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WINTER INJURY TO TURF

JUST as there are many different causes of injury to turf in the summer, likewise there are many causes of injury during the winter. Too frequently turf injury that occurs during late fall, winter and early spring is simply called "winter injury" or "winterkill" without any attempt to determine the specific cause. Suppose that a snowmold preventive treatment was made in late fall and that when the putting greens began to show color in the spring some injured turf was found. Should the practice of applying the snowmold preventive be given up or should one run back through the happenings of the winter in the hope of explaining the injury on some basis other than a fungus disease? The answer is rather obvious although many times the turf grower is unsatisfied because the snowmold treatment applied in the fall did not prevent all injury to the turf during the winter season.

Practically all winter injuries to turf are preventable. In order that these precautions may be used to advantage it is advisable to gain a knowledge of the grasses composing the turf; the prevalence, severity and control of cool weather fungus diseases; the drainage conditions, both at the surface and in the soil; and the ordinary weather conditions to be expected. With this information plus the opportunity to inspect the turf at frequent intervals during the dormant period the greenkeeper should be able to explain the injuries which may occur and take steps to prevent their repetition if sufficient funds are made available for the necessary work involved.

Injury by Low Temperature: Bermuda and other common southern grasses are confined in the South because of periodic injury from low temperatures farther north. Along the northern border of the area in which Bermuda grass is used for turf the greens may show winter injury while the fairways are free from it. Under the system of dual greens those for summer use are sometimes covered with pine needles, etc., in order to protect them during the winter. In other sections, simply withholding fertilizer after late summer has prevented this injury. Close clipping also may tend to lower the resistance of these grasses to low temperature.

Practically all of the cultivated bents, bluegrasses and fescues are tolerant of intense cold when they are in a dormant state. Conditions which induce active growth usually lower resistance to cold. It is the sudden drop in temperature following a period when the grasses are more or less in active growth that causes cold injury, and where winters are severe it is well to allow the greens to become dormant early. Late fertilizing tends to induce active growth of the grasses depending on the weather during the winter and early spring, and many times snow or ice coverings have a similar effect. If a turf is too heavily matted the plants are more apt to be injured by low temperatures. Grasses which tend to become green early in the spring are probably more susceptible to this type of winter injury than those which are rather late in becoming green.

Snowmold and Other Diseases: Snowmold may appear as a thick cottony growth of mycelium covering the turf or in later stages as irregular patches of grayish dead turf somewhat resembling brownpatch. In any case a rather definite patch is apparent. Snow is important for the growth of the snowmold fungi only to the extent that it provides a favorable temperature and moisture, because in the Pacific Northwest and occasionally elsewhere the disease is active during the winter season when there is an abundance of mist or rain but with little or no snow.

Red fescue, *Poa annua* and some of the strains of creeping bent appear to be particularly susceptible to snowmold. Of the common bents in use on putting greens, seaside creeping bent appears to be the most susceptible. The Columbia, Inverness and some similar strains are also in this class.

Covering greens with manure, straw and the like has proved unwise where snowmold has been found to be a serious pest. The use of any covering which keeps the grass wet after the snow has melted and the grass has commenced growth should be avoided. Fertilizing late in the growing season also has been shown to favor the disease. A layer of snow on unfrozen ground is particularly favorable for snowmold disease.

If the particular conditions are considered favorable for snowmold it is good insurance to apply a preventive treatment now. Even should the greens be covered with snow it is still practicable to apply corrosive sublimate or a mixture of calomel and corrosive sublimate at the rate of 2 to 3 ounces to 1,000 square feet, mixed with sand. Under the extreme western conditions where the winters are open, more nearly perfect control is obtained by repeating treatments with mercury compounds in the fall, winter and spring and applying less material each time. It is also a good practice to treat badly diseased patches as soon as they are evident in early spring even though a fall treatment was applied. Every means to bring about quick killing of the fungus should be used whether or not the mercury material is applied.

Another more or less common disease of late fall and early spring is ringspot, which does not yield as readily to the ordinary mercury fungicides at the rate applied for the prevention of snowmold. For more details on this and other diseases, including winter injuries, refer to the Bulletin of the United States Golf Association Green Section, Vol. 12, pp. 86-186.

There is a less known disease of cool weather occurring in New England caused by the fungus *Corticium fuciforme* which forms patches somewhat intermediate between snowmold and dollarspot.

There is always a question as to the advisability of removing snow in order to lessen the injury to greens. The snow may interfere with the flow of water so that drainage channels are needed through the drifts. However, there should be no need for wholesale shoveling of snow provided the mercury treatment for the snowmold disease has been put on and provided proper precautions as to fall fertilizing and resistant grasses have been taken.

Poor Drainage: Inadequate drainage is probably the greatest of all causes of wintry injury. There are a number of factors which are involved in this problem particularly during the winter. Although drainage may be good during the summer, the snow, ice and frozen soil all combine to prevent the water from running off or penetrating the soil in winter. Too frequently the turf is weakened by poor drainage conditions during the summer as well as winter.

An important cause of injury, particularly to seedling turf, is the alternate freezing and thawing (heaving) which is aggravated by poor drainage both on the surface and in the soil. As a rule heaving is worse in heavy soils than in light soils.

A covering of snow is usually desirable provided the soil is frozen under the snow and that natural drainage ways are opened through drifts as the snow is melting. Under heavy drifts there may be a tendency for the grass to initiate growth somewhat earlier than in more exposed locations.

An ordinary covering of ice such as a sleet storm has not been found harmful to turf. However, when the drain-

age is poor and ice forms in the pools there is a decided tendency for the turf to begin to grow, since the ice and water act in the same way as a window pane. Such ice should be removed or drainage ways opened through the ice as soon as possible, particularly from the greens, as the grass is rendered more tender and may be severely injured by a sharp cold wave. The theory that ice acts as a lens to concentrate the sunlight and burn the turf has not been proved and it seems hardly a plausible explanation of the damage which may result in such cases. Skating rinks located on turf have caused little noticeable injury provided drainage conditions were good.

It may be feasible to open trenches in late fall to drain pockets in the green or fairway. By next winter these pockets should either be filled or a worth-while channel should be cut out and the sod replaced. Seepage from shelves of rock or hard pan may water-log a large portion of a fairway or green for a month or more in the spring and so provide ideal conditions for fungus growth as well as prevent the roots from penetrating deeply. It must be remembered that water excludes the air from the soil which is needed by the root as well as the top of the grass plant. Drainage of such areas by means of tile lines which intercept the seepage above the wet area is a good remedy.

Drying of Turf: The drying action of cold winds has been found to injure exposed greens or parts of them where the snow blows off or where the fall of snow is light. Under these conditions it is a good practice to hold the snow or even shovel damp snow on them since these greens are usually free from snowmold disease. Injury of this type is particularly common in the western States. Where this type of surface drying occurs, the greens should be watered late in the season and occasionally during the winter if it is practical. Snow fences and light covering with brush may be useful to prevent the snow from being blown off and exposing the turf to excessive drying.

Winter Play: In a survey of the causes of winter injury on the golf course, the player also must receive some attention. Ordinary winter play will cause no serious damage to turf wherever the topsoil is not too heavy. There are, however, critical periods during the winter when the grass is apt to be injured and at such times players should not be permitted to use the regular putting greens. On some courses with sandy soil it may not be necessary to take play off the regular greens at any time. On most courses it should be necessary to close the greens only for a few days at most, and this is usually at times when weather conditions are such that there is little play. In placing the cups for winter use it is well to choose places near the front of the green and, wherever feasible, toward the side nearest the next tee. Such positions will tend to reduce the trampling across most of the putting green area.

WINTER SPORTS FOR THE GOLF CLUB

THE golf club located in the belt in which winters are mild to severe, particularly if located close to a city, should find several advantages in encouraging winter sports. The popularity of winter sports seems to be decidedly on the increase among both the younger and the older groups. If the club is readily accessible to the members much can be done to interest them in a program of winter sports. Even though the days for winter sports may be limited in the milder regions, the members could be advised by notices whenever conditions for winter sports are favorable. Much has been said about more time for recreation, and golf courses can be made to provide the proper facilities at moderate expense. Even if a sports program does nothing more than stimulate some off-season interest in the club it will have been worth while.

Accommodations for winter sports can readily be provided by the greenkeeper and his staff. In addition to extending the use of the course to members for a larger period it provides worth-while work for the greenkeeping staff so that the most desirable workmen may be occupied throughout the season. This provision often saves the greenkeeper from the unpleasant job of "breaking in" an entirely new personnel in the spring when the busy season opens.

Coasting and skating are welcomed by the entire family. It is not as simple to find the proper place either to coast or skate as it was some years ago. On many golf courses there are places that can easily be used for skating rinks or for coasting.

Skating is usually the leading winter sport. Ordinarily the tennis courts located near the clubhouse can be flooded to form a rink. The flat surface and the accessibility of water at the courts make these areas particularly desirable for conversion to skating rinks. Any flat area on lawns, fairway or rough where water is readily available may be flooded for skating. The turf will not suffer from the ice covering provided the ground is frozen well when it is flooded and if provisions are made to allow the water to escape quickly during thaws. If there is snow on the ground it should be removed before flooding. The best skating ice is made by repeated light spraying rather than heavy flooding. The latter tends to produce "shell ice," which is an abomination to skaters. Boards 8 to 10 inches wide are high enough around the outside of a rink to build the ice against. A small hockey rink with stake and board sides 3 to 3½ feet high should be provided for the children and possibly a larger one for the grown-ups.

Ponds and lakes on the course may be used as skating rinks. Bad cracks may be sealed with snow and hot water. Occasional planing, brushing and spraying of the ice will keep it in good condition at little cost.

To provide maximum enjoyment of the sport the skating rink should be provided with a heated house which need not be large but which should include toilet facilities. Light and music amplified from a phonograph will add much to the popularity of the rink, as will contests of various sorts. It may prove advisable to have a skating instructor available.

Coasting downhill on sleds or toboggans is a popular sport and there need not be any expense involved — only a hill well covered with snow. Many fairways with long hills may be used to advantage for such slides and the turf will not suffer provided no bare spots are used. Occasionally during the middle of the day small areas on the run which had a thin covering of snow may become nearly bare. Such areas may not be important enough to stop the use of the slide but they may result in some injury to the turf. By shoveling a thin layer of snow over such areas the grass can be protected and the slide greatly improved.

The skier can often be provided with a hill steep enough for an exciting ride at no expense. A ski trail or run cut through timber or smaller growth on a steep hillside will be even more appreciated. Small jumps properly placed can be provided with small cost and will give the skiing members some good fun and exercise. A long hill sloping towards the north or northeast is ideal.

GREENKEEPERS' CONVENTION

THE eleventh annual convention of the National Association of Greenkeepers of America will be held in Washington, D. C., February 2 to 5, 1937. The plans include a three-day educational program and an extensive exhibition of equipment and materials used in golf course upkeep. John Anderson, President, has arranged a new and varied educational program which should be of much interest and value to those who attend.

As has been the case in previous conventions, the Green Section is glad to cooperate with the Greenkeepers' Association in this program. Since the 1937 convention is to be held in Washington, the Green Section will welcome the opportunity to have attending greenkeepers visit the Green Section office or its turf experimental work at Arlington, Va., just across the Potomac River. If weather conditions permit, visitors will be shown the turf experiments at the garden and the greenhouse, laboratory and office activities of the Green Section.