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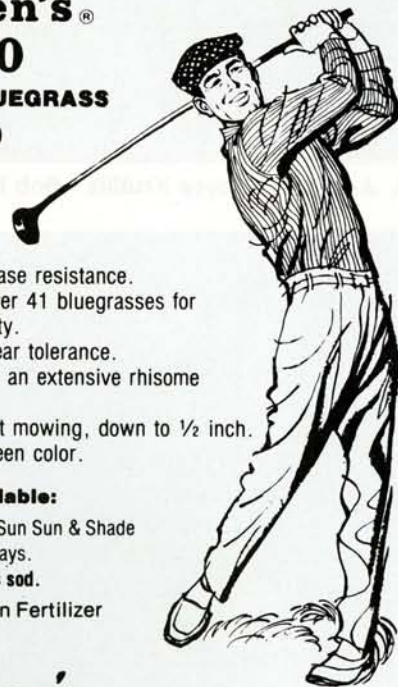
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Doc. Eshelman - Prayer Breakfast Speaker

WINTER DAMAGE

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 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

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