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"BEEN FARMING LONG?"

So often superintendents of smaller, lower budgeted courses must try to convince board members to upgrade fertilizers from farm grade to turf grade. The response is usually the same . . . grass is monocot like corn and farm fertilizers are good enough, even cheaper. While it is true grass and corn start out producing one seed leaf (monocotyledon) that is where the similarities end.

Technically speaking, grass belongs to the Monocotyledoneae family . . . the same family which includes onions, garlic, lilies and asparagus! Probably, if one grew a corn and turf plant side by side and allowed each to reach maturity (seed heads) the differences would be minimal with regard to growth habits.

However, that's not the real world of turf. The plant is trampled, sheared (sometimes too low), driven over, and generally abused.

A farmer grows corn for one reason—to produce a fruit. The plant is allowed to complete a life cycle from juvenile (vegetative) to reproductive (seed) stages, ending in death. A turf manager, on the other hand, strives to keep the plant juvenile, forcing the plant to constantly produce leaves and frustrating its efforts to produce a seed head (a difficult task when it comes to the black sheep of the family, *Poa annua*).

Mowing is the reason the turf plant stays juvenile. All this replacement of lost leaves takes incredible energy at the expense of root development. Corn is allowed to produce roots of 18-24". How many turf managers can boast that kind of root development?

Because of the larger leaf surface (dry matter) corn can photosynthesize and manufacture its own carbohydrates, channeling these sugars into the cob. Thinner leaves like those of grass, have it more difficult, especially when the leaf surfaces are mowed away several times a week. Fertilizing turf becomes essential to replace the carbohydrate supply lost to the mower blades.

From the very beginning the fertilizing of corn and turf is radically different. In corn fields starter fertilizers (corn poppers) are disced into the top 4" of soil. The soil is friable and can easily encourage good root development. After the plant is actively growing, the fertilizers are spread between the rows (banded) at the base of the plant. The nutrients are able to move into the soil easily and the risk of foliar burn is minimized.

Turf fertilizers are broadcast directly over the plant and the importance of selecting a low salt, low burn potential

fertilizer is essential. Below the turf, the soil has not been disced and usually is compacted from traffic. A heavy thatch layer adds to the barriers of fertilizers ever reaching the soil level.

Frequent applications of fertilizers for corn are needed all season long because of the larger leaf surface and size of the plant. Applications for turf must be timed to avoid summer stress periods. That means whatever is applied in the spring needs to sustain the plant longer even throughout the summer in some cases. However, most agricultural grade fertilizers are of a quick release nature and are readily available for a very short duration.

Nitrogen is the nutrient required in greatest quantity by turfgrass. The plant contains 3-5% nitrogen under ideal situations. Nitrogen is the necessary component in leaf production, but also provides for amino acids, protein, enzymes and chlorophyll. Chlorophyll is the substance produced and stored in the leaves which gives grass its green color.

However, high nitrogen rates produce excessive aerial shoots resulting in more frequent mowings and potential for scalping. Lush growth not only stunts the development of roots, but also suppresses lateral growth (tillering). A plant with too much nitrogen experiences depleted carbohydrate reserves, poor tolerance to heat and cold, and is less resistant to stresses.

Highly soluble fertilizers applied to turf can produce a softer leaf. This succulent leaf is very susceptible to insect and disease penetration. The stalks also do not have the rigidity needed to support a golf ball. They flop over and mat down when mowed. In addition, every mowing produces an open wound, dangerous during periods of high fungus activity. The total plant must be in a healthy state to ward off attacks.

That's another reason to choose the turf professional grades. Many have developed formulations to include the minor nutrients or trace elements (calcium, sulfur, boron, copper, manganese, zinc, molybdenum, magnesium and iron). Although the amount of these required by a plant is small, they play an important role in the plant's health.

Minors are primarily catalysts for the plant's enzyme reactions and "vital signs" such as respiration and photosynthesis. Of all the minor nutrients, it is probably iron which recedes the most. Deficient quantities of iron are evident in turf that takes on a yellow color and

continued on page 54

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responds poorly to growth.

In addition to nitrogen and the minors, potassium plays an extremely important part in a turf plant's physiology. It is involved in keeping photosynthesis (the manufacture of nutrients from sunlight) in working order. Potassium is responsible for overall hardness of a turfgrass. It thickens cell walls, making for strong support of stalks and defense against piercing insects and fungus. Thicker cell walls are also a hedge against water loss from summer stress periods and winter winds. The turf industry has realized this and many formulations now offer a higher ratio of potassium to nitrogen for just such occasions.

Corn doesn't have to live over winter and emerge in the spring green, healthy and playable. A farmer is judged on his good yield at the end of the season. If a farmer has a poor crop, he can have another chance—reseed and start over.

The turf manager is judged on a daily basis, continually throughout all seasons (How did he survive the winter? How soon can the course open? How is the turf for the Fourth of July tournament?). Poor fairways never go un-

noticed. The turf specialists can't start over. He has to use the same turf, with often no budget to overseed. He is not harvesting... he is managing.

Some voting members still insist on using the local Ag Co-Op and offer the superintendent a take it or leave it policy. In that case, the superintendent is forced to concede "some is better than none". However, employ caution with the application methods.

Because of the higher salt indexes of farm type fertilizers, insist on applications only in early spring or late fall. Be careful to choose a reputable farmer who pays strict attention to spreader or tank mix cleanliness. It has happened that residual herbicides in a tank were responsible for wiping out many fairways.

A good way to introduce members to the benefits of fertilizing with turf type formulations is to run your own experiment on a few fairways. The investment will be minimal and the members will have a chance to see the results. One good fairway is all it takes to convince the membership that the professional way is the way to go.

Fran Vallillo

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RECORDS - ARE YOURS UP TO DATE?

As golf rolls into mid-season it may be necessary for many of us to take a good look and see if we are maintaining our office files as well as our golf courses. Although we are aware of the importance of records, some items may slip by while we give our full attention to the mainstay of our business - growing grass. So, here are a few items one might want to make sure are being included in your records.

First and most important are records of fertilizer and pesticide applications. These records should include the following: **when** the material was applied, **what** the material was, **where** it was applied, **how much** was used, and finally make a short notation as to **why** the application was made at this point in time. I would like to stress the point that this information should be recorded for every fertilizer, fungicide, herbicide, or insecticide application made anywhere on the grounds of your golf course. Do not neglect to keep track of the rough, the clubhouse lawn, or an open area that is not in play.

Secondly, review your equipment maintenance records. These records might include the following items: the date any maintenance was performed, what parts were replaced or repaired, who performed the maintenance, and how long it took to complete the repair. One last item that is not as important, but may prove valuable, is making a note of who the operator was at the time of the breakdown; especially if your machinery is driven by more than one operator.

Another important area is employee work records. The superintendent should know when his employees worked, how long they were there, and ideally what jobs they performed on a daily basis.

In addition to these categories one can expand into more detailed data to be used in streamlining costs or to justify expenditures. These records would contain more specific details of work operations, such as: job performed, man hours involved, equipment used, gasoline consumption, and material costs if any.

I have touched on some very basic ideas concerning record keeping. Obviously this can be expanded upon many times over, however, the value of records as a tool in our profession should never be overlooked. Evaluation of records can aid in solving or preventing recurring problems with your turf-grass. Records can indicate the need to replace old equipment or justify purchasing time saving new machinery. Employee records are valuable in giving proper recognition and compensation to quality employees or in verifying the need to reprimand or replace one that's performing poorly. And last but not least, records are a source for answers. Answers to your problems and to those endless questions posed by your owner or members whatever the case may be.

So, invest a little time and keep your records current. You will find the benefits are as unlimited as the records you can keep.

David Behrman
Deer Creek Golf Club

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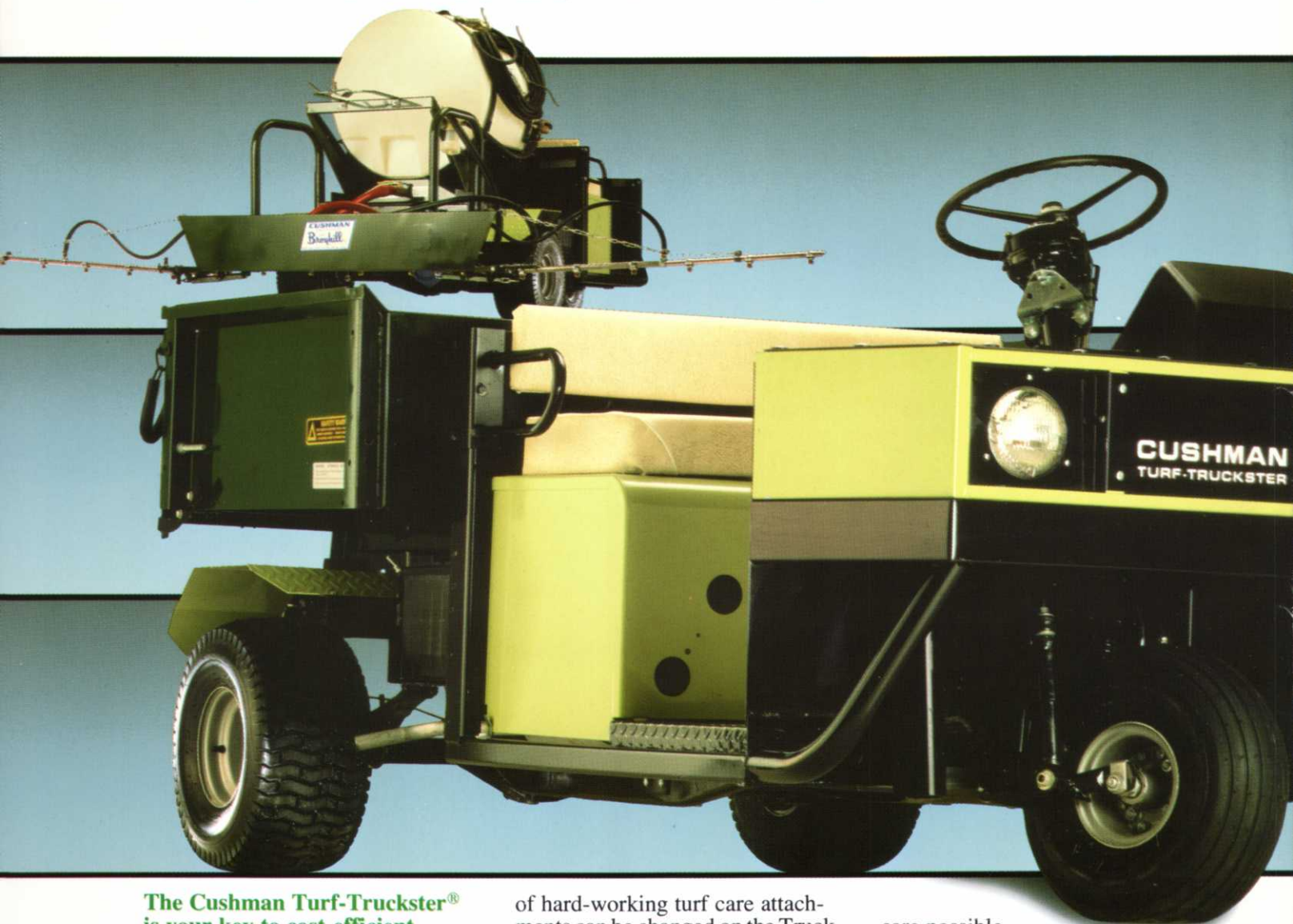
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ARE YOU ALL WET?

Bill Rhymes, Mallinckrodt, Inc., Shelby, NC

Imagine if you will, the mouth of the mighty Mississippi River as it empties into the Gulf of Mexico. While there is a main channel where most of the shipping moves, the river has broken up into many channels, all emptying into the Gulf. There is much marsh land and even completely dry land between these channels of water. Now, imagine a golf green, a garden, a flower bed or your yard, with rain or irrigation water falling on it. This water also channels down through the soil. There are wet areas, damp areas and completely dry areas.

When a soil or other growing media wets slowly or non-uniformly, it is due to the physical properties of the soil as well as the water. Hydrophobic organic components of soil and a preponderance of capillary pore space combine to restrict the rate of water movement into such soils. Water's high surface tension, due to strong cohesive forces, restricts movement into capillary pore space. The same physical forces that delay water movement into hydrophobic growing media or cause localized dry spots in turf also restrict or delay water movement out of wet spots, assuming the excess water has someplace to go.

The solution to both dry spots and wet spots is to **increase the rate of water movement** by providing a link between hydrophobic soil (or media) and hydrophilic water. Surface-active agents (surfactants) sold as soil wetting agents should do several things: 1) decrease water's surface tension; 2) facilitate water movement into dry soils; 3) remain absorbed onto the soil colloids after drying to effect rewetting; 4) facilitate drainage from areas prone to stay wet, and 5) have a wide safety margin on plant material.

Perhaps no other type product used in turf and ornamental industries causes as much confusion and misunderstanding as surfactants. Such names as detergent, dispersant, wetting or rewetting agent, penetrant, cleaner, spreading agent and emulsifier most often describe the action or result desired and are, as such, not descriptive when distinguishing between one and another. For instance, a detergent is also an effective wetting agent.

Rather than labor these names, it is sufficient for the professional turf and ornamental manager to recognize those products developed for wetting soil/artificial growth media. Have you attended any major turf or ornamental trade show recently? If so, you probably saw or were told about several wetting agents and why a particular one was "best on the market". Should you use one, and if so, which one and why? Here are some guidelines:

1. Don't buy water. Many products have very little active ingredients in them (some as low as 5%) and the rest is water. Initial cost per gallon is low, but they may not last but a few days in the soil.

2. Buy one that is all-wetting agent, i.e., 100% active ingredient. These are by far the most economical as only one or two applications are needed

per growing season.

3. Buy one that has a history of success and consistently ranks at the top in university and experiment station tests.

4. Talk to other superintendents and growers. Many are using these good products and they'll be glad to tell you why they do and their product of choice.

5. When using, soil wetting agents must be **well watered** in (using a liquid type) or uniformly mixed with the soil (using a granular type). Left on the plant surface, they can be phytotoxic.

Here are some benefits to you for using a good soil wetting agent:

1. TURF

a. Dew elimination for several days following application may aid in disease control.

b. Fewer dry spots, fewer wet spots.

c. Less hand watering to correct for dry spots, giving conservation of water and manpower.

d. Soils able to absorb moisture more rapidly during heavy precipitation.

e. Less stress on treated fairways, greens, etc. - wilting less severe.

f. Encourages stronger, healthier turf by helping water soak into and spread more evenly through the soil.

2. ORNAMENTALS

a. Prevents plant loss under dry or wet weather conditions.

b. Treated soils (or soilless mixes) wet rapidly - less runoff.

c. Wets and drains the root zone uniformly.

Lastly, we generally think of the major benefit of using a good soil wetting agent as better use of available water. This does happen. However, of equal or perhaps greater benefit is that other chemical soil additives are uniformly distributed for maximum efficiency. Remember the opening paragraph about the Mississippi River and the dry areas between the channels? Our wetting agent has done away with these dry areas in our soils. Therefore, our fertilizer, soil fungicides, soil insecticides, soil herbicides, etc., are spread out evenly, and the plant root system gets a uniform "dose" of not only water but these expensive chemicals as well.

Wetting agents don't cost you money! They make money for you. Your turf and plants have responded better to all soil additives; hence, they are healthier. You have done a better job, in less time, and have saved money and manpower in many ways. You are more secure as a professional. You find you are not "all wet", just "wet enough".

Carolinas Newsletter

A critical component in plant development, micronutrients offer a return on investment... but they must be well managed.

By Carl P. Spiva

Why micronutrients? Because they are the key to triggering most growth activity in plants. Without micronutrients as a "sparkplug," the enzyme system in plants would simply be an inert mass of protein.

DISTRIBUTION

Once soil begins to support plant life, the top foot begins to accumulate micronutrients in a slow, steady manner. The relative concentrations of these appear in Table 1. How does this occur? Accumulation is a result of a certain process:

First, plants grow and produce extensive root systems that extract both micro- and macronutrients from a depth of several feet, depending upon the kind of plant.

Second, extracted nutrients are routed to shoots and some are retained in the roots as storage.

Third, the growth cycle is completed and plant residues are returned to the soil (minus harvested portions).

Table 1
RELATIVE CONCENTRATION
IN PLANTS

Nutrient	Compared To Mo
Molybdenum	1
Copper	100
Zinc	300
Manganese	1,000
Iron	2,000
Boron	2,000
Chlorine	3,000
Sulfur	30,000
Phosphorus	60,000
Magnesium	80,000
Calcium	125,000
Potassium	250,000
Nitrogen	1,000,000
Oxygen	30,000,000
Carbon	40,000,000
Hydrogen	60,000,000

Fourth, crop residues are converted to inorganic salts from organic matter and ionization makes micronutrient cations subject to adsorption on the soil exchange complex where they are immobile. This is the reason that recently leveled fields may have micronutrient deficiencies.

This phenomenon is not restricted to just micronutrient cations. Macronutrient cations share the same fate.

Tillage layer soil sampling is often satisfactory for determining soil micronutrient levels, even for native plants existing on rainfall as their only source of moisture.

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FROM THE PUBLISHER



Is it the summer workload, or is there really disenchantment in the ranks? Recently I have had a number of calls from golf course superintendents and sports turf managers. They said their summer hours were playing havoc with their family lives. They felt unappreciated and lacking in the respect they thought they deserved. They lamented that they were underpaid and overworked.

After listening to the gripes for a while, I can see their point of view. It is one thing to own your own business and put in long hours. Hopefully it will be very profitable and you will reap the rewards. It's quite another to work for a corporation or municipality on a fixed salary.

I'm concerned. Are we beginning to see an exodus of professionals from the industry? Will the talented people leave for greener pastures? Such moves don't happen overnight; they evolve slowly into action. But if, in fact, disenchantment has set in, can those moves be far behind?

I look at a multi-million-dollar golf course or sports complex as I would view the physical plant at any large institution. It would be absurd to think that anyone would erect a 20-story building and not consider hiring a professional plant engineer to run the place. These qualified people would receive a salary commensurate with the size of the property they have to manage. They would also receive the respect their position deserves.

City managers, school administrators, presidents of golf clubs, and greens committee-men need to take a hard look at the professional turf manager. He has been entrusted with complete responsibility for millions of dollars' worth of land-scaped property. Accordingly, his superiors need to respect the vital position a superintendent holds—and come up with a compensation package on a level with those enjoyed by other physical-plant managers.

Equally as important, they can't expect him to put in 16-hour days, seven days a week, or burnout will become a major problem.

As more sports complexes and golf courses come on line, the demand for managerial skills will increase. If we lose these talented people they will be very difficult to replace. Perhaps it's because there is a shortage of top professionals that we are beginning to see more contractors being used in areas that were once the exclusive domain of the golf course superintendent and the sports turf manager. New companies are sprouting up, offering turf-management services on a contract basis.

Organizations like American Golf Corporation and Servicemaster offer programs on contract. Some sports arenas and golf courses use contractors for a complete renovation and rebuild. Others contract out the entire maintenance. In either case, we are seeing another niche being carved out. I am sure that some of those managers who left the clubs are now involved in these new enterprises.

The idea of being an independent businessman may appeal to them. There are pitfalls, to be sure: They will have to learn the business end of the business. They will have to learn how to use their labor corps most effectively and efficiently, because every wasted man-hour will cost them money.

I do feel that many of you turf professionals have most of the skills to begin with. Certainly you have the field skills; otherwise you wouldn't be in your present position. All of you develop budgets and work within those budgets, so many of the necessary business skills are already in place.

I believe our industry is changing, albeit slowly. I feel that the schooling and expertise you have developed in the field will put you in a position of strength in the months and years to come.

Now—how do we get the corporate executives and the bureaucrats to appreciate your very special talents?

A handwritten signature in black ink, appearing to read "Denne Goldstein". The signature is fluid and cursive, written in a dark ink on a light background.

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Denne Goldstein, Publisher