

## Experimental Results at Miami Beach, Florida

By John Monteith, Jr.

The series of demonstration gardens which have been established by the Green Section was extended into Florida in October, 1930, when a garden of this nature was planted on the Bay Shore Golf Course at Miami Beach. The character of the work being undertaken at the Green Section's demonstration gardens has been described in numbers of the Bulletin for December, 1928; December, 1929; and June, 1931. While the garden at Miami Beach conforms to the general plan of the Green Section's demonstration gardens in the North, it has been sufficiently changed in detail to meet the requirements of southern problems. As in the northern demonstration gardens, notes are made each month on the condition of the turf in the various plots in the garden and a copy of these notes is forwarded to the Green Section's office in Washington. The garden at Miami Beach is in charge of Fred Hoerger. The fertilizer and grass ratings herewith presented have been taken from Mr. Hoerger's notes.

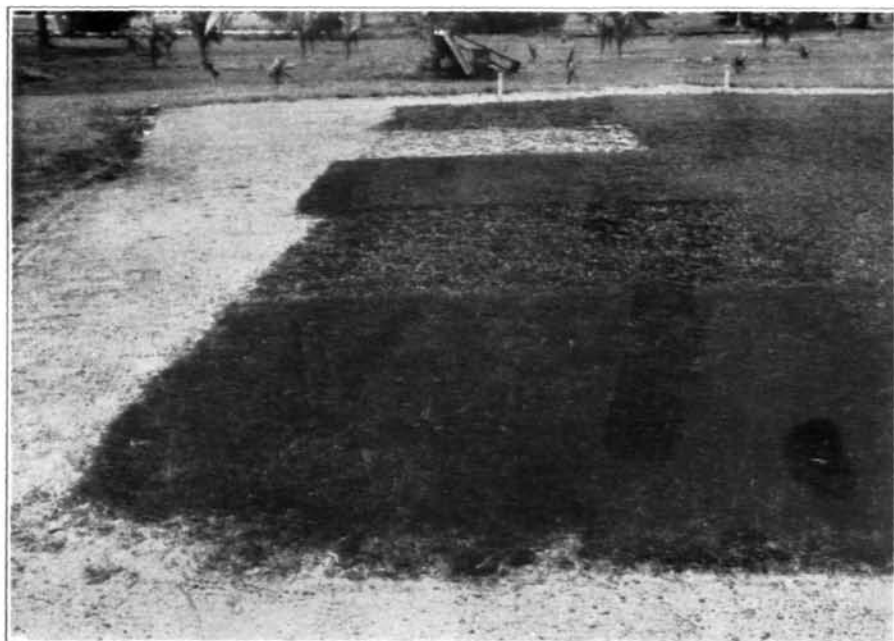


General view of the Green Section's demonstration turf garden at Bay Shore Golf Course, Miami Beach, Florida

The garden at Miami Beach is planted on natural sandy soil without the addition of marl or organic material, except the series of five plots where mixtures of clay and organic materials are being compared. As in the northern gardens, there are two main sections, one for putting green tests and the other for fairway tests. Different grasses and fertilizers are being compared in adjoining plots for their values for putting green and fairway turf. Some of the tests are designed to apply merely to winter use, whereas others are intended for all-year-turf purposes. The tests of fertilizers for both putting greens and fairways are made on Bermuda grass turf.

Each 100-square-foot plot in the putting green fertilizer series has received 1.6 ounces of nitrogen a month except that in July, August, and September only one-third of that rate was used. At this rate each plot in 12 months receives 1 pound of nitrogen, which is the

equivalent of 50 pounds of sulphate of ammonia to 1,000 square feet. During the course of the year each fairway plot of 100 square feet receives 7 ounces of nitrogen. It takes  $\frac{1}{2}$  ton of sulphate of ammonia to the acre to supply the proportionate amount. The nitrogen content was used as the basis for rates of application on the different plots—that is, all of the plots in the fertilizer series which received any nitrogen received it in equal amounts. The differences in the applications to the various plots therefore represent differences in the form of nitrogen or in its combination with other fertilizer elements.



Row of fairway grass plots at Bay Shore Golf Course, Miami Beach, Florida. Foreground, Bermuda grass; second plot, carpet grass; third plot, St. Lucie Bermuda grass; fourth plot (practically bare), Manila grass; fifth plot (in background), centipede grass

The following tables give some of the results for the first year at the demonstration garden. In going over these tables it should be borne in mind that the results are for one season only and that the winter season represented here was an unusual one in many respects in the section where this garden is located; therefore the summaries here given should not be read too critically. The tables do, however, include some interesting indications as to what may be expected from this type of work if properly conducted over a period of years on different types of soil. The favorable results obtained by using fertilizers containing potash offer one of the most interesting suggestions in the fertilizer tests. The fertilizers used on golf courses in the section of the country where this garden is located are generally deficient or entirely lacking in potash. It is indeed probable that, as a result of this type of work, fertilizing programs of golf courses in the South may be notably changed in the future.

PUTTING GREEN FERTILIZER RATINGS AT MIAMI BEACH NOVEMBER, 1930, TO  
OCTOBER, 1931, INCLUSIVE

	<i>Good</i>	<i>Fair</i>	<i>Poor</i>
Complete fertilizer 12-6-4.....	10	2	—
Complete fertilizer 6-12-4.....	8	4	—
Castor bean pomace.....	8	4	—
Cottonseed meal.....	7	5	—
Activated sludge.....	7	5	—
Sulphate of ammonia.....	1	10	1
Urea.....	—	8	4
Bone meal.....	—	5	7
Nitrate of soda.....	—	3	9
Ammonium phosphate.....	—	3	9
Check (5-E) (not fertilized).....	—	1	11
Sulphate of ammonia and lime.....	—	—	12
Check (4-C) (not fertilized).....	—	—	12
Check (5-A) (not fertilized).....	—	—	12
Check (6-E) (not fertilized).....	—	—	12

FAIRWAY FERTILIZER RATINGS AT MIAMI BEACH NOVEMBER, 1930, TO  
OCTOBER, 1931, INCLUSIVE

	<i>Good</i>	<i>Fair</i>	<i>Poor</i>
Complete fertilizer 12-6-4.....	10	2	—
Complete fertilizer 6-12-4.....	10	2	—
Sulphate of ammonia and muriate of potash....	10	2	—
Cottonseed meal.....	9	3	—
Sulphate of ammonia.....	5	6	1
Castor bean pomace.....	4	7	1
Activated sludge.....	3	8	1
Nitrate of soda.....	1	7	4
Bone meal.....	—	7	5
Manure.....	—	6	6
Tobacco.....	—	4	8
Sulphate of ammonia and lime.....	—	4	8
Ammonium phosphate.....	—	1	11
Lime.....	—	—	12
Check (11-C) (not fertilized).....	—	—	12
Check (12-A) (not fertilized).....	—	—	12
Check (12-E) (not fertilized).....	—	—	12
Check (13-C) (not fertilized).....	—	—	12
Check (14-A) (not fertilized).....	—	—	12
Check (14-E) (not fertilized).....	—	—	12

In the fertilizer tests the plots were rated as good, fair, or poor, according to the density and general vigor of the turf. The complete mixed fertilizer 12-6-4 had the highest rating in both the putting green and the fairway series. The other complete mixed fertilizer (6-12-4) was tied for first place in the fairway series and for second place in the putting green series. These two complete fertilizers were prepared by mixing sulphate of ammonia, commercial ammonium phosphate, superphosphate, muriate of potash, and sand. These are the same mixtures which have given such good results in the demonstration gardens on northern golf courses. The combination of sulphate of ammonia and muriate of potash in the fairway fertilizer series, as well as the two complete mixed fertilizers containing muriate of potash, indicate that potash is a valuable ingredient of fertilizers on the particular soil where this garden is located. The poor showing of ammonium phosphate, as compared with the two complete mixed fertilizers, further emphasizes the need of this soil for potash. It is interesting to compare these tables of results with the fertilizer

rating tables obtained by consolidating reports from several of the demonstration gardens on northern golf courses as presented in the Bulletin for December, 1929, and June, 1931. The low rating of the check plots emphasizes the poor condition of the sandy soil on which the garden is located and shows the need for fertilizer to produce satisfactory turf on such soil.

RATINGS OF PUTTING GREEN GRASSES AT MIAMI BEACH

*Northern Grasses Without Bermuda Base*

	*Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Annual bluegrass ( <i>Poa annua</i> ).....	good	good	good	good	good	good	good	poor
German mixed bent.....	good	fair	good	good	good	good	good	poor
Metropolitan creeping bent.....	good	fair	good	fair	fair	good	good	good
Seaside creeping bent.....	good	fair	good	fair	good	good	good	fair
Bulbous bluegrass ( <i>Poa bulbosa</i> )...	poor	poor	poor	fair	fair	poor	poor	poor

*Winter Grasses on Bermuda Base*

	*Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Annual bluegrass ( <i>Poa annua</i> ).....	good	good	good	good	good	good	good	poor
Redtop .....	good	good	good	good	good	good	good	poor
Colonial bent.....	good	fair	good	fair	good	good	good	fair
Italian rye grass (American).....	good	fair	good	fair	good	good	good	fair
Italian rye grass (European).....	good	fair	good	fair	good	good	good	fair
Kentucky bluegrass.....	good	fair	good	fair	good	good	good	fair
Perennial rye grass.....	good	fair	good	fair	good	good	good	fair
Seaside creeping bent.....	good	fair	good	fair	good	good	good	fair
40% rye grass, 20% redtop, 40% Kentucky bluegrass...	good	fair	good	poor	good	good	good	poor
Bulbous bluegrass ( <i>Poa bulbosa</i> )...	poor	poor	good	poor	fair	fair	fair	poor

RATINGS OF FAIRWAY GRASSES AT MIAMI BEACH

	<i>Good</i>	<i>Fair</i>	<i>Poor</i>
St. Lucie Bermuda grass.....	10	1	1
Bermuda grass.....	9	3	—
Carpet grass.....	8	4	—
Centipede grass.....	—	2	10
Manila grass.....	—	—	12

The tests with different northern grasses for winter putting greens included one set of five plots planted on freshly prepared natural soil without a Bermuda grass base. In another set of 10 plots comparison was made of different grasses on a Bermuda grass base. The results of this comparison are given in the accompanying table. The season was a generally unfavorable one for turf and Mr. Hoerger did not rate any of the plots excellent throughout the year. The initial ratings, which were taken in October and appear in the table in the column at the extreme left, were concerned only with the germination of the newly seeded grasses, and, as will be noted, were uniformly good except for bulbous bluegrass. All of the grasses listed were planted entirely for winter use and they were all rated as poor in June. The ten grasses on a Bermuda base fall into four ratings in the table. Annual bluegrass and redtop are tied for first place with a good rating throughout the season until May, when they both disappeared rapidly from the turf. Six plots were tied for second place in this series; these six have been listed

\* Report on germination.

alphabetically in the table. It is noted that all of these six plots continued in fair condition longer than the other plots of this series.

The garden included other tests of interest, but a full report of these results will be withheld until further data are available. Like all the other demonstration gardens, the one at Miami Beach has been made accessible to anyone sufficiently interested in grass culture to visit the garden. Many visitors interested in southern turf problems have gone over the garden from time to time during the year and made first-hand observations of the results obtained in the various series of plots. A Green Section meeting was held at the garden April 3, which was well attended by men in charge of golf courses in various parts of Florida.

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## All-Year Turf at Tampa, Florida

By Ray Tower

Forest Hills Country Club

Our golf course is situated on high, rolling ground six miles north of Tampa. It was built in 1925 and 1926 and opened in November, 1926. The soil is a light, deep sand. The 18 greens average in area 6,800 square feet, in addition to which we have 13,500 square feet of club house lawn maintained as a practice putting green. The average area of the tees is 1,500 square feet. The fairways occupy 55 acres; upon three holes the fairway turf is displaced by water hazards. These water hazards call for no special maintenance other than the keeping down of excessive growth of grass and sedge about the borders. The rough occupies approximately 35 acres, and the traps and bunkers 60,000 square feet. Our water supply, which is the same as that of residences in the locality, comes from deep wells and is medium-hard with lime. The course is in use 365 days in the year.

Our fairway construction presented no particular problems. The cleared ground was plowed about 4 inches deep, disced, harrowed, and leveled. Low places were filled and tile overflow lines laid in two places. Other fairway drainage was provided by deepening existing water holes, using the excavated dirt as fill, the open catch basins thus formed being so located as to form part of the course hazards. Nearly all of the fairways were dressed with 2 or 3 inches of black soil obtained from nearby dredging operations. These areas were limed and later fertilized with commercial organic fertilizers, chiefly blood and bone tankage.

The roughs received no special treatment; they were simply cleared of brush and stumps and mowed down to playable length.

The tees were brought to the desired grade and top-dressed with about 4 inches of the same black soil that was used on the fairways. This was limed and fertilized before being planted.

The greens were brought to contour and covered with a full 12 inches of the black soil from the dredging operations, limed and fertilized with organic fertilizers.

Originally the fairways were planted with stolons of Bermuda grass and were seeded at the same time with Bermuda grass and carpet grass. The carpet grass now predominates in all the fairways except one and in all the tees except one. All the greens were planted