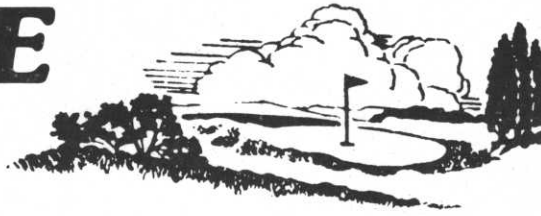


Minnesota Golf Course Superintendents' Association

AFFILIATED WITH THE GOLF COURSE SUPERINTENDENT'S ASSOCIATION OF AMERICA

MAY 1976

HOLE



NOTES

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"Winter Kill" of Annual Bluegrass - 1976

or

Why Golf Course Superintendents Grow Old Before Their Time

1976 will go on record as one of those years that Poa annua didn't survive the winter. Minnesota golf course superintendents face problems like this on the average of once every four to ten years. So we shouldn't be completely disoriented with a spring like we're facing this year.

This year greens came out of the winter dead or maybe even looking normal for a few days only to go downhill rapidly. Everyone is disturbed and questions like "Are you sure you sprayed that green last fall?"; or "That blankety-blank Poa annua"; or "Those lousy blankety-blank greens" are heard every day. Fortunately, more constructive discussions such as "What caused the problem?" and "What can be done about it?" are heard more often than not.

That's the way to go! Find the cause and correct the situation.

In order to answer these questions, it is necessary first to have some kind of understanding about what "winter kill" really is. There are several types of winter kill that we face in Minnesota. One is desiccation. That's simply drying out of the grass over winter to the point where the grass does not survive. We find this usually associated with knobs on the greens or places where the wind is directed between buildings or between rows of trees and in open, exposed situations. Desiccation may be particularly bad in open winters. That wasn't the major problem last winter.

There are three other types of winter injury that are all related. These were the culprits last winter and spring. One is direct low temperature kill where plants are simply killed when subjected to low temperatures. This direct low temperature kill of plants is most often associated with compacted soils, poorly drained sites or low places. Some consider ice damage as a separate type of kill. However, ice damage can be associated with either the direct low temperature kill where the crowns are hydrated (when crowns take up water) and where grass has been subjected to low temperatures or to inhibition of gas exchange.

Winter damage that is ordinarily associated with either ice or with free moisture on the surface of the soil is brought about by the inhibition of gas exchange in the soil and around the crowns of plants. The water and/or the ice seal the gases in the soil and the problem may be aggravated as the soil thaws and the ice melts inhibiting gas exchange. Under these conditions a buildup of toxic materials takes place resulting in direct kill of grass. It looks like this was a major factor in "winter kill" this spring with annual bluegrass as well as the direct low temperature kill of annual bluegrass in low or poorly drained places where the crowns became hydrated and frozen. On those locations on greens where samples smelled like sewer gas you may be fairly sure that a lot of the damage was associated with the gas exchange problem. Those areas on greens with substantial kill but a soil sample had no foul odor probably were killed by direct low temperature where the crown hydration-freezing situation prevailed.

Before proceeding further it would probably be useful to review some of the characteristics of annual bluegrass. First, annual bluegrass or *Poa annua* is not an annual. It's really a biennial. It flowers and seeds prolifically in the spring and fall. These seeds germinate in the spring and also in the fall. Seeds that germinate in the fall establish new plants that overwinter as new plants while the seeds that germinate in the spring establish plants that may overwinter the next year. In both cases, very young plants and the older more mature plants are susceptible to "winter damage".

One of the other characteristics of annual bluegrass is that if it is growing in free moisture the crowns become hydrated and in this condition become very susceptible to direct low temperature damage. The temperatures really don't have to be very low to kill the grass under those conditions. Also, as a comparison, annual bluegrass will not tolerate submersion nearly as well or as long as the bentgrasses.

To summarize then, it looks like our annual bluegrass was killed in two ways. First, in some situations, it was killed from direct, low temperature stress of hydrated crowns and in other situations from the inhibition of gas exchange and build-up of toxic chemicals and gases in the root zone and around the crown while the surface of the soil was wet during the spring thaw.

Why did it happen this year? It all started last year with a warm dry fall extending into late November. Just prior to freeze-up last fall it rained, moistening the surface soil. The rain was followed by subfreezing temperatures and wet snow accumulation so the grass went into the winter under very moist conditions. In fact, the soil did not freeze as deeply as usual because of mild temperatures. In January a check showed that in many places there was only two or three inches of frost under the snow. Then the thunderstorms in February accentuated the moist situation at the soil surface under the snow. Many superintendents found from one to several inches of ice on the greens at that time. Some removed the ice and others didn't but in any case the situation was set up for direct low temperature kill or for inhibition of gas exchange and poisoning of the plants.

What can we do about it? There are several alternatives. One of them might be to do nothing. If nothing is done the annual bluegrass will be back in June. By the end of July people will probably forget the problems they faced this spring. Another alternative might be to either convert the greens to bentgrass or to increase the bentgrass population on the greens. One procedure would be to simply spike the greens several times and overseed either with seed spread by means of a drop spreader or by hydroseeding. Another alternative would be to aerify a green, scarify the surface with a vertical mower (which would also break up the plugs) and then to overseed. Some people might find that they would have better success if they overseeded first and then used the aerifier and the scarifier. Another procedure might be to use the aerification-scarification-overseeding operation plus a top dressing. If top dressing is used you would have to be very careful that you didn't bury the seed too deeply.

It is important to note that aerification will be particularly important in situations where kill was caused by gas exchange problems. Aerification will allow the toxic materials to dissipate faster and for the soil situation to improve rapidly.

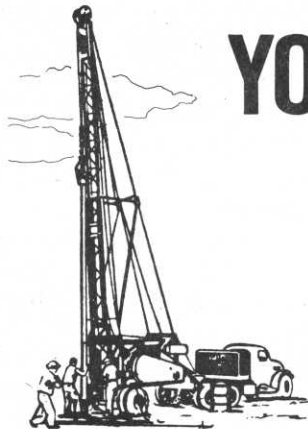
If you select Penncross as the bentgrass that you want to establish on your greens, an overseeding rate of 1/2 pound of seed per 1,000 square feet is suggested. If Seaside bentgrass or Emerald bentgrass is selected, you may want to use a pound or a pound and a half per 1,000 square feet. If the seed is to be applied dry, there is little problem when you apply it, either before or after the aerification, scarification or spiking. However, if you intend to apply the seed wet, that is through your sprayer, then it would be best applied after you've completed preparation operations. For those superintendents who have irrigation available at this time, it might be useful for them to consider soaking their seed overnight or until the seed is swelled. By doing this you may gain several days in the germination process. However, you must be very careful that once the seed starts to germinate that it has a continuous supply of moisture until it becomes fairly well established.

You may want to consider using a half a pound of actual nitrogen per 1,000 square feet in the form of a natural organic fertilizer or a non-burning type fertilizer after overseeding to insure an adequate nutrient supply for the new developing seedlings. Of course, you will want to keep people off these overseeded greens during rainy or wet periods.

It may be useful for you to let the membership of your club know what you're trying to do before taking on the task of converting greens to bentgrass at this time. It probably would be useful to let them know what to expect and that the greens will green up later in the spring.

I would like also to suggest that you take pictures or slides and keep records of what you do and how the treatments work out. It may even be useful then for some monthly meeting or to set aside some time at the annual meeting to exchange information, to show slides of before and after and to discuss the successes and failures of all your operations.

Good luck and best wishes for a good year. If I can help, don't hesitate to call. Thank you.



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