Two Years' Tests Reported on . . .

Snowmold Control

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SNOWMOLD is one of the most serious diseases of golf greens in the snow belt (Northern United States and Canada). Fairways and tees may be attacked, but damage is seldom as serious as on greens.

Damage to greens may range from complete kill to just superficial infestation. Complete kill often is associated with extreme environmental conditions such as a lingering ice pack produced by heavy drifting of snow and low spots which are quite wet and soggy for extended periods during thaws. Superficial infestations result from more or less mild attacks by the snowmold organism. Generally the growth of the organism is arrested before it invades the crown area and, as a result, there may be a heavy cob-webby growth (mycelium) covering the surface of the grass. When this dries, it becomes sooty black in appearance.

Another type of superficial infestation may be observed when the green is mowed for the first time. The circular spots which make their appearance at this time probably result from infestations which have been arrested before complete kill has taken place. Leaf growth has partially obscured the scar and when the green is cut sufficient leaf surface is removed to expose the scarred area.

Damaged areas should be checked closely and periodically as soon as unaffected grass begins to green up. If after 7 to 14 days there is no evidence of regrowth on the damaged spots, it can generally be assumed that complete kill has occurred. If this is the case, these spots should be removed and seeded, spot-sodded or plugged. Fortunately, complete kill is not as common as the superficial types of infestation.

As a general rule, most of the snowmold damage can be repaired and partially obscured by early raking, topdressing and fertilization.

The unsightliness and delayed greening from snowmold infestation, although it may be only of a superficial nature, is more than enough to justify treatment to control the disease.

Two organisms — *Typhula itoana*, the "gray snowmold," and *Fusarium nivale*, the "pink snowmold," are responsible for this disease. These organisms are active between 28 degrees and 42 degrees Fahrenheit, when adequate moisture is present. This environment exists as the snow pack melts in late winter and early spring. The common name, "Snowmold," has developed because of this association with melting snow. It should be pointed out, however, that the disease will develop whenever temperature and moisture are favorable, irrespective of snow coverage.

Several fungicides have been reported and are known to be effective against the snowmold organism. The list includes Calo-Clor[2], Phenyl Mercury (PMAS, Liquaphene, etc.), Teresan, Special Semesan and Cadminate.

([2]Trade names of chemicals and carriers included in the study are used for purposes of clarity and convenience.)

Retaining Control Chemical

The major problem associated with control of the disease is one of longevity and persistence of the applied chemical. This develops from the necessity of applying the fungicide in late fall or early winter, after the soil is frozen and prior to the first snowfall which will remain. Another problem is that of holding the fungicide in place when thaws occur in late winter — early spring. Often snow may melt — partially or completely — thus washing out or dissipating the material. Subsequent spring snows may find the turf unprotected and snowmold infestation results.

In an effort to find a material which would prolong the effectiveness and persistence of the fungicide, a snowmold test was located on an experimental green at the Toro Research and Development Center in 1953. This study was continued in 1954 and 1955. The results reported herein are based on the 1953-1954 tests (readings made in spring 1954 and 1955). The carriers included in the study were chosen because of their general use by golf course supts. in Minneapolis-St. Paul area.

The test involved two rates of two chemicals (PMAS at 1½ and 3 oz.; Calo-Clor at 2 and 4 oz.) and four carriers (water-spray-sand, topdressing and processed sewage sludge—Milorganite) in all possible combin-

ations. The study was replicated three times. The treatments were made in late fall only. Effectiveness of the various chemicals and carriers were measured by recording the actual number of snowmold spots which developed during late winter and early spring. Color ratings were also recorded during this period. Two or three thaws and subsequent snows occurred, thus providing excellent conditions for evaluating longevity and persistence of the various chemicals and carriers.

Two Years' Results

Two years' results have shown: (1) Both rates of Calo Clor and the 3 oz. rate of PMAS effective, irrespective of carrier; (2) The 1½ oz. of PMAS effective when Milorganite was used as the carrier; (3) Milorganite and topdressing produce greening up 10 to 14 days earlier than sand or spray; (4) Effectiveness of topdressing is not persistent; however, plots receiving Milorganite (at rate of 200 lbs. per 1000 sq. ft.) as carrier display superiority in density, vigor and color throughout most of the growing season — this even though the entire green is fertilized routinely.

As expected, untreated (check plots) were heavily infested with snowmold. Adequate rates of either fungicide produced satisfactory control without retreatment in the spring.

The results to date seem to indicate that the use of sewage sludge (Milogranite) and possibly topdressing improve the effectiveness of the low rates of phenyl mercury (soluble). The amorphus nature of the partially decomposed materials apparently hold the vapors of the mercury in place for a longer period, hence prolonging the effectiveness of the chemical.

The early greening of plots receiving Milorganite and topdressing may be partially explained by the thermal effects produced. The dark material absorbs more heat; hence, raises the temperature of the micro-climate enough to permit early metabolic (growth) activity.

The prolonged superiority (from a quality standpoint) of the Milorganite plots seems to be directly related to additional nitrogen received by the plots. The rate of material used was equivalent to approximately 12 lbs. of actual nitrogen per 1000 sq. ft. The results obtained (superior quality) are contrary to what may be expected from the application of this quantity of nitrogen over and above that supplied through the regular fertilization program. The failure to develop succulence and resultant damage associated with this condition may be partially explained by the slow breakdown of the sewage sludge. The application was made very late in the fall; low temperature at that time, as well as during winter, prevented complete breakdown.

Slow Decomposition

Subsequent spring temperatures were such that decomposition proceeded rather slowly, with no apparent ill effects. Quite possibly the grass is able to utilize some of the early products of decomposition (amino acids) for its very reduced metabolic activity during its period of dormancy.

Certainly this entire phase of the study requires further, more detailed investigation. Studies on the effectiveness and retention of mercury vapors by humus and related materials are likewise indicated.

This study was revised slightly in 1955, and now includes lower, more practical rates of Milorganite, as well as comparative plots of soluble nitrogen (ammonium sulfate) as a carrier for the fungicide. The test also includes plots of carrier alone — without fungicide. Results obtained in late winter — early spring of 1956, may permit a recommendation for snowmold control which will result in earlier greening of the turf, as well as control of snowmold.

Changes Made in National Open Qualifying Sites

TWENTY-SIX sections, instead of 25 as last year, will have qualifying rounds of 36 holes for the USGA Open at Oak Hills CC, East course, Rochester, N. Y., June 14 thru 16. Qualifying in Honolulu will be May 28; other qualifying rounds will be played June 4.

Entries must be in by 5 p. m. May 18 at USGA New York headquarters, 40 E. 38th.

Qualifying rounds in Long Island, Westchester County and northern New Jersey give the NY Met district three qualifying sites instead of one as last year. The PGA National course at Dunedin, Fla. gets the qualifying rounds formerly played at West Palm Beach, Fla. Other switches are from Birmingham, Ala., to Atlanta, Ga.; Baltimore instead of Washington, Falmouth instead of Manchester, Mass., Morganton instead of Fayetteville, N. C., and Dallas instead of Ft. Worth.

Phoenix, Portland, Ore., and Salt Lake City have been eliminated as qualifying round cities.

Number of qualifiers and exempt players will be 162.