This Poa annua *collar winter-killed in winter 1977-78. The bentgrass green survived the extended period under ice cover with no problem.*

Promoting Recovery from Winter Injury

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"NEVER HAS the winter weather in the East caused so much damage to the fine turfgrasses as this year."

Sound familiar? The winter of 1977-78; right? Or how about the winter of 1976-77? Actually, this quote is taken from the July 1963 USGA *Green Section Record* and describes the winter of 1962-63. It would be safe to say that golf course superintendents can never feel totally at ease about their chances to avoid winter injury.

Despite the best efforts of the superintendent to prepare his course for winter, to remove ice and snow and to make mid-winter snow mold fungicide applications, some courses still are hit by winter injury. Why winter injury strikes one section of the state and not another, one golf course and not the course next door, or one green and not the green 100 yards away probably never will be answered satisfactorily.

Fortunately, more than luck is involved in promoting the fastest possible recovery from winter injury. A number of good techniques have been developed for the introduction of new grasses into injured areas.

SET THE GROUND RULES

Ground rules regarding the nature of the re-establishment program should be set and made known to the entire membership through the Green Committee. The Committee should know what will be done long before damage occurs and about how long it may take to effect full recovery. Of paramount importance, try to ensure that heavily damaged greens will be temporarily closed until

An example of successful use of a winter cover over a green with a history of winter injury problems.

re-establishment is well under way. A little patience on the part of the members early in the spring will definitely pay off in terms of having the turf on the regular green in top shape far more quickly. Injured greens that remain in play recover painfully slowly.

START EARLY

We have found that the fastest and best results are usually obtained when the renovation work is begun as early in the spring as possible. It can be argued that the soil and air are too cold to promote fast germination and growth at this time, but the fact remains that the sooner the area is seeded, the sooner it is back in play. The golfers also like to see that something is being done to resolve the problem as early as possible. A green seeded a month earlier than another may be in play just a week or two sooner, but that is a significant period of time to golfers who are eager to play the regular greens after a long layoff.

PLASTIC MAY HELP

To partially overcome the germination and development problem due to cold soil and air temperatures in early spring, some superintendents have had excellent results by placing sheets of clear plastic over the seeded area. The plastic cover acts as a greenhouse, raising soil and air temperatures and keeping the soil surface moist. It is important to be prepared to remove the cover during warmer mid-day temperatures. Logs, boards and old tires work well to hold the plastic in place, as they must be moved daily to prevent the underlying turf from weakening. Black plastic causes drastic increases in the air temperatures below and should not be used. If reasonable care is taken, the use of clear plastic to promote early germination and growth can save several weeks of recovery time, especially when the spring weather is cooler and cloudier than normal.

SODDING VERSUS SEEDING

Sodding an area has some obvious advantages over seeding, but the situation has to be right to get the best results. Ideally, the new sod should be grown on a soil identical to the soil of which the green is constructed. If the soil accompanying the sod contains more silt and clay than the soil on the green, layering results and drainage becomes a problem. The sod is best taken from a nursery area on the golf course which has been maintained exactly like the regular green. If good sod is not available or the area to be treated is very large, then overseeding is the better choice. Another good reason for seeding is that it may take many months to true the surface after sod has been laid.

SLICE AND SEED

When overseeding is done, the basic prerequisite of providing good soil-seed contact is absolutely necessary. One accepted method is to

deeply verticut and broadcast seed over the area to insure that some of the seed will settle into the grooves. Spiking in several directions prior to broadcasting the seed may also contribute to the success of this operation. Another method is to use the machines which place the seed directly in the grooves in the same operation, thereby saving seed and ensuring good soil-seed contact. In the re-establishment of a green, it is best to go in two directions with this operation. For even better results, spike in several directions and broadcast more seed over the area after the machine has been used. A light topdressing should follow each overseeding.

We have found that chances for success are limited with this technique if the green is to be kept in play after overseeding. The crowns of the young plants are near the surface and the seedlings are crushed before they have a chance to mature. Under these circumstances it would perhaps be best to aerate, topdress and overseed, thereby giving the young seedlings an opportunity to develop in the aeration holes which protect them from traffic.

AERATE — TOPDRESS — OVERSEED

A good alternative to slicing and seeding, and one which many superintendents prefer, is to re-establish an area through aerating, topdressing and overseeding. Aerating relieves soil compaction and provides an excellent microenvironment for seed germination and turf development. As suggested above, this may be the preferred technique if the green must be kept in play during re-establishment. However, this method also will work far better if the green is kept out of play.

First aerate the green and remove or break up the cores. Then topdress at a rate of about two cubic yards per 5,000 square feet, broadcast seed over the area and drag or brush the material into the aeration holes. A seeding rate of about two pounds of bentgrass per 1,000 square feet should be sufficient. Some prefer to apply the seed before the topdressing and still others like to spike in several directions between the aerating and topdressing operations in order to provide more openings in which seedlings can become established.

Slicing and seeding in two directions is often recommended as part of a re-establishment program.

SYRINGE — SYRINGE — SYRINGE

Once the seed has been sown, nothing is more important to the success of the re-establishment program than keeping the seedbed uniformly moist. Allowing any portion of the surface to become dry may severely set back or kill many young seedlings. Syringing once per day is not enough, except perhaps where a mulch is used. Frequent watering is especially critical on a sandy base, and syringing may have to be done several times a day, seven days a week, depending upon the physical characteristics of the seedbed and the environmental conditions. Sometimes a light dusting of peat will help conserve moisture on high sand content greens. Periodic applications of a fungicide should be made to prevent damping-off of the young seedlings.

POST-ESTABLISHMENT CARE

In addition to frequent syringing, a number of other maintenance operations are recommended for best results. A starter fertilizer, high in phosphorus, should be applied at the time of or soon after seeding to promote root growth and seedling development. Syringing frequency can be reduced as the roots of the grass become stronger. Spiking the turf at least once per week is recommended because spiking will open holes in the surface crust through which new plants can develop. If you choose, seed can be put down after spiking at a rate of about ½ pound per 1,000 square feet. If overseeding is done, a light topdressing should follow at a rate of ½ to ¾ cubic yard per 5,000 square feet. Do not bury the seed with a heavy application of topdressing. When seed germinates and develops, it is most important to mow seedlings carefully with a sharp mower.

Finally, keeping traffic away from the newly seeded area is critical to ensure the best results. If a major portion of a green has been injured, it should be closed and a temporary green put into play. If a small, localized area on a green has been damaged, keep golfer traffic away by putting pin placements as far from the area as possible. If it is located in or near a walk-off zone, it will probably be necessary to redirect traffic.

A discussion of turf establishment would not be complete without mention of the weather. If cold, cloudy conditions prevail during much of the spring, as in the Northeast during 1978, recovery from winter injury can be delayed by several weeks or more. However, by following the procedures outlined above, successful results in promoting recovery can be obtained. Above all, remember to start your renovation work as early as possible, keep the seedbed evenly moist through frequent syringing, and keep traffic off the newly established areas as long as possible.