

Bentgrass in Florida

This article is a summary of the "Bentgrass in Florida" seminar which was held in West Palm Beach, Florida on October 8, 1987, at the JDM, Country Club (Mr. Carl McKinney, Superintendent). The seminar was sponsored by the Florida Golf Course Superintendents Association and was coordinated by Mr. Tom Burrows, CGCS, Turtle Creek Country Club, Tequesta, Florida. Dr. Paul M. Alexander, Golf Technology Department, Horry-Georgetown Technical College, Conway, South Carolina, assisted in the development of the Bentgrass survey questionnaire and was responsible for the compilation of responses (see below).

The purpose of the seminar was to provide an open forum for the discussion of the facts and fallacies concerning the use of Bentgrass on Florida golf courses. Moderator for the day long session was Dr. Max Brown, turf consultant. Audience participation along with superintendent panelists and invited guest speakers, was encouraged to insure coverage of the issues at hand. The superintendent panelists and guest speakers included:

SUPERINTENDENT PANELISTS:

Buddy Carmouche, CGCS, has been a golf course superintendent for 15 years and is now superintendent at Hole-In-The-Wall GC, Naples. He has a B.A. in Education from Nichols State University and an A.S. in Golf Operations from Lake City Jr. College.

Paul Crawford has been superintendent of Palm Beach CC for the past 8 years. Prior to that he spent two years at Jupiter Hills CC, Jupiter. He holds an A.S. degree in Turf Management from Michigan State University.

Richard Herr has been superintendent at Jupiter Hills CC for the past 7 years. Prior to that he was Pro-Superintendent for 15 years at Rolling Hills in Logansport, Indiana.

John Lapikas has spent 8 years as superintendent of Annandale CC, Jackson, Mississippi, where he hosted the 1986 USGA Mid-Amateur Tournament. Prior to that,

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he was superintendent of Lost Tree Club, West Palm Beach, for 3 years. He has an A.S. degree in Turf Management from Penn State University.

Luke Majorki has been superintendent at PGA National GC, Palm Beach Gardens, for the past 5 years after having served 4 years as assistant superintendent there. Prior to that he was Owner/Pro/Superintendent in Decatur, Indiana from 1957-1979.

George Ord, CGCS, has been superintendent of Pipers Landing and Harbour Ridge CC in Stuart since 1981. Prior to 1981, George served as superintendent for private country clubs in the Pennsylvania area for 21 years.

Dick Berbeten is presently superintendent at Isleworth G & C C, Orlando. Prior to that he served as superintendent at three separate clubs in the Wisconsin area. He received his education at the University of Wisconsin.

Tom Werner is presently superintendent at The Loxahatchee Club of Jupiter. Prior to moving to Florida, Tom served as superintendent at Lochinvar GC, Houston, and Colonial CC, Ft. Worth. He holds a B.S. in Agronomy from Texas A&M University.

TURFGRASS SPECIALISTS:

Paul Alexander, Ph.D., is presently Professor of Golf Course Technology at Georgetown Tech College, Conway, S.C. He received his B.S. at California State Poly-

technic College, and his M.S. and Ph.D. from Ohio State University. For 10 years Dr. Alexander was a Research Pathologist at Clemson University. He has also held positions with the USGA Greens Section, been Director of Education for the GCSAA, and spent 5 years as Training Director for ChemLawn Corporation, Atlanta.

Warren Bidwell has been a golf course superintendent for 51 years. He spent 33 years as superintendent in the Cincinnati area. He served at the Congressional Club in Washington, D.C., and also the Olympia Fields Club in Chicago. He has hosted several major PGA tournaments and is highly respected for his working knowledge of his profession. Mr. Bidwell currently serves as International Consultant for Tee-2-Green Corporation, Oregon.

Max A. Brown, Ph.D., has a B.S. degree in agronomy from Iowa State University. He earned his Master of Science in turfgrass management and a Ph.D. in soil chemistry from the University of Florida. He was an agronomist for eight years with Robert Trent Jones, Inc. as well as a research chemist for National Fertilizer Development Center, TVA. He was the 1982 recipient of the Florida Turfgrass Association "Wreath of Grass" Award and is now serving as President of that association. He is currently a Consulting Turfgrass Agronomist and President of Liquid Ag Systems, Inc.

Joe Duich, Ph.D., received his B.S., M.S., and Ph.D. from Penn State University. He has been a Professor of Turfgrass Sciences at Penn State since 1967. His research accomplishments include the development of Penn Cross Bent, Penn Eagle and Penn Links Bentgrass, as well as Penn Star Bluegrass, Penn Fine Ryegrass, and Penn Lawn Fescue. He has received the Distinguished Service Award from the Golf Course Superintendents Association of America, the Outstanding Service Award from the USGA Greens Section, the Service Award from Pennsylvania Turfgrass Council, and is listed in Who's Who in the East and Who's Who in Technology Today. He is a Director of the Musser Turfgrass Foundation and received a Fellowship from the American Society of Advanced Sciences.

Robert A. Dunn, Ph.D., has served as extension nematologist for the Institute of Food and Agricultural Sciences for the University of Florida since 1975. Many of his research activities have been directed toward improved diagnosis and management of nematode problems. He earned his Ph.D. from Cornell University.

John Foy has been USGA Greens Section Agronomist for South Florida for the past 2 years. He received his B.S. in Turf Management and his M.S. in Plant Protection and Pest Management from UGA. He spent 3 years in private industry field research and development.

T.E. Freeman, Ph.D., is professor of Plant Pathology at the University of Florida. He joined the institution after receiving his Ph.D. degree from Louisiana State University in 1956. Most of his professional career has been spent studying the cause, factors affecting occurrence, and control of disease affecting grasses in the southern United States. He is the 1985 recipient of the Florida Turfgrass Association "Wreath of Grass" Award and is

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presently serving as coordinator of the turf research program at the University of Florida.

Monica Juhnke, Ph.D., is an Assistant Professor of Plant Pathology for IFAS for the University of Florida in the Ft. Lauderdale Research and Education Center. Her research interests include the development of biological control agents via bacterial colonizers of grass roots. She received her M.S. and Ph.D. from Montana State University.

Jeff Krans, Ph.D., has been teaching Turfgrass Management at Mississippi State University for the past 15 years. He earned his Ph.D. from Michigan State University. His current research is on plant breeding activity in heat tolerance of creeping bentgrass.

Charles Peacock, Ph.D., is currently Associate Professor of Turfgrass Science at North Carolina State University. His research interests are in the area of turf nutrition and stress physiology. Prior to moving to North Carolina, he was Senior Agronomist with Nutri-Turf, Inc., and Associate Professor in the Ornamental Horticulture Department at the University of Florida for 5 years. He has published over 130 research and popular articles on turfgrass management and given over 140 presentations at workshops, seminars, and short courses.

J.M. Vargas, Jr., Ph.D., has been a Professor of Botany and Plant Pathology at Michigan State University for the past 19 years. He has published over 150 articles on turfgrass diseases and related subjects. His research accomplishments include the discovery of the first bac-

terial disease of turf, the first resistance to turfgrass fungicides, and the cause of the black layer.

Charles "Bud" White is currently an Agronomist with Lesco, Inc. Prior to that he served the USGA for 8 years as Manager of the entire Southeastern United States area including Florida. He received his B.S. from Tennessee Tech and his M.S. in Turf Management from Clemson. He is a Certified Professional Agronomist.

*

Following his introductory remarks, Mr. Burrows announced the attendance figure of 107 persons which included 70 superintendents, 8 club officials, 9 technical/sales representatives, 15 turf specialists, and 5 press/staff personnel. GCSAA certified superintendents received credit for attending this seminar.

Moderator Brown: Dr. Alexander will now present the results of the Bentgrass survey questionnaire. (75 had been mailed and 40 responses were received and compiled).

Question #1 — In which month do you oversee Bermuda greens with Bentgrass? Ranged from September to January (if split applications included); for non-split applications (17 total), months were:

September	-	1 (4.5%)	
October	-	11 (50.0%)	> 90.9%
November	-	9 (40.9%)	
December	-	1 (4.5%)	

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Question #2 - Do you split overseeding applications?

Yes	- 22 (55.0%)	Months of application:	
No	- 17 (42.5%)	Earliest	- September
All Bent	- 1 (2.5%)	Latest	- January

Types of Splits (1 person stated 3 or 4)

2 applications	- 13 (56.5%)	Ranged from 1½ + 1½ to	
3 applications	- 7 (30.4%)	3 + 3 + 4 to	
4 applications	- 3 (13.0%)	2 + 2 + 2 + 2	

Non-Split Rates

3 lbs.	- 3 (17.6%)	Earliest	- September
5 lbs.	- 3 (29.4%)	Latest	- December
5¾ lbs.	- 1 (5.9%)		
6 lbs.	- 1 (5.9%)		
7 lbs.	- 1 (5.9%)		
8 lbs.	- 1 (5.9%)		
10 lbs.	- 1 (5.9%)		
3 to 4 lbs.	- 1 (5.9%)		
3 to 5 lbs.	- 1 (5.9%)		
4 to 5 lbs.	- 1 (5.9%)		
4 to 6 lbs.	- 1 (5.9%)		

Question #3 - Procedures used in overseeding?

Vertical Mowing (1 to 7 times)	- 34 (27.6%)
Reduce Nitrogen	- 24 (19.5%)
Topdress (1 to 3 times)	- 21 (17.1%)
Scalp with Mower	- 12 (9.8%)

Apply Fungicides	- 10 (8.1%)
Spike (1 to 4 times)	- 6 (4.9%)
Brush, Mat or Drag	- 5 (4.1%)
Fertilize (High P and/or K)	- 4 (3.2%)
Aerify	- 4 (3.2%)
Apply Herbicide	- 1 (0.8%)
Apply Insecticide	- 1 (0.8%)
Apply Nematicide	- 1 (0.8%)

Question #4 — Mowing height/frequency?

Cool Weather		Summer Months	
Height Range - 3/8" down to 3/32"		5/16" down to 1/8"	
Frequency - 6 to 7 days/week		6 to 7 days/week	

Several respondents mentioned that walk mowing was done during peak play periods and/or during times of turf stress (cold/heat/drought). In addition, use of daily clean-up cut around perimeter of green was restricted to good growing conditions only.

Question #5 — Major problems with Bentgrass?

Competition from Bermudagrass	- 13 (11.8%)
Slow/Poor Establishment of Bent	- 11 (10.0%)
Pythium/Other Diseases	- 10 (9.1%)
Poor/Restricted/No Drainage	- 10 (9.1%)
High Fall Temperatures	- 9 (8.2%)
Wilt/Syringing Needs	- 9 (8.2%)
High Summer Temperature	- 8 (7.3%)
Poor Transition in Fall, Spring	- 8 (7.3%)
Traffic Wear/Ball Marks	- 7 (6.4%)
Labor/Chemical Costs	- 5 (4.6%)
Member Demands/Education	- 4 (3.6%)
Slow Healing of Damage	- 3 (2.7%)
Lack of Sleep/Supt. Stress	- 3 (2.7%)
Small Greens	- 2 (1.8%)
Loss of Bent	- 2 (1.8%)
Percolation Rate too High	- 2 (1.8%)
Humidity/Drought Stress	- 2 (1.8%)
Poor Crew Morale	- 1 (0.9%)
Bentgrass Not Adapted to Fla.	- 1 (0.9%)

Question #6 — Do you close your course during overseeding?


Yes	- 30 (75.0%)
No	- 7 (17.5%)
Not Stated	- 3 (7.5%)

For how long?

1 Day	- 15 (50.0%)	9 Days	- 1 (3.3%)
2 Days	- 4 (13.3%)	10 Days	- 1 (3.3%)
3 Days	- 2 (6.7%)	14 Days	- 3 (10.0%)
5 Days	- 1 (3.3%)	30 Days	- 1 (3.3%)
7 Days	- 2 (6.7%)		

Question #7 — Number of rounds per year?

Up to 10,000	- 4 (10.0%)
10,001 - 20,000	- 4 (10.0%)
20,001 - 30,000	- 11 (27.5%)
30,001 - 40,000	- 6 (15.0%)



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40,001 - 50,000	-	4	(10.0%)
50,000 +	-	2	(5.0%)
Not Stated	-	8	(20.0%)
"Too Many"	-	1	(2.55)

Question #8 — Who made decision to use Bentgrass?

Superintendent	-	16	(40.0%)
Club Officials	-	10	(25.0%)
Owner(s)	-	6	(15.0%)
Joint Decision	-	5	(12.5%)
Developer	-	1	(2.5%)
LPGA	-	1	(2.5%)
Not Stated	-	1	(2.5%)

Question #9 — Is there an alternative to Bentgrass? (Multiple Answers)

Do Not Overseed	-	11	(25.0%)
Cool-Season Mixture	-	8	(18.2%)
Rye/Rye Only Mixes	-	7	(15.9%)
No Alternative	-	7	(15.9%)
Not Stated	-	6	(13.6%)
Install USGA Greens	-	2	(4.5%)
Heat/Humidity Tolerant Bent	-	2	(4.5%)
Educate Members	-	1	(2.3%)

Question #10 — Would you continue use of Bentgrass at your course?

Yes	-	28	(66.7%)
No	-	10	(23.8%)
Not Stated	-	3	(7.1%)
Only in Mix	-	1	(2.4%)

Additional Comments by Respondents

1. If Bent meant for Florida, would snow every winter.
2. I don't mess with Bent after mid-May/early June.
3. Golfers should adjust to course — *not vice versa*.
4. Use Bent in Fall/Winter/Spring *only* Bermuda in summer.
5. South Florida needs a cold hardy Bermuda.
6. *Must* have good drainage and large greens for Bent.
7. Drainage is key to holding Bent in Summer.
8. Bermuda is badly damaged by holding Bent in June/July/August.
9. There is *no* acceptable alternative to Bent.
10. Costs too much to maintain Bent all year.
11. Use a Bent/Sabre mixture on Bermuda greens.
12. Wish the Bentgrass "syndrome" had never started; too many players comparing courses without know-

ledge of budgets, manpower, drainage, etc.

13. I may not oversee with bent in future.
14. Use Bentgrass *only* if members/management understand problems.
15. Bentgrass results do *not* justify inconvenience/expense.

IF BENT MEANT FOR FLORIDA — IT WOULD SNOW EVERY YEAR. BENTGRASS RESULTS DO NOT JUSTIFY INCONVENIENCE/EXPENSE.

Moderator Brown: Now we know what everyone out here thinks. We have three ways that Bentgrass is handled: (1) Overseeding of Bermudagrass greens with Bentgrass just for winter play which is the typical way it has been done, (2) Holding Bentgrass through the summer, and (3) 100% Bentgrass greens for all year round play in Florida. We have a panel of experts up here and we are going to hear from each of these superintendents giving them 5 minutes apiece.

We are going to start with "Overseeding of Bermudagrass greens with Bentgrass for winter play" and we will be hearing from 3 people who do this. We are starting (cont. on page 60)

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with Buddy Carmouche, Hole-in-the-Wall Club in Naples.

Mr. Carmouche (Summary): Has been overseeding with Bentgrass/Sabre combination for 7 years at 3 different courses. Success rate has been good, except for 2 years because of weather factors. At Hole-in-the-Wall, greens are small and play is slight during the winter. Found best overseeding time to be around Thanksgiving week and does not use split overseeding. Feels that it is cheaper to maintain Bentgrass because of reduced nitrogen levels and less watering once the Bentgrass is established. Firmly believes in hand watering of Bentgrass greens rather than relying on the irrigation system. All greens are hand mowed on a year round basis.

Moderator Brown: Our next speaker on the same subject is Paul Crawford from Palm Beach Country Club.

Mr. Crawford (Summary): Thinks that Bentgrass provides the best winter putting surface and his course has been using Bentgrass for the past 13 years. Overseeds with straight Bentgrass in early November at 3 to 4 pounds per 1,000 square feet (applied in two directions) and ensures good seed-to-soil contact with topdressing. Reduces nitrogen rate 30 days prior to overseeding to reduce competition from Bermuda. Vertical mows from 1 to 5 times, but no longer scalps with mowers. Forces Bentgrass out in April or May and maintains the Bermudagrass during the heat of the summer (very little play on his course during this time).

Moderator Brown: Our last speaker on the same subject is George Ord from Harbour Ridge in Stuart.

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Mr. Ord (Summary): Has been overseeding with Penn-cross Bentgrass since 1984 and feels that it provides the best possible winter putting surface at this point in time. Preparation includes: (1) No fertilization one month prior to seeding; (2) vertical mowing is done just prior to seeding; (3) uses Bentgrass at 2 pounds per 1,000 square feet, then topdresses and mats in with a carpet-covered mat. Preventive fungicides are used after germination and throughout the season. Three to four weeks, the process is repeated, except that vertical mowing is eliminated. Although basically pleased with result, feels that slow growing-in period (about 2 months) is a drawback. Stated that he believes research is necessary to improve the overall situation and that superintendents need to support such research efforts.

FIRMLY BELIEVES IN HAND WATERING OF BENTGRASS GREENS RATHER THAN RELYING ON THE IRRIGATION SYSTEM. ALL GREENS ARE HAND MOWED ON A YEAR ROUND BASIS: Buddy Carmouche.

Moderator Brown: Now we proceed to the next area of interest which is "Holding the overseeded Bent through the summer months." You can have Bent for 12 months with a Bermudagrass base under it. We have a couple of men with loads of experience in this area, and our first one is Richard Herr, of Jupiter Hills CC.

Mr. Herr (Summary): In spite of 95-100°F weather in 1987, feels that his Penn-cross Bentgrass held up well and that he may not have to re-seed this fall. Admitted to both mental and physical strain during the summer stress period, but feels that the effort was worthwhile. Stressed the point that much more support from Florida universities is badly needed. He relied on information from other universities. One of his two courses — The Village — has not had to be re-seeded for 3 years, but the Hills Course is done every fall after heavy vertical mowing.

STRESSED THE POINT THAT MUCH MORE SUPPORT FROM FLORIDA UNIVERSITIES IS BADLY NEEDED: Richard Herr.

Moderator Brown: Thank you, Dick. These two people — Dick and Luke — for those of you who may have been out of state, out of the country, or slept through the summer — had two major tournaments at their two golf courses during this difficult summer. Both golf courses had a good amount of Bentgrass on the greens. So, our next speaker is Luke Majorki of PGA National GC.

Mr. Majorki (Summary): Does not feel that Tifgreen (328) Bermuda supports the ball well enough on putting surfaces for tournament play. Since he hosts about 1200-1400 golf professionals on his 4 courses during January and February of each year, the decision was made to hold the Bentgrass all year long — at least in the range of 30 to 40 percent. By doing so, he feels that he has a "head start" on having good Bentgrass greens for his tournament season which usually starts in November. Also

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stated that he would have been more comfortable with Tidwarf Bermuda (with respect to maintaining Bentgrass in the summer), but the cost of renovating the greens on 4 golf courses precluded this.

Moderator Brown: Our first speaker on the next subject, "100% Bentgrass greens for year round play," is Dick Verbeten, Isleworth CC, Orlando.

Mr. Verbeten (Summary): Stated that maintaining 100% Bentgrass greens on a year round basis in Central Florida is not only stressful to the superintendent but is stressful to the superintendent's married life. Without an absolutely reliable and dedicated assistant superintendent, the situation could become extremely difficult. Throughout the summer months, daily readings of soil temperature at a 2" depth were taken on both nursery and playing greens; this revealed soil temperatures as high as 104°F. Whether heat or humidity is responsible for weakened greens has not yet been determined at his course. (At this point, Mr. Verbeten urged the audience to read an article in the July, 1987 issue of the U.S.G.A. Greens Section Record entitled "Management on the Edge"). He feels that this article described his particular situation.

Moderator Brown: It is interesting to note here that Dick's golf course was built by Arnold Palmer and our next speaker's golf course was built by Jack Nicklaus, who is also pretty influential. Our next speaker is Tom Werner, Loxahatchee Club, Jupiter, Florida.

Mr. Werner (Summary): His course was built in the early 80's and the greens were seeded to Penncross Bent in the fall of 1984. They contain 70% sand and 30% peatmoss and drain very poorly. However, proximity to the ocean provides good air movement and rate of play, at present, is low. In spite of this, it is a constant task to maintain good playability of turf. Utilizes an extensive preventive fungicide program and firmly believes in hand watering, but still experiences disease problems. Major problem being faced now is the encroachment of Bermudagrass into the greens — up to 6 feet in some instances. His crew is well trained and this certainly helps during the difficult times.

RATE OF PLAY, AT PRESENT, IS LOW. IN SPITE OF THIS, IT IS A CONSTANT TASK TO MAINTAIN GOOD PLAYABILITY OF TURF!

Tom Werner

Moderator Brown: Our last speaker on this subject, John Lapikas, was superintendent for several years at Lost Tree in Palm Beach and is now at Annandale CC in Mississippi.

Mr. Lapikas (Summary): His course is "land-locked" and, as such, experiences high humidity and both high day and night temperatures. The greatest stress period extends from early June through the end of September.

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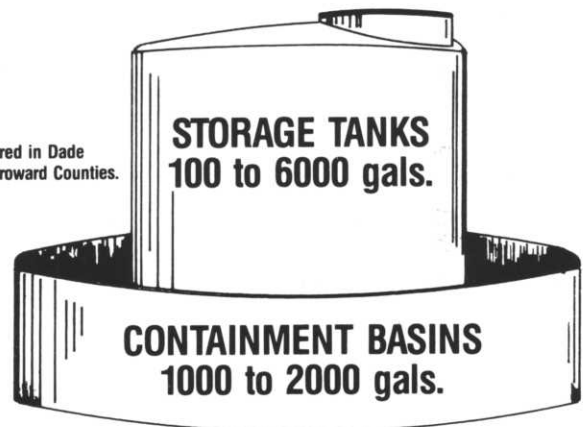
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(cont. from page 61)

During June-August, wind movement averages about 3-5 miles per hour, so stagnant, humid air can be a real problem on low-lying greens. Practices night time hand watering in an attempt to reduce soil temperatures (in the high 90's-low 100's). Night watering also helps the turf to recover from ball marks and other traffic injuries. Greens were built to USGA specifications and they drain well except during the high humidity periods in summer.

Moderator Brown: John, who was the impetus behind using Bentgrass on your golf course? Who designed it?

Mr. Lapikas: It was designed by Jack Nicklaus and the reason for Bent was that most of the courses in our area overseed in October and hold their overseeding till June. When they lose their overseeding in June, most of the Bermudagrass was gone too. So they only had one month with Bermudagrass and then they were tearing them up for overseeding again. So that was the reason that we went to 100% Bentgrass.

Moderator Brown: We had a few people here who were invited to be here but have sent material to be presented here since they could not attend.

First of all, Fred Klauk, who was superintendent for quite a few years at Pine Tree in Boynton Beach (overseeded with Bent). Then he went to TPC at Eagletrace for 3 years and overseeded there. Now he is at TPC in Jacksonville Beach where his Stadium Course is 100% Bentgrass on the greens. Here are Fred's comments: He has had a difficult summer. He averaged between 100 and 150 players a day. His is a resort golf course and it gets a lot of attention. Many people want to play the Stadium Golf Course through July, August, and the first part of September where it is very hot. He had a lot of trouble with the Bentgrass recovering from foot traffic and ball marks, so he feels he had poor putting greens through the hot summer because he couldn't keep the surface smooth. He didn't have disease problems except when it became overcast or rained. When it was sunny and dry, he used a preventive program but when it rained, brown patch became a serious problem. He says that on the Stadium Golf Course they are going back to Tifdwarf over the next two years and will overseed with a Bent mixture. He is concerned that with that much play and

the conditions he has there, it is too expensive to keep the Bent and that conditions in the summer make the Bent unsatisfactory.

Another comment is a letter from Dr. Al Dudeck, University of Florida, to Tom Burrows. Dr. Dudeck was invited to be on the panel here but couldn't attend because of teaching responsibilities, so I'll read his letter:

MOST TURFGRASS SPECIALISTS WHO HAVE BEEN WELL SCHOOLED IN THE CLIMATIC ZONES OF TURFGRASS ADAPTATION KNOW THAT BENTGRASS IS NOT ADAPTED TO FLORIDA:
Dr. Al Dudeck, U of F.

"Regrettably, I am unable to attend the 8 October meeting because of teaching commitments. Let me take this opportunity, however, to share my concerns about the continuing interest in attempting to grow Bentgrass year round in Florida. Most turfgrass specialists who have been well schooled in the climatic zones of turfgrass adaptation know that bentgrass, as a cool season turfgrass, is adapted to the cool, humid regions of the world — not to Florida. Florida is bermudagrass territory. We can grow bentgrass in the warm, arid regions of the Southwest, but only because of the lack of humidity and associated disease problems due to limited natural precipitation. Bentgrass can and should be used in Florida, but only for overseeding during the winter months. To attempt to grow it year round, and in pure stands, is sheer folly. It will jeopardize the golf course superintendent's professional status because it will bring about much closer scrutiny from various environmental groups and Florida's water management districts. Can we afford to lose any more pesticides due to indiscriminate use? The well-drained rootzones which are required for bentgrass will bring about increased leaching of nutrients and pesticides into Florida's shallow ground water table. Increased water needs for frequent syringing places greater demands on an already limited water supply. Although money may be no object on many of Florida's golf courses, the increased use of fungicides for disease control on bentgrass greens should be reason alone for abandoning such a practice.

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"Keeping Golf Courses Green"

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Has your membership read and do they thoroughly understand Mr. Moore's fine article which you enclosed, "Management on the Edge," USGA Green Section Record 25(4):1-3? If not, the parade of superintendents will continue along with increased restrictions on water and pesticide use. The University of Florida does not recommend bentgrass for year round use in Florida."

THE DEMAND FOR QUALITY PUTTING SURFACES IS THERE AND WE ARE THE PEOPLE WHO HAVE TO SATISFY IT.

Dr. Max Brown, Consultant

Moderator Brown: I have another superintendent who has been asked to give a short presentation. He used Bentgrass for several years and last year he used another type of grass. So here is Kevin Downing, Mariner Sands CC, Stuart, to tell us what his approach has been.

Mr. Downing (Summary): For 4 or 5 years, he used a Bentgrass/Sabre mixture which was satisfactory under light play. However, as play increased to about 250 rounds per day (January through mid-April), problems arose. While visiting in Palm Springs, California, he noticed the quality of the ryegrass mixture putting surfaces and decided to investigate further. These greens were very consistent, had good color and produced about 9 feet of roll as measured with a stimpmeter. In the fall of 1986, he seeded all greens with rye (variety not given) at 23 to 27 pounds and Sabre at 3 to 4 pounds per square feet. He plans to use Sabre at 5 pounds in 1987. The spring (1987) transition from cool season to Bermuda was extremely smooth and he stated that most players did not know whether they were playing on winter grass or Bermuda. Finally, putting speeds were better than anticipated and players were pleased.

Moderator Brown: Thank you Kevin. This is just a story with a different perspective on the same problem that we are looking at. I think you can see that we are in the business of trying to satisfy people who play a game.

The needs are different at each club — what works at one golf course — because of the people that play there, the area that it is in, the number of rounds — does not work at another. We have to keep these things in mind. Hopefully we will be able to, throughout the day, isolate these points, mark them down, keep them in our heads and be able to use them as we go on.

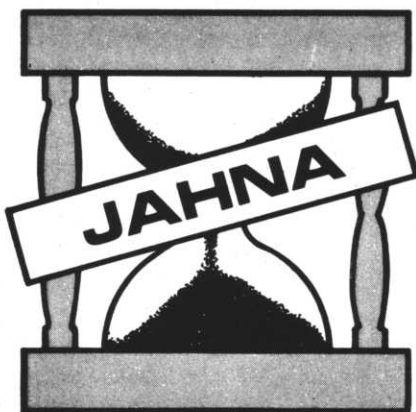
As we go into the Panel Discussion — we have quite a selection of experts here — we want to get all of the information from these panelists that we can. I have got a question here and it is based on the fact that we are in a warm season, humid, adaptation area and we are talking about growing a cool season turfgrass in this area. The question is, "What's the difference between a cool season and a warm season grass? This is just a basic question and I would like to get a few people to comment on this.

Dr. Krans (Summary): Optimum growth for Bentgrass occurs at 60 to 70°F (soil depth from 1 to 4 inches); for Bermuda, optimum is 80-95°F. For root growth, optimum is 50-65°F for Bentgrass and 75-95°F for Bermuda. Another important set of figures is that concerning soil temperatures required for 4 to 6 weeks to cause a 50% loss of roots; for Bentgrass, it is 75-77°F; for Bermuda, it is 75-95°F. These temperatures generally relate to stressing of the grasses, but what does it take to kill the total plant? If Bentgrass is held at 120°F for 20 minutes, the plant dies as cells lose their integrity; for Bermuda, this temperature is 150°F. Thus, Bermuda is seen to be better adapted to higher temperatures than is Bentgrass. Dr. Krans feels that there is no difference between high temperature tolerance and high humidity tolerance. A grass plant is always hotter than the surrounding air temperature; the only way it cools itself is through transpiration (evaporation of water). Therefore, if the surrounding air is very humid, transpiration will be reduced and the plant will heat up — perhaps to the point where it will die.

Moderator Brown: Thank you, Dr. Krans. Is there anyone else on the panel with a comment on this?

Dr. Duich (Summary): This treadmill we are on is very interesting. Growing Bent in Florida or anywhere else is very controversial. Why do it? Simply because we always

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want to do something better. It is fortunate that plants can not read — especially bentgrass. The academic world said it was absolutely impossible to grow Bentgrass in Arizona. Fortunately, Bentgrass did not listen and golf course superintendents did not listen.

To what extent should we be growing Bent? It's up to the people paying the bills! I don't think the superintendent should decide whether something is too expensive. That should be left to the people who are going to pay the bills.

There is one key factor in growing Bentgrass and that relates strictly to water. One of the things we have already proved is that there is no mechanical engineer, no irrigation engineer able to get an irrigation system where you can grow Bent on a putting green. So, if people are going to manage Bent, it must be hand watered.

Why is water so important? All of the figures I have ever seen by physiologists and all the factors that have been put down seem to forget the one most important factor — the solubility of oxygen is inversely proportional to the temperature. When we increase the temperature, the solubility of oxygen decreases. Water without oxygen is worthless. We need to learn how to grow grass with less water and less fertilizer. Everything relates to the insolubility of oxygen.

There are people growing Bent in areas where the book says you shouldn't be able to grow it. The key — on a practical basis — is that you have to eliminate thatch. Thatch retains quite a bit of water when you wet it. When the sun comes out it doesn't heat the soil 6" down and work backwards, it heats the surface.

There are a lot of people who do not know how little water you have to put on Bent. Where we get boxed in is the point that Dr. Krans brought out concerning transpi-

ration. We have to have effective cooling — but the water has to be efficient water. The key is we have always killed more grass *with* water than we have with *not enough* water.

Superintendents out in the southwest have it made. They have proved that they can grow Bent in temperatures higher than researchers say it can be done. But they do not have the humidity factor so that makes their cooling system work.

Humidity and uncontrolled water is the key — the uncontrolled water happens to be man applying it.

Moderator Brown: That's certainly very interesting. We are stirring up the pot here and maybe someone else wants to get into this.

Mr. Bidwell (Summary): Well, we must go back to 1934. The state is Cincinnati, Ohio, the month of August, the temperature is 109°F. How did we survive? We didn't have Penncross or the other cultivars of Bentgrass we have today. The only way we survived was because we felt sorry for the Bent. So we went out and syringed. That was a lesson in survival.

The golfing membership in Florida consists of a very high percentage of northern golfers who have been raised on Bent. They are going to demand it at almost any cost. You won't get away with trying to go back to Bermudagrass for a year round putting surface. The Yankees who love Bent are going to get their way. You will have to survive until the researchers can come up with a better type of Bent for your climate.

Moderator Brown: Did that get your attention? It is a relatively good area to cover completely. But we have other areas to talk about, other stresses and diseases, water management, etc. Does anyone else have something to say about plant physiology?

Dr. Alexander (Summary): I probably couldn't agree more with the three preceding gentlemen. But we are dealing with pure physiology of plants and I think it goes beyond that. Anytime that a grass plant — be it Bentgrass or Bermudagrass — is adversely affected, then the problems really start to snowball. It taxes the knowledge and capability of every superintendent sitting in this room. I don't think we can separate water, temperature or humidity in any way. They all have to be considered simultaneously — not individually.

Dr. Peacock (Summary): As to what Dr. Krans said about basic limitations of the plant, that is only the first step. Under your conditions, no one can make the decision for you knowing exactly what the situation is for your own particular golf course.

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ANYTIME THAT A GRASS PLANT — BE IT BENTGRASS OR BERMUDAGRASS — IS ADVERSELY AFFECTED, THEN THE PROBLEMS REALLY START TO SNOWBALL:
Dr. Paul Alexander.

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Moderator Brown: Dr. Dunn, our Nematologist, has to leave right after lunch so I am going to have him give some comments on nematodes and Bentgrass.

Dr. Dunn (Summary): I think this ties in with the physiological factors these gentlemen have been talking about. As you may imagine, there is very little literature on nematodes and Bent. But for the most part nematode activity has been worse in the south on the sandy soils of the Coastal Plain. The same nematodes that affect Bent in the north affect Bentgrass in the south — plus we have a couple additional ones in the south! Those of you who have been growing grasses know about the stubby root and spiral nematodes, etc. They have all been reported from Bent users and are probably prevalent in the north. The most damaging nematode in North Carolina are sting nematodes. If you are trying to grow Bent in high soil temperatures, a natural physiological degradation in the root system occurs when you get above 75 or 77°F. Therefore, the root system of that grass is naturally deteriorating as the temperature is going up. The nematode population goes up also as you go up into the 70's and the optimum for nematodes is the mid-80's.

I don't know whether you are going to be able to manage it chemically or not. There is a very serious problem with "mocap" on Bent. There is a specific problem that comes about 6 days after application that will make you wish you had not done it. Nema-cur can be used but I would much rather see you manage the soil and the growing conditions so that the plant wouldn't need a lot of chemical help to withstand nematode activity.

Moderator Brown: I think it is clear to most of us that the prevailing thought is that the demand is there for this finer quality putting surface offered by Bentgrass. We are either going to have to learn how to grow the existing Bentgrass or we will have to grow another type of Bent or have some other grasses to replace the ones now being used. The demand is there and we are the people who have to satisfy it.

Mr. Bidwell: I don't know how much involvement your state university system has in Bentgrass culture, but I say to you, if you don't have university support, get it. Stamp your feet, go to your Representative or any method that you think might be successful. Golf and recreation is a big monetary part of Florida's economy. You need university support.

Moderator Brown: We have good associations in place in Florida — the Florida Golf Course Superintendents Association with its nine local chapters, and the Florida Turfgrass Association — are two very strong, very influential organizations. We can't do it alone but as a group we can get the attention of the legislature to fund these projects.

THIS TREADMILL WE ARE ON IS VERY INTERESTING. GROWING BENT IN FLORIDA OR ANYWHERE ELSE IS VERY CONTROVERSIAL: Dr. Joe Duich, P.S.

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Dr. Freeman (Summary): Both what Mr. Bidwell and Dick Herr said earlier referring to the lack of research is specific to Florida. However, there is a lot of information available. What you can't extrapolate is the monies spent on research for something like Bentgrass. You can't turn the universities around in a short time. For most research projects to work, you are looking at least 3 to 5 years work before you really have something you can go on. So what Warren said is well founded. You need some people who have expertise in a given area. Again, you can get help from the university, but turning the results around in a short time is not practical.

Dr. Peacock: I might add to that if you stop and think back, this is not a long time situation that has been growing over a long period of time. This is a relatively new area. That is another consideration when you question the lack of Bentgrass research in Florida. The need wasn't there then, but now that the need is here, you need to get a response.

Moderator Brown: That comes from a researcher and a teacher from North Carolina State, not from the University of Florida.

We have found that grass wants to live and grow and that we have to help it grow. In order to have healthy grass, we must help it to maintain self-continuity so it will look

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good and play well.

Grasses under heat stress produce a breakdown in cell continuity thereby inducing stress and this is the area that we want to discuss at this time. One of the stresses that Bentgrass undergoes and one of the major problems is heat stress which increases the stresses of fungi and other pests. We have several scientists on our panel and I want to get some of their comments.

Dr. Vargas (Summary): A golf course superintendent trying to grow Bentgrass in Florida presents an *impossible* situation. Anytime you take a grass and put it to the limits of its environmental adaptations, stress will occur and you will have problems. I hear people talking about Brown Patch and Pythium. I think those are the *early* diseases that you see when you try to grow Bent year round, but the really serious ones have not come in yet. When you let that Bent grow all year long, that is when you are going to have some really serious root problems. Some earlier speakers didn't say how much was spent on fungicides for things like Pythium and Brown Patch. However, when you get into root organism problems, you are talking three, four and five times as much for fungicides for control. Dr. Dunn talked about nematodes. We have seen problems with nematodes up north, but I can't imagine the degree that must be here. One nematode species not yet mentioned is the root knot nematode. It gets into the root itself, causing it to swell and results in poor uptake of water. We are starting to see it in sand culture greens in Tennessee and Kentucky. This is a definite possibility in Florida.

I would like to make a comment on something Warren Bidwell said. He mentioned you would have to get used to growing Bentgrass for the Yankees in the summer. Well, I am a Yankee and like to come down to Florida in the fall, winter and spring. But like most Yankees, I am smart enough not to come down here in the summer!

A GOLF COURSE SUPERINTENDENT TRYING TO GROW BENTGRASS IN FLORIDA PRESENTS AN IMPOSSIBLE SITUATION:

Dr. J.M. Vargas, Jr.

I think that a cool season grass should be grown in a cool climate or it should be grown in a warm climate during the cool season only. With the type of grasses we have now, Bermudagrass is the best for warm weather and if you want to overseed with Bent or rye, then that is what you should do.

Dr. Freeman (Summary): Joe, I agree with you 100%. As Dr. Dudeck said in his letter, we are encouraging the use of overseeding with Bentgrass and are a little bit hesitant to recommend it for a year round use. One of the reasons is the disease problems you are going to run into. We have always seen diseases occur. We know the common ones you see — Brown Patch and Pythium. Frankly, we don't know what you may run into in the summer time when you start growing Bent year round.

The primary disease problem is probably going to be Pythium blight. Several people have talked about plants being under stress in high temperature. I believe the predominant type of Pythium in the north is Pythium Ultimum. Florida's prominent Pythium attacking grass is Pythium Aphanidermatum. That happens to be a high temperature Pythium whose optimum temperature for growth is approximately 95°F. So, when you have Bent at 95°, and Pythium is active at 95°, you have a potential disaster.

We at the University of Florida will help you in any way we can in solving your disease problems and other problems concerning Bentgrass — particularly as it relates to overseeding. After a few years you may have to do it on your own because we may not be able to afford the luxury in time and costs to research this, given the present economic conditions. We will eventually get around to it and this fall we will be testing various Bentgrass selections that are available for use. We will be evaluating Bentgrass for overseeding purposes in Gainesville this year. I will be monitoring it very closely.

Moderator Brown: Dr. Juhnke is the new plant pathologist at the Ft. Lauderdale Research Center. She is from Montana State and her specialty is soil-borne organisms. I will let her speak on the organisms that she has become familiar with here in Florida.

Dr. Juhnke (Summary): The important thing for any plant is root health. A plant without roots just doesn't survive. And this is where the importance of beneficial soil-borne organisms comes into play. The question is,

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how can we utilize this knowledge in Bentgrass or rye grass overseeding? This is one of the areas that I plan to work on in terms of biological control. How are we going to use that biological control agent on the roots of the Bentgrass? This is where overseeding might be beneficial as we can put the biological control agent into the seed before we plant it and have the organisms colonize the roots of the cool season grass and then transfer over to the warm season grass.

Moderator Brown: We can now see that there are organisms that have been here but have not been trouble for use because we didn't have susceptible hosts here. But there have been other things we have done that have caused an increase of stress on our grasses — whether Bentgrass or Bermudagrass. That is, our quest for speed and putting quality has caused us to lower the mowing heights. We have a lot of people in here who mow at 1/8" for a good part of the year. *That is a big stress.* So a lot of the organisms that may have been present, but not troublesome at 1/4", are now being a problem at 1/8".

Question for Dr. Duich. Has the close mowing that is done in the Pittsburgh area had an affect on the disease there?

Dr. Duich: I don't say it has had any direct affect on the disease problem but at a club like Oakmont, the membership is the determining factor. At one of their meetings, one of their Board Members made a suggestion that the greens never be higher than 1/8". Fortunately, that did not pass. But this gives you some idea of the mental-

ity of the people the superintendent has to serve. And the biggest problem over the years there has been thatch and the greens became more susceptible to winter damage.

(Reviewer's Note: This technique is extremely risky; unless great care is taken, severe damage can result.)

Questions from the Floor:

Question #1: Are there any problems with using a liquid fertilizer in the water system on overseeded Bent greens?

John Foy: I haven't seen any real problems with this but I will comment on the fertilizer used to establish your Bent. I have seen some success with 20-20-20 applied through a sprayer to get to the young Bent but not get it down to the Bermudagrass. I have seen that be helpful.

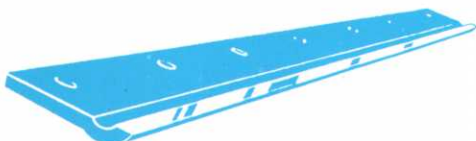
Question #2: What would it take to get the University of Florida interested in putting some greens in? What would it take to make it feasible?

Dr. Juhnke: We will be starting to renovate one of our research plots in the Ft. Lauderdale Research site for Bermudagrass. We will have overseeding studies and fungicide trials there. We will also have a fertility area, a nematicide area and another area for overseeding. But that will probably take about a year to do because it is in an area that is completely overgrown with weeds now. One of the biggest problems we have in Ft. Lauderdale is maintaining of the greens. We don't have someone there

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to mow every day — often we don't even have someone available once a week.

Dr. Krans: We have the same problem in Mississippi. We cannot afford to maintain the greens. So we have gone to a golf course and built the greens on the golf course and then they maintain it for us. That is how we do the research. Maybe you can find a golf course near the Experimental Station and use it to do the research.

Dr. Freeman: We have no plans to have a 100% Bentgrass green at the University of Florida at this time. We will have a Field Day in the spring where we will show the results of overseeding Bent on Tifdwarf. We do not know how to cope with overseeding problems and appreciate the opportunity of hearing your side of it. We can now go back to Gainesville and put our heads together to see what we need to do to help you.

Question #3: How much money would we need to build a green?

Moderator Brown: \$25,000.

Question #4: What about the so-called shortage of Penncross seed and the non-certified Penncross seed that is out in the market place.

Dr. Duich (Summary): We have never recognized such a thing as non-certified Penncross. When the variety was originally released, the only way to maintain genetic qual-

ity of the seed was to force the grower to plant and grow from first generation material. Certification sounds really good on paper but in order to have a strong program it has to be executed. If a field doesn't pass certification standards, we are turning it down.

As far as the demand for seed, we are trying to balance the supply and demand situation. I know how much seed has been shipped. We have never had as much seed shipped as has been sold. It is physically impossible to have all the seed ready this time of year, not by September 1 or even by October 1.

WE HAVE NO PLANS TO HAVE A 100% BENTGRASS GREEN AT THE UNIVERSITY OF FLORIDA AT THIS TIME.

Dr. Ed Freeman

Question #5: I have a question about buying treated seeds. If a seed is treated it means that the bag has been opened to be treated. How is this handled to maintain certification status?

Dr. Duich: Yes, that is right. You have to use interagency certification to police this. For example, if you want to use a blend of 4 different rye grasses and you want to certify the seed, you must get a representative from the seed company to physically be there when the seed bags are opened. We do Interagency Certification all over the country and I don't know why you can't do that in Florida. If you can't get it done in Florida, then I know you can get it done in other states.

Question #6: What is the shelf life of an unopened bag of Penncross?

Dr. Duich: One of the factors that affects longevity is moisture. If you can maintain your supply at 5-9% moisture, you can keep it for many years. If the moisture rate goes down lower than 5% you are going to get a very rapid drop in germination. You will get an even more rapid drop in germination if the moisture goes over 10% and you expose it to heat. The key is to control that moisture and keep it between 5 and 9%. For optimum situations, the total of temperature and humidity of the storage area cannot be more than 100. That is; 2/3 temperature and 1/3 humidity.

Moderator Brown: Again, thanks to the FGCSA for putting together this program and special thanks to the hands-on superintendents who deal with the everyday problems of bentgrass and to our distinguished panelists who have contributed so much to what I believe has been an extremely excellent program on "Bentgrass in Florida." How about a follow-up seminar, "Bentgrass — Part II?" ■

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