Green World

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Betty Ann Scully, daughter of Jack Ormond, receives the 1977 New Jersey Turfgrass Hall of Fame plaque, awarded to her late father at Expo 1977. Roy C. Bossolt, chairman of the N.J.T.A. Hall of Fame committee, who is handing Mrs. Scully the plaque, told the audience the many interesting facets of Jack Ormond's life. Jack and his wife, Arabell May Peters Ormond, were married 50 years and had three children, John Robert, Pierce and Betty Ann.

Jack Ormond Named to Turf Hall Of Fame

Jack Ormond, golf course superintendent at Canoe Brook Country Club for many years and an innovator in the construction and care of fairways, was enshrined in the New Jersey Turfgrass Association Hall of Fame in ceremonies at Expo 1977.

Jack, who died last year at the age of 76, came out of the snows of Nova Scotia to the warmer clime of New Jersey after working as a telephone lineman, a Royal Canadian Mounted Policeman and later as a worker at the Fisher Body Plant in Harriman, N.Y. While at the latter he was offered a job with a land clearing company which was preparing the way for the Canoe Brook Country Club. When the project was completed he accepted an offer to become an assistant to the golf course superintendent, Ed Cale, and in 1942 he took over for Cale and remained at the post for the next quarter century.

Jack quietly provided an excellent golf course. He was among the first to renovate his fairways and in the forefront in the pioneering of crabgrass control. He was always cooperative in providing space on his course for turfgrass research.

He served as a director of the N.J. Golf Course Superintendents Association for six terms and served with distinction on several committees of the N.J. Turfgrass Association.

Even after retiring in 1968, Jack was up front at turf meetings with an alert and attentive mind. Jack was a friend and helper to all turf growers. His opinion was always highly respected. He was a man's man, who shunned the limelight, but was always "ready to go" and "got things done."

The New Jersey Turfgrass Association is proud to have honored Jack Ormond as the first turfgrower member of the New Jersey Turfgrass Hall of Fame.

LAWN BOWLING: A SPORT FOR ALL AGES

EDITOR'S NOTE:
Lawn bowling, known as bocci by many Italians, is an enjoyable sport that has been overlooked. This game can be played on natural turf on many areas of limited space. Grass offers great pleasure compared with noisy, hot, harsh, hard artificial surfaces. The group most likely to enjoy lawn bowling will be middle age or older persons. This sport is a good social game that can be played in many back yards or in a corner of a public park. R.E.E.

The following articles on lawn bowling are taken from the proceedings of the 1977 Turf and Landscape Institute.

INTRODUCTION TO LAWN BOWLING

J. Michael Henry
Farm Advisor, Orange County, Ca

The origins of lawn bowling reach back into the Dark Ages. It is mentioned as a favorite sport of the military gentry of Europe and the British Isles in the 1300's, (3, 5). In fact, during this period, King Henry VII outlawed the game of lawn bowling due to the fact that the soldiers were spending too much time bowling to the neglect of their archery practice.

By the year 1588 A.D. bowling was back in favor and history records that Sir Francis Drake was engaged in a game of bowls when he was informed of the approach of the Spanish Armanda, a fleet of warships sent to attack England by Phillip III of Spain (5).

From England the game was spread

A GOOD LAWN HELPS STOP POLLUTION

Lawngrasses are effective "filters" for trapping a variety of substances that might otherwise wash into the soil and contaminate drainage water. A Kentucky bluegrass lawn has hundreds of leaf-bearing shoots to each square foot, sufficient to strain out dust and grime at the same time that they freshen the air by exchanging oxygen for carbon dioxide. And, as leaves having lived their life cycle crumble into humus, the colloids trap many free chemicals. Under ground roots and rhizomes are active, too, picking up solubles such as nitrate.

A study at Ohio State University points up grass's beneficial influence. Water running out of drains underlying test fields covered by bluegrass showed only three-tenths of a pound of nitrogen to leach into the subsoil annually on each acre. Twenty times as much was recorded for fields planted to a cultivated crop, such as corn. Even if the bluegrass sod was heavily fertilized, no more than six-tenths of a pound got into the underground water, again less than one-twentieth the amount for similarly fertilized corn.

The amount of nitrogen in groundwater that has filtered through bluegrass sod is far less than that occurring in natural rainfall. Rainwater measured 16 pounds of nitrogen for each acre annually. Yet the surface runoff from land covered with sod or woodland usually contains less than a pound of nitrogen. Most of the nitrogen in rainwater is picked up by grasses and the rich soil they help create. No need to fear water pollution because you fertilize your lawn! Rather, vigorous grass helps diminish pollution!

— "The Bull Sheet"

Panic In The Pantry — A Different Slant

"Panic in the Pantry" — A book worth reading. "People don't associate chemicals with food," according to Dr. Elizabeth M. Whelan, a demographer and medical writer. "In fact," she adds, "all food is made up of chemicals — the only difference between the chemicals already in our food and chemical food additives is that the additives are synthesized in a laboratory."

Following several years of study, Dr. Whelan has concluded that chemical food additives and the pesticides used in producing our food are helpful rather than harmful. And in many cases, they are safer than some health foods. As Dr. Whelan explains, "the problem with synthesized chemical additives is that their names sound funny to us. There is that fear of the unknown and a fear of cancer and what causes it. Once someone states that a chemical can cause cancer, word spreads and people believe it, whether it's true or not. And a scientist looking into such a statement," she says, "may not find anything bad, but probably cannot prove the statement false."

Dr. Whelan has co-authored a book on the subject with Dr. Fredrick J. Stare, a nutritionist and chairman of the Department of Nutrition at Harvard. Entitled *Panic in the Pantry; Food Facts, Fads and Fallacies,* it is probably the only book presently on the market that challenges the rash of books sponsored by anti-additive, anti-pesticide groups.

— National Agricultural Chemicals Association Newsletter

A man who wants time to read and write must let the grass grow long.

—Sloan Wilson

DRY PATCH

Soil Scientist Roy Bond of CSIRO in Adelaide, Australia, has isolated a type of fungus that invades the sandy base of golf greens and coats sand grains with a water repellant layer of organic matter. Wetting agents failed to correct the problem but introduction of loam soil into the sandy soil helped. This might help us remember that slow water percolation on a turf soil is not always caused by too many fine particles in the soil mix.

EDUCATIONAL PROGRAMS: WHAT WOULD YOU LIKE?

The 1977 educational program of Expo is past, but I still receive compliments. I wish to pass that word along to the speakers and the program committee.

Members of the committee were Paul Boizelle, Gary Crothers, James Gilligan, Rich Hurley, Henry Indyk, Paul Sartoretto and Jack Wittpenn.

It takes time to prepare a program with a committee, but we know a committee is essential for finding out about speakers. Also we would have less perspective in the program.

Our deepest thanks are extended to these persons who took the time and effort to participate in the several meetings necessary to make such a project successful.

Needless to say that an educational program never fulfills the needs of everybody. There is always more that we would like to accomplish at such sessions. Therefore, if anyone has suggestions, ideas, any thoughts in this area, please pass them along to us.

We're alwtys striving for improvement, and with your help and cooperation we'll offer better educational programs.

—R.E.E.

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INTRODUCTION TO LAWN BOWLING

(Continued from pg. 1)

throughout the British Empire and is still quite popular in Australia, South Africa, New Zealand and Scotland. Other sports that owe their beginnings to the game of lawn bowls include billiards, curling and bowling (indoor). It is interesting to note that lawn bowls predated the game of golf by hundreds of years as the first game to be played on a "finely manicured" turfgrass green.

Lawn bowling never reached great popularity in Canada or the United States, but it is gaining numbers especially with members of the senior citizen population in the United States. Currently, there are approximately 38 cities in California alone that support one or more lawn bowling greens, either through their local parks department or a private group or organization.

Green Dimensions

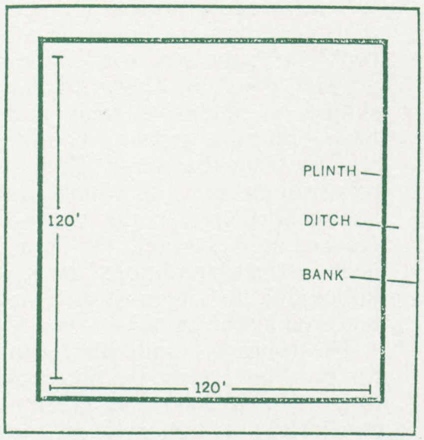
The bowling green is basically a square — most commonly 120 feet by 120 feet, although it can vary from a minimum of 110-feet square to 125-feet square or greater (2, 4). The green surface is bound by a wood or concrete border topped by a wooden cap referred to as a plinth (see figure 1). A roughly, 2-inch deep ditch surrounds the green. This was originally a drainage ditch when the greens were irrigated by flooding. They still function in this capacity on many sprinkler irrigated greens. The outer wall of the ditch is simply termed the bank. It rises 9 to 12-inches above the surface of the green and serves as a stop for overthrown bowls (1, 2). It is commonly constructed of wood or concrete.

The bank surface is usually concrete or mown turfgrass, making it useful as an area for spectators and players to observe the play off the playing surface.

The surface of the green bears directly on the play of the game and the skill involved in placing the bowls.

The turf is maintained from ⅛-inch (Hybrid Bermudagrass) to 3/16 or ¼-inch (Creeping Bentgrass) and the thatch produced by the grasses is ideally kept to an absolute minimum to achieve a hard, fast playing surface.

So important is the condition of the green's surface that an objective measurement of the time a bowl takes to travel a distance of 90-feet is used to compare green conditions. This measurement is called the "speed of the green" (4). A green with a speed of 10-seconds is slow, one of 16-seconds is fast. This seemingly incongruous statement can be explained thusly: a hard, firm surface supports the bowl with less frictional drag, so a bowl can be thrown rather softly, yet still reach the end of the 90-feet distance. A slow green, on the other hand, requires that the bowl be rolled harder and thus faster in order for it to overcome the friction imposed by thick, spongy thatch and/or saturated soil to reach the end of the 90-foot lane. This explains how a bowl rolled on a fast green actually takes longer to cover the given distance than it would on a slow green. Possibly, no other game played on a green is so closely tied to the condition of the surface of the green.



BOWLING GREEN DIMENSIONS

Play of the Game

The object of the game is to get one's bowl closest to the white target ball (called the Jack) some 90-feet away at the opposite end of the lane. The skill comes in rolling the elliptical, lopsided bowls in a curving path to avoid any previously thrown bowls that may be blocking the jack or to knock the jack into a more favorable position or move an opponent's bowl to a less advantageous location.

LITERATURE CITED

1. Anonymous. 1976. Sports Turf Review. New Zealand Turf Culture Institute. December, 1976. No. 106:205.
2. Anonymous. Turf Culture. New Zealand Institute for Turf Culture. Palmerston North. New Zealand. pp. 234-238.
3. Beard, James B., 1973. Turfgrass Science and Culture. pp. 2.3.
4. Haley, Edgar R., 1976. Construction of the Lawn Bowling Green. pp. 2.5.
5. Hanson, A.A. and F.V. Juska. 1969. Turfgrass Science. pp. 1.5.

Soils And Sands For Bowling Greens

William B. Davis

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Very few California lawn bowling greens afford good bowlers consistently good game conditions. We tend to blame the poor condition of a green on the greenskeeper, while, in fact, many greens were doomed to failure from the day they were constructed. Even with the technical skill of the greenskeeper and an unrestricted budget, it may be impossible to have good bowling as the rule rather than the exception if the growing medium of our green has the wrong physical characteristics.

Good bowling conditions require a very firm, dry surface which is perfectly level. This surface needs a vigorous turf which is mowed at a height of ¼ inch or less. This turf must be maintained with a minimum of thatch and/or mat below the grass blades. In order to achieve this desired surface, the growing medium becomes the limiting factor. Few, if any, natural or amended soils possess the physical characteristics required.

In order to grow any plant light, oxygen, water, nutrients, and a growing temperature are required. These must be in proper balance for the species of plant we wish to grow. Generally, we do not have to concern ourselves with light and temperature because these environmental factors usually are not major causes of poor bowling conditions. Nutrition of grass management is pretty well understood and can be supplied by any competent greenskeeper. Our real problem lies in maintaining a proper balance of the oxygen and water available to the grass roots while at the same time producing a firm, dry surface.

Clay soils, loam soil or even loamy sand soil are all highly compactible, and, once compacted, accept water slowly and do not afford good aeration to the roots. Many of these soil media can afford good bowling conditions but only for limited periods of time. After an irrigation, it may take two to three days before we have a good, dry surface. Typically, we find ourselves relying on frequent aeration and use of heavy rollers in an attempt to improve the bowling surface. We are continually sealing up the soil media, and

TABLE 1. Sand Particle Size Distribution Range for Construction and Topdressing of Bowling Greens

Class	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay
Sieve Opening M M	4.00 to 2.00	2.00 to 1.00	1.00 to 0.50	0.50 to 0.25	0.25 to 0.105	0.105 to 0.053	.037 and below	
U.S. Standard Sieve Number	10	18	35	60	140	270	....	....
Range			←	key fraction (50 to 75%) 85 to 95%	→	←	4 to 8%	→

without a good balance between oxygen and water, we limit root growth. This weakens the grass, and disease takes over. Even under the best of conditions, excessive use will thin out our turf, but recovery can be rapid with the right growing medium.

Ideally, we want a medium for a bowling green which will accept water rapidly, will retain available water for a reasonable length of time, and will have a good balance of water and oxygen in the root zone while at the same time give a firm, compacted surface.

For many years individuals as well as several public agencies have worked with various soils and amendments to achieve a proper growing medium for high traffic, extensively used turfgrass areas. The University of California has done extensive work in this area. We now generally recommend a very uniform type of medium to fine sand — unamended — to meet these very demanding turfgrass areas. Most of the applied research was initiated and developed for golf green construction and management, but the basic principles also have been adapted to football fields and bowling greens. While each of these high-use athletic areas is managed for quite different activities, they do have many things in common. Their turf surfaces are subject to much traffic and, therefore, are subject to all of the problems associated with a compacted growing medium. Their turfgrasses are subject to intensive wear and must have optimum growing conditions to recover from that wear. They also are recreational areas in which near perfect conditions for the games to be played are expected. Without these near perfect conditions, it is almost impossible to demonstrate the skills required by the games.

The types of sands we recommend for bowling greens are not substitutes for a competent bowling green manager. Early nutrition is very critical to proper establishment of a green grown on pure sand. It is now possible for the skilled manager to achieve and maintain that firm, dry level surface which will support a vigorously growing turf.

There is no single sand with one rigid set of specifications that is recommended for bowling greens. Table 1 shows the range of particle size distribution which will produce the type of medium suitable for good bowling greens. We have studied these sands under field conditions where the sand is placed 12 inches to 16 inches deep to the interface of the parent and/or subbase soil. A tile system is usually required at this interface in order to remove water that may accumulate at the interface. The subgrade may be nearly level with minimum depth trenches to give the tile lines a positive fall of 1 percent. We do not recommend and cannot justify the cost of a rock blanket or so-called rock drainage layer between the sand and the parent or subbase.

(Continued on pg. 7)

TABLE 2. Some Typical Sands Suitable for Bowling Green Construction and Topdressing (Percent Retained on Each Sieve)

Sand	10	18	35	60	140	270	Silt	Clay
*30-60 Crystal Silica Oceanside	0.0	0.34	33.0	45.4	17.70	2.26	1.90	0.40
*On-Site Ceres Washed Sand	0.3	0.5	11.0	50.5	33.8	2.60	0.70	0.40
Santa Cruze Aggregate 1070	0.4	0.76	2.48	66.14	26.84	2.00	1.50	0.50
*Monterey 30 Mesh	0.0	0.0	22.16	61.16	15.10	5.10	0.12	0.80
*Manteca Washed	0.0	1.62	18.4	49.08	27.66	1.82	1.10	0.2
Dillon Beach	0.0	0.42	2.86	48.10	44.80	1.48	1.00	1.20
Ocean View Mendocino	0.0	0.12	0.66	69.94	28.40	0.38	0.50	
Fortuna	0.24	0.22	0.86	60.46	34.96	0.50	1.20	2.10
Pacific Grove	0.00	0.18	14.26	78.02	5.82	0.16	0.0	1.20

*These sands are at the upper limits due to the percentage of coarse sand in relationship to the medium and fine sand fractions.

(EDITOR'S NOTE: *These are California sands. Of course it is entirely satisfactory to use New Jersey or other silica sand if it has equivalent textural qualities*).

PRACTICAL MANAGEMENT OF THE LAWN BOWLING GREEN

Edgar R. Haley, M.D.
Retired, Escondido, Calif.

In order to discuss the management of a lawn bowling green, it is necessary to decide exactly what constitutes the ideal green. What exactly are the attributes for which we are striving?

The ideal bowling green is an area of turf which is a completely level, completely smooth, hard, dry surface, supporting a healthy uniform turf no higher than ⅛" above the actual soil.

Within the past five years bowling greens are being constructed scientifically on the basis of well accepted research findings of the horticultural departments of universities, the world over.

To approach the ideal is far simpler if we have a properly constructed green. However, the vast majority of greens antedate these scientific principles and the present problem is to produce an acceptable bowling surface upon this vast majority of older greens.

First off, it must be well understood that bowling greens are not to be equated with golf greens, and the principles involved in the management of the one is very definitely different from the other. A bowling green managed along the lines of the golf green is invariably wretched. In contrast to the golf green, the bowling green surface is hard; it is dry; it is absolutely flat and absolutely level.

The turf contains no thatch whatever, and the grass is mowed to less than half the height of that of the golf green. In short, the bowling green is tremendously more exact and critical.

The basic key is to obtain a strong healthy turf. Given a strong healthy turf, the obtaining of a good bowling surface is primarily mechanical.

I. Irrigation

Without question, the most important factor in developing a deeply rooted healthy turf lies in proper irrigation. The great majority of greens in this country are tremendously overirrigated – literally in the state of near drowning.

With the use of a simple program of watering to an exact sufficiency and delaying the next irrigation until it is needed, virtual miracles have been accomplished in developing strong turfs of Bermudagrass on bowling greens which had been simply wretched for years previously.

With a relatively strong healthy turf, the obtaining of a smooth, level, hard surface desirable for bowling is simply a mechanical process.

II. Thatch Control

A golf ball "floats" over the surface of the turf. A bowling ball depresses the turf and rolls along the surface of the soil. It can easily be understood that if the grass is allowed to be higher than ⅛" to 3/16" or if there is any spongy thatch present whatever, then the bowling ball behaves in a sluggish fashion, giving a "slow," miserable game.

Therefore, no thatch or mat, whatever, can be tolerated.

The effect of excess thatch in the golf green can be controlled by regular topdressing. In no way is this method satisfactory for the bowling green. Rather, for the bowling green, the thatch or mat must be removed at regular very short intervals, as it develops.

The standard machine for removing thatch is the verticutter, which was designed for use on golf greens. It does an admirable job on the undulating golf green but for the flat surface of the bowling green it does not produce the result of a large flat machine as the scarifier, or particularly, the greens planer.

The scarifier is a frame 7'x4' which slides over the green with a center plank having rows of steel nails which remove thatch on a wide flat plane. Along with thatch, all lumps and ridges are removed, producing a flat smooth surface. Used on a reasonably healthy turf about once a week, this simple instrument can produce a remarkable improvement. It must be supplemented by a verticutter about four times a year.

Recently, a machine, the Escondido greens planer has been developed which produces an astonishingly superior surface on the bowling green. The greens planer is a flat frame, 6' x 4', sliding on skids with whirling verticutter blades in the center. It is propelled by a centrally placed 12 h.p. garden tractor. This machine, along with a large special mower for bowling greens, is probably the most important piece of equipment for obtaining and maintaining a smooth hard flat surface.

Regardless of the mode, the removal of thatch in its entirety is fundamentally essential. It should be removed on a weekly basis to the tolerance of the turf. A strong healthy turf easily withstands this treatment, especially so if the vertical cutting aspect is minimal per use, with the machines being used at very frequent, regular intervals of about one week or oftener.

EDITOR'S NOTE: *While thatch is unwanted on bentgrass, it will not tolerate the rigorous thinning in summer that bermudagrass tolerates).*

III. Leveling of Bowling Green

The average good bowling green in the U.S. has a variation in heights or levelness of from 4" to 6". This, of course, causes a marked variation in the "draw" of the bowl and reduces the skill of the game. To level a green it must be surveyed. The surface is divided into a checkerboard pattern, on ten foot centers. A rope, marked every 10' is stretched across the green at 10 foot intervals. A *water manometer*, easily constructed, and not only more accurate but faster and easier to use than a transit, is used to measure the relative elevations of the given points. From these readings contours of ⅛" levels are drawn on a grid. From this map the gross depressions are chalked on the turf. Sand, to a depth of 1/32" to 1/16", is spread evenly over the depressed areas, using an ordinary cyclone spreader. The areas are dragged with the steel mat and the sand is then "watered in" by a hand held hose, to the soil level.

IV. Mowing

The careful mowing of the grass of the bowling green is an important fundamental process if a smooth even surface is to be obtained. Great care for the details is most important.

Needless to say, the mower designed specifically for this function is entirely desirable. This mower is large (30" cut) and heavy (350 lbs.), with a relatively large base. It is beautifully balanced and easily handled. The smooth surface obtained is markedly superior to that produced from the comparatively small mower used for golf greens.

Mowing, along with all machines used on the bowling green, must always be performed on a 45° angle to the play. Each cut should overlap by 50 percent and it must be done in two directions, at right angles to each other. This results in four actual cuts to the turf each time the green is mowed.

From research, the turf is ideally mowed six days out of the week. Not only is this desirable for the bowling, but it is well accepted that removing small increments at a time causes much less stress than less frequent mowing with a removal of a greater portion of the leaf each time.

It goes without saying that the mower must be kept in careful adjustment, and the blades sharp. The hands should never weigh on the mower handle but be used only for guidance. The motor should always be declutched when turning, to prevent gouging the turf. All clippings are always removed.

The height of cut should be ⅛" in summer for Tifgreen, and ¼" during winter. The opposite is better for the cool season grasses, in Southern California.

A Smile

A smile costs nothing, but gives much. It enriches others who receive it, without making poorer those who give. It takes but a moment, but the memory of it sometimes lasts forever. None is so rich or mighty that he can get along without it, but none is so poor but that he can be made rich by it. A smile creates happiness in the home, fosters goodwill in business, and is the countersign of friendship. It brings rest to the weary, cheer to the discouraged, sunshine to the sad, and it is nature's best antidote for trouble. Yet it cannot be bought, begged, borrowed, or stolen, for it is something that is of no value to anyone until it is given away. Some people are too tired to give you a smile. Give them one of yours, as none needs a smile so much as he who has no more to give.

— Calif. Assoc. of Convention & Visitors Bureaus

ABSTRACT: Effect of IBDU and UF Rate, Date, and Frequency of Application on Merion Kentucky Bluegrass – J. F. Wilkinson, Agron. Journ. 69:657-661 (1977).

IBDU (isobutylidene diurea) and UF (ureaformaldehyde) are synthetic slow-release nitrogen sources available for turf. IBDU-N release is considered a dissolution process, whereas N release from UF involves microbial activity. As a result, different turf responses to the two sources are expected. The objective was to compare IBDU coarse and fine. UF, and AN (ammonium nitrate) applied to "Merion" Kentucky bluegrass *(Poa pratensis* L.) grown on Brookston silt loam, a member of the fine-loamy, mixed, mesic Typic Argiaquolls, with a pH of approximately 7.3 Each N source was applied at 1, 2 or 3 kg N/are. The 1 and 3 kg N rates were applied in April. The 2 kg N rate was applied either in April, September, split between April and September or split between April, June, July, and September. Treatments were made for 3 years and turfgrass response was measured monthly by turf quality ratings, clipping weights, and N uptake. Turf response to coarse and fine IBDU was very similar. Single spring applications of IBDU produced a poor initial turf response compared with UF. IBDU provided a much better turf response than UF at low temperatures, whereas there was relatively little difference in turf response to IBDU and UF during the summer months when applied at the same rate and date. Frequency of application affected turf quality response more with IBDU than UF. Two IBDU applications were required for most uniform turf quality response. Uniformity of response improved only slightly with multiple UF applications.

COMMENTARY: The results of this study show that slow release nitrogen carriers can and should be used differently to produce a given growth effect. The author's comments suggests that IBDU might be used at a slightly greater frequency of application than U.F. Data reported in the context of the paper showed that with April application, IBDU came closer than UF to the quality and clipping weight ratings of the equivalent rate of ammonium nitrate applied in 4 seasonal applications. This study and others show the great difficulty in determining the relative value of nitrogen carriers. The slow release N carriers may not stimulate growth totals equal to those of soluble nitrogen; but they have such values as less burn, less likelihood of excessively soft plants and some spreading of the nitrogen effect on the grass through more weeks of the season. Relative costs of N and costs of application also enter into the decision.

ABSTRACT

Combining Postemerge and Preemerge Herbicides for Crabgrass and Goosegrass Control in Bermudagrass. Abstracted from a paper by B. J. Johnson (1977). Agron. Journal69:1012-1014.

Experiments were conducted to determine if postemerge and preemerge herbicide treatments could be applied in June for control of emerged crabgrass [*Digitaria sanguinalis* (L.)] and goosegrass [*Eleusine indica* (1.)] Gaertn in [Bermudagrass *(Cynodon dactylon* (L.)] Pers.) and prevent further germination of weed seeds during the remainder of the season. Combinations of preemergence and postemergence herbicides were applied in each of 2 years at Griffin for control of large crabgrass and at Atlanta, Georgia, for control of goosegrass. Sequential treatments of metribuzin [4-amino-6-*tert*-butyl-3- (methylthio)-*as*-triazin-5 (4H)-one] at 1.1 kg/ha with either bensulide [0, 0-diisoprophyl phosphorodithioate S-ester with N-(2-mercaptoethyl) benzenesulfonamide], oxadiazon [2-*tert*-butyl-4- (2,4-dichloro-5-isopropoxyphenyl)- Δ^2-1,3,4-oxadizaolin-5-one], butralin [4-(1,1-dimethylethyl)-N-(1-methylprophyl) - 2,6-dinitrobenzeneamine], or napropamide [2- (-naphthoxy)-N, N-diethylpropionamide] controlled a higher percentage of large crabgrass than when either chemical was applied alone. Single treatments of MSMA (monosodium methanearsonate) or methazole [2-(3, 4-dichlorophenyl) 4-methyl-1, 2-4-oxadiazolidine-3, 5-dione] provide excellent control of large crabgrass. Goosegrass control was greater from sequential treatments of MSMA with oxadiazon, napropamide, or profluralin [N-(cyclopropylmethyl)- a,a,a - trifluoro-2, 6-dinitro-N-propyl-p-toluidine] than with MSMA alone. Methazole and metribuzin each controlled goosegrass almost completely.

EDITOR'S COMMENT: *This study suggests to us that repeating preemerge treatments through the crabgrass and goosegrass season may not be as beneficial as a postemerge treatment. Unfortunately, we northerners do not have the margin of safety on cool-season grasses that exists for Bermudagrass. Still, there are occasions when we might use a postemerge such as DSMA or MSMA earlier in the summer on a Kentucky bluegrass turf.*

On bentgrass turf, we might make more use of these herbicides in late summer to complement our earlier preemerge treatments. For those of you in research, turf still needs more selective postemerge herbicides for crabgrass and goosegrass. In closing, while you might try supplementing your preemerge programs with postemerge, leave some checks on your repeat preemerge treatments to tell you if they are worthwhile. Remember that a number of the chemicals used in this study are not tolerable on cool-season turf. Pardon us for all the confusion of chemical names in the abstract, but these are necessary for our readers who are interested in the chemical research aspect.

Soils and Sand For Bowling Greens

(cont. from page 4)

Examples of several native and/or screened sands judged suitable for bowling greens are presented in Table 2. None of these sands are commonly found at the local sand and gravel company which primarily functions to supply concrete and plaster sand for construction. Where sufficient demand exists, there are several companies now supplying these special sands. In some areas we have good natural deposits, but their costs can be high if they must be transported a great distance. In many cases they are less costly than a local plaster sand mixed with some amendment which may or may not give the desired medium.

You might compromise on your tile system; you might compromise the irrigation system; and you might compromise the development of the area surrounding the green, but you should not compromise on the growing medium for a bowling green.

We have heard that the pesticide document shelf space in Washington is now one-half mile long and is growing at the rate of 18 feet a week! At this rate, the documents are multiplying faster than the pests! Is anyone working on a control for "bureaucratic pests?"

– Jim's Almanac

SUSTAINING MEMBERS

1978

Sustaining Members (As of February)

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Green Hill Turf Supply, Inc.
Limestone Products Corp.
Lofts Pedigreed Seed, Inc.
Lewis W. Barton Co.
Wide Sky Farm, Inc.
Rockland Chemical Co., Inc.
Garfield Williamson Inc.
A-L Services
Playboy Resort & CC at Great Gorge
Leons Sod Farm

Turfgrass Allies

It is a well-known fact that in every gram of soil there are millions of microscopic organisms present, including bacteria, actinomycetes, fungi, algae, nematodes, and protozoa. The microbial activity in the thatch of turfgrasses is very high because of the high organic matter content. In studies on the fungal ecology of creeping bentgrass turf, over 28 genera of fungi were found to be prevalent in thatch and upper soil layers, treated or untreated with fungicides. Only a small percentage of the fungi isolated were known pathogens of creeping bentgrass. Many of the others isolated are known to be antagonistic or competitive with the facultative parasites which attack creeping bentgrass. Inoculations with fungal pathogens on plants grown in sterile soil cause more damage than when plants are grown in normal field soil. This suggests that saprophytic microorganisms, such as bacteria and fungi, may play a role in the suppression of facultative fungal parasites. Blair has shown that the parasitic activities of *Rhizoctonia solani* can be suppressed by saprophytic microorganisms.

— From the Kellogg Supply Newsletter.

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