



Bermuda grass from the apron around this green had spread until the green was reduced to the dark area shown around the flag. The grass was clipped short five feet beyond the original border, fumigated with a methyl bromide formulation and replanted with bent. Picture taken immediately after fumigation.

Fumigating With Gas Controls Bermuda Grass in Greens

By W. C. ELDER

In Oklahoma as well as other states in the South the spread of Bermuda grass from the aprons into the bent grass putting greens presents a problem to greenkeepers and others responsible for the care and maintenance of golf courses.

We have been interested in Bermuda grass control for several years in Oklahoma because it is our best lawn grass. It withstands our hot dry summers, responds readily to fertilizers and can be clipped very close without injury. Bermuda grass makes a very good turf for fairways but it will quickly overrun the bent greens.

When we started a turf study in Oklahoma two years ago the control of Bermuda grass was one of the leading objectives. Our problem was to develop a fast economical method for removing Bermuda grass that had encroached into the greens and to re-establish the bent grass in affected areas and control future re-encroachment from the aprons into the greens.

We finally decided to use chemical fumigation to eradicate Bermuda grass on the greens and at the same time fumigate the aprons several feet around the edges of the

greens and reseed both greens and aprons with bent grass. This would not only improve the lie on the aprons for critical short shots but it would also improve the green around the outer edge for putting.

Before our soil fumigation tests we had used several promising chemical weed killers. The only trouble we had with them was that the soil was sterilized for 50 to 60 days after treatment, making the greens unsatisfactory to play on. Consequently, we decided to test soil fumigation with methyl bromide using a liquid formulation which, when released under pressure gasifies and kills weed seeds, vegetation, and insects. Excellent results on weed and grass control had been reported in a paper read at the North Central Weed Control Conference by Dr. W. C. Dutton of The Dow Chemical Co.

We procured a supply of the fumigant and started our experiments during the 1949 season. Cooperating with Bob Dunning-Jones, Inc., Tulsa, golf course architects, greenkeepers, professionals, the greens' committees of several golf clubs and public courses in and around Tulsa and

Oklahoma City, and representatives from The Dow Chemical Co., we began our tests.

Applying Fumigant

At first we started our experiments by digging up the soil and then applying the gas. Later we tried applying the fumigant on the growing grass without disturbing it as it would be very undesirable to dig up the greens. We had very good results



Close-up of part of the green and apron being fumigated to kill back Bermuda grass around a green at the Highland Golf Club, Tulsa, Oklahoma. The gas is released through saran tubes run under the cover from the one-pound cans in the foreground.

where the Bermuda grass was clipped close to the ground before fumigation. In other words, if the greens are clipped in the usual way for playing before the fumigation, the grasses are killed without digging up the greens.

During our tests we worked out a simple method for applying the fumigant. The

gas is applied by releasing it under covers placed over the areas to be fumigated. We applied the gas to the area we wanted to fumigate by releasing the fumigant into open shallow pans placed under the center of a cover. The use of the shallow pans diffuses or spreads the gas under the entire area of the blanket and prevents it from soaking too deeply into the ground at the outlet.

The fumigant we used was a formulation of methyl bromide and chloropicrin (Dowfume MC-2) which comes in handy one-pound cans. The fumigant is dispensed by means of a so-called "Jiffy" applicator, at the rate of one pound per one hundred square feet. The applicator consists of a length of saran tubing with an outlet at one end and a sharpened steel tube and clamp at the other. When the clamp is shut the steel tube penetrates the can and permits the gas to escape through the Styron tube.

Holding Gas With Paper Blanket

The gas is held in close contact with the turf by an asphalt-laminated paper blanket or other gas-impervious cover. The paper can be folded inside to fit circular greens, allowing long strips to be treated at one time. This cover is supported by boards laid on bricks, drain tile, or anything that is handy, to form a ridge pole like an army "A" tent. The edges of the cover are weighted down to the ground with soil or top dressing placed on the cover around the sides. It is important to check the edges of the cover to see that there are no gaps between the ground and the paper through which the gas may escape. We found that we could effect a satisfactory seal by pat-



Greens are ready for play immediately after fumigation. The light-colored strip behind the lady golfers shows the condition of the turf after treatment. Greens and aprons have been re-seeded with bent grass.

ting the earth down around the edges with the back of a spade.

The cover should be raised by the supports about six inches from the turf. An asphalt-laminated paper which is impervious to gas was used in our tests for the covering material. Tobacco growers and others are using canvas covers treated to effect an impervious texture. Any material that is impervious to gas and resistant to rain and at the same time limp enough to



Close-up of dead Bermuda grass after fumigation. The dead stubble is left to protect the bent grass seed and topdressing during germination. In a few weeks bent grass will be re-established in the light-colored area.

conform to the irregularities of the ground surface will be found satisfactory.

After 24 hours exposure to the fumigant the covers were removed. Twenty-four hours later the bent grasses were planted. For conditions in Oklahoma the fumigation should be made some time in September as that is the best time to plant bent grasses. The Bermuda grass stubble should not be completely removed as it acts as an anchorage, but its most important role is to give a stable seedbed that can be played over immediately after seeding. It is more difficult to re-establish bent grass in areas where bent grass has been killed, than in Bermuda stubble. In the dead bent grass area it usually requires light raking and several disc spikings before and after seeding, followed by light top dressing.

Clean Soil as Weight

There is one precaution worth mentioning regarding the condition of the soil that is used to weight down the edges of the cover. Be sure that the top dressing used is fumigated so as to be free from weed seeds and harmful insects. It is impossible with average care to place top dressing around the edges of the cover without spilling some on the green. If the dressing is full of weed seeds and insects the greens may raise a new crop of weeds which will have to be removed. A little caution here to use clean soil will pay dividends.

In order to fumigate piles of top dressing, simply take a rake handle and force it into the piles at intervals about one foot apart. Then cover the pile with the paper and proceed to fumigate it in the manner just described, using two pounds methyl bromide per one hundred cubic feet of top dressing. Tests have shown that it can be thoroughly fumigated in this manner.

There are other ways to control Bermuda grass such as hand weeding, re-sodding and spraying with weed killers. However, considering everything, fumigation appears to be the best method we have found at this time for golf greens.

The outstanding advantage of this system of control is the speed with which Bermuda grass areas can be replaced with bent grasses. It requires less labor yet is comparatively inexpensive and readily available to anyone confronted with the problem of maintaining class "A" greens.

Kennedy, Muny Course Pro, Wants Women's Publinx

Joe Kennedy, professional at Knoxville, Tenn., Whittle Springs public course, is campaigning for a new national championship, a tournament for women public course players. Joe maintains that the great development of women's golf on public courses and the certainty of accelerated growth due to teaching of girls in high schools, colleges, employee recreation classes and at public courses establishes a need for women's national publinx event.

Kennedy makes a bid for the first tournament and has a local enthusiast, W. M. Vandergriff willing to underwrite the initial event. He says that the Whittle Springs hotel could be secured for use of contestants the latter part of July.

Indication of the merit of Kennedy's proposal is in the 2,483 entries in the 1949 men's amateur public links tournament of the USGA held at Rancho, Los Angeles. The 1948 Publinx at Atlanta drew 2,728 entries. Public and fee course play accounts for approximately 60% of the rounds played in the U.S. and although there are no statistics available on ratio of women's play at pay-as-you-play courses it is believed it is as high as at private clubs.

Pros at public and semi-public courses are requested by Kennedy to have their representative women golfers or women's organizations write him their views on establishing a national women public links championship so he can submit to the USGA a symposium covering this field for encouraging amateur competition. Kennedy's address is Whittle Springs Golf Club, Valley View Road, Knoxville, Tenn.