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The Science of Spring Transition

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The term "spring transition" refers to the change of a winter overseeded cool-season turfgrass community back to a green turf originating from the understory of a dormant warm-season turfgrass, typically bermudagrass (*Cynodon* spp.). Prior to the 1970s the spring transition problem was one in which the winter overseeded ryegrass (*Lolium* species) died before the bermudagrass (*Cynodon* species) greened up in the spring, thereby resulting in several weeks of a brown turf surface. This spring transition problem was particularly severe when annual ryegrass (*Lolium multiflorum*) was used. In contrast, the release of a number of improved turf-type perennial ryegrass (*Lolium perenne*) cultivars eliminated the period of brown vegetation during the normal transition period. However, a new problem emerged in that **the new turf-type perennial ryegrasses and other species including rough bluegrass (*Poa trivialis*) persisted for too long** a period of time, extending beyond the normal green-up period of the bermudagrass. Frequently associated with this persistence is loss of the bermudagrass turf. In some cases the perennial ryegrass persists into the summer period before it dies of heat stress. When this occurs there typically is not sufficient bermudagrass surviving, and thus replanting of the putting greens is necessary.

A number of potential causes for poor spring transition and loss of the winter overseeded bermudagrass have been proposed. Included are a weakened bermudagrass caused by improper autumn cultural practices and injury from such external stresses as spring root decline, direct low-temperature kill, plant water stress, diseases, and allelopathy. However, **by far the most important limiting factor causing poor spring transition due to death of the dormant bermudagrass under the overseeding canopy is light exclusion.** Thus, the first priority in spring transition is to reduce the canopy density of the winter overseeded cool-season grasses to the extent that sunlight is allowed to reach the underlying lateral stems of the bermudagrass. When the temperature rises to the induction threshold, the new leaves start to be initiated from nodes on the lateral stems of the bermudagrass. These leaves will die if there is not sufficient sunlight or radiant energy to sustain photosynthesis due to shading by the upper canopy of winter overseeded cool-season turfgrass. This mechanism is much like attempting to grow bermudagrass in the shade under a tree canopy. The

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