# PROCEEDINGS

TWENTIETH ANNUAL

# SOUTHEASTERN TURFGRASS CONFERENCE



GEORGIA COASTAL PLAIN EXPERIMENT STATION

and

ABRAHAM BALDWIN AGRICULTURAL COLLEGE
COOPERATING

TIFTON, GEORGIA

APRIL 11 - 13, 1966

# P R O C E E D I N G S

Twentieth Annual

Southeastern Turfgrass Conference

Tifton, Georgia

April 11-13, 1966

Sponsored By

UNIVERSITY OF GEORGIA COASTAL PLAIN EXPERIMENT STATION

In Cooperation With

ABRAHAM BALDWIN AGRICULTURAL COLLEGE

UNITED STATES GOLF ASSOCIATION GREEN SECTION

and

SOUTHERN GOLF ASSOCIATION

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# FOREWORD

Each passing year makes us realize the increasing importance of research designed to help mankind enjoy his leisure time. Whether it involves the development of a fine lawn, the enjoyment of a good golf game, or the thrill of an exciting ball game, turfgrasses are playing an important part in our life. Some people accept these grasses with little or no thought as to how or why they came about. Those of us who are involved in research to develop and manage these grasses especially appreciate the fine spirit of cooperation and support by those who are interested in this program.

Your attendance at the Twentieth Annual Turfgrass Conference builds anew our confidence that the research program is worthwhile; that adequate support is assured; and that the fruits of the work are bringing both profit and enjoyment to those who partake of it.

We hope that the future holds many more turf conferences that will be as productive as have the first twenty.

Frank P. King, Director
Georgia Coastal Plain
Experiment Station

# 20 YEARS' PROGRESS IN TURFGRASS MAINTENANCE

Mr. Tom Mascaro, President
West Point Products Corporation, West Point, Pennsylvania

It is my pleasure to be invited to this, the 20th anniversary of the Annual Turfgrass Conference at the Georgia Coastal Plain Experiment Station. Through the years, I have attended most of these Conferences and have watched the membership grow -- from a very small group to this impressive audience that is here today.

Having been involved in the turfgrass industry for some 30 years or more, it is particularly interesting to see and participate in the evolution of turfgrass management. Dr. Ferguson remarked, when speaking on progress in turfgrass research at one conference, "If we were to take a look at the progress made just today, it couldn't be measured. If we were to look at the progress made in turfgrass research during the last week, we still couldn't detect any real changes. If we look back over the last year, we would notice some progress, but not a great deal. If we were to analyze the progress made over the last five years, we would measure some very definite changes. But if we went back over the last 20 years, we would see that a great deal of progress has taken place and that we really have advanced considerably."

These advances have come about because men such as you gather here to discuss problems, to see new ways to do your job better. Dr. Ferguson's remarks apply to my subject. We have a tendency to take for granted all the equipment that we have today. We even do some complaining about it. Yet,

if we were to look back through the years, we would find that we have made tremendous strides in the development and perfection of turfgrass management tools.

I will illustrate this progress with slides. If we go back 20 years or more, we find that golf course superintendents or greenkeepers, as they were called in those days, held meetings and carefully studied the new equipment that was available to them then. There were new well-built, horse-drawn mowers. On display, you would find leather horse boots in various sizes so that hoof prints would not show on turfgrass areas. There were push-type greens mowers, horse- and human-pulled sod-cutters and all sorts of supplementary tools geared strictly to human power. Manpower was readily available in those days. A maintenance crew of 30 men was not unusual. Maintaining the golf course was back-breaking and time-consuming work. But the game of golf was different, too. There were many people who could not afford to play golf and so, there were fewer players. There was not the same demand for perfection either. There was not the heavy and constant play we are so familiar with today.

With the advent of the gasoline engine, conditions changed. Machinery began to appear. Heavy tractors with internal combustion engines were developed and they began to replace hand- and horse-drawn mowers. Greens mowers, too, were equipped with the internal combustion engine. Although they were highly inefficient, they were the last word in those days.

Golf course superintendents adapted this mechanized equipment to golf-course use. For instance, many courses had a generous supply of "spuds" on hand. These were metal projections fastened to the iron wheels of the tractor to prevent them from slipping on wet turf and hills. Later on, the rubber tire was adapted to turfgrass tools. These adaptations were proof positive that there was a need for equipment that was adapted to golf-course use. The turfgrass manager was expressing the need for it when he added the "spud" to the tractor tires.

But there were many arguments pro and con, and I can still remember that the rubber tire provided fuel for many a bull session. Some thought its use was extremely harmful and would eventually kill the grass. But progress demanded the change, the turfgrass manager swung over to using it, and he made more progress. Where would we be today without the rubber tire?

Maintenance of all this equipment was extremely difficult and there weren't many men who were trained mechanically to take care of it. We can laugh over it today, but there was a time when wooden coil boxes and the magneto system of the Fordson tractor was a great mystery to many people. When they had to test the power of the spark, they were quite certain it would kill them. The need for trained people began to make itself felt. As is always the case with we humans, such needs are gradually filled and men became trained in the use and care of mechanized equipment. It no longer held such fears for them.

As they used the new, mechanized equipment, new ways were being found to do the work better and faster. And industry spent a great deal of time and money through these years to supply turfgrass people with equipment that could replace hand labor. As a result, today we have some wonderful machines available to use to perform the jobs that were done by hand in the old days.

The trend toward complete mechanization still continues. Today it becomes a must. The turfgrass manager has many time- and labor-saving machines at his disposal. But he is faced with an increasing shortage of manpower for the many jobs that still must be done; he is faced with phenomenal growth in the golfing population; he is faced with growing and maintaining good turf with limited maintenance time. I doubt that any club can continue to operate for long without maintenance equipment that is designed to meet the needs.

The rubber-tired, engine-driven tractor was a tremendous innovation in its time. Even it had to undergo refinements and changes to meet requirements for use on turfgrasses. The changes and advance continue. They continue because there is a demand for the best possible turf. They continue because you bring those demands, and the problems arising from them into focus at meetings such as this, where interested men come together to discuss their common problems. It's here that ideas are born. It's here we discover what is needed. Progress can come only through such exchanges of ideas and frank discussions of problems. It is my hope,

and I know the hope of all gathered here, that such conferences as this one held at the Tifton Coastal Plain Experiment Station will long continue. These are the activities that stimulate new ideas. Tifton has a long record of contributions to the turfgrass world and, with your continued support, such stations as Tifton will continue to pave the way for the invention of new equipment and the development of new techniques.

# REVISION AND RENOVATION OF TEES

Mr. W.A. Roquemore, Manager
Patten Seed and Turfgrass Company, Lakeland, Georgia

At one time, a certain fairway area was designated as the "teeing ground" and there was little to distinguish it from other areas except for the "tee markers." As the game evolved, tees were constructed to provide a well drained "teeing ground" and to provide better visibility of the fairway.

Earlier tees, particularly on "do-it-yourself" courses constructed with minimum budgets, as often as not were knotty mounds difficult to maintain, too small to provide turf for any appreciable quantity of play, and none too attractive aesthetically.

Modern tees are designed large enough in area that: (1) Marker movement influences the strategy of play, and (2) Routine marker movement permits the maintenance of quality turf in spite of the great amount of play that most courses expect and receive today.

Basic considerations in constructing or expanding tees are:

1. Select site that "fits" hole and is adequate in size.

2. Provide site relatively free of shade.

3. Elevate tee for drainage (usually 12 to 18 inches is adequate) and for visibility only if essential for safety.

4. Draw out slopes so that they may be comfortably maintained with power equipment (5 to 1 preferable, 4 to 1 minimum). Build vertical retaining

walls in preference to slopes too steep to maintain with power equipment.

5. Pitch from rear to front so that appearance is compatible with surrounding terrain. On flat ground, pitch up to front very slightly (normal maximum 1 foot to 100 feet). On fairway sloping downhill, tee will often have to slope to front to avoid appearance that it is pointing skyward. On fairways going up hill, reverse may be true.

6. Swale back and sides to divert surface water.

7. Use best soil available on surface and slopes of tees, amending if necessary to provide surface into which wooden tee can be pressed with reasonable ease.

8. Irrigate completely, including slopes.

9. Sterilize with methyl bromide prior to planting if budget will permit.

Minimum teeing area is debatable. We feel that 3,000 square feet of usable teeing surface should be the minimum for any hole, with 4,500 square feet being the minimum for "iron" tees.

The best bermudagrass for tees in the Bermuda Belt is also debatable, but it is certainly one of the following hybrids, all vastly superior to common seeded bermuda: Tifway (Tifton 419), Tifgreen (Tifton 328), Tiflawn (Tifton 57), Tifdwarf, or Ormond.

Many properly constructed old tees are in desperate need of turf renovation, and some re-construction where the center has been cut out and lowered by repeated divot-taking with no top-dressing added.

There is no substitute for closing the tee, stripping existing turf, sterilizing, fertilizing, re-sprigging and producing a clean, new turf.

Many tees, however, cannot be closed, but could be improved tremendously by heavy aerification, seeding or strip sodding, top-dressing, spiking, and chemical weed-control spraying. Introducing coarse sand, Sorbolite, Turface, or similar materials, which do not compact into spike holes, will help many tees.

Tee maintenance should include daily movement of the markers, almost daily watering, cutting at .25 to .50 inches at least three times weekly, frequent fertilization, periodic removal of clippings, weekly top-dressing of divots, and periodic vertical thinning and top-dressing.

## REVISION OF FAIRWAY AND ROUGH DESIGNS

Panel Discussion

Moderator: Mr. Charles G. Wilson, Sales Manager and Agronomist, Milwaukee Sewerage Commission, Milwaukee, Wisconsin

Panel Members: Mr. Pete Dye, Dr. Glenn W. Burton, and Mr. Gene Armstrong

Resume of Panel Discussion by Mr. Wilson:

Slides were shown depicting rough utilization at Pine Valley and Merion Golf Clubs in the Philadelphia area. Wilson made the statement that championship clubs there, as a result of properly utilizing rough, had less than 35 acres of fairways to maintain. Conversely, many Southern courses have 70 acres or better of fairway turf on an 18-hole course.

Wilson also mentioned that rough was far cheaper to maintain than fairways, that it did not slow play when kept at a reasonable height, and that it did provide a better test for the scratch player without adding strokes to the high handicapper's game.

Dye emphasized that rough could be quite high, provided it was sparse. He reviewed Wilson's slides, pointing out that the broom sedge rough at Pine Valley was much easier to play from than the dense Kentucky bluegrass rough at Merion. Dye advocated more experiments with chemicals to thin out rough areas, and further pointed out the value of rough when properly contained to delineate target areas and direct traffic.

Burton was asked to discuss Southern grasses that might be used for roughs. He mentioned that centipedegrass might have a place and

that it was certainly economical to maintain. In fact, centipede should receive almost no fertilizer. Bahia cannot be considered now because of seed formation that could contaminate fairway and putting-green turf. Carpetgrass was mentioned as a possibility and under low-fertility lev-
bermuda
els,/strains like Tifway (Tifton 419) would be better than seeded bermuda.

Armstrong, with practical owner-manager experience in Tennessee, found any rough was bad with new golfers. They want to score well above all else. Eliminating the rough at his course increased the play and, thus, the income from fee golfers. This helped pay for the increased cost of "park-like" fairway maintenance. He conceded that where rough could be utilized, it would eventually save on maintenance costs even though different mowers were required on higher-cut grass.

Time ran out to prevent an active question-and-answer discussion. In summary, it can be said that each course presents an individual problem, but that each superintendent, working with the professional and golf committee, should take another (and closer) look at the rough in relation to the fairway in revising design.

# FAIRWAY AND ROUGH RENOVATION

## Panel Discussion

Moderator: Mr. E. R. Jensen, Agronomist, Southern Turf Nurseries, Tifton, Georgia

Panel Members: Dr. G. C. Horn, Associate Turf Technologist, Department of Ornamental Horticulture, University of Florida, Gainesville, Florida

Mr. C.M. "Doc" Greene, Okefenokee Country Club, Waycross, Georgia

Mr. Gene Baston, Greens Superintendent, Oglethorpe Country Club, Savannah, Georgia

Talk by Mr. Jensen:

Today's panel members consist of C.M. "Doc" Greene, Okefenokee Country Club, Waycross; Gene Baston, Oglethorpe Country Club, Savannah; and Dr. G.C. Horn, University of Florida, Gainesville. All have had considerable experience in renovating fairways and roughs.

Doc Greene began a golf-course improvement program in 1962 and by 1964, had completely reworked his fairways. They are now some of the best in Georgia. Doc will tell of his experiences in converting from a mixture of grasses to Ormond bermuda. His work has been with Lower Coastal Plain land that includes low, wet sands and dry, sandy ridges.

Gene Baston is wearing two hats today. First, he will tell of his and Johnny Graves' experience during the past four years in renovating the Augusta National. Both men were scheduled to participate in the panel today, but Johnny has asked to be excused because of the ordeal he went through

yesterday at the play-off. Secondly, Gene will give us some advance information on renovation of the old Fort Oglethorpe Golf Course, where he has been since last fall.

Dr. Horn's subject will be "Weed Control." This is a vital phase in turf renovation and Dr. Horn's studies on pre-emergence herbicides are of great significance in golf-course construction and maintenance. Much of the information that he will present is new and yet unpublished. We are indeed fortunate in having him with us.

Before turning the microphone over to these panelists, I would like to mention a few items of general significance in turf renovation. The magnitude of the renovation problem can be illustrated by the condition of golf courses in the Tifton area. Within a radius of 80 miles, there are 23 golf courses. Two of them are new, one has undergone fairway and rough renovation, two are in the process, and the other 18 would benefit by a good reworking. This is the general situation all over the South.

William Byrd, Southern Golf Architect, says there is a greater need for revamping the old golf course than there is for building new ones. This idea is substantiated by the fact that several clubs have recently improved their turf through renovation. Some of the more prominent include: Lake Region Yacht and Country Club, Sarasota Bay Country Club, Okefenokee Country Club, Augusta National, and Plant City Country Club.

In considering renovation, golf-course superintendents always ask, "Do we have to close the course?". Recently, however, we have had

good luck by interplanting stolons of selected hybrid bermuda into existing sods of common bermuda, ryegrass, centipede, and carpetgrass without disrupting play.

We use a single- or double-row planter. The colter splits the sod ahead of the shoe that opens the furrow. Grass falls from a self-feeding tray into the furrow, which is closed by a roller. After a few weeks, there is little evidence of machinery or tracks. One man is needed to fill the trays. Depth of grass in the tray governs the planting rate. The single-row machine will plant up to three acres per day, and the double-row planter up to seven acres.

Machine planting on old sods has shortcomings. The seedbed is not loosened or reworked. Skips are common and it is difficult to get the even spacing of sprigs that is needed for rapid coverage. Too, there is a possibility that existing competition will overcome the fresh plantings.

In turf renovation when the old sod is completely torn up, the disposition of old vegetation is of major importance. Our current procedure is to cultivate and turn the sod during dry weather and remove the vegetation with side-delivery rakes and sweepers. This is a cheaper and more effective method of getting rid of unwanted grass and weeds and preparing a high-quality playing surface than our old way of spraying with sodium arsenite and turning the sod with a bottom plow. The latter always created a corrugated effect in spite of many ditchings, rototilling, and floating.

In all fairway improvement, whether by interplantings or complete renovation, there is always a question of what kind of grass to plant. In general, we recommend Ormond or Tifway (Tifton 419) bermuda. Both are very good. Ormond will cover quickly and has a high tolerance to herbicides, but is not as attractive, nor does it produce as good a turf, as Tifway bermuda. All things considered, we like Tifway best. To overcome its slow starting characteristic, we increase the planting rate to 400 bushels per acre.

Weeds are always troublesome in fairway renovation. We have successfully controlled them by using the pre-emergence herbicide, Balsaum, at the rate of 1 pound per acre. For a post-planting treatment, we recommend a weekly application of 1/4 pound of 2,4-D and 1 pound of disodium methyl arsonate per acre.

Soil amendments, fertilization, and close mowing are also helpful in controlling unwanted grasses such as carpet, centipede, and to a certain extent, bahia. These grasses do best where soil pH is below 6.0, whereas bermudas grow best where soil pH is above 6.0. If lime is applied several months in advance of the renovation, the increase in pH will favor the bermuda and retard the others. Likewise, high-nitrogen fertilization rates and low mowing heights tip the balance in favor of bermuda.

I will now turn the discussion over to the panelists. We will hear from Doc Greene first.

Talk by Mr. Greene:

Spray all the old turf with 2 pounds of 2,4-D, 2 pounds of 2,4,5-T, and 8 pounds of sodium arsenite. Add wetting agent to make the chemicals adhere to the grass blades. This spraying should be done at temperatures in excess of 80 degrees. Allow seven days for a complete kill of all vegetation. Do not allow this spray to get on any trees or shrubbery.

If an irrigation system is planned in conjunction with the fairway conversion, it should be done in advance of the spraying. Planning a schedule of the work to be done is most important.

Turn the fairways with bottom plows approximately 8 to 10 inches deep. After a fairway has been turned, it should be harrowed several times to separate the old grass and loosen the dirt in order to make a good plant bed for the new grass.

Rototill the fairway before trying to remove the old grass. After the land has been over with a rototiller, as much of the grass as possible should be gotten out, using a side-delivery rake. Wind-row the old grass and remove by hauling it away.

Pre-plant fertilizer should be put out. A soil test can be made to find out if any special fertilizer is necessary. Normally, 500 to 800 pounds per acre of 5-10-15 or 10-10-10 and 1 ton of lime per acre should be used.

After the fertilizer has been spread, go back over the fairway again with a side-delivery rake to remove the truck tracks and to work the

fertilizer and lime into the soil.

Your fairway is now ready to plant. Use the grass most adaptable to your locality. If Ormond or Tifway (Tifton 419), plant at the rate of 300 to 400 bushels per acre. Planting can be done by broadcasting the loose stolons and rolling in with a fairway planter or a mechanized planter. As soon as a section is planted, it should be watered. The new fairways should be watered twice daily until new growth is quite noticeable. When the grass is first planted, it will turn brown and appear to be dead but after 8 to 10 days, you will find roots are beginning to start and the stolons will turn green again. In about two weeks after new growth has begun, it will be time for your post-planting fertilizer program to begin. For rapid coverage, use a high-nitrogen fertilizer at the rate of 200 pounds per acre each week for a 3-week period. After the first three applications of nitrogen, alternate each week with 5-10-15 or 10-10-10.

Full coverage should be in about 8 to 10 weeks' time from the date of planting. Continue your watering program all during the growing-off period. This is most important.

Any drainage problems should be corrected before the turning. Pile up the sand in the middle of the trap and re-spread and re-shape the traps while you are going through the growing-off period. Spray the traps and trap banks.

At this time, I would like to show you a few slides of the Okefenokee Golf Club before and after we converted our fairways.

Talk by Mr. Baston:

While Assistant Superintendent at the Augusta National, it was decided to convert some of their fairways from common bermuda to Tifgreen (Tifton 328) and Tifway (Tifton 419) on a three-year program. We began the program with six of the fairways. There was quite a bit of thought and planning put forth before this was decided.

Our first experience in renovation began in 1962, when it was decided to put in Tifway on the No. 5 and No. 7 fairways. We planted these fairways, but were a little disappointed in the growth rate of Tifway in the heavy clay soil. Because of this slowness in growth, we spot-planted some Tifgreen along with the Tifway. The Tifway, however, came on through and is now the predominant grass on these two fairways.

We learned quite a bit from this first experience and it helped us come up with the program for the complete renovation of all fairways. This program with all the fairways, however, will be planted in Tifgreen. Some of the reasons for this were:

(1) The par 3 course was planted completely in 1958 with Tifgreen. Much success has been enjoyed on this course due to the rapid coverage, late growth of the grass into the fall, and early growth in the spring.

(2) Probably the most decisive thing in the club management's minds was Tifgreen's ability to come back quickly after excessive wear experienced during the tournament. I am not in position to say — maybe Mr. Jensen can help us — as to whether it will stand "continuous

excessive wear" but from our experience at the Club, it was remarkable. To add to the wear-ability test, we put in sod strips of Tifgreen between No. 9 and No. 18 greens. This area receives probably the most wear of any on the course. After the tournament, there was no grass left of any description — Tifgreen, common, or any — but within two weeks, the sod strips of Tifgreen were green and growing, while the common was not yet showing much sign of life.

(3) The fairways at the Club over the years had settled and small depressions were evident on all of them. The renovation program was designed to smooth the fairways.

These were some of the reasons for the conversion. I will try now to give you what we found to be the most successful and economical way of going about it. We accomplished splendid results with basically a nine-step program:

1. Plow with a field cultivator.
2. Rototill.
3. Use flail mower.
4. Sweep area.
5. Use side-delivery rake.
6. Sweep again.
7. Fertilize and lime if needed.
8. Float out.
9. Plant.

Step 1. - The Field Cultivator

We ran the cultivator three times in three different directions at a depth of 12 to 18 inches and a fourth time as deep as possible, about 20 to 24 inches. There was some tried logic behind this. After the first two times, there was sufficient surface damage or plowing, but we found that in the heavy, rocky soil at the Club, we needed sub-surface damage or plowing to prevent uneven settling. This was accomplished with the third and fourth plowing.

Step 2. - The Rototiller

We used the rototiller twice in two directions at a high r.p.m. to pulverize and level the soil and separate the soil from the sod. Because of the heavy texture of the soil, large clods or chunks of grass needed breaking up.

Step 3. - The Flail Mower

We used the flail mower to cut up the sod and further separate it from the soil. The flail did a fine job in spreading the grass sprigs over the surface. We did this also in two directions.

Step 4. - The Sweeper

We then used the Rogers Sweeper to pick up the old grass after the flail mower had fluffed and chopped it. We did this also in two directions. We tried to go in at least two directions with each step to avoid any rutting or depressions.

Step 5. - Side-delivery Rake

We then used a side-delivery rake to dislodge any grass left from the first sweeping.

Step 6. - Sweep area again.

Step 7. - Fertilize and lime if needed.

Step 8. - Float out.

We used a spring-tooth harrow and drag for best results. We tried many things, but the smoothest finish was accomplished with this method. This then gave us a smooth finish and a fine seedbed.

Step 9. - Plant

On the rolling terrain at the National, we always tried to let our last part of each step run parallel to the slope, thus, preventing as much wash damage as possible. We did, however, have heavy rain after planting the No. 1 fairway and patching and replanting were required.

Talk by Dr. Horn:

Herbicides listed in the following tables, which summarize results of our work on bermudagrass weed control, should be tried out on small areas before treating larger plantings.

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN ORMOND BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.
(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)
Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Banvel D | 1/2 | 7.0 | 9.0 | 8.3 | 8.3 | 9.0 | 9.0 |
| TH 073 H | 4 | 2.3 | 2.3 | 3.0 | 4.7 | 7.0 | 7.7 |
| TD 199-214 | 1 | 6.0 | 9.0 | 2.0 | 4.0 | 8.3 | 6.3 |
| Dacamine 4-D | 1/2 | 6.7 | 8.3 | 3.7 | 4.7 | 8.7 | 7.3 |
| Dacamine-Silvex | 4 | 7.7 | 8.7 | 6.3 | 7.0 | 8.0 | 7.0 |
| Treflan | 4 | 4.7 | 6.7 | 5.3 | 6.3 | 9.0 | 6.7 |
| Mecopex | 2 1/2 | 8.0 | 7.7 | 6.7 | 8.3 | 9.0 | 8.3 |
| Prometone | 2 | 2.0 | 3.0 | 1.7 | 2.7 | 8.0 | 4.3 |
| Benefin | 2 | 5.3 | 7.3 | 6.0 | 7.7 | 9.0 | 8.0 |
| MCP-Dacamine | 1/2 | 6.3 | 6.3 | 7.7 | 8.0 | 9.0 | 8.7 |
| Tordon | 1/2 | 7.7 | 4.7 | 8.7 | 8.7 | 4.7 | 4.2 |
| Dacthal | 10 | 5.3 | 8.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| Scotts Bonus | 2 | 1.3 | 1.7 | 5.0 | 4.7 | 9.0 | 5.7 |
| Dymid | 6 | 2.7 | 4.3 | 4.7 | 5.7 | 9.0 | 4.7 |
| Prometryne | 2 | 1.7 | 2.3 | 1.0 | 3.0 | 6.3 | 5.7 |

(over)

(continued)

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN ORMOND BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

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|---|---|---|---|---|---|---|---|
| Atrazine | 2 | 1.3 | 2.0 | 2.3 | 4.0 | 8.3 | 6.7 |
| Simazine | 2 | 1.0 | 2.3 | 1.3 | 3.0 | 9.0 | 8.7 |
| Tupersan | 4 | 5.3 | 6.3 | 6.7 | 8.0 | 8.3 | 5.3 |
| Amchem 64-296B | 8 | 5.0 | 6.0 | 8.3 | 8.3 | 9.0 | 8.0 |
| Amchem 63-303 | 8 | 1.3 | 3.7 | 3.0 | 1.7 | 8.7 | 7.7 |
| Patoran | 4 | 1.0 | 2.0 | 1.0 | 1.7 | 4.3 | 2.0 |
| Tenoran | 4 | 1.0 | 4.0 | 3.3 | 3.0 | 8.0 | 8.7 |
| F439 PPC | 1 | 4.0 | 7.3 | 5.3 | 6.0 | 8.7 | 8.7 |
| Herban (H) | 3 | 1.0 | 2.0 | 1.0 | 1.7 | 8.3 | 6.2 |
| Azak (A) | 10 | 7.0 | 9.0 | 9.0 | 8.3 | 9.0 | 9.0 |
| H + A + Clay | 3 + 10 | 1.0 | 1.7 | 2.0 | 1.0 | 8.7 | 7.7 |
| H + A + Clay | 3 + 7 | 1.0 | 2.3 | 2.7 | 3.7 | 8.7 | 7.0 |
| H + A + Clay | 3 + 5 | 1.0 | 2.7 | 3.0 | 1.3 | 8.7 | 7.3 |
| H + A + Clay | 2 + 5 | 1.0 | 2.7 | 2.7 | 3.0 | 9.0 | 8.3 |
| Emid | 6 | 1.3 | 4.3 | 1.3 | 1.0 | 1.3 | 2.3 |
| Tok E.C. | 4 | 2.0 | 4.3 | 2.3 | 3.0 | 9.0 | 8.7 |
| Tok 3% Gran. | 4 | 3.3 | 8.3 | 6.7 | 8.3 | 9.0 | 9.0 |
| EH 9180 | 1 | 4.3 | 9.0 | 8.3 | 8.0 | 9.0 | 8.7 |
| EH 9180 | 2 | 7.7 | 9.0 | 8.7 | 8.7 | 9.0 | 9.0 |
| DSMA | 6 | 5.3 | 8.3 | 4.3 | 4.3 | 9.0 | 9.0 |
| MSMA | 6 | 4.3 | 8.7 | 1.3 | 2.0 | 8.7 | 9.0 |
| DSMA ≤ 2,4-D | 4 + 1/2 | 3.0 | 7.0 | 3.3 | 2.7 | 9.0 | 9.0 |
| MSMA + 2,4-D | 4 + 1/2 | 1.3 | 6.3 | 1.7 | 1.0 | 9.0 | 7.7 |
| DSMA + Dicryl | 3 + 1 | 1.7 | 5.0 | 2.0 | 2.7 | 8.7 | 8.3 |
| Weed-B-Gone | 1 | 4.0 | 5.7 | 5.3 | 6.7 | 4.7 | 5.3 |

(over)

(continued)

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN ORMOND BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.

(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)

Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Ortho CS 5298 | | 1.3 | 5.0 | 3.0 | 4.3 | 7.7 | 8.3 |
| Banvel D + oil | 1/2 | 2.0 | 5.3 | 6.0 | 7.3 | 9.0 | 8.7 |
| Prometryne + oil | 1 | 1.0 | 3.0 | 2.0 | 1.7 | 8.3 | 7.3 |
| Atrazine + oil | 1 | 1.0 | 2.3 | 2.0 | 2.0 | 9.0 | 6.0 |
| DSMA + oil | 3 | 5.7 | 9.0 | 3.3 | 7.0 | 8.7 | 9.0 |
| DSMA + oil | 1 | 6.0 | 9.0 | 6.7 | 7.0 | 9.0 | 9.0 |
| MSMA + oil | 3 | 3.7 | 9.0 | 1.0 | 2.0 | 8.0 | 8.3 |
| MSMA + oil | 1 | 7.7 | 9.0 | 6.0 | 8.0 | 9.0 | 8.0 |
| MSMA + 2,4-D + oil | 1 + 1/2 | 2.3 | 7.3 | 4.3 | 2.7 | 9.0 | 9.0 |
| Amchem 63-303 + oil | 1 | 5.0 | 9.0 | 7.3 | 8.7 | 9.0 | 8.0 |
| Amchem 63-303 + oil | 4 | 2.3 | 5.3 | 5.3 | 4.0 | 9.0 | 8.7 |
| NF + Phenoxy (P) | | 2.0 | 5.3 | 6.3 | 4.0 | 8.3 | 6.0 |
| NF + Azak (A) | | 7.3 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| NF + P + A | | 1.3 | 2.0 | 4.3 | 3.7 | 7.0 | 6.7 |
| WT 20-5-5 + Atr. | | 1.0 | 1.7 | 4.0 | 3.0 | 8.7 | 4.7 |
| WT 9-7-7 + Atr. | | 1.3 | 1.0 | 7.7 | 3.7 | 9.0 | 8.7 |
| 12-4-8 + Azak (A) | 10 | 5.0 | 4.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| 12-4-8 + A + H | | 2.0 | 4.0 | 6.0 | 6.0 | 9.0 | 9.0 |
| 12-4-8 + Phenoxy + Chloradane + A | | 4.0 | 1.0 | 5.0 | 7.0 | 4.0 | 7.0 |
| NF + Herban (H) | | 1.0 | 2.0 | 3.0 | 7.0 | 9.0 | 9.0 |
| NF + H + A | | 2.0 | 1.0 | 7.0 | 4.0 | 9.0 | 5.0 |

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN TIFGREEN BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.
(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)
Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Banvel D | 1/2 | 7.7 | 9.0 | 8.0 | 9.0 | 8.3 | 8.3 |
| TH 073 H | 4 | 1.7 | 1.7 | 3.0 | 6.3 | 7.0 | 5.7 |
| TD 199-214 | 1 | 5.7 | 8.3 | 2.7 | 5.0 | 7.0 | 6.0 |
| Dacamine 4-D | 1/2 | 8.0 | 7.7 | 3.3 | 5.3 | 7.7 | 8.7 |
| Dacamine-Silvex | 4 | 7.7 | 8.7 | 6.0 | 7.7 | 8.7 | 8.3 |
| Treflan | 4 | 4.0 | 7.3 | 5.0 | 7.7 | 8.3 | 7.7 |
| Mecopex | 2 1/2 | 7.3 | 7.7 | 7.0 | 8.0 | 9.0 | 8.3 |
| Prometone | 2 | 1.7 | 3.0 | 1.7 | 2.3 | 7.0 | 3.3 |
| Benefin | 2 | 6.7 | 7.7 | 6.0 | 7.3 | 9.0 | 9.0 |
| MCP-Dacamine | 1/2 | 6.0 | 7.3 | 8.3 | 7.7 | 8.3 | 9.0 |
| Tordon | 1/2 | 5.7 | 5.3 | 8.7 | 8.3 | 6.0 | 3.3 |
| Dacthal | 10 | 9.0 | 8.7 | 9.0 | 9.0 | 8.3 | 9.0 |
| Scotts Bonus | 2 | 1.7 | 1.7 | 4.0 | 3.3 | 9.0 | 6.0 |
| Dymid | 6 | 4.7 | 6.0 | 4.0 | 6.3 | 7.7 | 5.7 |
| Prometryne | 2 | 2.0 | 2.3 | 1.0 | 3.3 | 7.0 | 3.0 |
| Atrazine | 2 | 2.0 | 2.3 | 2.7 | 5.7 | 8.3 | 6.7 |
| Simazine | 2 | 1.0 | 1.7 | 2.0 | 4.7 | 8.7 | 5.7 |
| Tupersan | 4 | 5.0 | 8.3 | 5.0 | 8.0 | 8.0 | 4.3 |
| Amchem 64-296B | 8 | 4.0 | 7.3 | 8.3 | 8.7 | 8.0 | 7.7 |
| Amchem 63-303 | 8 | 1.0 | 3.3 | 2.0 | 1.7 | 8.3 | 8.3 |
| Patoran | 4 | 1.0 | 2.0 | 1.3 | 3.0 | 5.0 | 2.3 |
| Tenoran | 4 | 2.0 | 3.3 | 3.0 | 5.7 | 9.0 | 7.0 |
| F439 PPC | 1 | 3.0 | 8.0 | 5.0 | 6.3 | 9.0 | 7.3 |
| Herban (H) | 3 | 1.0 | 2.0 | 1.3 | 2.7 | 8.3 | 4.7 |
| Azak (A) | 10 | 7.0 | 8.7 | 9.0 | 8.7 | 9.0 | 9.0 |
| H + A + Clay | 3 + 10 | 1.0 | 1.3 | 1.3 | 5.0 | 8.7 | 5.0 |
| H + A + Clay | 3 + 7 | 1.3 | 2.7 | 3.0 | 4.0 | 8.0 | 7.7 |
| H + A + Clay | 3 + 5 | 1.0 | 3.0 | 2.0 | 4.0 | 8.7 | 8.0 |
| H + A + Clay | 2 + 5 | 1.0 | 2.7 | 3.0 | 4.0 | 9.0 | 8.0 |
| Emid | 6 | 1.0 | 4.3 | 1.0 | 2.0 | 1.7 | 1.3 |

(over)

(continued)

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN TIFGREEN BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.
(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)
Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Tok E.C. | 4 | 1.0 | 4.0 | 2.0 | 5.7 | 9.0 | 9.0 |
| Tok 3% Gran. | 4 | 3.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| EH 9180 | 1 | 5.7 | 9.0 | 8.7 | 9.0 | 9.0 | 9.0 |
| EH 9180 | 2 | 8.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| DSMA | 6 | 5.7 | 8.3 | 3.3 | 4.7 | 9.0 | 9.0 |
| MSMA | 6 | 3.0 | 8.3 | 1.0 | 1.7 | 9.0 | 9.0 |
| DSMA + 2,4-D | 4 + 1/2 | 1.7 | 6.7 | 2.0 | 4.0 | 9.0 | 8.7 |
| MSMA + 2,4-D | 4 + 1/2 | 1.0 | 5.3 | 1.3 | 1.0 | 8.7 | 8.0 |
| DSMA + Dicryl | 3 + 1 | 2.7 | 5.7 | 1.3 | 2.3 | 9.0 | 9.0 |
| Weed-B-Gone | 1 | 3.3 | 5.7 | 4.7 | 6.7 | 6.3 | 7.0 |
| Ortho CS 5298 | | 1.3 | 5.3 | 3.0 | 5.7 | 8.0 | 6.7 |
| Banvel D + oil | 1/2 | 3.0 | 5.7 | 4.7 | 8.0 | 8.3 | 7.3 |
| Prometryne + oil | 1 | 1.0 | 2.7 | 1.3 | 3.0 | 8.0 | 4.0 |
| Atrazine + oil | 1 | 1.0 | 2.3 | 2.3 | 3.3 | 7.3 | 3.0 |
| DSMA + oil | 3 | 4.0 | 9.0 | 4.3 | 5.3 | 8.7 | 8.7 |
| DSMA + oil | 1 | 5.7 | 8.7 | 4.0 | 6.7 | 9.0 | 8.7 |
| MSMA + oil | 3 | 4.0 | 8.0 | 1.0 | 2.0 | 8.3 | 8.7 |
| MSMA + oil | 1 | 7.3 | 8.3 | 5.0 | 7.7 | 9.0 | 8.7 |
| MSMA + 2,4-D + oil | 1 + 1/2 | 2.3 | 6.3 | 2.3 | 3.3 | 8.3 | 7.2 |
| Amchem 63-303 + oil | 1 | 5.3 | 8.7 | 7.0 | 8.3 | 8.3 | 9.0 |
| Amchem 63-303 + oil | 4 | 2.3 | 4.7 | 7.3 | 6.0 | 8.7 | 8.7 |
| NF + Phenoxy (P) | | 1.0 | 5.0 | 4.3 | 5.0 | 7.3 | 6.3 |
| NF + Azak (A) | | 7.7 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| NF + P + A | | 1.0 | 2.0 | 2.7 | 4.7 | 6.3 | 4.3 |
| WT 20-5-5 + Atr. | | 1.0 | 1.3 | 5.0 | 5.3 | 9.0 | 7.7 |
| WT 9-7-7 + Atr. | | 1.0 | 1.0 | 8.0 | 7.7 | 9.0 | 8.3 |
| 12-4-8 + Azak (A) | 10 | 5.0 | 3.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| 12-4-8 + A + H | | 2.0 | 3.0 | 6.0 | 6.0 | 9.0 | 9.0 |
| 12-4-8 + Phenoxy + Chloradane + A | | 4.0 | 1.0 | 7.0 | 8.0 | 5.0 | 4.5 |
| NF + Herban (H) | | 1.0 | 2.0 | 1.0 | 6.0 | 9.0 | 6.5 |
| NF + H + A | | 1.0 | 1.0 | 5.0 | 2.0 | 9.0 | 7.0 |

THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEEDS AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN TIFLAWN BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD, GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.
(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)
Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Banvel D | 1/2 | 6.3 | 8.0 | 8.3 | 9.0 | 8.7 | 8.3 |
| TH 073 H | 4 | 1.7 | 1.3 | 2.7 | 3.7 | 5.7 | 5.3 |
| TD 199-214 | 1 | 4.3 | 8.7 | 2.0 | 4.0 | 7.3 | 5.7 |
| Dacamine 4-D | 1/2 | 7.3 | 9.0 | 3.3 | 5.7 | 8.3 | 8.0 |
| Dacamine-Silvex | 4 | 6.3 | 9.0 | 6.3 | 8.3 | 8.3 | 8.0 |
| Treflan | 4 | 1.7 | 6.7 | 4.3 | 8.0 | 9.0 | 8.3 |
| Mecopex | 2 1/2 | 5.3 | 8.0 | 6.3 | 7.3 | 8.7 | 8.3 |
| Prometone | 2 | 1.7 | 2.3 | 1.7 | 3.0 | 7.7 | 2.0 |
| Benefin | 2 | 5.7 | 7.0 | 6.3 | 7.7 | 8.3 | 9.0 |
| MCP-Dacamine | 1/2 | 9.0 | 6.7 | 5.7 | 8.0 | 8.3 | 9.0 |
| Tordon | 1/2 | 7.7 | 4.7 | 8.3 | 7.7 | 6.0 | 4.3 |
| Dacthal | 10 | 8.3 | 8.7 | 9.0 | 9.0 | 9.0 | 9.0 |
| Scotts Bonus | 2 | 2.3 | 1.3 | 3.7 | 6.0 | 8.7 | 4.2 |
| Dymid | 6 | 4.0 | 5.0 | 4.3 | 6.0 | 8.3 | 4.7 |
| Prometryne | 2 | 2.0 | 2.7 | 1.0 | 5.0 | 8.0 | 3.0 |
| Atrazine | 2 | 1.7 | 3.0 | 3.3 | 7.0 | 8.7 | 7.0 |
| Simazine | 2 | 1.7 | 2.0 | 1.3 | 3.7 | 9.0 | 3.0 |
| Tupersan | 4 | 3.7 | 8.3 | 5.7 | 6.3 | 7.7 | 4.3 |
| Amchem 64-296B | 8 | 4.7 | 6.7 | 8.3 | 6.7 | 8.7 | 7.7 |
| Amchem 63-303 | 8 | 1.0 | 4.0 | 2.0 | 2.0 | 8.3 | 6.7 |
| Patoran | 4 | 1.0 | 2.3 | 1.0 | 1.7 | 6.0 | 1.3 |
| Tenoran | 4 | 1.3 | 3.0 | 3.0 | 2.0 | 8.3 | 7.3 |
| F439 PPC | 1 | 4.0 | 7.0 | 4.7 | 6.3 | 9.0 | 8.8 |
| Herban (H) | 3 | 1.0 | 1.7 | 1.3 | 4.3 | 8.7 | 3.3 |
| Azak (A) | 10 | 5.0 | 8.7 | 8.7 | 8.7 | 9.0 | 9.0 |
| H + A + Clay | 3 + 10 | 1.0 | 1.3 | 1.0 | 1.3 | 8.3 | 3.3 |
| H + A + Clay | 3 + 7 | 1.0 | 1.3 | 2.3 | 5.0 | 9.0 | 5.3 |
| H + A + Clay | 3 + 5 | 1.0 | 2.0 | 2.3 | 5.0 | 9.0 | 6.3 |
| H + A + Clay | 2 + 5 | 1.0 | 1.7 | 1.3 | 4.0 | 9.0 | 5.3 |
| Emid | 6 | 1.0 | 4.0 | 1.0 | 3.0 | 2.7 | 2.0 |

(over)

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THE EFFECTS OF VARIOUS HERBICIDES ON EARLY AND LATE PRE-EMERGENCE CONTROL OF GRASSY AND BROADLEAF WEED S AND ON CONTROL OF NEWLY ESTABLISHED AND WELL ESTABLISHED (MATURE) WEEDS IN TIFLAWN BERMUDAGRASS. TOLERANCE OF ESTABLISHED SOD , GERMINATING TURFGRASS SEEDLINGS AND NEWLY SPRIGGED TURFGRASSES ARE INCLUDED IN THE TABLE.

Ratings: 1 = All sod, turfgrass seedlings, turfgrass sprigs or weeds killed.
9 = No damage to sod, turfgrass seedlings, turfgrass sprigs or weeds.
(Each entry is the average of 3 replications except sprig columns, which are averages of 6 replications.)
Untreated check plots were left on each side of the treated plot for comparisons.

| Herbicide | Rate # ai/ A. | Early pre-emergence weed control | Pre-emergence, Broadleaf weeds after 6 mos. | Control of newly established weeds | Control of well established weeds | Tolerance of established sod | Tolerance of seedlings or sprigs: Sprigs |
|---|---|---|---|---|---|---|---|
| Tok E.C. | 4 | 1.0 | 4.0 | 2.3 | 2.7 | 8.7 | 8.7 |
| Tok 3% Gran. | 4 | 2.0 | 8.3 | 8.3 | 8.3 | 8.7 | 9.0 |
| EH 9180 | 1 | 3.7 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| EH 9180 | 2 | 6.0 | 9.0 | 8.7 | 8.7 | 9.0 | 9.0 |
| DSMA | 6 | 5.7 | 9.0 | 5.3 | 4.7 | 9.0 | 9.0 |
| MSMA | 6 | 4.0 | 7.7 | 1.7 | 1.3 | 8.7 | 7.7 |
| DSMA + 2,4-D | 4 + 1/2 | 2.0 | 7.7 | 3.3 | 1.7 | 9.0 | 8.0 |
| MSMA + 2,4-D | 4 + 1/2 | 1.7 | 4.3 | 1.7 | 1.3 | 9.0 | 8.0 |
| DSMA + Dicryl | 3 + 1 | 2.7 | 3.0 | 1.3 | 2.3 | 9.0 | 8.7 |
| Weed-B-Gone | 1 | 3.3 | 6.0 | 5.7 | 7.3 | 7.0 | 6.3 |
| Ortho CS 5298 | | 1.3 | 4.7 | 4.3 | 4.3 | 8.0 | 6.3 |
| Banvel D + oil | 1/2 | 3.0 | 5.0 | 6.0 | 7.7 | 8.3 | 7.0 |
| Prometryne + oil | 1 | 1.0 | 2.0 | 1.7 | 1.7 | 8.7 | 4.0 |
| Atrazine + oil | 1 | 1.0 | 1.7 | 2.0 | 4.7 | 7.3 | 4.5 |
| DSMA + oil | 3 | 4.0 | 9.0 | 4.0 | 4.0 | 9.0 | 8.3 |
| DSMA + oil | 1 | 5.7 | 9.0 | 6.7 | 5.0 | 9.0 | 9.0 |
| MSMA + oil | 3 | 4.0 | 8.3 | 3.7 | 2.0 | 7.7 | 7.7 |
| MSMA + oil | 1 | 7.3 | 9.0 | 6.7 | 7.3 | 9.0 | 9.0 |
| MSMA + 2,4-D + oil | 1 + 1/2 | 2.3 | 7.3 | 5.0 | 2.7 | 9.0 | 8.7 |
| Amchem 63-303 + oil | 1 | 5.3 | 8.7 | 8.3 | 8.0 | 9.0 | 8.7 |
| Amchem 63-303 + oil | 4 | 2.3 | 5.0 | 5.7 | 6.3 | 9.0 | 7.3 |
| NF + Phenoxy (P) | | 1.0 | 4.0 | 6.0 | 5.3 | 9.0 | 6.0 |
| NF + Azak (A) | | 7.7 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| NF + P + A | | 1.0 | 1.7 | 4.0 | 4.7 | 8.3 | 7.0 |
| WT 20-5-5 + Atr. | | 1.0 | 1.0 | 4.0 | 5.0 | 9.0 | 6.7 |
| WT 9-7-7 + Atr. | | 1.0 | 1.0 | 6.0 | 7.3 | 9.0 | 8.3 |
| 12-4-8 + Azak (A) | 10 | 5.0 | 7.0 | 9.0 | 9.0 | 9.0 | 6.0 |
| 12-4-8 + A + H | | 2.0 | 2.0 | 7.0 | 5.0 | 9.0 | 9.0 |
| 12-4-8 + Phenoxy + Chlordane + A | | 4.0 | 2.0 | 8.0 | 8.0 | 7.0 | 8.0 |
| NF + Herban (H) | | 1.0 | 2.0 | 3.0 | 4.0 | 8.0 | 3.0 |
| NF + H + A | | 1.0 | 1.0 | 2.0 | 3.0 | 8.0 | 2.0 |

# RENOVATION OF GOLF GREENS

## Panel Discussion

Moderator: Mr. James B. Moncrief, Agronomist, USGA Green Section, University of Georgia, Athens, Georgia

Panel Members: Mr. Billy B. Sumrell, Callaway Gardens Golf Courses, Pine Mountain, Georgia

Mr. Palmer Maples, Jr., Charlotte Country Club, Charlotte, North Carolina

Mr. Pete Dye, Golf Course Architect, Delray Beach, Florida

Resume of Panel Discussion by James B. Moncrief:

This paper summarizes the discussion and questions on "Renovation of Golf Greens."

There are many ways to build a green and, no doubt, every method has been used. During the past 10 years, the Green Section has supported a procedure for construction of greens in a specific manner. Most of the panel has had experience in building greens according to the Green Section specifications and each step will be discussed in detail and then the session opened for questions.

During the past five to six years, some 1,200 greens have been built according to this method, which has proven to be both practical and successful. There are, however, some questions that continue to arise. This is probably due to the lack of understanding of the significance and importance of each single step in this process. There have been many failures and it is felt that the procedure was only partially followed. This method was

printed in the 1960 GREEN SECTION RECORD and was reprinted in the November, 1965 RECORD, and is called "The Green Section Specifications for a Putting Green."

The sub-grade should be the same as the finished grade of the putting surface with a plus or minus of 1 inch tolerance. Also, the sub-grade should be constructed 14 inches below the finished putting-green surface. Be sure that the sub-grade is compacted to prevent future sinking or depressions in the sub-grade, which would prevent good drainage.

In most cases, 4-inch diameter tile is sufficient and should be placed so the water will not have to travel more than 10 feet. The pattern of the tile can be varied, but usually the herringbone or gridiron arrangement fits most situations. Trenches should be uniformly dug into the sub-grade with a minimum fall of .5%. It is seldom necessary for the grades to be steeper than 3 to 4%. There are about four or five different types of tiles which can be used, such as plastic, concrete, clay, or perforated asphalt paper composition. Where the tiles are joined, 1/4 inch space should be allowed for water to enter. The top of the tile should be covered with asphalt or fiberglass composition material. This prevents gravel from entering from the top. It is advisable to lay the tile on 1/2 to 1 inch of gravel to prevent washing of silt and soil into the tile. After the tile has been placed, then the trenches can be filled with gravel. The preferred gravel is a washed pea gravel or an aggregate similar in size. Larger-sized gravel or stone can be used, but it is important that the size change between the coarse material and the

succeeding one above is not too great or the smaller particles overlying the larger will wash down. If you use 1/4-inch aggregate, which is about 6 mm. in size, then the overlying coarser sand should not be less than 1 mm. in diameter. When the pea gravel is in place, it should be a minimum of 4 inches in a uniform thickness. This depth can be judged either by 4-inch pots or by grade stakes placed throughout the green. Immediately above this layer of gravel, place 1 1/2 to 2 inches of coarse sand and the error in thickness of gravel and sand should not be more than plus or minus .5 inch.

When the gravel and sand are in place, ring the area which will be used as the collar or apron of the greens. Some golf courses are fortunate enough to use material similar to that used in their green mixture. After the green has been ringed, place the top-soil mixture at least 12 inches thick over the layer of sand. The soil mixture should meet certain physical requirements according to methods laid down by this 10-year study. This should be done by a competent laboratory, following certain soil-physics principles.

The soil mixture should be thoroughly mixed off site, transported to the green, and dumped on the edge of the green. It can be spread uniformly with a light crawler tractor or by some other means which will not disturb the base material. This soil mixture should be firmed uniformly and saturated with water to further settle it. This will reveal any water-holding epressions, which might have been built into the green. After the soil mixture is in place, then fertilizer and lime can be worked into the soil and the seedbed should be sterilized before planting.

The main question which usually arises from this method of construction is the layer of sand. Past experience has shown that a layer of sand in the soil reduces movement of water. Due to surface tension, the water does not move until sufficient gravitational force accumulates and then the tension force is overcome and water drains through the sand and gravel. This sand layer is used to increase the water-holding capacity of a very open textural soil. If irrigation is stopped just prior to the soil reaching the saturation point, no drainage occurs, but in case of a heavy rain, the soil will not hold too much water. The soil overlying a sand layer can be made to hold more water than it would without the gravel layer, but it cannot be made to hold enough water to be harmful to the plants' growth, provided the soil has been mixed according to laboratory recommendations.

Building greens by this method should not affect the design or the artistic ability of the architect in any way. It is advisable that the greens are not built according to this method unless all steps are followed.

# LANDSCAPING AND MAINTENANCE AROUND THE CLUB HOUSE

Mr. T. M. Baumgardner, Landscape Architect and Vice President,
Sea Island Company, Sea Island, Georgia

The golf course superintendent all too often inherits one of two types of clubhouse grounds:

(1) If the club is a new one, the usual situation is that construction costs have exceeded the budget and there is no money left for the services of a landscape architect or landscape nurseryman to either plan or plant the grounds.

(2) If the clubhouse is an old or remodeled one, the typical situation is that the club and grounds have grown like topsy over the years and have become a maze of unrelated walks, roads, cart paths, and parking areas with a sprinkling hodge-podge of unrelated and overgrown plantings.

## Planning

Regardless of the existing conditions, landscaping of the clubhouse grounds should start like any other well-planned project, with:

First - the best advice obtainable,

Second - most careful thought, observation, and consideration of all the problems and possibilities involved,

Third - the drawing to scale on tracing paper of a comprehensive plot plan showing buildings, walks, drives, service and parking areas; also, existing trees and plantings surrounding greens, tees, and fairways and any other physical features. Several

black-lined prints of this basic plot plan should then be secured so that studies of proposed revisions and new plantings can be superimposed on the prints, and

Fourth - Very careful staking, restudying, and restaking on the ground of any new circulation patterns and/or new plantings.

General Design Principles

The following general principles of landscape design should be adhered to:

1. Added shrub or tree plantings should be located carefully and after study from all viewpoints to enhance the general appearance of the building complex and grounds.

2. In general, simple lines and not overly complicated or fussy plantings are preferable.

3. Tree plantings should, in general, blend harmoniously with the surrounding native trees or wooded areas.

4. Screen out service areas and unsightly views wherever practical with simple plantings of enduring shrubs or trees.

Primary Trees

Any landscape planting should begin around, and with, trees. If you are blessed with good existing trees and surrounding wooded areas, these should first be properly pruned, thinned, fertilized, and put in good order. Then additional primary trees can be added for the purpose of framing the

clubhouse itself, breaking long and/or complicated roof lines, screening of objectionable views and areas, and framing of desirable views and vistas, as well as to provide shade patterns and foliage masses where indicated. Primary trees in the far South should be predominantly evergreen and should be chosen for their year-round attractiveness, hardiness, longevity, and ease of maintenance.

Secondary Trees

After the primary trees have been taken care of, groups of smaller trees can be introduced, chosen for their flowering or fruiting habits or for their colorful foliage at certain seasons of the year. Colorful trees are usually better planted in groups of several, where they will provide a real show rather than a spotty appearance. If the scheme of walks and drives is a formal one, in some instances, such trees can be effectively planted in formal rows to enhance the design. Flowering trees and shrubs generally are more effective if planted where they will be seen against a background of green foliage.

Care should be taken in planting trees so that as they develop, they will not obscure, but enframe, desirable views and vistas. Trees and shrubs can often be used to partially screen from view, and relieve the monotony of, large parking areas, which are a part of every modern club.

Foundation Plantings

In planning the usual foundation plantings around the clubhouse, keep in mind that the plantings should tend to accentuate and enhance the good

architectural lines, and obliterate the bad features. Here again, plantings should generally be kept simple, using few varieties that will stay reasonably well within the desired bounds and heights desired without the necessity of too frequent or too severe pruning. Fairly large groupings of the same variety are more desirable than a spotty planting of many varieties. Height accents can make or break the planting and should be carefully studied, either on the job or from photographs. Evergreen plants with attractive, year-round appearance are preferred here. Flowering shrubs often do not have strong enough foliage and are used better in outlying groups.

Shrub Groupings

These can often be effective in directing foot or cart traffic in desired patterns. The areas around the starting tees and walks from the clubhouse to the first tee should be made as attractive as possible to create that all-important first good impression.

Annual and Perennial Flowers and Bulbs

Last, but not least, we come to the "frosting on the cake," consisting of carefully located and selected plantings of colorful annual and perennial flowers and bulbs for seasonal splashes of vivid color.

If basic shrub and hedge plantings have been established, flowering plants can be planted in well-prepared borders, in front of these plantings, where orientation is right for the best sun and shade exposure for the particular plants involved.

In the event funds are not sufficient for adequate shrub plantings, then temporary beds of colorful annuals can be established without great expense and can be very effective. Here again, use fairly large groupings of one variety or color and be sure that colors will be harmonious.

Maintenance

In conclusion, be careful not to plant more than you can reasonably expect to be able to properly maintain. Neatness and an atmosphere of orderliness are cardinal factors of good landscape design and should be constantly kept in mind. Beds should be kept neatly edged, weeded, cultivated, mulched, and pruned as well as watered and fertilized regularly.

Appearance

The appearance of the clubhouse and the provision and maintenance of an attractive landscape picture should be just as important a responsibility of the golf course superintendent as are the greens, tees and fairways. Nothing will contribute more to the pleasure and pride of all the club members, both social and playing members, than beautifully landscaped grounds. A fine country club can be a real community asset and a stimulus to quality suburban development.

Responsibilities

The golf course superintendent (who really wants to get ahead), as I am sure you all realize, is the one who does not shirk responsibilities, but who takes on as many projects as his job will permit. In that way, he may become that "Indispensable Man" around the golf club, which will inevitably be reflected in his paycheck and in his prestige.

# ESTABLISHING COLOR ON THE GOLF COURSE

Mr. T. G. Williams, Jr., Head,
Extension Landscape Department, Extension Service, Athens, Georgia

In golf-course design, as in other landscape developments, color is an important factor. A golf course, with its standard elements of lush greens, water, white sand traps, native pines, hardwoods, and rolling topography, presents a splash of nature's color in its finest form. The golfer himself and spectators provide much color, with the gaudy dress and costumes seen on many courses. Golf courses seem to draw the "flashy" dresser.

A golf course is one of the best examples of man-made design imposed upon nature without the telltale marks of bulldozers, rigid retaining walls, unattractive structures, utility poles and acres of paving for vehicular traffic.

When color is added in the form of plant materials, every effort should be made to keep harmony with nature. Native plants, with naturalistic groupings, should be used as much as possible. Formality and straight-line plantings should be avoided in most situations.

Individual flowering trees may be added to wooded areas along fairways. Mass plantings of flowering shrubs are more practical from the maintenance standpoint, as well as more aesthetically pleasing. As a general rule, flowering plants on a golf course are viewed from great distances and large masses are in better scale.

However, plants used for mass color effects or individual specimens should be planted no closer than 20 to 25 feet from the edge of the tree line of fairways.

Maintenance is a most important factor, and plants that need frequent spraying, watering, and pruning should be avoided. Native plant materials certainly conform to these requirements better than introduced, exotic plants.

Plants native to a given area and hardy, introduced materials, such as forsythia, quince, and spirea, add color to a golf course.

In the spring, dogwood, redbud, crab, forsythia, quince, spirea, native azaleas, rhododendron, mountain laurel, and Grancy-greybeard, are excellent plants for color with low-maintenance requirements. Of course, cultivated azaleas may supply outstanding color if additional maintenance facilities are available.

During the summer months, color may be provided by crapemyrtle, oak-leaf hydrangea, and the red-leaved Japanese maple, and purpleleaf plum.

In the fall and winter seasons, many plants provide outstanding fall color that will brighten up an otherwise dull season.

Native sumac in masses is good for fall color with low maintenance. Dogwood, sourwood, maple, oak, sassafras, and ginkgo have extremely good fall color.

Some of the hardy, berry-producing shrubs and trees, such as pyracantha and holly, add good foliage and red color in the winter months.

Even in the dreary winter months, a golf course can be colorful with winter greens, white sand, shadow patterns, and evergreens to offset the dormant grasses and trees.

# ATTENDANCE ROSTER

| Name | Affiliation | City |
|---|---|---|
| **ALABAMA** | | |
| Anderton, Wayne J. | Yielding's, Inc. | Birmingham |
| Carnes, Robert H. | City of Birmingham | Birmingham |
| Dickey, George, Jr. | Woodley Country Club | Montgomery |
| Dickinson, Thomas E. | Willow Point Golf & Country Club | Alexander City |
| Edmondson, Carl J. | Bonnie Crest Country Club | Montgomery |
| Godwin, George E. | Country Club of Birmingham | Birmingham |
| Latta, J. D. | City of Birmingham | Birmingham |
| Lawrence, Doyle | Maxwell Air Base | Montgomery |
| Ledbetter, Bob | Green Valley Country Club | Birmingham |
| Moses, Cecil C. | Montgomery Country Club | Montgomery |
| Nelson, W. F. | Green Valley Country Club | Birmingham |
| Scott, Jim | Anniston Country Club | Anniston |
| **COLORADO** | | |
| Cochran, John N. | Golf Course Architect | Denver |
| **FLORIDA** | | |
| Allen, Paul E. | Paul E. Allen Company | Palm Harbor |
| Billett, Robert W. | Vineland Chemical Company | Hialeah |
| Bryan, Joe | Zaun Equipment, Inc. | Jacksonville |
| Bryant, Al | North Palm Beach Country Club | North Palm Beach |
| Caswell, Barry | Melbourne Golf & Country Club | Melbourne |
| Clarke, Stan | LaGorce Country Club | Miami Beach |
| Cobb, J. C. | Chorde Hall Golf Course | Sebring |
| Deatherage, A.M. | City of Daytona Beach | Daytona Beach |
| Dilsaver, Carl E. | Miami Shores Golf Course | Miami Shores |
| Dowling, Elmo | Rainy Sprinkler Sales | Gainesville |
| Ervin, Eddie, Jr. | Turfgrass Times | Jacksonville Beach |
| Fortner, J. Leroy | Superior Fertilizer & Chemical Co. | Sarasota |
| Hartig, Ben | North Palm Beach Country Club | North Palm Beach |
| Hartwig, Lester H. | Amchem Products, Inc. | Tallahassee |
| Hines, Reuben P. | Sunset Golf Course | St. Petersburg |
| Horn, G. C. | University of Florida | Gainesville |
| James, Bryson L. | Hercules, Inc. | Orlando |
| Johnson, Lawrence | Buckner Industries, Inc. | Jacksonville |
| Jones, Ralph F. | Wilson & Toomer Fertilizer Co. | Jacksonville |
| Lazaroff, Ted | Sara-Bay Country Club | Sarasota |
| Linderman, Harvey | Mountain Lake Corporation | Lake Wales |

| Name | Affiliation | City |
|---|---|---|
| FLORIDA (Cont.) | | |
| Mascaro, Charles | Florida Milorganite, Inc. | Miami |
| McKinney, Robert C. | P.G.A. National Golf Club | Palm Bch. Gardens |
| Nixon, Rufus | Eglin Golf Course | Eglin A.F. Base |
| Noggle, J. C. | American Potash Institute | Gainesville |
| Nutter, Gene C. | Turfgrass Times | Jacksonville Bch. |
| Ousley, J.E., Sr. | Ousley Sod Company | Pompano Beach |
| Paguaga, Felix C. | Royal Palm Yacht & Country Club | Boca Raton |
| Perry, Bill, Jr. | Winter Haven Golf Club | Winter Haven |
| Perry, Bill, Sr. | Winter Haven Golf Club | Winter Haven |
| Rigdon, Charles H., Jr. | U. S. Air Force | Eglin A.F. Base |
| Schmeisser, Otto | Gulfstream Golf Club | Delray Beach |
| Shepard, Willie | Riviera Country Club | Daytona Beach |
| Smith, Carl K. | Palm Beach Country Club | Palm Beach |
| Sprogell, Frank T. | Paul E. Allen Company | Palm Harbor |
| Stephens, Larry | Russell Daniel Irrigation Company | Havana |
| Taylor, Bob | Orkin Exterminating, Inc. | Jacksonville |
| Thompson, Ronald E. | Standard Sand & Silica Company | Davenport |
| Thompson, Roy | Fort Walton Beach Golf Course | Fort Walton Beach |
| Todd, Leamon W. | Sebring Golf Course | Sebring |
| Turcotte, Paul | City of Miami Lejune Golf Course | Miami |
| Walker, Winston G. | City of Fort Walton Beach | Fort Walton Beach |
| Wallace, David L. | Mackle Company | Sanford |
| Williams, James | City of Daytona Beach | Daytona Beach |
| Yuzzi, Joseph G. | Biltmore of Granada Golf Courses | Coral Gables |
| GEORGIA | | |
| Andrews, D. P. | Houston Lake Country Club | Perry |
| Armstrong, Eugene S. | Cowan Supply Company | Atlanta |
| Baumgardner, T. M. | Sea Island Company | Sea Island |
| Beck, E. M. | Coastal Plain Experiment Station | Tifton |
| Bolton, J.E. | Georgia Tech Athletic Association | Atlanta |
| Boswell, Fred W. | City of Atlanta | Atlanta |
| Brasington, Chuck | Town and Country Club | Blakely |
| Brodie, Bill B. | Coastal Plain Experiment Station | Tifton |
| Brooks, Jerry W. | Peachtree Golf Club | Atlanta |
| Burnam, Joe | Mystery Valley Golf Course | Lithonia |
| Burton, Glenn W. | Coastal Plain Experiment Station | Tifton |
| Carter, R. L. | Coastal Plain Experiment Station | Tifton |
| Clements, Lee | Coastal Plain Experiment Station | Tifton |
| Cochran, Bin | Johns-Manville Corporation | Atlanta |
| Cottle, Donald H. | Dixie Turf Farms | Ty Ty |

| Name | Affiliation | City |
|---|---|---|
| **GEORGIA (Cont.)** | | |
| Derrickson, M.E. | Cherokee Golf & Country Club | Cedartown |
| Dexter, Lew | Armed Forces Golf Course | Augusta |
| Douglas, Lawson E. | Augusta Golf Course | Augusta |
| Ebright, R. C. | City of Atlanta | Atlanta |
| England, Henry G. | City of Atlanta Parks | Atlanta |
| Evans, Rufus | Dixie Turf Farms | Ty Ty |
| Evans, Thurlow | Stovall and Company | Atlanta |
| Few, Joseph C. | | East Point |
| Flanders, C. Dyson | Sea Island Company | Sea Island |
| Fussell, George T. | Valdosta Country Club | Valdosta |
| Goodwin, Wayne | Cowan Supply Company | Atlanta |
| Green, Doc | Okefenokee Country Club | Waycross |
| Hassell, Grady T. | Lawn and Turf, Inc. | Conyers |
| Hayden, Harold H. | Cowan Supply Company | Atlanta |
| Holden, Preston L., III | Vineland Chemical Company | Smyrna |
| Howell, D. B. | Athens Country Club | Athens |
| Huskey, Hank, Jr. | Cowan Supply Company | Atlanta |
| Inglis, Hugh A. | Extension Service, Seed Certification | Athens |
| Jensen, E. Ray | Southern Turf Nurseries | Tifton |
| Johnson, Dewey W. | Lawn and Turf, Inc. | Conyers |
| Johnson, Troy | Coastal Plain Experiment Station | Tifton |
| Jordan, Alvin E. | Mystery Valley Golf Course | Lithonia |
| Katsekis, James G. | Orkin Exterminating Company | Atlanta |
| Kincaid, E. E. | Evans Implement Company | Atlanta |
| King, Frank P. | Coastal Plain Experiment Station | Tifton |
| King, George H. | Cotton Commodity Commission | Athens |
| Kozelnicky, George M. | University of Georgia | Athens |
| Kraft, Art | Forest Heights Country Club | Statesboro |
| Lambert, Jimmy | Evans Implement Company | Atlanta |
| Lambert, Paul | Stovall and Company | Atlanta |
| Land, Harold N. | Glen Arven Country Club | Thomasville |
| Langston, M. L. | Houston Lake Country Club | Perry |
| Lawrence, Lester | MOOM Golf Course | Fort Benning |
| Lawson, Lee | Lafayette Golf Course | Lafayette |
| Lee, Harold E. | City of Atlanta Parks Dept. | Atlanta |
| Lee, Herman R. | City of Savannah | Savannah |
| Mallard, John | Vidalia Country Club | Vidalia |
| Mason, Jack D. | Mason's Turfgrass Nursery | Augusta |
| McConnell, Don | Stovall and Company | Atlanta |
| McCoy, Robert C. | Fort Benning Country Club | Fort Benning |
| McGee, Tom | Soil Conservation Service | Cordele |
| McGuire, Bob A. | Willmar Manufacturing, Inc. | Decatur |

| Name | Affiliation | City |
|---|---|---|
| GEORGIA (Cont.) | | |
| McKendree, Marion | Sea Island Golf Course | Sea Island |
| McNally, John F. | Material Service Company | Atlanta |
| Miller, Jerry F. | City of Atlanta | Atlanta |
| Moncrief, James B. | U.S. Golf Association | Athens |
| Monk, Samuel E. | City of Savannah | Savannah |
| Mulford, Walter W. | Crescent Lake Country Club | Attapulgus |
| Newton, J. P. | Georgia Experiment Station | Experiment |
| Patten, Robert | Patten Seed & Turfgrass Company | Lakeland |
| Pendley, Jerry B. | City of Atlanta | Atlanta |
| Perryman, Leslie R. | Swainsboro Golf Club | Swainsboro |
| Poss, Bob | Russell Daniel Irrigation Company | Tifton |
| Powell, Jerrel B. | Coastal Plain Experiment Station | Tifton |
| Rampley, K. C. | City of Atlanta | Atlanta |
| Roquemore, Bill | Patten Seed & Turfgrass Company | Lakeland |
| Savage, Hurley | Augusta Country Club | Augusta |
| Shields, E. A. | Standard Club | Atlanta |
| Skinner, Albert | Coastal Plain Experiment Station | Tifton |
| Smith, Gerald | Extension Service | Athens |
| Smith, Joe W. | Lawn and Turf, Inc. | Conyers |
| Smith, Randolph W. | Jacobsen Manufacturing Company | Atlanta |
| Storey, James | Warm Springs Fdn. Golf Course | Warm Springs |
| Sumrell, Billy B. | Callaway Gardens Golf Courses | Pine Mountain |
| Swenson, J. Elmore | Fort Benning Country Club | Fort Benning |
| Warnecke, Mel J. | East Lake Country Club | Atlanta |
| Washburn, H.G., Jr. | Jenks-White Seed, Advance Seed | Atlanta |
| Watson, T.W. | City of Atlanta | Atlanta |
| Weaver, J. B. | University of Georgia | Athens |
| Wells, Homer D. | Coastal Plain Experiment Station | Tifton |
| White, Don | Southern Turf Nurseries | Tifton |
| White, H. G. | City of Atlanta | Atlanta |
| Wilcox, David B. | Evans Implement Company | Atlanta |
| Yelverton, J.L., Jr. | Akron Irrigation Company | Tifton |
| ILLINOIS | | |
| Walling, Robert | Roseman Mower Corporation | Glenview |
| INDIANA | | |
| Dye, Pete | Golf Course Design | Indianapolis |
| Riddell, Homer | Elanco Division, Eli Lilly | Indianapolis |

| Name | Affiliation | City |
|---|---|---|
| **KANSAS** | | |
| Rogers, C.D. "Buck" | Rogers Manufacturing Co., Inc. | Olathe |
| **KENTUCKY** | | |
| Posejpal, George J. | American Air Filter Company | Louisville |
| **MINNESOTA** | | |
| Rose, Russ | Ryan Equipment Company | St. Paul |
| **NEW JERSEY** | | |
| Cleary, Leo | W.A. Cleary Corporation | New Brunswick |
| **NORTH CAROLINA** | | |
| Burgin, George | Quail Hollow Country Club | Charlotte |
| Eagles, J.C., Jr. | Happy Valley Golf Club | Wilson |
| Lineberger, Abel R. | Gaston Country Club | Gastonia |
| Mann, W. E. | Camp Lejune | Camp Lejune |
| Maples, Palmer, Jr. | Charlotte Country Club | Charlotte |
| McKenzie, Lloyd T. | Pinehurst Golf Course | Pinehurst |
| O'Donnell, E. J. | Willow Haven Country Club | Durham |
| Sutton, W. C. | U.S. Government | Goldsboro |
| **OHIO** | | |
| Schauer, Richard L. | Diamond Alkali Company | Cleveland |
| **PENNSYLVANIA** | | |
| Mascaro, Tom | West Point Products Corporation | West Point |
| **SOUTH CAROLINA** | | |
| Ripley, C. R. | Anderson Country Club | Anderson |
| Skeen, Jimmy | Fountain Inn-Simpsonville C. C. | Fountain Inn |
| Warko, John R. | Litchfield Country Club | Pawleys Island |
| Willimon, Charles P. | Bonnie Brae Golf Club | Greenville |
| **WISCONSIN** | | |
| Wilson, Charles G. | Milwaukee Sewerage Commission | Milwaukee |

TWENTIETH ANNUAL
SOUTHEASTERN TURFGRASS CONFERENCE
Tifton, Georgia

April 11-13, 1966

TOTAL REPRESENTATION FROM EACH STATE:

| | |
|---|---|
| Alabama | 12 |
| Colorado | 1 |
| Florida | 45 |
| Georgia | 89 |
| Illinois | 1 |
| Indiana | 2 |
| Kansas | 1 |
| Kentucky | 1 |
| Minnesota | 1 |
| New Jersey | 1 |
| North Carolina | 8 |
| Ohio | 1 |
| Pennsylvania | 1 |
| South Carolina | 4 |
| Wisconsin | 1 |
| TOTAL | 169 |