



After flooding recedes, the turf turns brown or dies, the soil remains a problem for play, traffic and turf growth long thereafter.

Water Effects on Turfgrass Wear

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WATER IS JUST one factor that has an effect on turfgrass wear. Other factors include cutting height, fertility level, species and cultivars. Water, therefore, is only one of the many critical concerns over which the turf manager exercises control in his attempt to provide a more wear-tolerant turfgrass plant for golf.

Since irrigation can be controlled, it has been found helpful to water perennial bluegrass areas deeply and infrequently. On well-drained soils, deep and infrequent irrigation of perennial grasses

helps minimize mechanical and physical damage to the soil. Furthermore, maintaining an irrigation regime that encourages perennial grasses will discourage annual grasses.

Research has shown that perennial grasses are substantially more wear-tolerant than *Poa annua*, the most abundant annual species found on golf courses. When cloudbursts, unexpected rainstorms or malfunctions in the irrigation system occur, it is important to route the traffic and minimize it so that damage to the golf course will

be minimal. In areas where water accumulation is a continuing problem, drainage improvements must be made. If necessary, a pump should be installed to remove excess water within a reasonable period.

Excess amounts of water in plant and soil affect both plant and playing conditions. When saturated soil conditions exist, reduced amounts of oxygen in the root zone inhibit the metabolic functions of the plant, thereby causing the turf to become thin and weak. Occasionally, during the hot summer when excessive water accumulates within the soil profile, turfgrass loss occurs because of a phenomenon known as wet wilt. Furthermore, traffic over a saturated soil causes soil compaction, and it could cause permanent damage to the soil system. Damage to the green and tee end of fairways is evidenced by large equipment turning in those areas. Also, since many people enter and exit on the putting surface from the front, additional mechanical and physical damage may occur on the approach area of the green.

Just as excessive amounts of water are externally damaging, excessive amounts of water forced internally are equally detrimental to turfgrass growth, wear and playability. The turfgrass plant is composed mainly of water. This water is essential for transporting nutrients, amino acids and other compounds vital for growth and for sustaining daily metabolic functions. Also, water is

essential in the cooling process of the turfgrass plant, known as transpiration.

When excessive amounts of water occur within the turfgrass plant, it is not as tolerant of environmental stress. These environmental stress conditions include foot/vehicular traffic, high winds, and high or low temperatures. Succulent or delicate plant shoots have a reduced wear tolerance and tend to promote "flyers." Research has shown that turfgrass areas maintained under excessive nitrogen fertility levels, deficient potassium levels, intense irrigation or areas of low light intensity are more likely to exhibit wear injury.

As the use of golf courses and other large turfgrass areas increases, it is important that measures be taken in an attempt to cope with increased traffic. Therefore, it is essential to provide drainage in areas where it is needed, maintain adequate but not excessive nutrient levels and above all to irrigate judiciously. Also important are the cultural and management programs of coring, slicing, spiking to help provide a healthy environment for turfgrass growth.

A well-balanced turfgrass maintenance program will greatly enhance turfgrass density and wear quality. Wear tolerance and plant density also contribute to playing enjoyment. A full, firm turf stand for the ball to sit up on and a firm soil to play from, add immeasurably to the enjoyment of the game. Water management is extremely important to all of the above.

Wear strips quickly develop when traffic is forced to confined area between fairways on a heavily played public course.

