

# Timing is Everything

## What's wrong this picture II

BY DR. JEFF KRANS

**T**his is a follow-up article to "What's Wrong with this Picture?" in the May issue, page 30. There I addressed two management strategies. One strategy was based on the concept of bringing your turf to game-ready status as soon as possible, then holding quality until game day. The other strategy stood on the concept of delaying game-ready status of the turf and peaking just before game day. Using turf biology as a guide, I concluded that you should delay your quest for game-ready quality and peak just before game day. How does a field manager achieve this objective?

There is no universal management schedule that will achieve the above stated objective for all fields in a uniform manner. Each and every field is unique in that they have a definable location and composition (zone of climatic adaptation, soil composition and grass community); type and sequence of sports played, and most importantly, game schedule.

These criteria make-up the field's profile. A field manager must schedule field activities based on the principles and concepts of plant and soil science in concert with the field's profile. In addition, a field manager should have a clear picture of their anticipated end product.

Now some managers may say that their end product is obvious: high quality sports turf. But what exactly is meant by high quality sports turf? Sports turf experts have addressed this question and generally agree on a list of criteria. A high quality sports turf will have solid traction, low surface hardness, high traffic tolerance, and true ball response properties. Translated into turf characteristics, the field should have high verdure (high leaf and stem biomass below the height of cut), prodigious lateral stem development, and a deep and extensive root system.

Achieving these turf characteristics is a challenge within itself, but achieving these characteristics on time is an even greater challenge. Because all field profiles are different, attaining these surface features must be based on turfgrass growth and development principles that will provide a guide rather than a schedule of activity.

### Building verdure

Building verdure is one of the key turfgrass features in sustaining a safe and playable field. Past research studies have reported that the level of verdure is highly correlated to wear tolerance. In common sense terms, this can be interpreted as "the more you start with, the more you end up with."

Of course species selection plays a role in biomass accumulation, but what cultural practice can be used to promote verdure in all species? One of the most powerful tools to create verdure is height and frequency of cut. Mowing provides the manager with the opportunity to stimulate and layer biomass. This is achieved by adjusting mowing height during the course of the growing season. Within the mowing height tolerance range of any species, mowing should start at the low end of the range, then move upward. The early low mowing height stimulates dormant axillary buds to break dormancy as well as reduce leaf sheath and blade lengths (Figures 1 and 2).

As time progress towards game-day, height should be adjusted upward until the designated game height is reached. The practice of low-to-high cutting height adjust-



Figure 1. Bermudagrass turf cut at 3/4 inches causing prostrate growth and shortened leaf sheaths and blades. A gradual increase in height will layer biomass and build verdure.



Figure 2. Bermudagrass turf cut at 1 1/2 inches causing upright growth and elongated leaf sheaths and blades.



ments will promote verdure development by layering or concentrating shoot biomass below the height of cut. However, as previously stated, not all fields can be treated the same and a low cutting height on a cool season turf during peak heat stress would not be recommended. In this case, a higher summer time cutting height should be adopted to sustain a more vigorous turfgrass plant. Once the stress subsides, the appropriate mowing height strategy can be used. In this and other cases, the field manager must always weight each decision and draw compromises as required.

Another cultural practice that affects shoot biomass is nitrogen applications. As stated in the May 2002 article, an aggressive nitrogen application should be avoided early if there is not an early game scheduled. Early application should only meet the need of achieving a closed canopy. As the game-day schedule approaches, nitrogen applications can be increased to achieve the anticipated growth that will be needed to recuperate from post-game defoliation and divoting. In the context of overall fertility management, proper nutrient balance, levels, and pH levels should never be compromised.

Creating a wide-ranging network of lateral stems (tillers, stolons, and/or rhizomes) is also a key component of a safe and playable field. One of the most direct relationships of lateral stem density and a cultural practice application is seeding rate (Table 1, and Figures 3 and 4). Research studies have repeatedly shown that a seeding rate beyond the recommended level retards lateral stem development in all turfgrass species. Applying only the recommended seed number per unit area may be difficult for some managers, as quick cover (due to high seeding rates) is usually interpreted as a successful planting.

**TABLE 1: Turfgrass seeding guidelines for sports fields**

Turfgrass common name	Lbs. per 1000 sq. ft	seeds per sq. inch
perennial ryegrass	7 to 9	13 to 19
Kentucky bluegrass	1 to 1.5	10 to 14
tall fescue	7 to 10	10 to 13
bermudagrass (hulled)	.5 to 1.0	10 to 12

in response to these practices is due in part to enhanced light penetration and the cutting or wounding of stem tissue. These signals are the triggers that tell the plant to make a developmental change. The stimuli that enact the biological changes occur at the hormonal level.

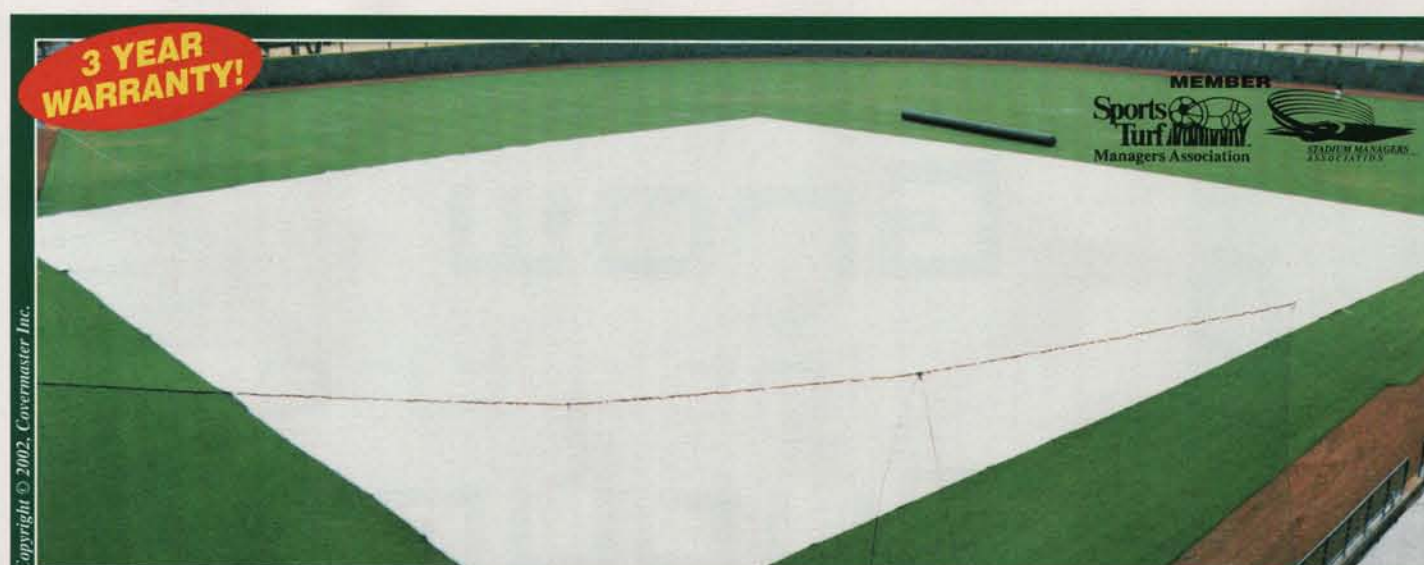
A turf community that increases its lateral stem density will have greater verdure and more growing points for leaf production. Similar to the cutting height strategy, these cultural practices should be used during the off-season to position the turfgrass community for recuperation. When recuperation is needed, nitrogen applications can stimulate the needed growth.

An extensive and deep root system is another turfgrass feature of a safe and playable field. Several cultural practice strategies have been proven to increase root mass and depth. One of the most critical practices is water management. Researchers have shown that deep and infrequent irrigation promotes a deep root mass. When water is applied deep into the soil profile, the turfgrass plant will adjust its root development and grow a deep and more massive root system.

Determining deep and infrequent water management is not always an easy task. The best approach is to watch the turfgrass plants for signs of temporary wilt (daytime wilting that will disappear by the next morning) before the next irrigation. Your goal is

## Mowing on low end

On established fields, mowing at the low end of the cutting height range, light vertical mowing or spiking, and core cultivation can increase lateral stem density. All of these practices stimulate the growth of dormant axillary buds at or near the soil surface. The breaking of dormant buds



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## Maintaining the Grounds



Figure 3. Bermudagrass seeded at 1/2 lbs. per 1000 sq. ft. causing seeding to elongate internodes and begin lateral stem production.



Figure 4. Bermudagrass seeded at 2.0 lbs. per 1000 sq. ft. causing upright growth and a lack of internode elongation. Lateral stem production will be inhibited.

to irrigate to meet the needs of the plant based on signs from the plant.

Another effective practice for increasing root depth and mass is core cultivation. Core cultivation creates voids or space for roots to occupy as well as improves the water drainage and gas exchange. No matter what the turf condition, age or soil composition, core cultivation is an essential maintenance practice for a healthy turf and deep root system.

There are multiple pathways to achieve a safe and playable turf. All cultural practices should be applied with anticipation of how the turfgrass plant will respond. Peaking your turf just before game-day should be your ultimate goal. Your geographic location, type of

species, soil condition, anticipated end product and game-ready date will determine your schedule. No single management schedule fits all situation, so be prepared to make changes to meet the needs of the plant. Time your cultural practices to position the turfgrass plant for growth, then adjust to promote growth. In all situations, no matter what cultural practices are used, timing is everything.

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