



If the soil mixing, soil components or management is poor, there is trouble ahead for bentgrasses.

Bentgrasses in the Land of Dixie

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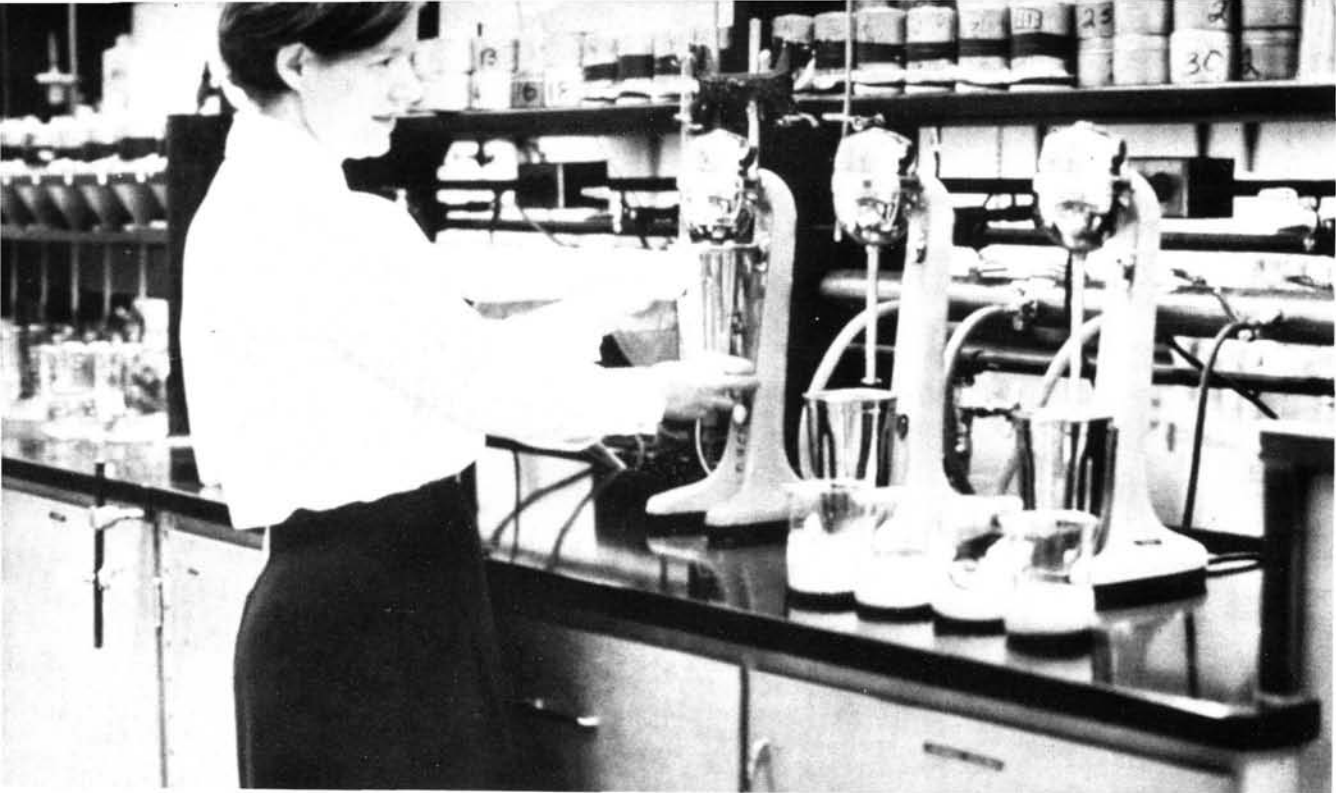
Research on turfgrass extends further back than most people realize. Settlers along the East Coast used both native grasses as well as those brought from Europe for grazing their cattle. Bluegrass is mentioned in writings before 1800, but the first monograph on grasses and sedges was published in 1870 in Pennsylvania.

George Washington and Thomas Jefferson did research on many crops, including meadow fescue, bluegrass, and probably some bentgrasses. In 1784, John A. Binns, of Loudoun County, Va., began experiments using gypsum on various crops, including bluegrass. It was not until the late 1890s, however, that the Connecticut Agriculture Experiment Station, under the direction of Alcott, showed interest in collecting turfgrasses. In 1906, the first mention of bentgrass turf plots in the United States was made under the direction of Dr. W.S. Harbin, of Long Island, when he went to the United States Department of Agriculture for technical assistance in solving problems on greens at his golf course. This was when he met Dr. Charles V. Piper and Dr. Russell A. Oakley.

The Agriculture Experiment station at Rhode Island also developed turfgrass plots early in the century.

Some 20 years later, according to the records of the USGA Green Section, \$900 was given to the University of Florida under the direction of Dr. Charles R. Enlow. He observed both warm and cool season grasses, including red top, various ryegrasses, annual bluegrass and seaside bentgrass. About the same time, Dr. Howard B. Sprague of the New Jersey Experiment Station, with the assistance of Dr. Piper, laid out the first bentgrass plots, including Metropolitan and Virginia varieties. The USGA Green Section contributed \$600 a year to conduct the experiments with the remaining costs taken up by the New Jersey State Agriculture Experiment Station. The bentgrasses tested were *Agrostis palustris*, *Agrostis tenuis*, and *Agrostis canina*.

Following World War I, Lima Carrier, chief agronomist at the Virginia Polytechnic Institute, went to the Pacific Northwest to raise bentgrasses. The first turf garden at Arlington



One of the physical soil analysis tests being performed at the Mississippi State University laboratory supported by the USGA Green Section.

Farms, in Virginia, was started in 1921, sown with Colonial bentgrasses. The chief creeping bentgrass varieties of the day were Washington and metropolitan, and from these the Green Section began to establish demonstration gardens. Other bentgrasses in use at the time were south German, a mixed bent containing a large percentage of Rhode Island or colonial bent, a fair percentage of velvet bent, creeping bent and some red top. Rhode Island bent and colonial bent are quite similar. Velvet bent is the finest textured bentgrass of all and is creeping in habit. The forerunners of today's bentgrasses were from many strains of creeping bent and the better adapted, hardier types were established with stolons rather than seed.

The first selected bentgrass plots (metropolitan, C-51) were established at the Country Club of Virginia at both its Richmond course and its James River course. The golf course superintendents decided that bentgrass should not be fertilized in the summer, and it should be maintained at a higher cut. Greenbriar Country Club, Hot Springs, W.Va., had its first creeping bentgrass, known as the Ekwanok strain, in 1924. In 1926, however, 15 greens were planted with Metropolitan.

Some demonstration plots at the Bay Shore Golf Course, Miami Beach, Fla., were estab-

lished with south German bentgrass seed in 1931 and made their best growth from October through May. The same year, demonstration gardens of bentgrasses were established in Tulsa, Okla., and Greensboro, N.C.

As early as 1929, double greens of bermudagrass in the summer and cool season grasses in the fall were being used in the Atlanta, Ga., area. In reviewing old Green Section *Bulletins*, we note one paragraph asking, "One of our bent greens is almost completely overrun with clover. What can we do to get rid of it?" The answer was, "Heavy spring fertilizing gets the grass off to a good start."

The first domestic commercial bentgrass seed came from mixed strands harvested in southwestern Oregon. Most of it was seaside with some Astoria or colonial-types. Seed production increased considerably through 1936, and then it became stationary. Until 1934, seed production was from natural stands but these began to deteriorate and contained considerable weak seed. The growers then began to improve production and strive for better seed quality. Old timers will recall coose bentgrass which came from Coos County, Oregon.

In the early 1930s the Green Section began to collect selections of bentgrasses which had survived abnormal weather conditions and a



Some of the survivors of the high temperature bentgrass studies at Arizona. Soil and air temperature at the time of the picture was 115° F.

wide variety of soils. Many golf course superintendents from throughout the country cooperated by sending in material. Creeping bentgrass selections were given the prefix C and velvet selections the prefix V. The velvet bentgrasses were not adapted to warm climatic conditions and were soon eliminated.

At the Arlington, Turf Gardens, the first plots of selected bentgrass varieties were planted in 1937. Incidentally, the Pentagon now stands on the site of the original Arlington Turf Gardens. The bentgrass plots were later transferred to Beltsville, Md. Selections of the best varieties were made and shipped to various clubs throughout the country. They were planted in pie-shaped experimental greens and were observed for putting quality as well as survival under adverse growing conditions. Some of the selections were sent to Atlanta, and Chattanooga, Tenn. At that time, Dr. John Monteith was in charge of the Green Section and he came to Atlanta and worked with the father of Harold Sargent, who is now the golf professional at Atlanta Athletic Club.

The first courses in Tennessee to have bentgrass greens were Chattanooga Golf and Country Club and Holston Hills Country Club, in Knoxville. This does not include golf courses in the higher elevations of eastern Tennessee where Highland and Astoria bents were the main grasses used until *Poa annua* became dominant.

Considerable progress was made in the 1940s in establishing bentgrasses across the South. In

checking with people informed of this era, some interesting facts about establishing bentgrass in the South were revealed. Dr. Roy A. Bair had numerous warm and cool season grasses at the Everglades Experiment Station in Florida. Many of the bentgrasses were furnished by the USGA Green Section under the direction of Dr. Fred A. Grau. The grasses were observed for use in lawns, recreational areas, airports and roadsides. There were also turfgrass trials established at Indian Creek Country Club, Miami Beach, Fla., in 1947-48. Several dozen of the most promising bentgrasses were shipped to Florida, but only C-3 and C-5 survived. They were eventually taken over by bermudagrass. Indian Creek Country Club also seeded with Astoria and Highland bent but they were lost within a year or two.

The history of bentgrasses in the South would not be complete without a summary of Superintendent Charlie Danner's efforts in adapting bent to the South. Charlie started in golf in Virginia when he was a young man, and he moved to Richland Country Club, in Nashville. In 1950 he started a nursery of Arlington (C-1) and Congressional (C-19) bentgrasses. He planted one or two greens a year and gradually developed 18 greens with this bentgrass mixture. In spite of poor soils and poor surface drainage, he maintained the grasses successfully for many years at Richland Country Club before moving to the Capital City Club, in Atlanta, in 1961.

C-1 and C-19 were established at many other

courses in Tennessee, including Belle Meade Country Club and Hillwood Country Club, following Charlie Danner's success at Richland. Many clubs in the area have now changed from bermudagrass to bentgrass greens.

Bentgrass was used in the Atlanta area with some success and became very popular about 1956-59 when George Barnhardt established the greens at Cherokee Town and Country Club. Penncross is now the most popular of the seeded bents. Initially, Seaside bentgrass was used across the South including the Oklahoma-Texas area many years before Penncross or vegetative bentgrasses were used.

As improved strains of bentgrasses are developed by researchers and improved techniques come into wider use, more bent will be used in the South. There are now bentgrass greens from Myrtle Beach, S.C., across the South to the West Coast. Attempts are still being made to grow it in Florida. At one research center, a short summer vacation by key personnel resulted in the loss of the bent research plots as well as a three-year old Penncross green. Green construction techniques will have to be followed more closely than they have been if losses are to be reduced.

Selections of heat-tolerant bentgrasses are being made by researchers and should become

more widely used in the next five to 10 years. There are several selections that seem promising, including two from Bartlesville, and Muskogee, Okla., selected by Dr. Wayne Hufine.

More clubs are beginning to establish bentgrass greens in areas where they would not have thought of using it 20 years ago. In the past, the lack of satisfactory soils, correct mixing and sound construction methods were not emphasized as much as they are today. For the past five to seven years, golf courses have been built so rapidly that emphasis has not been placed on proper green construction. Because of faulty construction, bentgrass greens have been lost after the first year with members being unhappy and inconvenienced. Any club that is going to renovate greens should first seek out available information regarding proper construction. This includes a physical soil analysis of the component parts of the soil media.

With more sand being used in construction of greens, there is much more leeway in dates for planting grass either with seed or by vegetation. Bentgrass can be planted throughout the year by hydro mulching if the superintendent is aware of the limitations of bentgrass. Normally, the best time to plant bentgrass is in early September or the early spring.

High temperature bentgrass studies are underway at the University of Arizona. They are supported by the USGA Green Section. Supt. Bob Sanders, Drs. G.V. Johnson and W.R. Kneebone (left to right) discuss the project.



Penncross bent seeded at $\frac{3}{4}$ to $1\frac{1}{4}$ pounds per 1,000 square feet has been quite satisfactory. Those greens being converted from bermudagrass to bentgrass by using Tupersan should be seeded at a higher rate of two to three pounds per 1,000 square feet to minimize transition.

As soon as bentgrass begins to grow, mow it at $\frac{3}{8}$ -inch for maximum root development, and gradually lower to the height desired by the club. Bentgrass is usually mowed from $\frac{1}{8}$ - to $\frac{5}{16}$ -inch.

Probably nine or more pounds of nitrogen per 1,000 square feet will be needed for one or two years where greens are built with high infiltration rates. Those built with more silt and clay will require less nitrogen.

The further south below 34 degrees latitude, the more a superintendent will have to adhere to good management practices to minimize loss of bentgrass. Bentgrass will withstand heat, but heat plus moisture, poor drainage, or a combination of these, plus mismanagement of fertilizer, chemicals and irrigation can cause thinning or loss of the bent. Disease problems can be minimized through the proper use of fungicides and the latest methods of construction. With the excellent fungicides now available, formerly dread diseases need not be much

of a concern today.

One hundred miles south of Atlanta is about as far south as bent is being used for permanent greens today. However, in the Southwest where the humidity is lower, bent is being maintained much further south, in Austin and San Antonio.

Increased cost of seed for overseeding bermudagrass greens will cause more southern superintendents to consider the use of bent as a year-round grass. Deep penetrating aerification equipment, i.e., punching holes six to eight inches deep and then filling them with the proper sand mix, should contribute to bentgrass establishment. The cost of growing bent should be about the same as bermuda, since annual overseeding of bermuda is expensive and counterbalances the amount of money spent for fungicides. Someday, with proper construction and management techniques, bentgrasses will be grown in the extreme South and replace bermudagrass greens.

Many questions have been asked during the past few years about the use of bentgrass in the South. Because it grows and remains green throughout the entire year, the inconvenience of two transition periods is eliminated. On this score alone, bentgrasses use in the South is certain to increase.

Main drain line and lateral being backfilled with coarse gravel.

