

oxygen. True, the extra water is not needed but it did the trick by providing oxygen and lowering the temperature. Without oxygen, roots cannot absorb water and grass actually wilts with its roots standing in water.

Restoring Health — Patience and understanding is needed between the membership and the supt. when there is loss of grass. The supt. didn't want it to happen. It happened in spite of everything he did to prevent it. Actually it is a good time to assess overall conditions and to determine the weakest point in a management program.

The supt. no doubt will be spiking the damaged green frequently. This is designed to get more oxygen into the soil and gently to prime the roots to stimulate new root growth. He may sow some seed more quickly to restore the surface to its usual good condition. He may gently dust hydrated lime over the greens to check diseases and stimulate recovery. He may topdress lightly to improve the putting qualities until the grass becomes full again.

These and other techniques will be brought into play. If the green chmn. and committee members know what is going on (and why) they can help soothe the ruffled feelings of the members and keep them off the supt's. neck.

Improper Drainage

Prevention — Modern maintenance programs are designed to avoid loss of grass in summer, or at any other time. Occasionally a green is built without proper drainage. All surface water must run clear across the green and spill out on the approach, injuring both the green and the approach.

The green may have been constructed with "built-in pockets," a cardinal sin. The subgrade may be of heavy, impervious clay and also pocketed so that there can be no sub-drainage. Under these circumstances it is virtually impossible to avoid losing grass when the combination of conditions are all wrong.

Given his head, adequate equipment, labor and materials, the supt. will correct the "built-in mistakes" before he gets into serious trouble. He will have a large putting green sod nursery of the best types of grasses upon which he can draw for replacement sod to repair damage. So, before the supt. is called on the carpet to explain why he has lost some turf, it might be wise to first find out what he is lacking that keeps him from doing the things that might have prevented or minimized loss.

One thing always to keep in mind is the fact that, when the going gets rough, it is the weaker grasses that go first, leaving the better adapted types to spread and to replace the less desirable ones. Also, loss of grass is not always catastrophic. It might be a blessing in disguise, giving the supt. a chance to replace weak turf.

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Manure vs. Commercial Fertilizer

Q. One of our members thinks that manure is the only way to fertilize a course. Another influential member agrees with him because it sounds inexpensive. Another member is neutral but some of us are holding out for commercial fertilizer. Do you have any pamphlets on manure versus commercial fertilizer, any facts and figures? We have put a lot of seed on the fairways this year with only a thin cover of manure. Some of us believe that we need to put on something additional or we will waste a lot of seed. Perhaps you know of a commercial fertilizer outfit that could tell us just what manure can and cannot do. (Colo.)

A. I'm not even going to look back into the literature on facts and figures on manure versus commercial fertilizer because I don't believe we need that kind of an argument to relegate manure to the farm where it can be plowed under to do the most good. Many years ago, when there was no commercial fertilizer, manure was about the only recourse. It was composted until it was odorless before it was used on the course and then it had a somewhat higher value. Manure is distinctly unsanitary. It brings in many weeds that are undesirable. It is expensive compared to commercial fertilizers, even though manure is "for free." By the time manure is hauled, spread and the very low nutrient content is partly absorbed by the grass (incidentally a very large part of it escapes into the air before it ever feeds the grass), the cost of the "free" manure is much higher than commercial fertilizer. The commercial fertilizer is weed-free, it is clean, easy to handle and there is less loss and waste with it.

There is plenty of evidence to show that when manure is applied to the surface of the land, a large part of the nitrogen, the growth promoting element, is lost to the atmosphere. The best use for manure, as any county agent will tell you, or any good farmer, is to be plowed down shortly after being applied. That, in itself, should practically rule it out for use on a golf course.

Perhaps one way to get at the problem is to actually sit down and figure costs. I shall be glad to help you figure those costs if you can lay the facts before me. Get the prices of available commercial fertilizers in your area and then give me the prices of manure, by the ton, applied to the course. Calculations such as this have been made many times in the past and the end result is that everybody has stopped using manure and is now using commercial fertilizer.