itself" to a wide range of management procedures, soils and climates. The broad gene base of the grass (three good parents) fits it to various environments. It covers the entire range of bentgrass adaptation,

We do not mean to imply that the excellent existing greens of Washington, Cohansey, Arlington, Congressional, Toronto, Pennlu, Old Orchard, Seaside, Velvet and all the rest should be scrapped - far from What we see coming is an increasing it! difficulty in obtaining good stolons of all the named varieties, plus an increasing cost of planting and maintaining them. Ed Geary, laughs every time I tell him that we are not recommending Seaside bent for putting greens. Every time we say this in print he tells us that he sells more Seaside than ever before. Seriously, though, Penncross is outperforming Seaside on every count.

Bermudagrass greens are changing complexion at a rapid rate. The introduction of soil sterilants have given great impetus to changing over to better grasses. Many old greens are being re-contoured and provided with better drainage. Bermudagrass requires good drainage, just as bentgrasses do.

good drainage, just as bentgrasses do. Tifgreen (328) is being planted on many new greens over a wide area. Two features are liked universally: rapid initial coverage and good color. This is in addition to good medium texture. But not every planting is being managed according to the specific requirements of that particular grass. This brings on disappointments which are in no way the fault of the grass. This will happen with every new grass until management requirements are known and publicized as a part of the initial sale of the grass.

Bayshore (Gene Tift) strain has many supporters. Houston CC is covered solidly with this grass. It has performed well in tests at the University of Florida.

Everglades 1 performs differently than all the others and is preferred by some, particularly in So. Florida. This grass received a great deal of discussion at the recent Florida Turfgrass conference.

Ugandagrass is growing in favor where it has been managed according to its requirements. In its favor are finest texture (looks and putts like bent), rapid coverage, ability to maintain good color and playing quality under minimum of irrigation ( water once a week during a severe drought). There are no worries about disease. Fertilization is generous.

Seeded Bermuda greens rarely are heard of except in outdated specifications which someone forgot to change. Compared to the improved strains, seeded Bermuda is lacking in quality.

Sand greens steadily are being converted to grass. Minimum irrigation and maximum fertilization appeal to low-budget courses which ask for grasses that "can take it." At Davis, Calif., heavily fertilized Bermuda remained green and playable for 100 days without irrigation in daily temperatures of 100°F.

Tees today are receiving as much attention

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as greens used to get. With improved Bermudas, Merion bluegrass and better bents, we have better tees than ever. Two factors help in a large measure: less irrigation and heavier feeding. Tees of large size are of great benefit in rotating play to permit recovery. Teeing areas practically equal putting areas in size at many courses. When the turf on a tee is unsatisfactory, it is a fairly simple matter to strip the old sod with a power sod cutter. re-work the seedbed with additions of soil amendments and fertilizer and lay new, mature sod of improved grasses taken from the nursery.

This leads directly into the subject of the sod nursery. We find that too many courses have no nursery at all on which to make necessary mistakes. A rule of thumb on many courses is to have enough putting green sod to replace one full green at any time and enough tee sod to replace two tees. In addition to this, there should be ample areas for testing of new materials, new tools, new chemicals, new fertilizers and getting new men acquainted with turf.

On fairways, the need for devices to remove clippings is becoming more acute. Many drought-damaged fairways are being renovated and planted to improved strains of grasses. In the bluegrass area Merion bluegrass, along with improved fescues, is becoming more popular on new fairways and on renovated fairways. In the south, some of the improved strains of Bermudagrass, such as Ormond and Everglades and Gene Tift, and in the central part of the country, Uganda, are being planted on fairways. These disease resistant strains produce relatively more clippings because they are not thinned by disease periodically.

With longer lasting fertilizers and a relatively higher level of fertility, and with more disease resistant strains, fairways are going to be clogged with clippings that will have no place to go. Paul Weiss called this to our attention many times on bent fairways that were so thick and dense the clippings could not enter the turf. Finally, the blowup had to come and in a particularly severe period of high temperature and humidity, many bent fairways simply exploded.

#### Suggests Study of Conservation

Another factor that is contributing to the accumulation of clippings on fairways is the high degree of control that is being exercised on the insects that normally would eat a large part of the grass that was produced.

Still on the subject of fairways, it is our contention that the supts' associations might well devote a portion of their time to discussing ways and means of conserving water on the course and how to grow the best possible turf with the least amount of water.

The Noer-Grau Roundup articles will be concluded in January GOLFDOM.