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The Hidden Connection

Science and common sense are an unbeatable combination for a successful overseeding program.

by Steve Batten

Winter overseeding has become not only a household word to turfgrass managers across the Southern United States, but to golfers, baseball players, and managers of all types of recreational facilities as well.

Each local area of the United States has developed standard procedures for overseeding that have evolved through the creativity of individual turfgrass managers and research by state universities.

In each part of the country there are misconceptions to winter reappear in discussions with turfgrass managers.

Everyone has heard or observed these. They include the diehard turfgrass manager who uses the same cool season turfgrass cutlivar from year to year.

This is based on the incorrect assumption that all cultivars of perennial ryegrass, as an example, perform the same.

Another misconception is often observed when golf course greens are overseeded with excessive seeding rates or kept at high mowing heights to produce what appears to be attractive putting surfaces.

In reality, these types of playing surfaces place undue burden on the golfer who has to bat the golf ball rather than stroke it to the hole.

Even fall overseeding dates have been misunderstood because they are often based on local tradition instead of natural characteristics of the cool season turfgrass species planted.

Research has shown soil temperature links that play an important role in determining the optimal dates for winter overseeding.

The combination of science and common sense is the hidden connection to a succesful overseeding program.

Common sense

Everyone is trying to find the perfect turfgrass for overseeding, one which establishes quickly and has a smooth unnoticeable spring transition, which, of course, seldom happens.

The chance of outlining the ultimate method of overseeding is just as remote because of the great variance of cultural practices.

However, as the stories of each turfgrass manager are analyzed, similarities continue to appear.

Across the country the preparation of a proper seedbed, as an example, is similar. That is, the bermudagrass is physically or chemically supressed and thinned in density prior to seeding.

One golf course superintendent in

Optimal seeding dates *for rough bluegrass/ryegrass mixture should correspond to the slowest germinating specie. (Photo courtesy of Butch Gill, Northrup King Seed Co.)*

Perennial ryegrass *overseeding for 50 consecutive days at Texas A&M University.*

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Wear simulator being *used to screen wear tolerance. (Photo courtesy of Dr. Jim Beard, Texas A&M)*

Palm Springs, who spent considerable time researching the cultural practices employed in seedbed preparation for overseeding, said each golf course has its own overseeding method. Yet, all had the same goal.

These could be winters with unseasonal sudden cold temperature declines, or even wet winters with a large amount of pest problems such as disease or weed encroachment.

The success of spring transition, particularly in the bermudagrass transitional zones of the Southeastern United States, is directly affected by the condition of the bermudagrass from the previous fall.

If the bermudagrass has a shallow weakened root system in the fall, then its recovery in the spring will be seriously delayed.

Seedbed of the bermudagrass preparation, therefore, has to start in early summer immediately following spring transition of the overseeded grasses.

The first of the summer everyone is searching the market for better grasses, lower prices and outlining the steps towards next fall's seeding dates.

This is the time when entire programs are presented to property owners and green committees.

During this early thought process never overlook the most important consideration or the purpose of overseeding.

Everyone's goal is to have an attractive green playing surface throughout the winter.

However, overseeding can be used to camouflage the encroachment of unsightly foreign bermudagrass selections in areas of the country where bermudagrass does not go dormant.

Overseeded grasses also provide wear stress protection to the underlying bermudagrass. Since most overseeded grasses have greater shade tolerance than bermudagrass, they will also provide a uniform playing surface across a golf course putting green in partial shade.

Also, during early summer, consult with the property owners and green committees to determine the standards the overseeding must accomplish.

On golf course greens, as an example, wear tolerance is a must at golf clubs with large numbers of daily players; 150-200 golfers or more per 18 holes.

The best choice of turfgrass species for these golf courses would be the wear tolerant perennial ryegrasses. Golf clubs wanting fast, low mowed putting surfaces in warm climates could select bentgrass or a mixture with bentgrass as one of its components.

Where both a relatively fast ball roll surface and wear tolerance is the goal, then perennial ryegrass or mixtures and blends with perennial ryegrass can be used.

The golf club has to be made aware that fast ball roll speeds will require constant topdressing and possibly a change in scheduled mowing techniques. This extra care will also require a large enough maintenance budget to accomplish these goals through the winter.

Outlining the seeding program early in the year will mean that there will be no surprises to the supporting facility as far as budget restraints. It also provides an opportunity to apply early common sense logic to your overseeding program.

Selection

Basically, there are four distinct regions across the Southern United States where overseeding bermudagrass occurs.

These are the:

- warm, humid regions along the Gulf coast and far south as Miami,
- the cool, humid regions from Virginia to East Texas,
- cool, arid regions from West Texas to central California, and
- the warm, arid areas of Arizona and Southern California.

The climate difference in each of these regions will vary the requirements for the selection nearest to the ultimate overseeded turfgrass.

In the warm, humid and arid regions, heat tolerance will be essential. Many of the newer perennial ryegrass cultivars possess enough heat tolerance to survive daily winter highs above 80 degrees F even in Miami.

Several perennial ryegrass cultivars such as Birdie, Derby, Pennfine and Prelude, as examples, have experimentally shown good tolerance at two southern universities.

It is no secret that creeping bentgrass has excellent heat tolerance.

For the past 20 years, selections such as Penncross and Seaside have been used in overseeding mixtures as insurance for good early spring performance, when daily air temperatures often become high.

The popularity of overseeding with bentgrass alone is again increasing in some local areas of the United States.

In South Florida from North Palm Beach to 30 miles north, bentgrass is so popular for overseeding that this area has pioneered the use of early and late fall split overseeding dates. This two-date method eases the interruptions of establishment to the late fall and winter golf traffic.

Both the cool humid and cool arid climates have similar seed requirements—early establishment and cold tolerance. Both perennial ryegrass and rough bluegrass possess these characteristics.

Since all bluegrasses have excellent cold tolerance, it is no surprise to consistently observe rough bluegrass cultivars such as Sabre performing well under adverse cold conditions.

Experimentally, rough bluegrass has stood out as an excellent overseeding component in mixtures and alone in monostands since it was pioneered in overseeding research in Virginia in the early 1960s.

Its early establishment makes it ideal for use in the cooler overseeding regions of the country.

Of course, the fastest establishing cool season turfgrass is perennial ryegrass.

During the 1970's, several perennial ryegrass cultivars originating in northern Europe were observed to have excellent cold tolerance.

Two of these that found their way into the U.S. marketplace are still commercially available. They are Loretta and Elka.

At present there is a limited amount of overseeding research at the Southern state universities to determine actual cold and heat tolerance characteristics.

Many of the new perennial ryegrass selections are both heat and cold tolerant, so the gap between cultivars is more narrow.

continued on page 37

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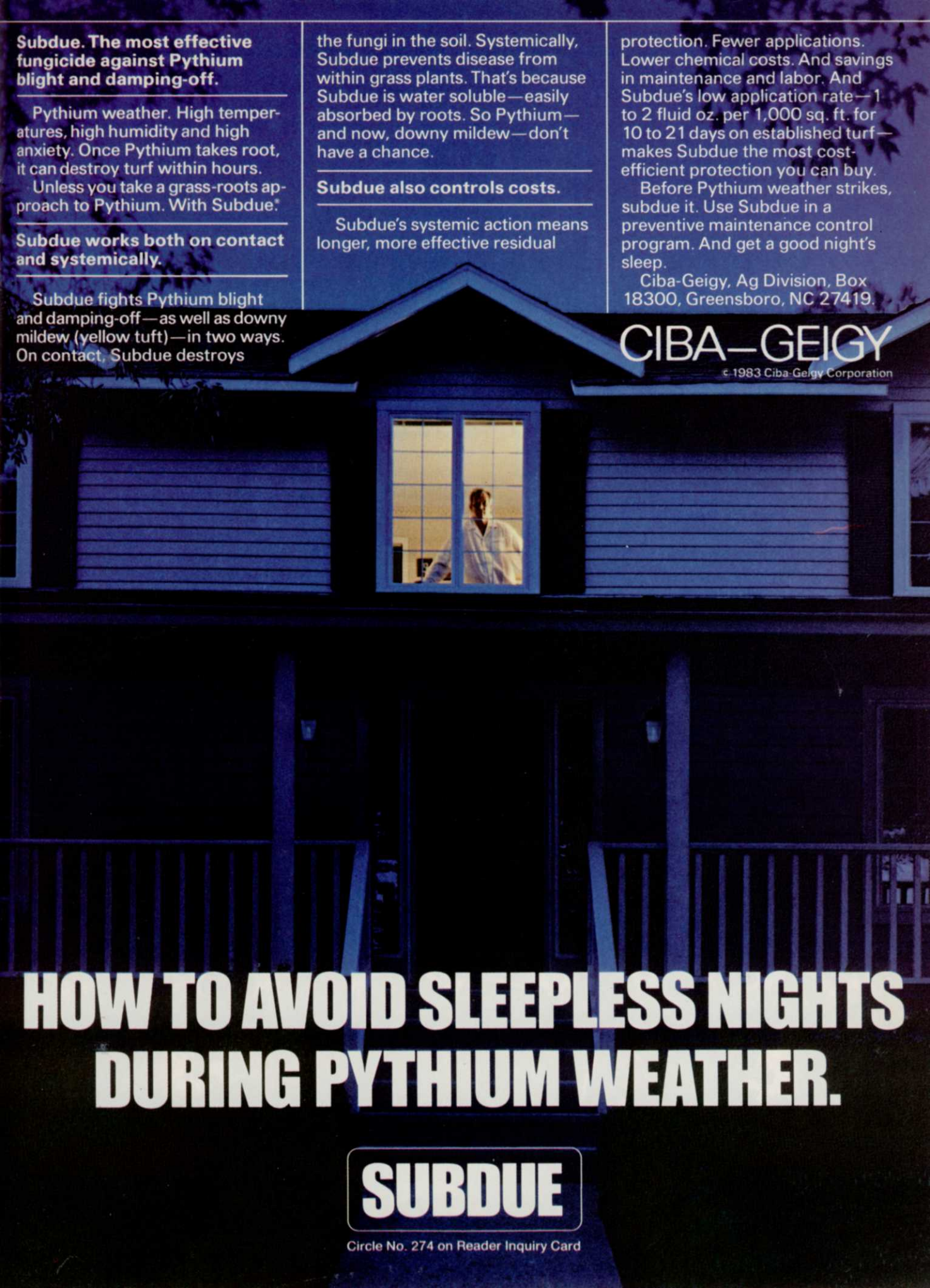

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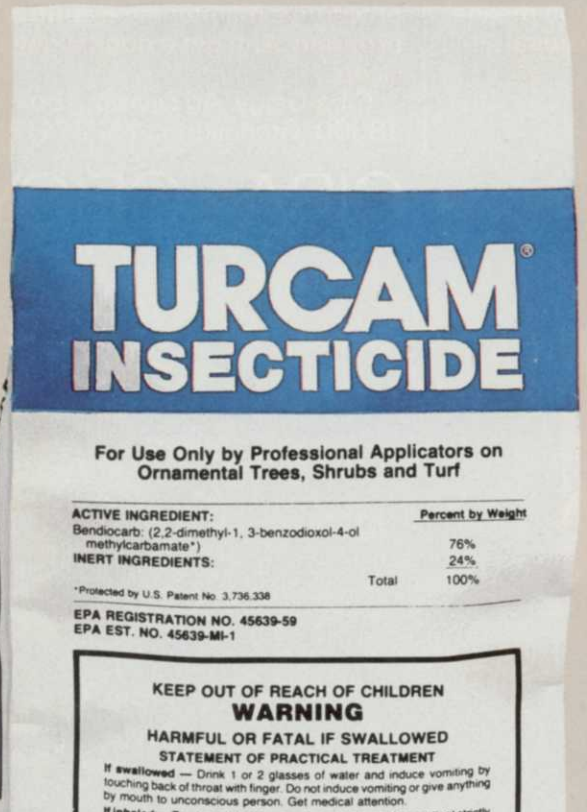

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HIDDEN *from page 34*

Just the same, earlier research and consumer demand pioneered the way for the introduction of these new cultivars through turfgrass breeding.

The use of blends of different perennial rye components can combine both heat and cold tolerant characteristics into one commercial commodity.

Wear tolerance

The natural characteristics of wear tolerance and ball roll can affect the selection of the most optimal cool season turfgrass. Cultural management such as seeding rates are factors that influence the performance characteristics of the overseeded grasses.

Ball roll characteristics on a golf course putting green are the results of both the individual cultivar or species, seeding rates and cultural management. Wear tolerance is also affected by seeding rates.

Research in Mississippi and Florida during the mid-60's established suggested seeding rates for annual and perennial ryegrass, rough bluegrass and bentgrass that are much in existence today. These included overseeding rates for ryegrass at a 35-40 pound seed/1,000 sq. ft. range for golf course greens.

These seeding rates are still popular in the southwestern United States where desert heat initiates spring transition.

The southeastern states experienced poor spring transitions resulting from a prolonged shading effect of the bermudagrass and an increase in the natural heat tolerance of the newer available overseeded grasses. This has led to much lower seeding rates of 25-30 pound/1,000 sq. ft. for golf course greens.

Typically, 300-450 pounds of perennial ryegrass seed per acre are rates used for fairways as opposed to 400-700 pound seed/acre for fairways of their western counterparts.

This illustrates where local tradition and experience have played an important role in the acceptance of overseeding techniques.

On several golf courses in south Alabama, seeding rates between 22 to 25 pounds of perennial ryegrass seed/1000 sq. ft. have produced excellent ball roll surfaces that promoted early but smooth spring transitions back to bermudagrass. The key objective here is to realize that too high a seeding rate for golf course greens will create a fast growing, dense vertical shoot mass that creates slow ball roll speeds.

Ball roll speeds

There is also a difference in ball roll speeds between perennial ryegrass cultivars as well as species. It is interesting to note that the difference between ball roll distances of more than eight perennial ryegrass cultivars evaluated at both Texas A&M and the University of Florida in the late 1970's were nearly identical.

Although ball roll characteristics vary among ryegrass cultivars, there is obviously more difference among species.

In mixtures of perennial ryegrass and rough bluegrass for instance, the ball roll speed can be reduced by increasing the percentage of rough bluegrass in the mixture.

Although seeding rates and percentage of mixture components affect golf ball roll characteristics, they could have even more affect on wear tolerance.

At mowing heights of 3/4 inch, a perennial ryegrass seeding rate study was conducted in 1979-81 at Texas A&M University.

One interesting observation of a 3/4 inch mowing height was that too great a seeding rate can actually cause a reduction in wear tolerance.

At the lower putting green mowing heights one could only speculate from field observations that this would not be apparent at typical seeding rates below 40 pounds seed/1,000 sq. ft. At the higher mowing heights such as tees and fairways and at high seeding rates, the perennial ryegrass will not mature and tiller through the winter season, so wear tolerance is reduced through late winter.

Several perennial ryegrass cultivars that have experimentally shown good wear tolerance characteristics in Texas, Florida and even in Europe, are Citation, Delray, Regal and Manhattan.

Often poor results from overseeding can be blamed on cultural practices. The natural characteristics of cool season turfgrasses are part of the formula for successful overseeding.

Overseeding establishment

Philosophies for preparing a seedbed, like overseeding rates, vary. The more modern approach requires the light and frequent vertical mowing of the turf from late summer until the seeding date. This can include light frequent topdressing on greens and tees and even brushing of the fairways with mechanical street sweeping brooms.

Drag mats such as chain link fence or spring tooth harrow to comb the turf prior to seeding are often used. A few turf managers, particularly in warm arid regions, still scalp the bermudagrass and vertical mow just before overseeding.

Chemical suppression with the growth retardant *maleic hydrazide* (or even by applications of Diquat) have been used for large acreage such as golf course fairways. The goal is to suppress the bermudagrass to give the overseeded grass the upper hand.

Research indicates there is a relationship to soil temperature decline and the selection of most optimum overseeding dates.

Beware, however, of retarding the bermudagrass to a point where optimal spring growth is delayed. Nitrogen should be reduced to prevent excessive bermudagrass shoot growth. Conditions in each area are not identical. Turf managers must make common sense judgements concerning their sites.

Fertility practices for overseeding differ also although most managers follow similar patterns using supply starter fertilizers high in phosphorus and potassium. One young superintendent in south Florida pretends his bentgrass is a carpet lying on top of the bermudagrass. His program includes phosphorus and potassium with no nitrogen until the first of January. Color is maintained with micronutrient applications of iron and manganese. Bentgrass has a lower nitrogen requirement than bermudagrass.

Overseeding dates

Research at Texas A&M several years ago is helping managers select the best dates for overseeding. These studies indicate there is a relationship to soil temperature decline and the selection of most optimum overseeding dates.

In the study, four-inch soil temperatures were monitored and perennial ryegrass was overseeded daily for more than 50 days in the fall.

At the Texas College Station site a sudden decline in soil temperatures was observed to occur annually. The

fall soil temperature decline was also observed in cotton research near Dallas and at field research centers in south Georgia and north Florida. This sudden decline can be used to predict the best range of overseeding dates to insure best germination and good seedling vigor.

Typically, dates for overseeding bentgrass should be ahead of overseeding perennial ryegrass. Bentgrass takes longer to establish and its heat tolerance allows for overseeding when optimal bermudagrass shoot growth temperatures are present in early to mid fall. Rough bluegrass, similar to ryegrass, should be overseeded as the fall temperature decline reduces the bermudagrass shoot growth but is high enough for optimal germination. This can be a *narrow* range of dates for the northern transitional bermudagrass areas. Mixtures of different species should always be overseeded at the earliest date that provides optimal results.

Spring transition

Research at both Clemson and Texas A&M fits well with common cultural practices used to initiate spring transition. At Texas it was learned that low mowing and an application of soluble nitrogen fertilizer stimulates a rapid transition of perennial ryegrass. At Clemson chemical suppression with low application rates of melfluidide retarded the shoot growth of overseeded ryegrass enough to help initiate spring growth of bermudagrass.

The difference in growth retardant tolerance between the two grasses is great enough to create this chemical induced transition. Vertical mowing at frequent intervals recessed the bermudagrass more than at less frequent weekly intervals and caused a delay in transition. These studies indicate spring transition can be predicted. The greater heat tolerance of many of the new perennial ryegrasses may no longer present a problem with spring transition.

Cultural practices such as vertical mowing, low mowing heights, and application of soluble nitrogen fertilizers are now common for forcing spring transition on golf courses.

Transition naturally occurs when spring soil and air temperatures above 80 degrees F. cause the ryegrass roots to decline in active growth. If soluable nitrogen fertilizer is applied then the shoot growth of the ryegrass is further stimulated, but not the root growth. This causes an imbalance in the grass plant.

Combine this with low vertical mowing and the rate of transition accelerates.

Heading where?

In the past 20 years turfgrass research has opened doors, leading to our present techniques for winter overseeding and a large number of improved cool season turfgrasses. (From 1977 to 1980 over 120 different turfgrasses among five species were evaluated at Texas A&M alone.) Common cultural practices came under scrutiny and more uniform and trustworthy methods blended with and improved local techniques. The use of triplex greens mowers with vertical mower reels aided the revolution.

The research continues.

There is an ever increasing number of commercially available perennial ryegrass cultivars and a national overseeding test coordinated through the USDA in Beltsville, MD. This is encouraging for the common sense utilization of the scientific aspects of winter overseeding. **WT&T**

Batten is an agronomist with Golfturf, Inc.

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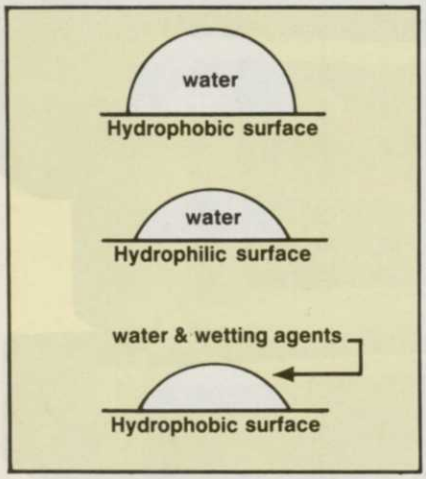
Wetting Agents

by **Dr. A. Martin Petrovic**, Cornell University

The field of turfgrass management has seen a myriad of products come and go. One class of products called wetting agents has received a lot of attention and caused some controversy from time to time.

Wetting agents, sometimes called surfactants or surface active agents, have been developed mainly to change the physical properties of water.

They act by reducing the surface tension of water, which makes it possible to wet the surface of solid objects such as soil particles or thatch. Surface tension is the tendency of water to form a droplet, as shown below, when placed on a surface.



If the surface is hydrophobic (water repellent), there is a large contact angle formed between the water and the surface; a drop forms. If a drop of water is placed on a hydrophilic (water loving) surface, such as a sponge, a small contact angle develops; wetting occurs.

If a wetting agent is added to the water on the hydrophobic surface, there is a small contact angle formed, due to a lower surface tension, and wetting occurs. Wetting agents are generally classified based on their chemistry: anionic, cationic and nonionic.

Anionic surfactants (negatively charged) are seldom used on turfgrass because they are somewhat more phytotoxic than the other forms and are suspect to leaching as are any anions like nitrates.

The effects of wetting agents *on improving the quality of an area with localized dry spots is dramatic. Note the darker, healthier areas treated with wetting agents.*

On the other hand, cationic wetting agents (positively charged) act much like cations in the soil and are tightly held to the soil which makes them less effective.

Nonionic wetting agents have no charge and appear to be less phytotoxic than the other classes. Nonionic wetting agents come in the form of esters, ethers and alcohols.

Combinations of one or more of these forms provides for more effective wetting over a wide range of soil types. Table 1 contains a list of some of the wetting agents used in turf.

Current uses for wetting agents

Wetting agents have been reported to or claimed to be useful in the following ways:

1 Improving the wetting of localized dry spots, such as hydrophobic soils and/or thatch
2 Affecting plant growth
3 Improving water movement into soil
4 Improving drainage
5 Reducing compaction
6 Helping to reduce the development of thatch
7 Removing frost and dew
8 Increasing fertilizer and pesticide effectiveness
9 Aiding water efficiency, thus reducing irrigation costs

What is known that can support some of these concepts?

Improving localized dryness

The name wetting agent implies that their major purpose is to aid in the wetting of substances.

There has been considerable research done at both Michigan State University and Ohio State University on the causes and cures of localized dry spots, LDS.

Table 1.
A list of common wetting agents used in turfgrass management

Trade Name	Manufacturer	Rate of Application (oz/1000 ft²)
Aqua Gro	Aquatrols Corp. of America	4 to 16
Hydro Wet	Kalo Laboratories	8 to 16
Lesco Wet	Lesco Corp.	8 to 16
Peneturf*	Four Star Agr. Serv.	0.2
Surf Side	Montco Prod. Corp.	16 to 32

* Marketed as a soil conditioner.