Brown-Patch and Its Control at St. Louis

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The seriousness of brown-patch diseases as a problem in golf course maintenance varies greatly. With some clubs they are a major problem; with others scarcely a problem at all. The successful handling of these diseases, as with many other problems of golf courses, must be governed largely by local conditions; and on the judgment and experience of those in charge, much will depend.

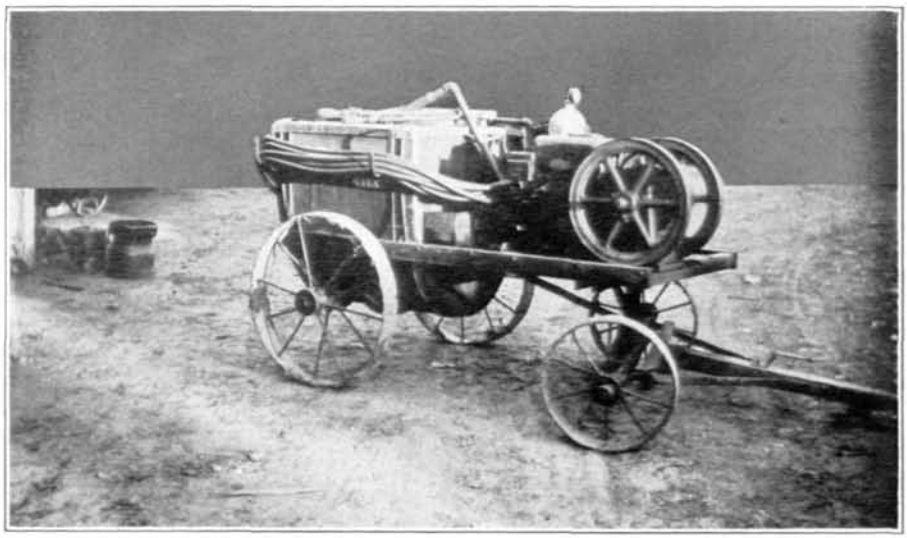
At Algonquin we have found that bent is the grass best suited for putting greens and that it is affected by brown-patch no matter how the soil is prepared or how the grass is handled. Our regular greens are seeded German mixed bent grass. Of our 18 temporary greens, about one-half are German mixed bent and the remainder are the Virginia strain of creeping bent. Most of our tees are creeping bent of different strains. Our practice green of 12,000 square feet consists of three plots, of German mixed bent, creeping bent, and seaside bent, respectively. We also have considerable areas of creeping bent of different strains in the fairways. We have been testing creeping bents, velvet bent, and other grasses for a number of years. Our tests indicate that the creeping bents are much more resistant to large brown-patch than are other grasses commonly used on putting greens. The Washington strain of creeping bent appears to be more resistant to large brown-patch than any of the other 25 strains we have tested; on the other hand, it appears to be the least resistant to small brown-patch. The soil of our greens is a clay loam.

Large brown-patch makes its appearance at St. Louis about May 15 and continues until about October 1. Between these dates it presents an incessant problem, especially serious during the three months of hottest weather. It is the chief problem on some golf courses in the St. Louis district, and, strange as it may seem, on some courses only a short distance from these, with similar grass and soil conditions, it rarely appears. The rapidity with which it develops, the frequency of its appearance under certain conditions, and the serious damage it may cause within two or three hours, make it by far the most serious problem we have at Algonquin.

Small brown-patch makes its appearance about two weeks earlier than large brown-patch and lasts from two to three weeks later in the fall. It is more or less of a problem on all courses in the St Louis district, but is not nearly so serious as large brown-patch, since its attacks do not appear so suddenly, giving more warning and thus enabling one to treat the greens before much damage results. Control measures may be relied upon to keep the disease out of the greens for a much longer period than is the case with large brown-patch; yet if treatment is delayed or improperly conducted when the first warnings appear, the results may at times be disastrous.

Both types of brown-patch are prevalent on our greens at Algonquin, the large brown-patch being the more serious. Prior to 1925, before treatments with mercury compounds came into use, it was expected as a matter of course to play on bare ground on our greens after the first of July, due to the ravages of brown-patch. Mercury treatments were inaugurated at St. Louis early in the season of 1925. Semesan was first tried, in applications of 1, 2, and 3 pounds

to 1,000 square feet, to determine whether the heavier applications would give protection for longer periods. It was found that the heavier applications did not materially add to the length of time the turf was protected. Our study of the problem at length led to the conclusion that better results could be expected if efforts were made to apply the chemical directly to the blades of the grass and not to the ground, since the disease attacked the blades and not the roots of the grass. So we began to experiment with a spray pump instead of the barrel sprinkler as a means of applying the chemical. We used the same concentration of Semesan, that is, 1 pound to 50 gallons of water—spraying this quantity on about 6,000 square feet of turf. With the spray pump this was enough to wet the grass on the 6,000 square feet thoroughly, while with the barrel sprinkler we could cover only 1,000 square feet with 50 gallons. It was found that such an application would effectively check an attack of brown-patch; and that while it did not give protection for quite as long a time as the heavier application, yet with more frequent applications the disease could be kept under better control at a greatly reduced expense.



Power sprayer used for the past few years at the Algonquin Golf Club in applying brown-patch fungicides.

At about the same time, experiments at the Arlington turf garden were directing attention to the use of corrosive sublimate (bichloride of mercury) and calomel (chloride of mercury) in the control of brown-patch. We began to use these chemicals in a small way. We soon found that the dose used at Arlington was too strong for the grass on our greens, producing in some instances severe discoloration, especially so when applications were repeated at short intervals. We continued these tests through the seasons of 1927 and 1928, gradually reducing the dose, especially of corrosive sublimate, as this seemed to be particularly effective in the treatment of large brown-patch. We finally decided that 1½ ounces of corrosive sublimate to 50 gallons of water was about the right dose for an area of 6,000 square feet; and

that is the dose we have used during the past season, 1929. It is a 1 to 4,400 solution. We used this solution throughout the worst part of the past season with satisfactory results and at a great saving in cost of the chemical used.

We have found that a heavy rain following an application is apt to result in an attack of large brown-patch no matter what treatment is used. During periods of hot weather with frequent rains and high humidity, large brown-patch becomes a trying problem indeed. Under these conditions we think an application of 1½ ounces of calomel to 1,000 square feet is the best treatment to hold the disease in check until the weather settles, since calomel is less soluble than corrosive sublimate and therefore less liable to be washed away. The calomel should be applied dry, mixed with sand to provide an even distribution. This treatment was used on one course within a few miles of Algonquin where only small brown-patch and no large brown-patch appeared throughout the season. In this case applications at such intervals as appeared necessary served to prevent damage over the entire season.

A comparison of costs of the various treatments we have relied upon at Algonquin based on present costs of labor and material will show how we have reduced the expense of handling the problem. According to our figures, the cost of labor in applying the chemical to the greens with a power sprayer is 1/6 the cost in applying it with a barrel sprinkler. The cost of the necessary corrosive sublimate is 1/10 the cost of the chemicals previously used. A single application as used at Algonquin a few years ago cost a total of $288 for the full set of greens. With the new system, employing a different method, different chemicals, and a reduced rate of application, the total cost for the same set of greens is $7.60.

The working out of this problem has called for a great deal of painstaking labor and careful observation, but we feel that results have justified both. The light dose of corrosive sublimate can not be applied by any other means than a spray pump; but in our case the saving in the cost of treating greens has paid for the equipment many times. We are using a sprayer rated at 12 gallons to the minute against 300 pounds pressure. We can spray our 20 greens in about 4 hours, 2 men doing the work. The machine cost us about $850 complete. Power sprayers cost from about $300 to about $850. A hand sprayer may be purchased for about $60 complete. Where much use is required, the better machine will result in saving much labor and enable one to treat the greens much more quickly, which is a very important consideration when brown-patch is active.

The results we have obtained from 1½ ounces of corrosive sublimate applied to 6,000 square feet we think about equal the results obtained from 1 pound of Semesan (chlorophenol mercury) applied to the same area in the treatment for both large and small brown-patch.

We have found the effects of calomel to be more lasting in the treatment of small brown-patch than either corrosive sublimate or Semesan. The latter however are much more effective in the treatment of active large brown-patch except when the weather conditions are such as to render the use of soluble materials impractical. Under such conditions calomel may be useful in holding the disease in check until the weather clears. In applying calomel we mix 1½ ounces of

calomel with 1 quart of sand. The sand should be just moist enough so the calomel will adhere to it when scattered on the green. If the sand is too dry the calomel will dust out and drift with the wind. If the sand is too wet the mixture can not be scattered well. In either case an uneven distribution results. The calomel must be thoroughly pulverized and thoroughly mixed with the sand. One quart of the mixture is measured out to be scattered on 1,000 square feet of surface. Men who can scatter the mixture and do a good job of it are scarce. Unless it is evenly distributed good results are not to be expected. A good plan is to scatter one-half of the mixture each way, following the marks left by the mower in cutting the green. We have not found it necessary to water such applications in. We do not believe that calomel can be distributed as evenly with the spray pump as it can be by hand.

For the benefit of those who may wish to try the application of a solution of corrosive sublimate by means of a spray pump I shall describe in detail the method we employ. We use 5 one-gallon glass jugs as containers for our concentrated solution. The following utensils are used in preparing the solution: 1 three-gallon granite pail; 1 granite funnel; 1 wooden stirring paddle; 1 pint bottle; 1 planed board 10 by 24 inches; 1 small scale which will weigh accurately; 1 china cup or glass tumbler for handling the chemicals. The corrosive sublimate must not be allowed to come in contact with metal when preparing or storing the solution. One of the glass jugs is filled with water to about 4 inches from the top. One-half pound of chloride of ammonia is put into the pail; this is used solely as a solvent for the corrosive sublimate, as without its use it is impossible to dissolve the latter. The water from the jug is then poured over the chloride of ammonia in the pail. One pound of corrosive sublimate is placed on the planed board, and with the bottle as a pestle is reduced to a powder by mashing the lumps. The powdered corrosive sublimate is then dumped into the pail containing the water and chloride of ammonia, and the mixture is stirred until both chemicals are thoroughly dissolved. The solution is then poured, through the granite funnel, into the glass jug. Should this not fill the jug, water is added until it is filled, and a stopper is inserted. This gives 1 gallon of stock solution. The jug is placed in a square box, large enough to contain the jug with a couple of old sacks wrapped around it to prevent breakage in hauling. After the solution is prepared the utensils are washed.

A pint bottle is used to measure out the solution. As 1 pound of corrosive sublimate is contained in the 1 gallon of solution in the jug, the solution weighing approximately 128 ounces, 1½ ounces of corrosive sublimate are contained in 12 ounces of the solution. To measure out 12 ounces of the solution, the pint measuring bottle is placed on the scale and filled with 12 ounces of water by weight. With the edge of a file, a mark is cut into the side of the bottle to show the height of the 12 ounces of water in the bottle. When the bottle is filled to this mark with the solution, a solution of 1½ ounces of corrosive sublimate is obtained. This quantity of solution is sufficient for a barrel, or 50 gallons of water. When the pint measuring bottle is completely filled, a solution of 2 ounces of corrosive sublimate will be obtained. It is possible that in some cases a 2-ounce solution in a barrel of water will not discolor turf. Should however discoloration result, the

strength of the dose may be readily reduced. Greens quickly recover from discoloration produced when this light dose is sprayed on the grass, as the roots of the grass are not injured as is liable to happen when stronger doses are used and watered in.

When ready to begin spraying, ¾ pint (12 ounces) of the stock solution, measured out in the graduated bottle, is added to each 50 gallons of water in the tank. Before starting to spray, the solution should be thoroughly mixed into the water in the tank. Fifty gallons of the mixture are sprayed as evenly as possible over 6,000 square feet of surface; this is not watered in, but the spray is allowed to dry on the grass. Best results may be expected when the grass is dry. If the greens are wet it is advisable to brush the water off the grass and allow it to dry before spraying, unless an emergency should render such delay inadvisable.

Care must be taken in using corrosive sublimate, as it is a deadly poison. There must be no leaks in the hose or anywhere about the sprayer, as severe burning of the turf may result from leaks.

After the day's spraying, the solution is drained from the tank and the tank and hose are thoroughly washed out by pumping clear water through for several minutes. None of the solution should be allowed to remain in the equipment over a period of several days.

The brass barrels with which spray guns come equipped will not withstand the action of corrosive sublimate. We have accordingly substituted iron pipe for the brass barrels, constructing a double-nozzle spray on each of our two lines of hose. After using the solution throughout the season we have not observed any damage to the equipment aside from the damage to the barrels of the spray guns.

We spray our greens on Saturdays during the worst of the brown-patch season regardless of whether brown-patch is evident or not; this is to give the greens protection from an attack over Sunday. This has served its purpose throughout the past season, except on one occasion, when unfavorable weather necessitated our spraying a few greens on Sunday. Ordinarily during the worst part of the season, which lasts with us for about three months, spraying twice a week has served to keep large brown-patch under control; only occasionally has it been necessary to spray the greens more often. Under this treatment small brown-patch has never appeared. The only time we have small brown-patch on our greens is early in the season or late in the fall, before and after the prevalence of large brown-patch. It is, however, found to occur on our creeping bent tees and temporary greens, which are not treated as often as the regular greens, and also on the bent in our fairways, which receive no treatment. It would be interesting to many to see brown-patch at work on the bent grass in these fairways where it has been planted and is growing in places without fertilization or artificial watering.

Success in controlling turf diseases, as in other problems of golf course maintenance, depends greatly on the use of careful methods. Haste and carelessness, with resulting uneven distribution of the chemicals applied, are very apt to bring failure.

A grassy hollow is often more effective than a sand trap, always more attractive in appearance, and never as expensive to build and care for properly.