James B. Beard

AMERICAN LAWN APPLICATOR

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Renovated Lawn

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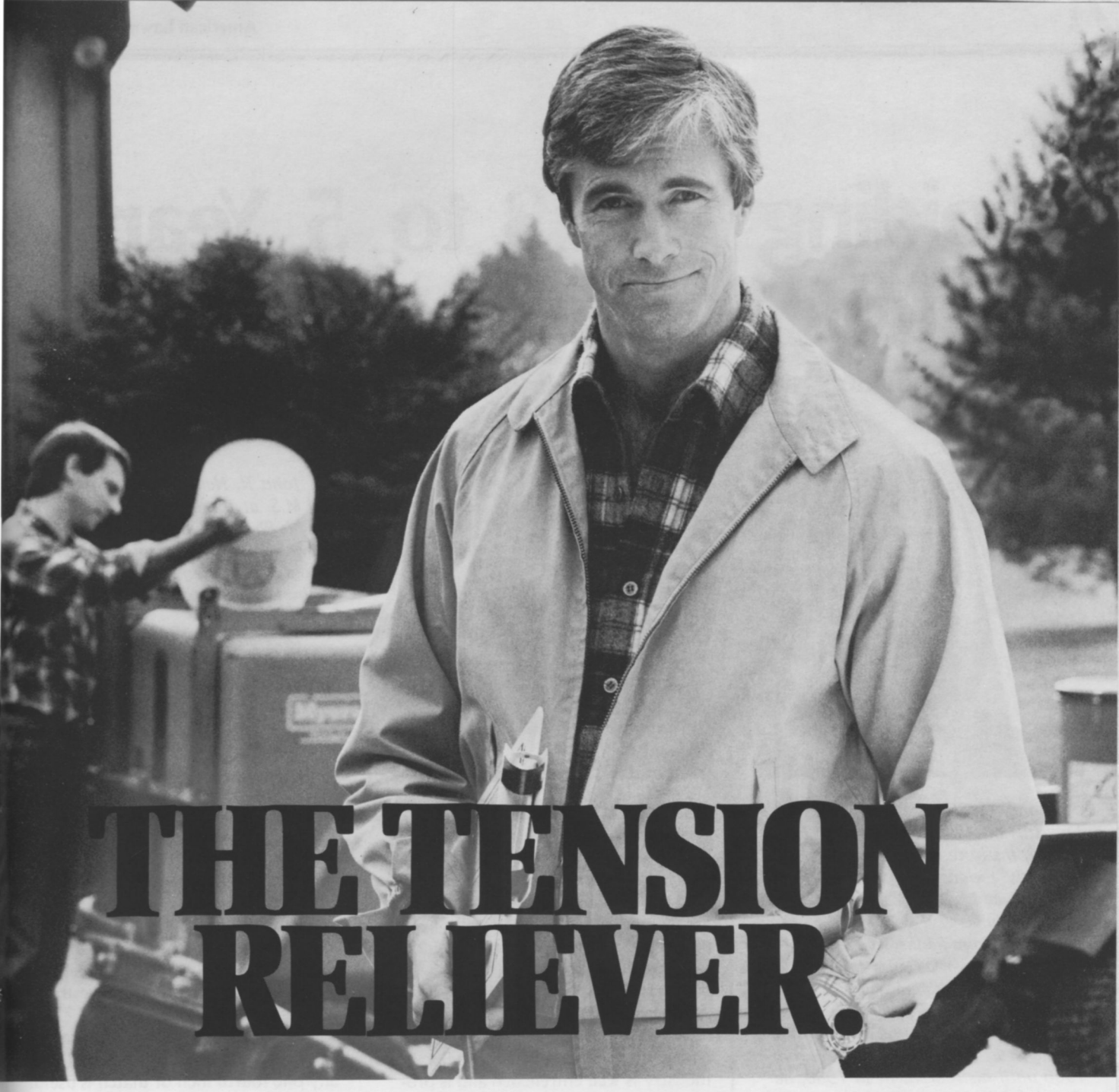

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Avoiding the 3 to 5 Year Thatch Syndrome

by John F. Shoulders, and John R. Hall, Virginia Polytechnic Inst.

John F. Shoulders is Professor Emeritus of Agronomy, Virginia Polytechnic Institute and State University (formerly Extension Turf Specialist), and received his B.S. degree from West Virginia University, and his M.S. in Agronomy from Pennsylvania State University. John was a County Agricultural Agent in West Virginia from 1946 to 1952 and joined Virginia Tech Agronomy Department in 1952 as Extension Specialist in Forages and Turf. From 1966 until his retirement in 1980, he devoted full time to Turf Programs.

He is a member of numerous professional societies including the American Society of Agronomy and is a charter member of International Turfgrass Society.

John R. Hall, III received his B.S. and M.S. at the University of Illinois, and his Ph.D. at Ohio State University. He was an Assistant Professor of Agronomy and Extension Specialist, Turf at the University of Maryland for five years.

Dr. Hall is now Professor of Agronomy and Extension Agronomist, Turf, Virginia Polytechnic Institute and State University where he has been since 1976.

The astronomical growth of the Lawn Service Industry in the United States in the last ten to fifteen years has been exciting and challenging. A leading lawn service company that reported annual gross sales of approximately $50,000 a year in the late 60's is now amassing annual gross sales in excess of $140,000,000 a year. The beautiful lawn, that in the late 60's was within reach of only the wealthy who could afford a gardener or the local agronomic enthusiast has finally been put within reach of the average middle-class family. A nice lawn has always been an integral part of the "Great American Dream," and now part of that dream can be purchased just like the house, car and boat. The Lawn Service Industry is well entrenched and is providing a much desired service to today's society.

The future of the Lawn Service Industry in America looks bright. But the picture is not all "Peaches and Cream." The disturbing observation made by some lawn service companies is that many lawns on their programs seem to have their best quality after being on the program 3 to 5 years. The tendency toward better adapted, more vigorous cultivars and the adoption of improved management and pest control practices have resulted in a more vigorous turf of higher quality. But after a few years of improved quality, a downward trend in quality is frequently noted in spite of the continued use of accepted practices. The decline in quality is usually accompanied by a build-up of thatch and mat. The decline in turf quality, and loss of turf is often attributed to causes other than thatch. Lack of moisture, insect injury, disease or other causal agents are often more identifiable as the immediate problem while the underlying problem is frequently excessive thatch accumulation.

It should be recognized that a small amount of thatch is beneficial. Normally one fourth inch of thatch is useful in maintaining moisture, insulating the soil surface and otherwise improving the turf. However, the beneficial aspects generally cease when the thatch layer exceeds a thickness of about one fourth inch. Once a thickness of one-half inch or more is reached, control measures are in order to prevent the detrimental effects of thatch which occur with increasing severity as the thatch layer thickens.

Undesirable results occurring from thatch accumulation of one half inch or more include:

1. Problems in maintaining adequate soil moisture, particularly that of rewetting the dry thatch layer and getting water into the soil.
2. Interference with surface applied

Thick thatch layer that interferes with nutrient and water utilization and movement.

fertilizer, lime or pesticides which need to reach the soil surface.

3. Nitrogen loss by volatilization.
4. The tendency of thatch to attract insect pests because of the favorable conditions presented.
5. Increased disease pressure due to weakened plants and the favorable alternate medium provided for pathogenic microorganisms by thatch and mat.
6. The tendency of the roots of turfgrass plants to grow in the thatch and mat with decreasing penetration into the soil as the layer becomes thicker. This alters patterns of water use, and pesticide and fertilizer response.

In transition zone climate areas where turfgrasses are often pushed to their survival limits by limited moisture and extremes of temperature and disease, excessive thatch can be deadly. This lignified layer of undecomposed organic matter is capable of altering pest populations, moisture relations, nutrient utilization patterns, soil temperature and many other climatic and biotic factors.

In general, practices that promote growth, vigor and persistence and make a lawn program worth buying, also promote thatch development. In thatch-related turf decline, the missing management ingredient is often a failure to employ practices that control excessive thatch buildup.

There is no simple method of controlling thatch. Most golf course superintendents solve the problem on golf greens by topdressing greens with sand-soil-peat mixtures a minimum of twice a year. This solution is economically unreasonable for the Lawn Service Industry. In-depth attempts to "spike" thatch layers with microorganisms that facilitate thatch decomposition have thus far met with very limited success. At this point in time, although the theory is promising, the technique is not reliable enough to be utilized. Another curative method of solving the thatch problem involves dethatching with a vertical mower. This solution is as radical as surgery is to the human being. When faced with the prospect of surgery, one often asks; what could have been done to avoid it? And so the homeowner will also eventually ask: "What could have been done to avoid the necessity of dethatching my lawn?"

Obviously, adequate research has not yet been conducted to candidly answer this question in all situations. The simple answer to the question of "what could have been done to avoid the necessity of dethatching my lawn?" is: "Have the lawn managed in such a way that the accumulation rate of dead or-

Newer type drum aerifier which provides the capability of collecting the cores. Most efficient on smaller areas.

Conventional rolling tine aerifier. Type commonly used on large turf areas.

Piston type aerifier commonly used on small areas where surface disruption must be minimized.

Vertical mower (Verticutter) commonly used to remove thatch from a turf.

ganic matter on the surface of the soil does not exceed the decomposition rate." . . .Easier said than done. There is a great disparity in todays marketplace between the demands of the lawn service customer and our agronomic ability to meet those demands without the production of excessive thatch.

Thatch management involves the integration of practices intended to slow the rate of organic matter accumulation, increase the rate of decomposition and physically remove a portion of the thatch. Successful thatch management utilizes both biological and mechanical methods. Many of the usual cultural practices can be used in such a manner that they enhance or interfere as little as possible with decomposition or do not promote excessive turf growth in the first place. Such practices include:

1. **Employing a fertilizer and mowing program that provides adequate turf quality.**

High nitrogen fertility programs if properly managed produce more shoots, roots and rhizomes and under these conditions the rate of accummulation of organic matter can rapidly exceed the rate of decomposition. The majority of improved turfgrass varieties have been selected for their extreme vigor and density. In many cases this vigor and density is likely to positively correlate with thatch buildup. Some species of turf such as zoysiagrass and red fescue build up thatch in spite of relatively slow rates of growth because of their decomposition-resistant tissue.

Higher-cut grass produces faster thatch build-up rates. Work at Nebraska indicates that no significant difference in thatch build-up occurred between 2 and 4 lb. nitrogen per 1000 sq. ft. per year programs on Kentucky bluegrass. In this situation where clippings were returned to the plot the thatch build-up was 50% greater at the 2 inch mowing height than it was at the 1 inch mowing height (6).

Successful thatch management utilizes both biological and mechanical methods

2. **The use of pesticides that interfere least with micro- and macro-organism activity.**

Pesticide usage can play an important role in thatch development. Seven years of annual tricalcium arsenate and bandane applications at 187 and 35 lb. a.i./A respectively, led to noticeable thatch build-up in experimental plots at the University of Maryland Plant Research Farm. Dieldrin and chlordane have produced similar results on thatch build-up in Illinois tests (5). Surfactants used to increase water infiltration and percolation rates also have a tendency to increase thatch build-up. The surfactant creates better water movement through the thatch layer leaving the thatch in a dry condition not conducive to microbial decomposition (2). Fungicides have also been implicated in affecting thatch build-up. Increased thatch resulted from the negative effect of fungicide-induced acid soil pH on thatch decomposing microorganisms (1).

Pesticide selection is important to minimize harmful side effects to earthworms and insects involved in thatch decomposition. Commonly used pesticides such as benomyl, anilazine, chlorothalonil, and mancozeb have been noted to produce moderate to high toxicity to earthworms (3).

3. **Maintaining the pH in the thatch layer and at the soil surface at a level conducive to organism activity, normally pH 6.0 to 6.5.**

Researchers have shown that light annual applications of lime (20-25 lb/1000 ft^2) may be beneficial in speeding the thatch decomposition rate (2,4).

4. **Maintaining a favorable carbon to nitrogen ratio, from 25 to 1 to 30 to 1.**

Classic soil organic matter research

Thatch collection after removal is generally labor intensive.

indicates that microbial decomposition of plant organic matter will be maximum when the carbon to nitrogen ratio in the system is between 25 and 30 to 1. However, lowering carbon to nitrogen ratios in thatch by applying nitrogen to turf can be risky if not timed and applied properly.

5. **When applicable, choose satisfactory cultivars that have lower thatching potential.**

Choose cultivars that perform well in your region and whenever possible opt for the variety that has a moderate or low tendency to develop thatch.

There is no simple method of controlling thatch development. Preventive programs for thatch reduction should be built into every turfgrass management program. Curative programs involve the labor-intensive process of "dethatching" which is made possible with vertical mowers. Timing of the dethatching operation is critical and is best done during periods when the plants can recover rapidly from the verticutting treatment.

Preventive thatch management will involve proper selection of species and cultivars, moderate levels of nitrogen fertility, careful selection of pesticides to minimize destruction of thatch-decomposing insects and earthworms, monitoring of the pH of the thatch layer to maximize microbial decomposition and periodic vertical mowing and aerification.

Aerification is an auxilliary agronomic service that needs to be included in more lawn service programs. Aerification increases oxygen exchange, water infiltration, water retention, nutrient penetration and thatch decomposition. It decreases surface runoff and irrigation frequency. Use of an aerifier that brings up soil and reinoculates the thatch layer with soil and microbes is going to improve the probability of thatch decomposition. The aerobic microorganisms involved in thatch decomposition benefit from the improved oxygen levels as much as the turfgrass.

The dilemma arises from the fact that the public desires dense, green lawns that are free of weeds, damaging insects and diseases. Economic survival, given the current state-of-the-art, requires the use of nitrogen and pesticides in amounts that can create excessive thatch. Assistance in solving this problem can come from the incorporation of thatch-reducing managemnt techniques into the Lawn Service Company programs. Core aerification is one of these potential thatch-reducing management techniques.

As the lawn service market matures the name of the game will be reduction of customer turnover. Companies surviving in this climate will be those providing programs that improve the quality of the lawns **indefinitely**– not those that lead to declining turf quality in 3 to 5 years because of excessive thatch development. Thatch control is continuous. Practices to deter thatch build-up or to reduce thatch accumulation after build-up has occurred need to be developed carefully and systematically to maintain the desired level of quality and to extend the useful life of the turf.

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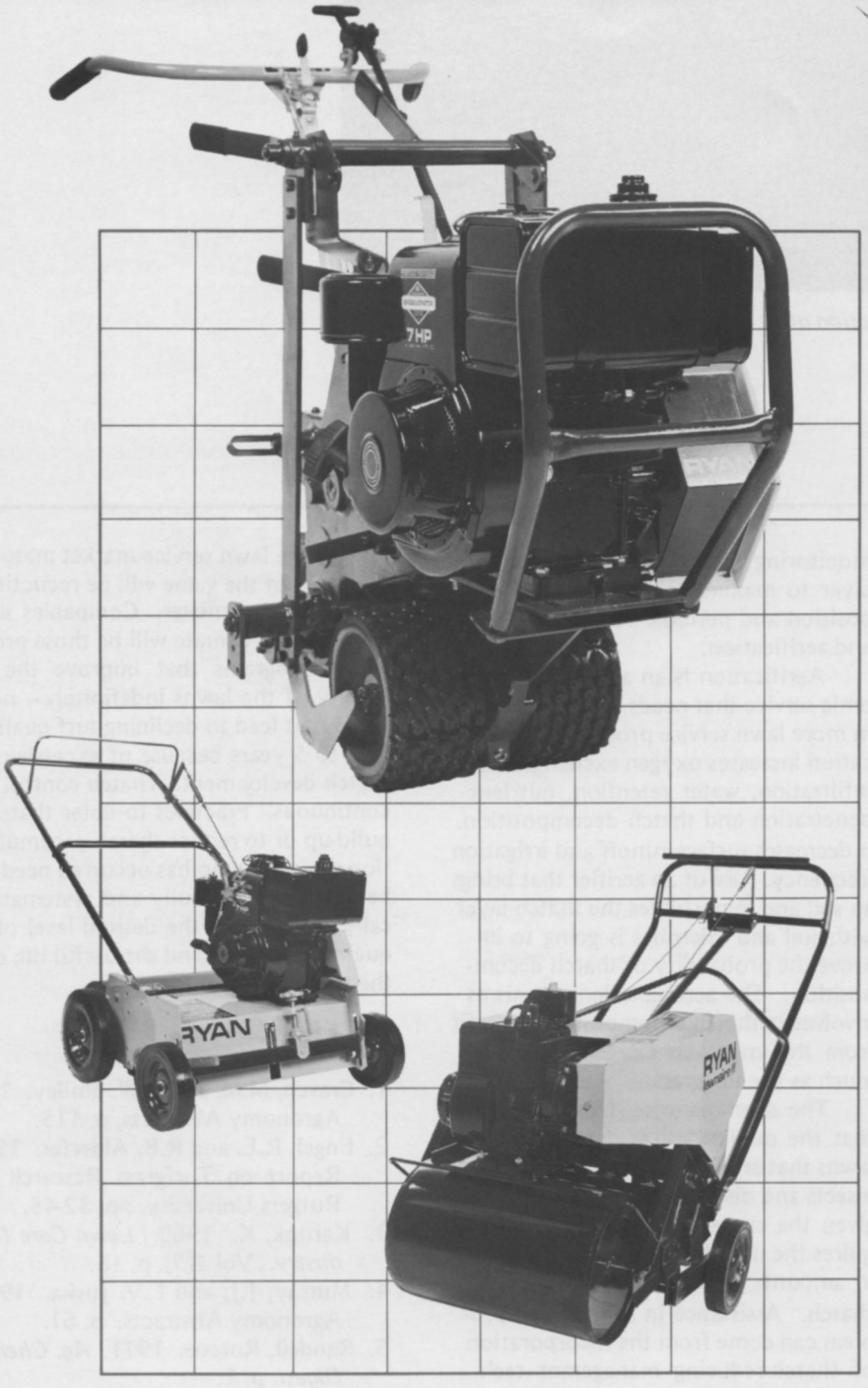

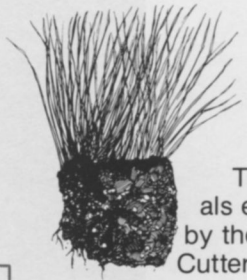

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Lawn Renovation– Why and How

by Rick White, Village Green Lawn Spraying

Rick White graduated in 1968 from the University of Illinois with a B.S. in Agronomy. He is Past President of the Illinois Turfgrass Foundation and is currently an Executive Board Member of the PLCAA.

Rick formed Village Green Lawn Spraying in 1973 as a professional chemical lawn care company. Village Green has diversified into tree care, commercial maintenance and lawn renovation.

Often we encounter turf problems which we are unable to remedy through maintenance practices. Examples include: disease or insect damage, improper varieties for the site, a thin strand of grass, or severe weed infestation which can't be selectively controlled. In these situations where we can't expect adequate turf quality with our chemical lawn care program, we must select a renovation technique to upgrade or entirely change the turf area.

Since the main turf problem which requires renovation in the Chicago area is fusarium blight, we have chosen slit seeding as our renovation procedure. Typically, the lawn affected by this disease is sod installed on a compacted clay soil. Often the sod was cultured on a dissimilar growth medium causing an interface between the sod layer and heavy mineral soil beneath it. This interface causes the sod to develop a thatch layer and live within itself rather than rooting in the soil. Due to the large pore size of thatch, it does not exhibit the capillary movement of water upward unlike the clay mineral soil below it. Even short periods of heat with no water will cause this "floating ecosystem" to show signs of drought stress. Dethatching will do little to relieve this problem since thorough dethatching would virtually remove the lawn. The problem goes back to the interface of the clay and the organic layer above it. We feel cutting through the thatch and planting the seed in the soil establishes the new grasses where they can root in the soil rather than the organic layer above.

It is important that seed selection is based on local performance

THE RENOVATION PROCESS

Killing Existing Vegetation– We have had our best results, in terms of long term performance of the lawn, by killing the existing lawn rather than seeding into the established lawn. This removes the competition and totally changes the lawn to better varieties. Killing the lawn also has side benefits of reducing the depth of the thatch layer through desication of living roots and rhizomes. The cutting blades cut much better through a dead thatch layer, creating a greatly reduced clean up volume of thatch.

The lawn is sprayed with Roundup at 3 qts. per acre and Trimec at 3 pints per acre. The heavy rate of Roundup is required for quackgrass control, which is our most difficult grass to eliminate. Straight Roundup leaves some of the commonly encountered broadleaf weeds such as dandelions necessitating the use of Trimec. Two factors, volume and moisture, have to be considered when total control is needed. Since we are often killing these lawns late July and August, the lawn may need irrigation to get affective Roundup translocation in the grasses. We have had poor results at spray volumes of 3 gal./M, but improved results by lowering the volume to .75-1 gal./M. During warm weather the lawn is dead in 10-12 days. Anticipating skips, we take a hand spray tank when we return to seed. If quackgrass is a big problem, the lawn should be watered after about three days from the Roundup application. This will encourage resprouting of the quackgrass right away as it may need a second application. It is very discouraging to see quackgrass regenerating from rhizomes with your new seeding.

THE SEEDING PROCESS

Transportation– If your business is chemical lawn care, transportation equipment for the seeding process may be a problem. Large volumes of thatch have to be hauled away from the site plus space for the seeding equipment. We currently use a stake bed truck with 48 inch sides and a rear lift gate. The lift gate facilitates the movement of the heavy seeder up and down from the bed.

Equipment– We have used both the Jacobson and Olathe slit seeders and find the Olathe performs better for us. Both plant seed on 3 inch centers, but we find the Olathe is more manuerable, has a better cutter blade design, has a shorter distance between cutting blade and seed delivery making seed placement more consistent in the slit. The

hand grip clutch and electric start are operator conveniences appreciated when seeding in the hot weather of August and early September.

The most time consuming step of the seeding process is the clean up of the thatch generated by the slit seeder. Hand raking is possible but very time consuming. We use a Parker power sweeper. If the renovated area is dry, the machine works well. However, the handles bend easily and the bag, if picked up loaded, will fall apart. It is best to pull the thatch out of the bag of the sweeper onto a tarp to transport it to the truck.

We also carry a cyclone spreader on the truck, either a Scotts or Lesco, to apply granular fertilizer as the last step in the seeding process.

Seeding— Ideally, the turf will be completely dead and dried out when you arrive to seed it. When the turf is dead and dry it cuts cleanly leaving very little clean up. The homeowner should prepare the lawn by mowing it on the lowest setting to scalp off grass which would otherwise add to the debris to be cleaned up.

For each lawn the seeder should have the depth of cut adjusted to cut through the thatch layer and 1/8-1/4 inch into the soil so the seed is in contact with the soil rather than thatch. The seeder is run over the lawn two times on a 45 degree angle to the first cut creating a diamond pattern. Double cutting the lawn provides a much faster fill in of the new lawn.

The client should know what to expect on a time schedule

Prior to seeding, the machine is calibrated to deliver 16-20 seeds per lineal inch which equals 2-3 pounds of seed/M. We do not promote this service as a dethatching process, although some of the thatch is removed and the slitting has some aerating effect. There is some value in leaving a thatch layer, as it decreases evaporation and prevents wash outs during the germination period. If the thatch is greater than one inch, some mechanical removal should probably be considered. However, we have been pleasantly surprised at the decrease of thatch layers as deep as one inch after the killing-seeding procedure.

The clean up of thatch after seeding should be the minimum required to have a neat appearance and not leave heavy clumps over seed rows. The more the area is cleaned, the more seed is picked up and unnecessarily increases the time on the job.

The last step after clean up is the application of a 12-12-12 fertilizer with the broadcast spreader. We have tried broadcasting seed as a final step to hasten the total fill in of the lawn, but found little or no grass in between the rows and the liability of grass coming up in the wrong places i.e., patio cracks, flower beds, sandboxes, etc.

Seed Selection— On our full sun sites, we currently use a blend of 90 percent improved bluegrasses (3 varieties) and 10 percent improved perennial rye. The rye was originally included to satisfy the customer's desire to have something happen right away. However, these lawns with rye show improved drought resistance, excellent color,

Renovation in progress— Fall 1980.

This is a picture of the same lawn the following year.

Lawn Renovation

Various renovations in progress.

Photo of a completed renovation.

green bug resistance, and have a more diversified gene pool to prevent another disease wipe out.

However, it is important that seed selection is done on local performance since the same grass that performs well in Chicago may not in Cincinatti. This selection is worthy of considerable time as this decision obviously has long term effects. Also, we find custom made seed blends are no more expensive than pre-bagged seed blends. Therefore, you may want to buy exactly what you want.

Problems– Like everything else we do, there are problems with this renovation process.

1. Underground utilities– Even though we are cutting into the soil ¼ inch, we have cut telephone lines and gas light plastic hose.

2. Hills and edges– If a hill has to be traversed across the face, seed often will not be delivered into the slit since the machine back end tends to slide down hill. The seeding machine obviously cannot seed right up to a wall because of the wheel allowance. Also, if the wheel is put on the sidewalk to cut close to the walk, the added height of the walk causes it to bridge out of the soil.

3. Improper watering– Although watering requirements are less than bare soil seeding, lack of sufficient watering is the number one problem. When evaluating a poor stand, look for increased seedling density in shady areas and gutter downspouts.

Customer Relations– In your enthusiasm for establishing a new lawn for the client, do not oversell your product. This is a seeded lawn being established at about 1/3 the cost of removing and resodding the existing lawn.

The client should know what to expect on a time schedule to relieve a lot of phone calls about the progress. Seeded in August, this is what we tell our customers to expect:

1. *4-7 days– ryegrass up (hands and knees look, not from the kitchen window)
2. 12-16 days– bluegrass up
3. 16-45 days– rows of grass lighter green than it will be when mature
4. 45-90 days– grass turns darker green, side shoots (tillers) and underground stems (rhizomes) develop to fill in the voids
5. Expect to have weeds to come up with your seed. Some of them will die with the first frost, and others we will control in the spring.

We require all clients to remain on our lawn care service for at least one year. This puts us in control of herbicides and fertilizer applications. This is **not** a short term project with few factors out of your control. The more control you have over the growth conditions on that lawn, the greater the potential for success of the reestablishment.

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**Growing days– do not count winter days*

Jet-Action Deflector from Lesco

Lesco Products now has available a Jet-Action Deflector* for use on the Lesco Rotary Spreader.

The deflector provides a straight spreading edge to prevent granular material from being directed onto walks and flower beds. The Lesco Jet-Action deflector does not merely drop the diverted material, but directs it back into the spreading pattern for uniform, full-rate distribution.

Lesco's Jet-Action deflector attaches to the right side of the spreader and bolts to the frame. It may be raised or lowered into position with a convenient lever.

The new Jet-Action deflector is one of several continuing improvements for the new Lesco Spreader. In keeping with the demands of the turf industry, Lesco has made several improvements on the spreader since its introduction in 1982. Additional zerk fittings have been added for mechanism lubrication. The handle has been reinforced with two steel-welded plates for strength and durability.

For more information contact Barb at Lakeshore Equipment & Supply Co., 300 S. Abbe Rd., P.O. Box 4015, Elyria, Ohio 44036, or use the reply card.

Circle No. 5 on Reader Reply Card

Turf Disease Control of the Past and Present

by Noel Jackson, University of Rhode Island

Dr. Noel Jackson obtained an honors degree in Agricultural Botany at the University of Durham, Kings College, Newcastle upon Tyne, and later a Ph.D. degree in Agronomy.

From 1958 to 1965 Dr. Jackson was employed as Biologist at the Sports Turf Research Institute, Bingley, England where he established his interest in turf management, in particular, turfgrass diseases.

In 1965 Dr. Jackson joined the Faculty at the University of Rhode Island as Assistant Professor in Plant Pathology and is now a Professor at that institution. The position involves teaching, research and extension duties in the area of turf, trees and woody ornamental diseases. Over the past 18 years Dr. Jackson has worked closely with the professional growers (sod farmers, golf superintendents, nurserymen and landscapers) and with homeowners to ascertain and research their plant disease problems and recommend appropriate control programs. Dr. Jackson teaches two undergraduate courses at the University, lectures nationally and has published widely on his research.

References to lawns and sports turf in the old world may be traced back for many centuries, but any documentation relating to fungal disease is of relatively recent occurrence. Descriptions of early turf swards indicate that they were of varied botanical composition, and their quality probably left a lot to be desired by modern-day standards. None-the-less, they must have harbored a wide range of fungal pathogens. As pioneers ventured into the new world, inadvertently or otherwise, they transported plant materials including the common turfgrass species together with their associated microorganisms. Fungal pathogens not already present in the new environments accordingly were introduced to colonize along with the grass hosts. In the reverse direction, new world pathogens were similarly dispersed as trading between the continents developed. Thus the association of turfgrass host and fungal pathogen is presumed to be, in most instances, of long-standing occurrence.

In the wild or in turf of low quality, depradation from disease is of little consequence and disease symptoms may pass unnoticed. As first the art and then the science of turf management developed to bring about a marked upgrading in turf quality so turf diseases assumed increasing importance. The intensive management regimes imposed in a monoculture situation provided the means to improved turf quality, but, in turn, they offered an environment eminently suited to desease causing fungi. Activities of the various pathogens intensified, damage became more evident, turf disease diagnosis improved, and the early decades of this century saw the recording of these events. Brown patch was the first turf disease to be documented in 1914, but by 1932 Monteith and Dahl had published their celebrated bulletin, "Turf Diseases and Their Control", containing the descriptions of many of the formidable list of fungi which are now known to damage turf grasses.

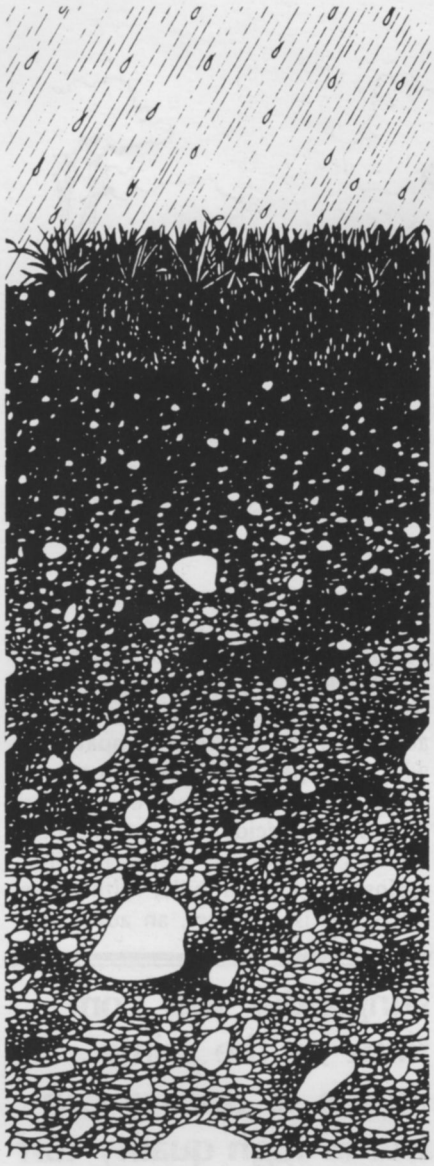
From time to time new diseases have been added to the list prompting the query as to how and why they arise. In these days of rapid and extensive world travel the introduction of a pathogen into a new location is a possibility. Spores or other inoculum in plant debris and soil may traverse a continent or an ocean in a few hours, borne unwittingly for example on the shoes of a professional golfer. As already described it seems likely, however, that the various fungi already are well distributed. Given conditions that are less than ideal, these indigenous or long established turf pathogens may be the cause of mild, chronic diseases which are overlooked or misdiagnosed. The "new" diseases may therefore only be a product of keener observation and better diagnostic technique.

Brown patch was the first turf disease to be documented in 1914

Yellow tuft disease is a good example of misdiagnosis. Symptoms of the disease have been documented since the early 1920's, and various agents (most commonly nematodes) were suggested as the probable cause. In the 1970's it was determined that a common and widely distributed downy mildew fungus was the actual yellow turf incitant. Some recent examples of new diseases have arisen following a

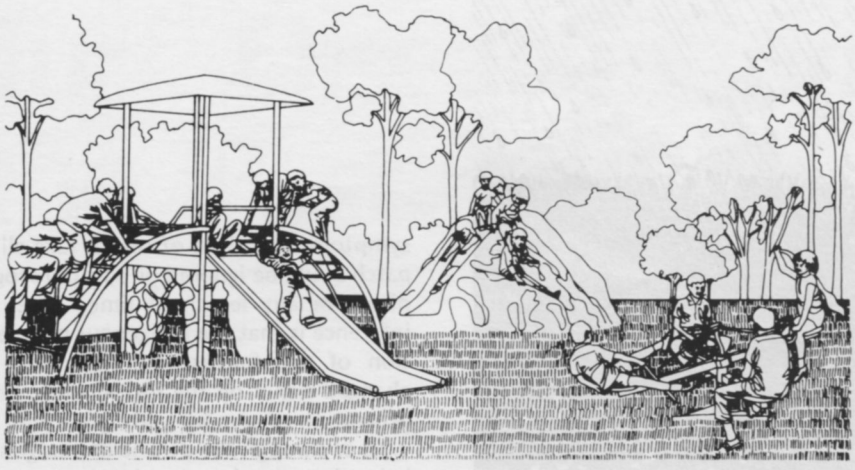
reappraisal of existing ones. The latter we now realize are, in fact, disease complexes. Symptoms may be similar but different fungal species may be involved. Three or more species of *Rhizoctonia* in addition to *R. solani* are being investigated as "brown patch" pathogens. *R. solani* continues as the accepted cause of large brown patch but *R. cerealis* is now established as the incitant of "cool weather brown patch", recently designated yellow patch disease. Similarly we now know that red thread or pink patch is a disease complex involving at least three fungal species. It is interesting to note how these two diseases, with causal agents previously thought well founded and certainly widely researched, have responded to closer scrutiny. Perhaps some of the controversies surrounding other turfgrass diseases, for example anthranose and Fusarium blight may be resolved by a reexamination of the purported causal agent or agents.

The sudden appearance of a severe outbreak of a new disease results most probably from changes taking place in the local fungal populations. Spontaneous genetic change may give rise to a more virulent biotype which if sufficiently competitive will dominate the population and cause a disease flare up. Similarly, local shifts in environmental conditions may favor build-up of pathogenic biotypes, previously in low numbers or suppressed by antagonistic microorganisms. Weather-related stresses interact with the various turf management practices to produce these local changes in the environment. One feature common to all intensive turf management programs is the use of various pesticides. Widespread benefits obviously accrue from the use of insecticides, herbicides, growth retardants, and fungicides, but all may influence the complex biological systems which function in the mown sward. Their potential for altering the naturally occurring checks and balances to favor a



particular pathogen and promote an outbreak of a new disease (or indeed an already known one) cannot be ignored. Ophiobolus patch disease, or take-all patch as it is now called, is a disease of bentgrasses which fits somewhere into this scenario. The disease reached serious proportions in western Washington during the 1960's but recently severe outbreaks have been reported in New England and in Maryland. Since the same fungus causes disease of cereal crops and the latter have a long cropping history in these areas, the fungus is probably of common occurrence and the cause of mild chronic symptoms on bentgrass turf. The symptoms could have been misdiagnosed or dismissed as a cultural problem. It is doubtful, however, whether the very distinctive symptoms and signs of severe take-all patch could be ignored or pass unrecognized for any length of time. The inference is that the indigenous population of the fungus somehow has changed either by the introduction or generation of a more pathogenic biotype or through the demise of antagonistic microorganisms previously suppressing the pathogen. Soils are known to acquire suppressive properties to *Gaeumannomyces* fungi which cause the take-all disease, and it may be that this suppressive mechanism has been reduced or eliminated in the turf, thus allowing severe outbreaks to occur. What triggered the change is not clear, but the effect of some fungicides to increase the incidence of particular turf diseases has been established. Iprodione increases yellow tuft incidence, mancozeb and captafol exacerbate dollar spot disease, and there seems a strong correlation between the development of superficial fairy rings in turf and the use of the systemic fungicide benomyl. The incidence of turf diseases caused by *Pythium* species may also be enhanced where benomyl is used.

Accurate diagnosis of diseases by identification of the pathogen and a thorough understanding of the etiology of a particular disease always have been and will continue to be major requisites in determining any control program. Early turf managers realized that manipulation of cultural practices could influence disease incidence, but they soon were looking towards chemical control as the only reliable means. The situation remains much the same today. During the 50 years since 1932 the list of turf diseases has expanded somewhat, and turf research endeavors over the period have established or confirmed the generally limited value of cultural control methods against particular diseases. It says much for the diversity and resiliency of the turf pathogens that after sustained assault by a vast battery of chemicals no complete spectrum turf



fungicide has emerged and the search for more effective materials continues. In the absence of any imminent major breakthrough by plant breeders to produce turfgrass cultivars with multiple disease resistance, fungicides will continue as the prime means of disease control in high quality turf. In his book, "Diseases of Turfgrasses" Couch in 1963 itemized ten requirements for an ideal turf fungicide which are still relevant and which form a useful framework on which a discussion of the subject can be developed. The first three requirements related to marketing considerations: (1) ready availability, (2) convenience in packaging, (3) good storage or shelf life. Although we now tend to take these points for granted, they were not fulfilled until recently. Three further required characteristics were concerned with the physical and/or chemical nature of the fungicide and involved (4) early dispersal and trouble-free spraying properties, (5) the absence of objectionable visible residue on the turf, and (6) compatibility with other pesticides. Developments in formulation technology over the years have led to great improvements in spraying properties and uniformity of dispersal. Current emphasis is directed towards operator safety through minimizing inhalation of the product. Pre-weighed soluable bags or flowable formulations are effective in this respect. The latter were not without initial problems as some few manufacturers soon became aware; the solid containers of "flowable" met neither requirements (3) nor (4) and functioned better as doorstops than as fungicides! Granular formulations have also improved but still tend to lag in performance compared to equivalent formulations for spraying, largely a question of poorer distribution of the active ingredient. While compatibility with other pesticides may be useful in reducing labor costs, lack of this attribute in a fungicide efficient in other respects should not weigh heavily against it. Compatibility with other fungicides is, however, an advantage since fungicide mixtures offer a means of broadening the spectrum of activity.

Fungicides will continue as the prime means of disease control in high quality turf

Two further requisites of an ideal fungicide related to the economics of a disease control program, namely (7) efficacy in controlling diseases and (8) low cost. Early fungicides and a good number of those available today are protectant in action and require in most instances frequent preventive applications. Even those with an eradicant action must be applied as soon as possible after infection, since penetration of the plant tissues by the fungicide is very limited. Some turf diseases, for example stripe smut, flag smut, and yellow tuft, eluded control completely because the mycelium of the causal agent is truly systemic. With the fairly recent advent of systemic fungicides, control of these and other intractable diseases become possible for the first time. These same systemic materials initially offered effective and more persistant control (as compared to the contact fungicides) for many of the other turf diseases but most seem to lack effectiveness against the Helminthosporium leaf spot fungi. The benzimidazole group of chemicals made the first big impact on the turf fungicide market but tolerance problems now cast a small cloud over this group as will be discussed later. In spite of stringent EPA regulations and horrendous development costs, new systemic material with totally different chemistry have reached or are reaching registration and commercial release. Triadimefon, iprodione, fenarimol, and metalaxyl all have tremendous potential as turf fungicides with activity against an array of the common diseases. Although high in price, their capacity to control the more difficult problems, e.g. Fusarium blight and Pythium blight, coupled with their longer term control, make them a competitive proposition, but hopefully their prices will drop a little further!

Two final requirements in Dr. Couch's list were concerned with the toxicity of the compounds, i.e. (9) low phytotoxicity and (10) low mammalian toxicity. The importance of these two factors is largely self evident. Phytotoxicity could be a problem with some of the heavy metal fungicides which formed the small group of materials available to the early turf manager. Repeated use of copper fungicides led to the eventual accummulation of toxic levels of copper in the soil. Both inorganic and organic mercury fungicides were potential turf scorchers if applied in hot weather and/or at rates only marginally above the recommended ones. Cadmium fungicides were somewhat safer but again could discolor turf if misapplied. A feature of the organic materials which came along later, for instance the dithiocarbamates (thiram,

zineb, maneb and mancozeb), anilazine and chlorothalonil, was their fungicidal effectiveness coupled with a wide margin of safety. A few of the newer materials still bear watching; cycloheximide can yellow turf in hot weather under Rhode Island conditions, but we have not confirmed reports from elsewhere of benomyl phytotoxicity. Systemic materials currently available appear to be active physiologically in the turf grass plant, and high rates can bring about striking changes in color and sward texture.

The heavy metal fungicides especially mercury and cadmium certainly were not of low mammalian toxicity, but in spite of often glaring inattention to safety precautions on the part of early turf maintenance personnel I am unaware of any recorded fatalities connected with the use (or misuse) of these materials. Stringent federal registration procedures and the regulation of labelling, storing and application of pesticide products quite rightly have been introduced and, with adherence to these rules, no human hazard should occur.

An additional factor to add to the ten already listed concerns the fate of the applied chemical and its impact on the environment. The possibility that turf fungicides may have important short or long term effects not only on the immediate turf environment but on the surrounding area has generated a fair amount of interest in recent years. Heavy metals, in particular mercury, have been shown to accumulate to toxic levels in some food chains especially in aquatic environments. The fate of mercury applied to turf received close scrutiny, but the use was never implicated as a serious source of pollution. Never-the-less, it required heroic efforts to retain the inorganic mercury compounds as registered materials for snow mold control— a function still not surpassed by any of the new fungicides. Cadmium compounds were also subject to an RPAR evaluation by the EPA but, although banned in Europe for some time now, no final decision has been made on their future as turf fungicides in this country.

Long valued for dollar spot control but also useful against red thread, copper spot and gray snow mold, the cadmium fungicides conceivably could be withdrawn without any serious effect on the turf industry. Adequate substitutes are available and in many cases preferable because of the reduced effectiveness of cadmium as a dollar spot fungicide. Since the mid 1960's the causal fungus of dollar spot has developed a high tolerance of cadmium compounds, a phenomenon that is now of widespread occurrence throughout the country. Presumably, under repeated use of cadmium, a selection pressure for tolerant biotypes occurred and resulted in their domination of the *Sclerotinia homoeocarpa* population to such levels that cadmium use is no longer practical in many areas for dollar spot control. The tolerance problem unfortunately did not remain confined to heavy metal fungicides, anilazine and benomyl soon fell to the wily dollar spot fungus. Since benomyl and the whole benzimidazole group of fungicides have similar fungitoxicant activity, all proved ineffective against the tolerant biotypes. Iprodione and related compounds are the latest group of fungicides to which this fungus has demonstrated field tolerance.

Not to be outdone, we now have other fungi with demonstrated tolerance to various fungicides: fusarium associated with fusarium blight tolerant of benomyl, powdery mildew tolerant of benomyl, the Fusarium patch fungus tolerant of iprodione. Metalaxyl, the new systemic fungicide so effective for Pythium blight control, promoted tolerant biotypes in populations of the fungus causing late blight of potatoes within the time period of one growing season. Hopefully, the situation will not be the same in the turf environment with *Pythium* spp. but the odds seem extremely high! It seems that in addition to the other numerous environmental impact studies with which the pesticide manufacturer now must comply one more is required.

This involves assessing the potential of a candidate chemical to promote or select for tolerant biotypes and to predict if, and how quickly, this would happen after release for commercial use.

Certainly, tolerance development to turf fungicides has forced us to adjust our fungicide programs. No longer is it wise to rely exclusively on one or two products. Tank mixes or alternate sprays with as wide a range of effective materials as possible lessens the risk of tolerance problems. Industry therefore must continue to develop new materials and we should resist attempts to remove arbitarily some of the older effective ones— the arsenal should be as broad as possible.

Early challenges involved disease diagnosis and identification of the pathogen, manipulation of management procedures to reduce disease incidence and severity, and finally, finding and using a suitable fungicide. So what has

Disease Control

changed? Not a great deal. We do essentially the same things. We do it more easily and generally we do it better but the costs escalate. High energy costs are with us, they are here to stay, so it is important that we maximize the benefits from our disease control procedures.

In crops other than turf, a certain amount of loss to pests and diseases can occur without markedly affecting the profitability of that crop, and the concept of integrated pest management (IPM) strives to identify the management strategies and input levels to achieve these goals. Integrated pest management is now being touted in the area of turf management. If the discerning public will accept a lessening in turf quality perhaps IPM principles may have more opportunity for application. However, where perfection is expected, no tolerance of pest or disease damage is acceptable and, in any event, the astute turf manager already is utilizing all possible pest management options to fullest advantage.

Excessive spraying or spraying with the wrong material are wasted inputs. Forecasting turf disease outbreaks eventually will help in scheduling optimum timing of fungicide applications but the development of this science is still in the preliminary stage. Correct diagnosis remains an imperative to ensure that the appropriate fungicide is used. New fungicides are being developed but no doubt the resourceful fungi will find ways to circumvent their effectiveness. Breeding for disease resistance is a relatively unexplored area for turfgrasses but is now being pursued more actively with good prospects of reducing the depradations of some diseases, but again time and wide genetic diversity are on the side of the fungi. The challenges presented in attempting to control turf diseases are still there and we must meet them with all available resources. However, there seems little danger that turfgrass pathologists will be redundant in the immediate future!

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SDS Biotech Announces New Price For Daconil 2787®

SDS Biotech Corporation, a newly-formed joint venture of Diamond Shamrock Corporation, Dallas, Texas and Showa Denko K.K., Tokyo, Japan, has announced a new pricing policy for Daconil 2787® fungicide. The announcement was made by Ronald L. Dezember, Vice President, Agricultural Chemicals Business.

Dezember said, "We've been in the turf and ornamental fungicide business for a good number of years with our product, Daconil 2787. What we have built over these years is a fully integrated, extremely efficient manufacturing process. Coupled with the fact that we are now operating under a new corporate structure, the Agricultural Chemicals Business of SDS Biotech is in a position to take dramatic steps toward expanding our domestic fungicide business.

"As of today, all of our North American distributors will have been infomed that we've significantly reduced the price of Daconil 2787 fungicide. The reduction becomes effective August 1, 1983. "Dezember emphasized that the primary objectives behind the price reduction are to rapidly expand the Daconil 2787 business and to further strengthen the product's position in all markets including the professional lawn care market.

"What we want to make clear is this: The Agricultural Chemicals Business of SDS Biotech will be an aggressive organization, meeting the needs of America's ornamental and turf care professionals, not only with our current products, but also with new products."

John R. Anderson, Manager of Marketing and New Business Development added, "Our new pricing policy for Daconil 2787 is a strategic move, one that has been studied for well over a year."

For more information contact, Ed Sabala, SDS Biotech Corp., 7528 Auburn Rd., P.O. Box 348, Painesville, OH 44077, or use reply card.

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Turf Renovation: Options Explained and Explored

by Ed E. Jordan, Monsanto

Ed Jordan was born 50 years ago in Huntington, Indiana. In 1955 he earned a Bachelor of Science degree in agronomy from Purdue University, and in 1959 received his Master's in crop physiology from the same university.

Jordan joined Monsanto in 1960, and has since made significant contributions in market development for several of the company's herbicides, including Lasso and Roundup. A district manager for several years, he also helped establish and develop a number of Monsanto Agriculture Centers throughout the midwest during the 1960's.

Since 1975, when he was appointed to his current position of Senior Sales Specialist for Roundup Non-Crop, he has concentrated on expanding non-crop use of Roundup in a variety of areas including forests, nurseries, transportation departments and lawn care companies.

Interest in turf renovation is on the rise. In increasing numbers, homeowners, golf course superintendents and grounds maintenance managers are choosing this option improve landscape appearance and simplify maintenance. Recent surveys have shown that a full 15 percent of all lawn care company clients are potential customers for a change in turf variety. Reasons may vary widely. In some instances, existing turf may be disease-prone, or weeds may have gotten out of hand. In other cases, change of use— introduction of pets or children, or the revegetation of roughs or fairways on a golf course— could be the motivation. Whatever the reason, when a lawn care specialist is consulted, the professional should determine whether a renovation is really necessary, and explain the existing options in terms of complexity and cost. It is the obligation of the professional to make these options as clear as possible, so that the purchaser can easily weigh the pros and cons.

Renovation options vary tremendously. They include an array of mechanical renovation procedures and chemical techniques, with chemicals becoming truly viable only a few years ago.

Mechanical renovation tools include cutting, discing, scraping and tilling devices. While such tools can successfully clear a site of most visible vegetation, they still can leave active rhizomes in the soil, and also move dormant seeds into new positions where they can germinate. In addition, by substantially disturbing soil surfaces, mechanical devices often can leave sites virtually impassible in wet weather.

For decades, the only chemical options were soil residuals or soil ster-

Like home lawns, golf courses sometimes must be chemically renovated to eliminate such problems as severe poa annua infestations, as seen here before renovation of the Ogden, Utah Golf and Country Club's fairways.

After Roundup herbicide was used to totally eliminate grass on those fairways, they next were slit-seeded in two directions.

ilants, which made turf-re-establishment difficult, at best. Since 1977, however, when Roundup, a non-residual herbicide, was labeled for use on turfgrasses, lawn care professionals have been able to control old turf, both the above-ground foliage and below-ground roots, confining mechanical activities only to the work necessary for creating an ideal seedbed. In many instances, the only mechanical device needed is one for slit seeding. Where soil is tightly compacted, or where there's a heavy layer of thatch, more extensive mechanical work might be called for, however. Similiarly, in renovation projects where sod is to be laid, chemical vegetation removal generally confines the need for mechanical device to just the work necessary for leveling or rock removal.

Still, despite all these advantages, some lawn care professionals in the past have been hesitant to recommend chemicals because of initial herbicide costs, along with a belief that clients would not willingly accept the "brownout" factor that accompanies chemical use. Actually, the time and labor savings that chemicals provide more than offset initial costs, and clients themselves are more likely to accept the attendant "brownout" if they realize it leads to a faster new lawn. On this point, Purdue turfgrass specialist Dr. William Daniel, for example, says that an "acceptable" amount of new growth will be evident as much as several weeks earlier on a chemically-treated plot compared to one started the same time with mechanical tools. Also affecting how quickly and substantially a renovated area will be acceptably improved are such factors as timing and the seed species or mixture used. A seed specialist's advice can be invaluable in respect to both these points.

"Cool season" grasses are generally recommended after renovation

The mix they recommend is likely to vary, depending on the job's location. However, as renovations generally are done only from the transition zone northward, the ideal species or mix almost always fall into the "cool season" grass category. Such grasses— including bents, blues, fescues and ryes— can be sowed successfully either in the spring or the fall. In either season, sowing should be done when temperatures are rising toward or descending from the 50 degree range, giving the desired species its best "fighting chance" against such tough competitors as crab- and goosegrass, both of which thrive primarily at higher temperatures. Other aspects of timing have to do with water—which usually is plentiful enough for germination and growth in the spring and fall 50 degree "windows"— and the renovator's schedule. Lawn care professionals, though, often try to schedule all renovations in the fall because of heavier spring workloads.

Fall renovations also have an advantage because, by then, spring-applied preemergence crabgrass or broadleaf herbicides have dissipated from the soil. With one exception— DuPont's Tupersan— no such preemergence product should be present when a renovation begins. If Tupersan is used in conjunction with a renovation, its label should

Turf Renovation

Several days of watering. . .

. . .helps bring on germination of newlyseeded bluegrass, which quickly forms a thick carpet on the fairway because of the two-way seeding.

be checked for application rates, timing and other details.

Let's walk through a renovation process using Roundup, a foliar-applied, translocating product which effectively and thoroughly controls growth, without leaching off-site or having any residual effect in the soil.

For at least a week before beginning Roundup treatment, renovators should make sure that target plants have not been in a stressed condition. Mowings should be skipped, and target plants should be kept well-watered. Target plants, however, should not be watered within six hours before and after being treated with Roundup. If they're dampened within that time, the chemical's effectiveness could be reduced. A soaking rain within two hours after treatment could, in fact, necessitate a second chemical application.

It is essential, too, that the herbicide be sprayed in a way that will keep it within its target area. It should not, for example, be sprayed when wind conditions could cause drift. However, since Roundup doesn't vaporize, drift through volatization is not a problem. On the other hand, right after spraying, Roundup could accidentally "stray" on the feet of unexpected pedestrians or pets, or even by wheels or hoses being drawn through the treated area. To avoid this, the area should be closed off until the spray has dried, which could take anywhere from a few minutes to several hours, depending on such factors as temperature and humidity.

To assure that it is used properly,

Soil rich in nutrients is a result of chemical renovation

Roundup always should be mixed in water following label instructions. For renovations, the rate should fall within the 1 to 2 percent range, or 2-4 ounces of product per gallon of water per 1,000 square feet to be treated. Seed can be sown immediately following Roundup treatments. It's best, however, to allow the chemical at least seven days to translocate through treated plants so they won't compete with the new, desirable seed.

The same amount of time should be allowed from "spray day" if any mechanical work– such as dethatching or core aerifying– is to be done. If a core aerifier is used, the area should next be dragged to break up the cores and allow the nutrients they contain to serve as a top dressing.

After seeding, new growth may become evident in as short a time as seven days, or roughly 14 days following the chemical application. To some that may sound like an extraordinary short time from seeding to emergence, and it would be, had the seed been put onto or into bare ground. When the old turf's been chemically eliminated, though, the habitat in which the seed is growing is ripe with nutrients from the resulting decaying matter. A week or so later, when a substantial amount of new ryegrass may already be evident, bluegrass will start to appear, if that is the mixture being used. By this time– 21 days after spraying– the "brownout" effect should be relatively insignificant.

The actual thickness of the new lawn, and the ability of the newly-seeded species to compete with undesirable grasses or broadleafs, also will depend on the rate at which seed is applied, and how it is applied. Widespread tests have found that two passes with a slit seeder– so that sowing is "diamond patterned"– provide ideal coverage. This results both in a thick stand of desired grass and reduced opportunities for competitors to survive. Any undesirable grasses or broadleafs that do manage to get a

foothold in the new lawn or turf area usually can be controlled as part of the lawn care professional's normal, summer post-emergence program. By the time that program is ready to start, the new lawn should be in an ideal condition.

In the long run, both mechanical and chemical renovations can result in successful new lawns. However, while the purchaser of the renovation must decide which procedure to "buy," the professional can and should influence that decision. It is his responsibility, in short, to explain the options available so that the buyer can arrive at an educated and informed decision. The final result– the end product– is a satisfied client.

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Within weeks of the initiation of the renovation, the course is well on its way to looking like this all over– much as would be the case, in the same amount of time, where a home lawn is renovated.

Lawn Care Spray System from Agrotec

Lawn sprayer units are now available in several new models from Agrotec Inc. They can be mounted on either trailers or skids to handle a variety of spraying jobs, said Agrotec president, Roger Cohill.

The new sprayers have many new design features, including Agrotec's recently announced diaphragm piston pump. Several hose reels and "comfort-fit" handgun options are available.

Model ES1116D has a 9.5 GPM diaphragm piston pump, with pressures ranging from 100 to 550 PSI. This model also is equipped with a 110 gal. polyethylene tank. The unit is excellent for spraying golf greens, large landscape areas and for other commercial uses, say those who've tested it.

For all tall tree spraying, Model ES4515 will reach heights of approximately 70 feet, said Cohill. It is also equipped with a diaphragm piston pump and a 500 gl. tank. The high volume directional handgun is standard with this unit and allows for controlled spraying. On high pressure units, Agrotec's new lightweight Durotec thermo-plastic hose is standard equipment. For more information, contact Agrotec Inc., P.O. Box 49, Pendleton, NC 27862, or use the reply card.

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Dec./5-6-7-8, 1983

Contact Dr. John Street
c/o Ohio Turfgrass Foundation
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Columbus, Ohio 43210
614-422-2047

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Calendar of Events

SEPTEMBER

NORTHERN MICHIGAN TURF CONFERNECE—
Septemer 20. Travers City Country Club. Contact Paul Rieke, Dept. Crop & Soil Sciences, Michigan State University, East Lansing, MI 48824 (517)355-0266.

1983 OKLAHOMA TURFGRASS RESEARCH FIELD DAY—
September 21. Horticulture Turf Research Center, 1 mile west of O.S.U. campus, Stillwater OK, follow signs from campus; 9 a.m. free admission. Contact Dr. Robert L. Green, 360 Ag Hall, Stillwater, OK 74078, (405) 624-5414.

1983 VIRGINIA TECH TURFGRASS RESEARCH FIELD DAYS—
September 27, 28, 29. Virginia Tech. Blacksburg, VA. Contact Dr. John R. Hall, III, Agronomy Dept., VPI&SU, Blacksburg, VA 24061-7294 (703) 961-5797.

OCTOBER

FLORIDA TURF-GRASS ASSOCIATION 31st ANNUAL CONFERENCE AND SHOW—
October 9-12. Hyatt Orlndo, Orlando, Florida. Contact: FT-GA Executive Office, 1520 Edgewater Drive, Suite E., Orlando, FL 32804 (305) 425-1581.

23rd ANNUAL MISSOURI LAWN & TURF CONFERENCE—
October 10-12, Marriott's Tan-Tar-A, Osage Beach, Missouri. Contact Mr. Nik Palo or Ms. Betty Wiley, Conference and Short Courses, 3-44 Hearnes Bldg., University of Missouri, Columbia, MO 65211 (314) 882-4087.

PROFESSIONAL GROUNDS MANAGEMENT SOCIETY 71st ANNUAL CONFERENCE AND TRADE SHOW—
October 15-19. Cincinnati-Marriott Hotel, Cincinnati, OH. Contact Allan Shulder, Exec Dir., Professional Grounds Management Society, 7 Church Lane, Suite 13, Pikesville, MD 21208, (301) 653-2742.

NOVEMBER

NEW YORK STATE TURFGRASS CONFERENCE AND TRADE SHOW—
November 1-3. Rochester, NY. For booth space information contact NYSTA Executive Dir. Ann Reilly, 210 Cartwright Blvd., Massapequa Park, NY 11762, (516) 541-6902. A detailed program will be offered to all interested by writing to the New York State Turfgrass Assoc. at the same address.

NATIONAL INSTITUTE ON PARKS AND GROUNDS MANAGEMENT MEETING—
November 7-10. Hyatt Hotel/Civic Center, Birmingham, AL. Contact National Insitute, Box 1936, Appleton, WI 54913, (414) 733-2301.

PROFESSIONAL LAWN CARE ASSOC. OF AMERICA CONVENTION AND TRADE SHOW—
November 8-10. Indianapolis Convention Center, Indianapolis, IN. Contact James Brooks, Executive Dir., PLCAA, 1225 Johnson Ferry Rd., Suite B-220, Marietta, GA 30067- (404) 977-5222.

ASSOCIATED LANDSCAPE CONTRACTORS OF AMERICA MAINTENANCE CONFERENCE—
November 13-15. Denver, CO. Contact ALCA, 1750 Old Meadow Road, McLean, VA, 22101. (703)821-8611.

1983 OKLAHOMA TURFGRASS CONFERENCE AND TRADE SHOW—
November 14-16. Camelot Tulsa, I-44 & Peoria. Concurrent sessions on golf course and commercial turf mgmt.. Hands on workshops Nov. 16. Contact Dr. Robert L. Green, 360 Ag Hall, Stillwater, OK 74078, (405) 624-5414.

DECEMBER

NEW JERSEY TURFGRASS EXPO '83—
December 5-8. Resorts International Hotel, Atlantic City, New Jersey. Contact Dr. HenryW. Indyk, Soils and Crops Dept., Cook College, P.O. Box 231, New Brunswick, NJ 08903 (201) 932-9453.

14th ANNUAL G.G.C.S.A./U. of Ga. TURFGRASS CONFERENCE—
December 14-15. Center for Continuing Education, University of Georgia, Athens, GA.

OHIO TURFGRASS CONFERENCE & TRADE SHOW—
December 6-8. Contact Dr. John Street, OTF, 2021 Coffey Rd., Columbus Ohio 43210 (614) 422-2047.

1983 PENNSYLVANIA TURFGRASS CONFERENCE AND TRADE SHOW—
December 12-15. Contact Christine King, 412 Blanchard St., Bellefonte, PA 16823 (814) 355-8010.

JANUARY

MICHIGAN TURFGRASS CONFERENCE—
January 17-18. Long's Convention Center, Lansing, MI. Contact Paul Rieke, Dept. Crop & Soil Science, Michigan State University, East Lansing, MI 48824. (517) 355-0266.

24th ANNUAL VIRGINIA TURFGRASS CONFERENCE AND TRADE SHOW—
January 18-20. Williamsburg Hilton and National Conference Center, Williamsburg, VA. Contact Dr. John R. Hall,III, Agronomy Dept., VPI&SU, Blacksburg, VA 24061-7294, (703) 961-5797.

DANGEROUS and DEADLY POISONS Have been applied by...

by John Kenney, Turf Doctor, Framingham, MA

Goodby, Chicago!

At the time this article is being written (August 22, 1983), the future of commericial pesticide application in urban and suburban Chicago is uncertain. A group of extremists, called 'The Lake County Defenders' in conjunction with a national group of environemotionalists called the 'Citizens for a Better Environment' have swooped in on the lazy little village of Wauconda, Illinois.

For a view of what unbalanced leadership is offered by these extremists, we need only to know that the leader of the 'Lake County Defenders' tried to have outdoor Bar-B-Ques banned last year because of the pollution.

In the hamlet of Wauconda, **it is now the law** that before each occasion of a pesticide application, the applicator must post a sign, not less than "144 square inches", and at eye level, stating the exact chemical used and "Dangerous and Deadly Poisons have been Applied by_____Company on_____ Date". The sign must be posted on the front door or front window of any restaurant that has been treated or in the front yard of any lawn or treed area that has been sprayed. The sign, which must be black, have block lettering with a white background and a red border must remain in place for at least 3 days after the application.

Obviously, the environemotionalists have declared open warfare on the commercial pesticide applicator, and they are claiming, in very loud voices, that this will be a "model law" and that they will see to it that it is spread throughout Chicago-land for now and then throughout the country. They claim that they will receive a great deal of local, regional and national press about this ordinance and that town by-laws such as these will be the rule, rather than the exception in a short time.

Goodby, New York?

On Friday, August 12, 1983, Governor Cuomo of New York called a news conference to highlight his signing of Senate Bill No. 6887C which changes the pesticide laws in New York state. Although I have not yet seen the text of this bill, it has been reported to me that the significant parts are:

1. Licensed applicators are not sufficient in New York. Anyone who performs pesticide applications in New York must now be certified. (One New York applicator has told me that to become certified in New York you must have experience in New York. Have they closed the system forever?)
2. Penalties for violations now include $2,500 for a general use violation (1st offense) and $5,000 for a restricted use material. $10,000 and/or 1 year in jail for any 2nd offense.
3. Pre-notification: each applicator must provide sample labels of each material to each person affected by each application.

The big questions about No. 3 on this list are: a) does the Department of Environmental Conservation (DEC) intend to write the regulations such that the abutters must also be included in this pre-notification requirement? b) will DEC regulations require notification per visit or will once per contract or once per year be sufficient? c) will DEC even get around to writing and publishing their regulations or will this be a case where we must be cited for a violation before we know just how they intend to enforce such laws?

Goodby, Others?!

Other recent actions:

Burlington, Massachusetts has just passed a town by-law that requires anyone who plans on making an herbicide application in the town to get a permit from the Department of Public Health. The permit can only be issued after approval at a public hearing.

Hatboro, Pennsylvania is considering enacting a resolution that 'ensures' clean water. The law would ban any and all chemicals that have ever been detected in their town water. They seemed surprised that this could potentially include every chemical known on earth.

Back again in Massachusetts, the town of Sharon has recently put thru a law that re-classifies fertilizers as pesticides. The more difficult part is that we have to be certified applicators in order to apply any 'pesticides' in the town.

From August 30th thru September 3rd, the state of Vermont will be holding public hearings to decide whether or not to ban the use of 2,4-D in the state.

P.C.O.'s and arborists are concerned about losing picloram in Vermont (Tordon) and it looks as if extra regulations are being applied to 2,4-D in Maryland and chlordane in Rhode Island.

The town fathers of Boise, Idaho have told the applicators to prevent citizen compaints about pesticide use otherwise they (the town officials) will have to 'fix it' for them with laws.

Hello, N.E.L.F. !!!

The **National Environmental Law Foundation** is now a reality. Many lawn care, arborist, P.C.O. and right-of-way people have joined together to form N.E.L.F. and it was quite easy to do. There has been such a mountain of pressure from the environemotionalists to regulate us into oblivion that it only took a few months for a groundswell of approval for N.E.L.F. to form in the applicator communities. The result is a non-profit organization whose aims include that scientific fact is used in the risk-benefit discussions that determine the regulation of the urban and suburban use of pesticides.

N.E.L.F. is not a membership organization. Anyone can be a financial supporter of N.E.L.F. and when N.E.L.F. moves-in to help in areas of real trouble, there is no charge to the people involved. N.E.L.F. is designed to be a free service but it is expensive to run.

Be a N.E.L.F. supporter. Fill out the pledge form below and mail it in. The company you save will be your own. $500,000 is needed within the 1st year and over $140,000 is already identified. If we don't fund N.E.L.F. then we will get what we deserve. Fellow applicators, we have been idle too long. Send in your pledges or sell your businesses. . . . otherwise they will be taken from you by force of law.

N.E.L.F.
1983-84 Pledge Form

☐ I am pledging $_____ to support the N.E.L.F.
☐ I am using the suggested formula of 1/10 of 1% of my gross income.
Enclosed is my first payment in the amount of $_____
Please bill me ☐monthly ☐quarterly ☐semi-annually ☐annually

☐ No payment is enclosed, please bill me according to the above schedule.

NAME_____ TITLE _____
COMPANY NAME_____
ADDRESS_____
CITY _____ STATE _____ ZIP _____
PHONE _____

_____
SIGNITURE

Make checks payable to the N.E.L.F. and send to: N.E.L.F., P.O. Box 495, Halifax, MA 02338. (617) 294-1666.

The Lawn Floater

The Lawn Floater– the little machine for the big jobs– is offered from Green Grow Lawn Care, Auburn, IN. Exclusive features include: quick change design allowing instant machine conversion from liquid to dry to fun; apply 250,000 sq. ft of liquid with the Micromax Unit per fill-up; application speeds of 5 to 8 mph.; maximum flotation for soft turf; low cost operation (3 gallons fuel per day); easy to operate.

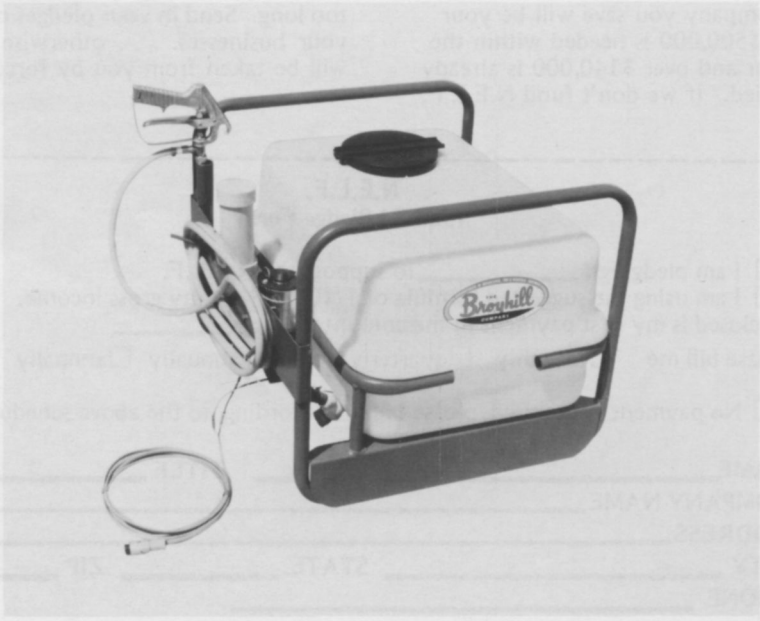
Enter new market areas, be competitive and profitable with a small investment– school athletic fields, cemeteries, industrial lawns, large estates, park systems, small pastures, churches, apartment complexes and hospitals.

For more information contact Green Grow Lawn Care Service, Box 530, Auburn, IN 46706, or use reply card.

Circle No. 38 on Reader Reply Card

Broyhill Introduces 20/12 Spot Sprayer

The Broyhill Company has expanded their 12 gallon/12 volt spot sprayer line and is now offering a portable spray unit with a 20 gallon/12 volt D.C. pumping system which is completely self-contained. The unit utilizes a 20 gallon poly tank, trigger grip spray gun with adjustable nozzle and 15 ft. of hose, a 12 volt electric diaphragm pump rated at 45 psi and up to 2.8 gpm. Sprayer delivers a straight stream up to 25 ft. away. A pressure switch on the pump eliminates the pump's operating time to your liquid spraying requirements. Automatically turn the pump on and off, letting the operator focus on his spraying and driving needs. The unit measures 26" long x 25½" wide x 20 3/4" high and will easily fit any tractor, pickup or other vehicle utility space.



For more information on Broyhill's new 20/12 spot sprayer, contact The Broyhill Company, North Market Square, Dakota City, NE 68731-0475, or use the reply card.

Circle No. 13 on Reader Reply Card

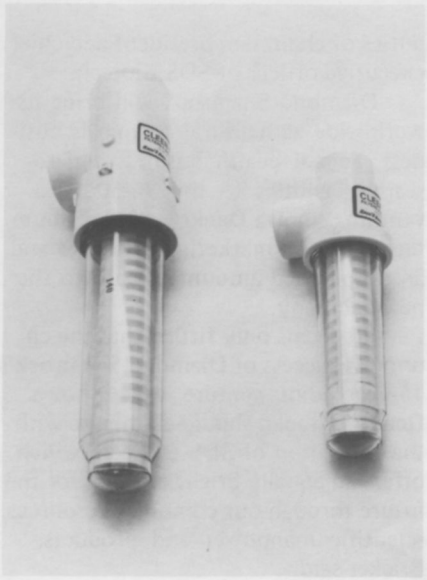
"Well, whaddaya think?"

Rain Bird Plastic Screen Filters

Rain Bird has added a line of plastic screen filters to its family of irrigation products. These new Cleen-Flo screen filters are constructed of non-corrosive, UV-stabilized materials and are extremely lightweight and easy to install. Each filter features a clear, impact-resistant cover that allows continuous viewing of the filtering process and promotes timely and efficient cleaning.

The Cleen-Flo screen filters are available with maximum flow rates of 60 and 120 GPM, as well as a wide selection of polymeric mesh screens. Rain Bird filters are used for domestic, landscape, and agricultural applications.

For further details on the Cleen-Flo plastic screen filters, write to Rain Bird Sprinkler Mfg. Corp., 145 N. Grand Avenue, Glendora, California 91740 or use the reply card.



Circle No. 15 on Reader Reply Card

Diamond Shamrock/Showa Denko Form SDS Biotech

In a formal signing ceremony here today, Diamond Shamrock Corporation and Showa Denko K.K., a Japanese chemicals and pharmaceuticals firm, formed SDS Biotech Corporation, a joint venture which will market, worldwide, agricultural chemicals and animal health products.

William H. Bricker, chairman and chief executive officer of Diamond Shamrock and Haruo Suzuki, Showa Denko chairman, signed documents making SDS Biotech a reality. SDS Biotech corporate headquarters and research facilities will be located in Concord Township, Painesville, Ohio.

Allan J. Tomlinson, formerly president and chief operating officer of Diamond Shamrock, has assumed the duties of chairman, president and chief executive officer of SDS Biotech.

Diamond Shamrock will bring its worldwide agricultural chemicals business, animal health business and research facilities to the 50-50 joint venture. Showa Denko will contribute technical and marketing resources and an unspecified amount of cash to the new company.

"It seems only fitting that the enormous success of Diamond Shamrock's 15-year joint venture with Showa Denko in Japan should culminate with the formation of SDS Biotech, which offers an equally bright outlook for the future through our combined resources, scientific manpower and products," Bricker said.

"SDS Biotech scientists at our new headquarters here and in Japan are already researching a wide variety of new product opportunities for the production of animal vaccines, pesticides, herbicides and growth regulators," Tomlinson said.

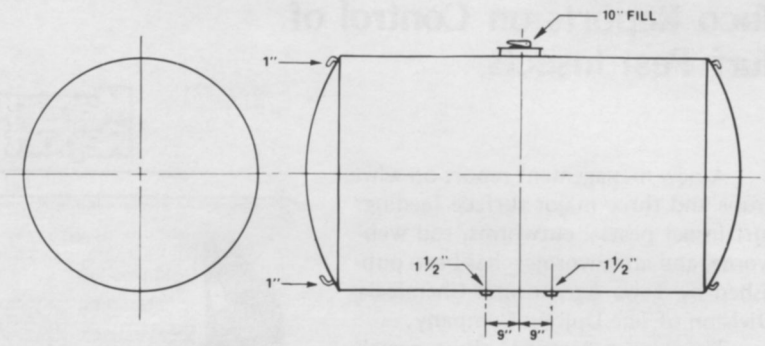
The long-standing Showa Denko and Diamond Shamrock joint venture in Japan produces and sells Daconil 2787®, a fungicide.

Showa Denko was established in 1939 by the merger of Japan Electrical Industries and Showa Fertilizers, both of which were pioneers in Japan's chemical industry. Diamond Shamrock was formed in 1967 with the merger of Diamond Alkali Company and Shamrock Oil & Gas Company.

PRECISION TANK & EQUIPMENT CO.

DRAWER D, VIRGINIA, IL 62691/Ph: 217-452-7228

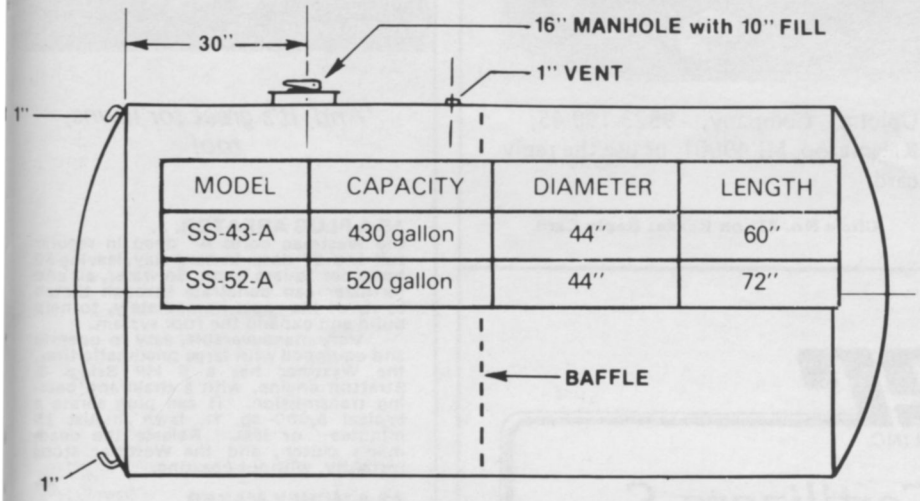
STAINLESS STEEL



SPECIFICATIONS: 430 to 520 GALLON CAPACITY

Constructed of type 304 stainless steel—equipped with standard openings as shown

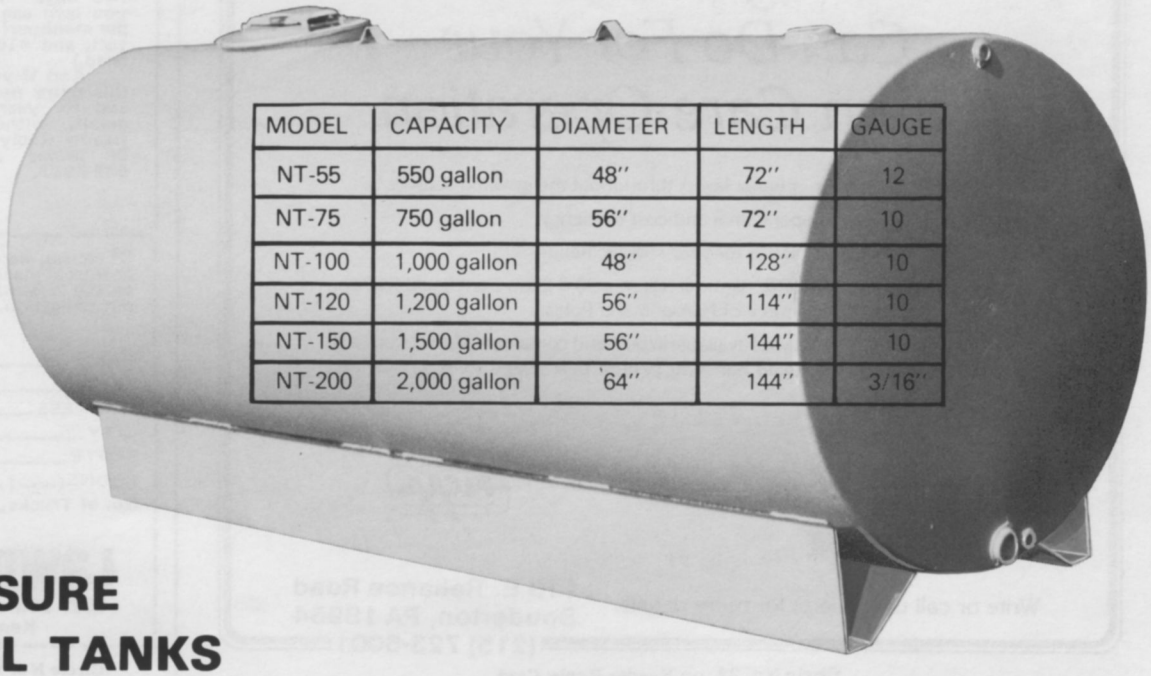
SPECIFICATIONS: 830 to 1600 GALLON CAPACITY



MODEL	CAPACITY	DIAMETER	LENGTH
SS-43-A	430 gallon	44"	60"
SS-52-A	520 gallon	44"	72"

SINGLE – DOUBLE & TRIPLE COMPARTMENT TANKS ARE AVAILABLE.

SPECIAL DESIGN TANKS WILL BE QUOTED, SO PLEASE CALL!



MODEL	CAPACITY	DIAMETER	LENGTH	GAUGE
NT-55	550 gallon	48"	72"	12
NT-75	750 gallon	56"	72"	10
NT-100	1,000 gallon	48"	128"	10
NT-120	1,200 gallon	56"	114"	10
NT-150	1,500 gallon	56"	144"	10
NT-200	2,000 gallon	64"	144"	3/16"

NON-PRESSURE MILD STEEL TANKS

Tuco Reports on Control of Turf Pest Insects

A new management report on white grubs and three major surface feeding turf insect pests— cutworms, sod webworms and armyworms— has been published by Tuco Agricultural Chemicals, Division of The Upjohn Company.

The report describes these pests' life cycles and suggests management practices to help keep them under control.

In addition, the report summarizes university trial data on Proxol 80 SP, an organophosphate insecticide marketed by Tuco, and its effect in controlling white grubs, cutworms, sod webworms and armyworms.

To obtain a single copy of this report, or for more information, write Control of Turf Insect Pests, Tuco Agricultural Chemicals, Division of The Upjohn Company, 9823-190-45, Kalamazoo, MI 49001, or use the reply card.


TUCO
Management Report
Turf/Insect Control
A Digest of Valuable Management Information from TUCO, Division of The Upjohn Company
Take Economical, Safe Approach...
Don't Apply Insecticide Until Needed
Insect Pressures Vary Each Year
Treat Only When You Have a Problem

Circle No. 21 on Reader Reply Card

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Circle No. 23 on Reader Reply Card

PLCAA Regional– `83 Detroit

Over 100 turf professionals gather for the Detroit PLCAA Regional.

Jim Brooks addresses a packed conference room at the PLCAA Regional, August 4th.

August 4th, 1983– Livonia MI. Over 100 turf professionals gathered recently for a very successful regional seminar. The topics of discussion were timely and informative, and the entire seminar was very well organized.

Don Benham of Benham Chemicals and his committee did an excellent job in bringing the 106 lawn care professionals together for a day of education and a chance to talk to the following vendors: Benham Chemicals; Clean Crop; Great Plains; Cleary Chemical; Lebanon Chemical; Perma-Green; Lawn Masters; Lakeshore Equipment; The Bulkkem Corp., J. Mollema & Son W.F. Miller; USS Agrichemicals; Monsanto; American Lawn Applicator.

Those who attended heard Carl Dollhopf of the Michigan Department of Agriculture speak on the European Chafer which has literally attacked the Metropolitan Detroit area. An increasing interest in renovation encouraged Ed Jordan of Monsanto to share his enthusiasm and knowledge with us.

Lee Mannes of Eradico Lawn Care shared his experience in mole eradication to a packed conference room. Lee explained the importance of "knowing what you are doing" before attempting to use the new Phostoxin tablets.

An update on Cool Season Brown Patch/Yellow Patch, which will be showing up as the temperatures begin to drop, was given by Cindy Brown of Michigan State. Cindy will be graduating shortly, and I would like to take this opportunity to wish her a successful future and thank her for the articles that she has written for us. I hope she will continue to share her knowledge with us.

The hottest subject being talked about in the industry today is aeration. Jim Gourley of Lawn Masters told the audience how he successfully worked the service into his customers schedules.

Greg Patchen of Michigan State Extension Service, did an excellent job in making everyone aware that ornamental damage to their customers shrubs is not necessarily their fault. Greg stressed the fact that you should be aware of the similarities between chemical damage and natural causes in order to be able to evaluate the problem intelligently.

"Dormant Feed– Finish with a Profit", was covered by Chuck Darrah, an agronomist with ChemLawn. Chuck's timely subject of late fall fertilization was truly appreciated by the audience.

The program was closed after Jim Brooks, Exectutive Director of the PLCAA, Ron Giffen of Lakeshore and Tom Jessen of Perma-Green talked to everyone about the pro-pesticide coalition. We were informed of another law just passed the previous week in a suburb of Chicago where signs must now be posted stating that chemicals have just been applied to the lawn and to keep all children and pets off for three days. The signs must be of a specific size, weather resistant, and naturally, because of the expense involved, must be picked up again by the applicator.

The pro-pesticide coalition has gone into full swing and a room full of raised hands indicated strong support from the Detroit area. Local groups will be forming throughout the country, they will need your support. Find out how YOU can help the pro-pesticide coalition help YOU!

New Sod Cutter from Turfco

A completely new, self-propelled sod cutter is now available from Turfco Mfg., Minneapolis, Minnesota.

The Model "A" Turf Cutter is powered by a 3-hp, industrial/commercial engine and cuts 12-inch wide and 3/4-inch thick sod at speeds up to 75-fpm. A 5-hp I/C engine and a blade for 1¼"-thick cuts are available as optional items. The unit weighs only 140-lbs. and is controlled by a simple, single, clutch-lever.

The well-balanced sod cutter includes a sturdy roll cage to protect it during transport and handling. With one-third fewer parts than other powered sod cutters, normal maintenance is fast, easy and simple.

Its small size, along with a removable handle, allows transport in car trunk or station wagon. For more information contact Russ Rose, Turfco Mfg., Inc., 3456 N. Washington Ave., Minneapolis, MN 55412, or use the reply card.

Circle No. 24 on Reader Reply Card

Classified Ads

LAWN SPRAY BUSINESS For Sale in Florida. Ask for Wayne. (305) 567-1706.

SPRAY TRUCK— 1979 Chevy one ton truck- 750 gallon tank— mechanical agitation. Excellent spraying condition. Low mileage. Must sell. $9200. Call (502)456-6777, ask for Pat McConnell.

1979 Louisville **FORD TRUCK** with custom designed storage compartments. 1979 FINN LAWN FEEDER with power take off. Both like new, will sell separately or together. (313) 468-5285.

SPYDER FORKLIFT/TRAILER, 200 hours, exc. condition, Zionsville, IN $12,400. Call George (317)873-5231 or 873-5937.

SPRAY TRAILER— 300 gal. poly tank, electric hose reel, brake & lights. Centrifugal pump and 8 HP motor, excellent condition. $2,850. Atwood Lawnspray (313)939-3636.

QUALIFIED INDIVIDUAL needed to work my turf spraying business in the N.Y., N.J. area. He or she must be licensed appropriately and be willing to work long hours March-Oct. Contact Tony Cioffari, Creative Landscaping, 398 Garibaldi Ave., Lodi, NJ 07644 (914)356-2074.

WANTED TO BUY— Lawn spray/tree spray company or accounts. S.E. Penn., central and southern NJ. Residential, commercial and industial accounts any size including sterilization. Contact Steve after 6 p.m. (215)357-8875, or write to Spray Associates, Box 445, Warrington, PA 18976.

TRACTOR/LAWN COMBINE UNITS (2) No. 179 IH Hydrostatic tractors w/10 gal. tank on tractor. Combines are stainless steel with aerators, 4 granular bins and 20 gal. spray tank. $3,500 per unit. Call (315)637-6001 or (315)492-3217.

ACCOUNTS WANTED— national chemical lawn care company seeks accounts to acquire. Selling price open for negotiation. If interested, send name, address, phone number and number of accounts available to Dept. B, American Lawn Applicator, 31505 Grand River Ave., Suite One, Farmington, MI 48024.

WANTED TO BUY— Lawn care company in Midwest (Mich., Ill., Ind., Wisc.) area. Small to med. size. Chemical turf applications only— no mowing or tree care. Send information to Lawn Care, P.O. Box 361, Grosse Isle, Mich. 48138.

WANTED— Used four wheel self-propelled Hahn or Cushman 120-175 gallon sprayer for greens. P.O. Box 191, Brentwood, TN 37027. (615)794-6646.

WANTED—Dealers/Distributors for Ag Spray Hose. Hose is of finest quality and fully guaranteed. Receive distributor discounts and supplement your winter income. Call Dick Charles, Green Thumb Spray. (516) 485-1919.

SPRAYING EQUIPMENT— pump, hose and reel. Price $300 negotiable. Call Northville, MI. (313)348-6251. Ask for Bob.

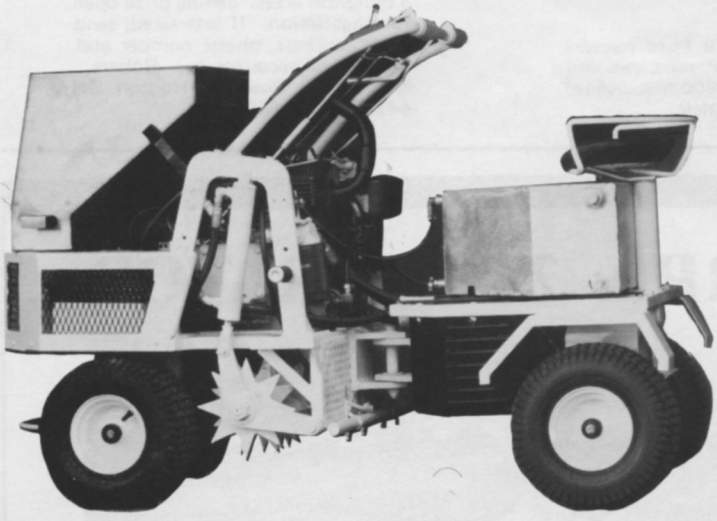
FOR SALE— 1979 Ford tractor/loader, 545 tractor, rops, cab and box scraper. A-1, 800 hrs. (414) 387-4542 ask for Dick.

SPRAY TRUCK—1973 F-600 1200 gal., 1976 C-60 1500 gal., 1978 C-60 1200 gal., all have mechanical agitation Hannay reel, FMC pump, aux. 8 H.P. engine for pumping system. Excellent condition. Biddle Lawn Care Inc., (217) 359-7012 ask for Dick.

ACCOUNTS WANTED— in Ohio: Cleveland, Akron, Canton, Ashtabula, Youngston areas. Selling price open for negotiation. If interested, send name, address, phone number and number of accounts to: Robert Naylor, P.O. Box 201, Hudson, OH 44236, (216) 656-1111.

Meet the

Lawn Maker and Walk/Ride Behind



before you buy any other machine that fertilizes, seeds, coreaerates and spikes.

If your considering the purchase of a single machine that can perform all the functions of seeding, fertilizing, coreaerating and spiking, you should be looking at the Lawn Maker and the Walk/Ride Behind! Now there are two tough machines that handle the grueling punishment dished out by today's lawn professional!

LAWN MAKER

An all-in-one seeder/fertilizer/coreaerator for riding operation. Welded construction - Weight, 625 lbs. - Seeds, fertilizes and aerates 4,000 sq. ft. in only 9 minutes - 11 hp Briggs & Stratton electric start motor - Easy to transport - Variety of attachments - 1 year warranty

WALK/RIDE BEHIND

A new generation of compact seeder and fertilizer. Welded construction - Weight 300 lbs. - Seeds and fertilizes 10,000 sq. ft. per ½ hr. - Easy reach controls - 3 hp Briggs & Stratton motor - Short turning radius - Rider Cart available - 6 month warranty

Made-to-spec loading ramps available for both models

SALSCO

Welding & Fabrication, Inc.

196 Clark Street, Milldale, CT 06467 (203) 621-6764

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More tree and turf professionals are finding:

CLEAN CROP® chemicals make a difference.

The difference Clean Crop makes for you is competitive prices, quality formulations, service and delivery, and a full line of professional chemicals.
At Clean Crop, we measure our performance by your success–today– and in the future.

Before you buy your chemicals for 1984 call us. Ask about our early order prices on Clean Crop Betasan, Diazinon, Dursban, Four Power Plus, Weedone DPC, Balan and many more.

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For more information about our full line of professional products and service call the office nearest you.

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Greeley, Colorado
(303) 352-4750

Central Valley Special Products
Bryan, Texas
(409) 272-8479

UAP-Special Products
Omaha, Nebraska
(402) 330-1910

Growers Service Special Products
Columbus, Ohio
(614) 276-5103

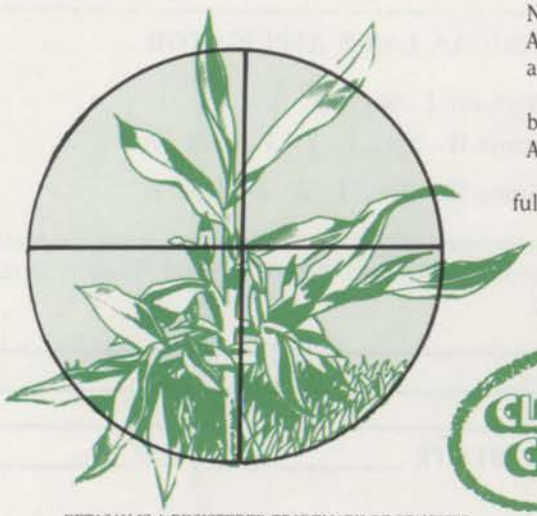
Selco Supply Co.
Greeley, Colorado
(303) 351-7110

And be sure to visit our booth at the PLCAA show November 8, 9 & 10 in Indianapolis.

Diazinon is a registered trademark of CIBA-Geigy. Dursban is a registered trademark of Dow Chemical. Weedone is a registered trademark of Union Carbide. Clean Crop is a registered trademark of United Agri Products. Balan is a registered trademark of ELANCO Products Co.

CLEAN CROP® Betasan® Selective Herbicide

Herbicide for turf



Nobody knows weed control like lawn care professionals. And more of these pros demand Betasan herbicide than any other brand.

For good reason. Just one application stops crabgrass before it starts. Stops it without damaging your grass. And stops it all season long, in most of the U.S.

Fight crabgrass with Betasan, one application, full-season control.

Betasan® Selective Herbicide

No. 1 against crabgrass

CLEAN CROP®

No. 1 in service to the lawncare industry

BETASAN IS A REGISTERED TRADEMARK OF STAUFFER

UAP SPECIAL PRODUCTS GREELEY, COLORADO

Circle No. 30 on Reader Reply Card

AMERICAN LAWN APPLICATOR

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Martin McGinn, a Notre Dame graduate in chemistry and philosophy, has been involved in the turfgrass industry for the past fifteen years. He comes to Cleary from Southern Mill Creek Products, Tampa Florida.

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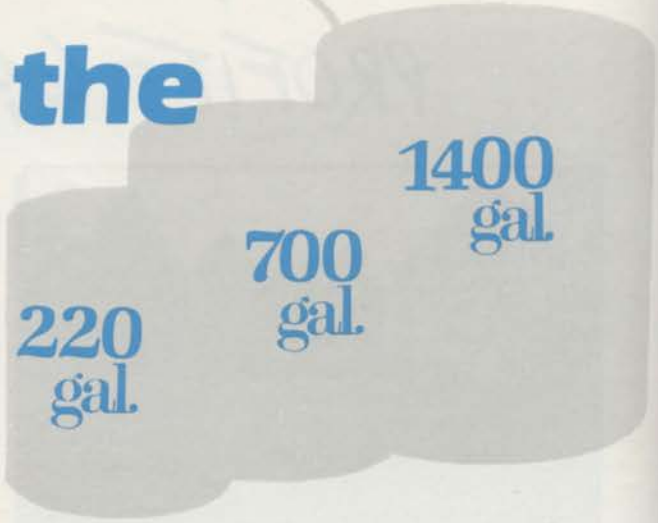

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