

Beach is a fungous disease resembling brown-patch. It can be controlled by applications of corrosive sublimate and calomel or any of the remedies on the market for brown-patch. We are rarely bothered by this disease except in the young winter grass.

The mole cricket attacks our greens and tees, but does not bother the fairways. To control this insect on the putting greens, we apply from 5 to 7 pounds of arsenate of lead to each 1,000 square feet early in the fall with the first few top-dressings. This is either mixed with the top-dressing or applied on top of the dressing before it is dragged. During the winter the arsenate of lead is also applied each time we top-dress the greens, but in much smaller quantities. The tees are treated in the same manner as the greens whenever they appear to be in the need of treatment.

A Winter Course on a Limited Budget

By Terry Dolson

Punta Gorda Country Club, Punta Gorda, Fla.

The Punta Gorda Country Club occupies 105 acres of uniform sandy loam on flat, slightly sloping ground $1\frac{1}{2}$ miles from Charlotte Bay. The highest elevation is but $13\frac{1}{2}$ feet above sea level with a tide-water creek entering the property for a short distance. The present course was built in 1928, utilizing such improvements as have been made since I came to Punta Gorda in 1922, and was opened for play in January, 1929. It is essentially a winter-resort course which must be maintained on a basis of strict economy working on a limited monthly budget. From April to September a mechanic and one laborer are employed to keep the fairways mowed and to haul in at least 350 cubic yards of top-dressing. From October to March four additional laborers are employed. A daily record kept on a form sheet helps me to plan the work economically.

Proper drainage was the main consideration in the construction of the course because the carpet grass, which thrives in this section, requires sufficient drainage to remove standing water without lowering the water table. Marl pockets are occasionally encountered several feet below the surface but I have never noticed a trace of marl in the topsoil. Playable ditches 10 yards wide were dug 1 foot deep on the high back part of the property, gradually increasing to a depth of nearly 3 feet on the lower, front part. This drainage system intercepts water from the back country and discharges into a pond developed from the slough and into two artificial ponds. The water level holds up well in these ponds during the dry winter months. The excavated dirt was used for building putting greens and tees, and the muck from the slough was used for the top 5 inches of the putting greens and tees. All ditches are water hazards, turfed, and playable except during the rainy period. The ponds have a depth of from 2 to 4 feet during the dry months. Their banks are turfed and kept mowed to the water's edge. We have not tried to keep the ponds cleared. Rushes grow along the banks of the ponds and water lilies have been introduced. There is good bass fishing in the big pond, and one or two alligators sunning themselves on the banks prove a source of interest to the winter golfers.

We have an adequate water supply from two 6-inch wells sunk 400 feet in sand. The water is pumped directly to the putting greens,

tees, and club house by two 6-horsepower gas engines. The water is exceptionally pure for this part of the country, being relatively free from iron and sulphur. Grass near the pump house receiving excessive amounts of this water is not harmed.

In building the fairways the ground was thoroughly plowed and disc-harrowed. Most of the pulverizing and smoothing was done with an Acme harrow. Cow manure at the rate of 4 cubic yards to the acre was worked in at a cost of about \$7.50 a cubic yard. The results were good, but I would not recommend cow manure for this section because of its cost. We have never observed any infestation of grubs from its use, however, and in fact have never had any trouble from grubs, although June beetles are occasionally in evidence. Carpet grass seed at the rate of 120 pounds to the acre was sown on the fairways in 3 seedings; each seeding was followed by a light harrowing, and the last one finished with a plank float. A very uniform stand of grass was obtained.

The putting greens were built with the sand and soil from the drainage system. On this was spread 5 inches of muck from the slough and mixed with the top 2 or 3 inches of sand. After the final smoothing, wood ashes and tankage were carefully raked in. They were planted with stolons of giant Bermuda grass spaced about 10 inches apart; this was done during the two weeks before June 15, when the rainy season definitely set in. There was some damage from washing, but the grass knit quickly and upon my return the following October it had become thoroughly matted. No seed was used on the putting greens. The stolons were all obtained from the first putting green which I had planted on the course several years previous. They had originally been obtained from the golf course at Useppa Island, 25 miles to the south, where I had found this giant Bermuda grass producing a turf of superior quality on very sandy soil and presenting a fair putting surface. It is true that the giant variety of Bermuda grass can not be recommended for its putting surface; yet with top-dressing, as is necessary with all varieties of Bermuda grass, and with the use of a power putting green mower with a high-speed reel, it makes a putting surface that is surprisingly little inferior to that of the finer varieties. I prefer the giant variety for this particular course for two reasons: in putting greens that are not cut during the 6 summer months, or are scantily maintained during that time, the giant variety holds its own better; further, it stands up better under the quick succession of heavy top-dressings and accompanying rakings and brushings that are necessary in October and November, when we apply about 3 cubic yards of top-dressing to 1,000 square feet of surface.

Our top-dressing material is obtained from the cultivated edge of a muck pond about 3 miles from the course. It is not muck, but a soil with a varying degree of muck containing some marl. When the tomato season is over and before the rain sets in, the men shovel off the tops of the cultivated rows. This is easy to shovel and is practically weed-free. The material is hauled to the course and dumped in piles closely together so that, when leveled, the top of the material is only about 18 inches high. It is then plowed and disced twice a month during the rainy season, which ends about October 1. As most of it is put on the putting greens with shovels, it is applied either wet or dry. Some of it is hauled under shelter so that it can be screened

and used in the light top-dressing of the winter grass seed. After it is shoveled on the putting greens it is raked, dragged with a large cocoa mat, and then washed down well into the grass with an open hose. After the next to the last top-dressing the putting greens receive an application of 40 pounds of hardwood ashes to 1,000 square feet. After the last top-dressing they receive an application of 40 pounds of castor bean pomace and 5 pounds of a commercial grade of ammonium phosphate to 1,000 square feet (hardwood ashes and organic fertilizer are applied separately to prevent quick release of nitrogen from the organic fertilizer). A week later Italian rye grass is sown with a mechanical seeder, in two sowings, at the rate of 25 pounds to 1,000 square feet. Each seeding is lightly top-dressed with a mechanical top-dresser. Arsenate of lead and a commercial organic mercury compound, the former at the rate of 12 pounds and the latter at the rate of 7 ounces to 1,000 square feet, are mixed with the last of these top-dressings. December 1 is the earliest time advisable to sow winter grass of any kind in this section.

We start cutting the putting greens in about a week or 10 days, depending on the growing conditions. For about two weeks, hand mowers are used to prevent damage on the turns; after that power mowers are used. We have 3 power mowers, which have been highly satisfactory in results obtained and money saved. On putting greens that are gently contoured they have no drawbacks, but on sharply contoured putting greens, especially those of a sandy nature, they may be troublesome because of slipping and scalping. An adjustable brush attachment for the mowers is useful for light brushings of the Bermuda grass, to prevent graining, or for heavy brushings to loosen the soil and tear up the old roots. The brush is never used on the winter greens. During the winter only two of these mowers are ordinarily in daily use, one being kept for emergencies.

From the time of seeding to the end of the winter season the putting greens are never top-dressed. Light applications of commercial ammonium phosphate are made on an average of once every two weeks, with a barrel sprinkler. A concentrated commercial fertilizer containing potash, in addition to ammonia and phosphoric acid, was used for a time, but was abandoned because it resulted in so great a stimulation of the Bermuda grass that the latter started to crowd out the rye grass.

All of our putting greens except one are rather uniform in their water requirements. This one has an impervious marl base and requires only about one-third of the amount of water needed on the other putting greens. On an average each of the 17 putting greens gets 3 hours of watering every other night from one sprinkler. The pressure at the sprinkler is from 25 to 30 pounds. Regular watering of the putting greens is practiced only from the time the winter grass is sown until the close of the winter season.

From April to September inclusive, 9 holes are closed to play and the putting greens watered until the grass has become tall and gone to seed and the hot weather has killed out the winter grass. Neither these greens nor the tees are cut until fall. On the other 9 holes there is a little local play. They are watered a bit during drought and top-dressed once or twice. No fertilizer is applied during the summer and little weeding can be done.

The rough is cut twice a year. After the November cutting, the clippings are raked away from the trees, plantings, and clumps of palmetto that have been allowed to grow, and the rough, except that containing any Australian pine trees, is then burned over. This burning, which has been done for three years, is not intense enough to burn out the soil or destroy the grass roots, as each year the grass in the rough becomes denser with the invasion of carpet grass. Although the rough grows but little during the playing season, it is given a cutting toward the latter part of February to improve the unkempt appearance. During the playing season the rough can not be burned; so the near-rough is raked about 10 yards in from the fairway, and the rakings piled out of the way of play and burned at the end of the playing season. From June until the cutting and burning in November a golf ball driven into the rough is as good as lost. Regular cutting would tend to change the rough from field grasses to carpet grass.



Bermuda grass at Punta Gorda attacked by disease

Carpet grass seems to have a limited range for fairway use. It seems to thrive best on low land which has a high water table, but standing water will cause it to thin out or die. It has a very extensive root system and, under suitable conditions, it makes an ideal turf. It mats well, and a golf ball sits up nicely on the stiff blades, but heavy top-dressing will smother it.

Here at Punta Gorda there is a 3-acre spot on the course that is a bit more sandy and higher than the rest of the course, and rendered dome-shaped by grading. Carpet grass would not grow on the high part. I plowed up this entire area, turning the furrows over onto bunches of cuttings of a common variety of Bermuda grass. I used 20 wagon loads of cuttings on the 3 acres. I then top-dressed with 75 cubic yards of muck. For a year I had a fine mat of Bermuda, but now, after 3 years, the carpet grass has completely taken over the

ground up to its former limit, and the higher part of the ground has a fairly good turf of blanket grass (*Syntherisma serotina*), which probably came in with the muck. Hardly a blade of Bermuda grass is left, yet during all this time the turf has been consistently good. A mat of Bermuda grass, in putting greens or fairways, will give way to other grasses on sandy soil unless top-dressed regularly.

Our tees during the entire year are covered with Bermuda grass and some carpet grass. During the winter, before receiving the frequent, light top-dressings, worn parts and divot holes are lightly sown with Italian rye grass. They are mowed with lawn mowers set as low as possible.

Brown-patch is our worst trouble. Copper-lime dust was first used as a control measure, but had to be discontinued on account of its toxic effect on the grass. Since then, mercury preparations have been used. I was able to get 150 pounds of a commercial organic mercury preparation last winter and with it was able to protect our greens from the time of seeding. As we did not have enough to treat the tees also, they suffered, and one was entirely killed. It was resodded but became badly damaged again before the end of the season. The disease appears in two forms—one the typical, large, circular brown patch with the weblike appearance in the early morning, the other the occasional irregularly-shaped patch. It appears first in early fall, is worst during the early winter, and seems to lessen somewhat in March. It can be controlled with mercury, and will not kill the turf if treatment is promptly applied. We seem to get about 2 weeks' protection by applying 7 ounces of the organic mercury preparation to 1,000 square feet. The ammonium phosphate fertilizer is applied about every two weeks with the mercury preparation. Ten days after the mercury has been applied we watch sharply for any sign of the disease. If the greens do not need fertilizing, a few spots of brown-patch can be checked with a light dusting with the mercury. Sometimes it is necessary to give the entire green a separate treatment. Every green is watered rapidly and lightly before 9 in the morning, to wash off the dew, which is ordinarily heavy and hinders the putting of early golfers. On nearby wind-swept island or beach courses the disease does not seem to appear, and it is possible that the removal of the dew by early-morning watering may aid in the control of the disease on our course.

The extensive drainage system, including three ponds and playable water hazards, and encountered to a greater or less degree on every hole, makes the 6,365-yard course sufficiently testing. There are but one extensive fairway trap and no sand traps adjacent to the putting greens. I believe that the winter tourist, whom I had in mind when I built the course, would rather play from a grassy depression or from the hard sand of a water bed, than from the soft sand and sand traps, and it results in a saving in maintenance costs.

Trees need enormous quantities of water to keep them in a healthy condition. An apple tree 30 years old gives off approximately a barrel of water a day in summer, and a good-sized birch tree gives off nearly 2 barrels of water on a hot day. A single oak tree is known to have given off into the air in the form of vapor approximately 800 barrels of water in a growing season.