Finding Solutions for Poorly Drained Greens

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poor root development, etc. This prolonged period of wetness also makes them more subject to soil compaction, a factor that compounds the drainage problem.

This problem is made worse yet by careless irrigation practices on these greens. Since they stay wet for a longer period of time, greens located in pockets of trees should not be irrigated as often or as heavily as other greens. Superintendents who do not recognize this and who don't make the necessary adjustments often blame the subsequent turf problems on poor soil drainage.

The solution to this drainage problem is sometimes as simple as removing or thinning out a few of the nearby trees to improve sunlight penetration and air circulation. Adjustments to the irrigation program may also have to be made. If trees cannot be removed for some reason, or if these practices do not work, then the traditional methods of drainage or reconstruction may have to be used.

The Effects of Traffic

Many greens that exhibit adequate drainage characteristics under light to moderate use can develop poor drainage symptoms when subject to heavy traffic. When a municipality takes control of a private club, for example, this scenario is quite common. It also can occur when a switch is made from walk-behind greensmowers to triplex greensmowers.

The cause of the problem in this situation is compaction in the upper part of the root zone. Water infiltration is reduced in compacted soils, causing runoff and puddling symptoms in many instances. Also, compacted soils do not dry as quickly, compounding the problem even more.

When poor drainage symptoms occur due to the effects of heavy traffic, cultivation practices should be increased. Core cultivation, followed by core removal and topdressing with a sandy, compaction-resistant material, should be practiced as often as necessary to improve and maintain good water infiltration. Deep-tine cultivation may be needed on soils that are being affected at a greater depth.

Green design sometimes impacts the effects of traffic. For example, heavily trafficked greens that lack adequate cupping area can show severe symptoms of surface compaction and poor drainage in the most common hole locations. By redesigning the green to expand hole location areas, these symptoms can sometimes be greatly reduced or eliminated.

When traffic problems occur on walk-on and walk-off areas, redesigning the green or the nearby sand bunkers can sometimes relieve the symptoms. Also, switching to walk-behind mowers for part or all of the time can significantly reduce traffic effects.

Dealing with Poor Drainage

If drainage symptoms persist, even though the problems mentioned previously have been addressed, then a more direct approach to solving the drainage problem will be needed. First, the cause of the drainage problem in the green needs to be determined. It could be one or more of these three possibilities:

- Poor surface drainage.
- Poorly drained soil
- Layering problems.

Poor surface drainage is often recognizable by the surface puddling that occurs after light to moderate rainfall or irrigation. It stems from poor green design or settling after the green was built.

Poor surface drainage can be overcome in several ways, depending on the extent and severity of the problem. In some cases, low spots can be eliminated by selectively topdressing the area on a light, frequent basis. Where a broader area is involved, sod may have to be removed, the subsurface regraded and the sod replaced. In some instances, the entire surface may have to be stripped, regraded and resodded, or be rebuilt completely. Sometimes, nothing at all needs to be done if good surface infiltration can be maintained with a program of regular core cultivation.

When poorly drained soil is the cause of the problem, developing a solution is usually a matter of degree. Where the problem is not too severe, a good program of core cultivation, core removal, and topdressing with a sand or high-sand-content material affords relief over a period of years. Deep-tine aerification also can be incorporated into the program for faster results.

Where the symptoms are severe, the addition of drainage tile to the green may be necessary. The installation of 2″ to 4″ plastic perforated pipe sometimes works quite well, though the disruption to the putting surface can sometimes take years to eliminate. Various types of sand injection systems and geotextile-covered drainage systems have been tried, but in many instances the results have been insufficient or temporary. If a green has a long history of drainage problems, the best solution is to rebuild to USGA specifications.

Layering problems caused by poor construction, topdressing inconsistencies or some other factor, can sometimes be overcome by breaking through the layer and allowing water to reach the well-drained soil below. This is accomplished by regular core cultivation or deep-tine cultivation, depending on the location of the layer. If the coring holes are filled with sand, real progress can be made in overcoming the effects of the layer. In a more severe case, it may be necessary to add drainage tile. Greens that do not respond well to these techniques should be rebuilt to USGA specifications.

Summary

Green drainage problems aren't necessarily what they appear to be. Poor irrigation practices, tree effects and traffic effects sometimes mislead golf course superintendents into thinking they have a drainage problem. On greens where poor drainage is identified, the cause of the problem could be 1) poor surface drainage, 2) poorly drained soil or 3) layering problems. The cause must be determined before a good solution can be developed and implemented.