

THE PERILS of growing bermudagrass on the California coast



BERMUDAGRASS is a tropical/sub-tropical warm season perennial grass native to southeastern Africa. It is believed to have entered the United States around 1751, probably through coastal Georgia and/or the Carolinas. There are approximately 10 species that include the common seeded wild types as well as many interspecific hybrids. The most commonly used for turfgrass are the sterile hybrids of the *C. dactylon* x *C. transvaalensis* types.

Originally used in this country for pasture and hay production, it has become one of the best performing turfgrass species available. In my mind, Tifway (Tifton 419) bermudagrass is still the standard in the industry for golf fairways and athletic fields where it can be grown. It has a rich green color and produces aggressive rhizomes and stolons

making it very tolerant to wear with rapid recovery from turfgrass stand loss.

Some specific cultivars of bermudagrass can be grown as far as 53 degrees north latitude, however, most are best suited for growth below 37 degrees north—the limiting factor being winter kill. For instance Patriot bermudagrass, released by the Oklahoma Agricultural Experiment Station (Oklahoma State University), is being used as far north as Purdue University in Indiana.

Most bermudagrasses are quite well adapted to hot (85-95 F, day) dry climates and can perform well under moderate drought. However, bermudagrass does not perform well under even the slightest of shade. For example, bermudagrass requires between 800-970 langley (a unit of radiation = one gram calorie per square centimeter of irradiated surface) per day solar radiation (390-

470 watts per square meter per day). This equates to at least 6 hours of full sun per day. Compare this to many cool season grasses that can thrive with only 245-490 langleys per day. This represents a very significant difference in shade tolerance.

Growing bermudagrass in shade is especially difficult when managed at low mowing heights under any traffic stress like athletic fields. Fortunately, most athletic field designs provide for minimal structural shade throughout the day. This is not always true with golf course designs, as planting or leaving a “strategic” tree(s) can be an important part of golf hole design yet can pose hours of shade per day.

This brings me to the subject at hand—growing bermudagrass in the coastal regions of California which includes San Diego in the southern most part north to the central coastal region of San Luis Obispo—approximately 300 miles north of the Mexican border. This area is characterized as having a mild Mediterranean climate with average summer temperatures ranging from 75-90 F (day) with winter temperature ranging from 40-60 F. This is perfect weather for humans but not very ideal for growing many warm season grasses. This is especially true when you consider the rapid drop in night time temperatures in the summer.

Add to this the “coastal” influence which includes fog and clouds, you can see that this region may not always be conducive to growing bermudagrass. Not only do you not have temperatures suited for bermudagrass growth but cloud induced limitations in radiant energy adequate for photosynthesis may be lacking as well.

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COMPARE WITH PHOENIX

Comparing the percent growth potential (GP) for bermudagrass in Phoenix, AZ (where bermudagrass is highly preferred) with that of San Diego, CA there is a significant difference in potential for growth. Growth potential reaches 100% in Phoenix for approximately 6 months of the year (late May to mid-October). The highest GP in San Diego, however, only reaches a high of 40% and for only about 3 months (July to mid-September). In Sacramento (further inland but also further north of San Luis Obispo) the GP still only reaches a high of 60% for July to mid-September.

Gelernter and Stowell state that bermudagrass still performs adequately at and above 50% growth potential, but does poorly below that mark. So you can see why turfgrass managers struggle along California's coast to grow quality bermudagrass.

What this means is that even though it appears these coastal regions should be ideal for bermudagrass growth, low average temperatures (especially at night) and cloudy/foggy days prevent adequate carbohydrate production and therefore limited growth in bermudagrass.

FESCUES

This is not the case for most cool season grasses, however. I have found that both tall fescue and the fine fescues do very well in these coastal regions as they have moderate heat and drought tolerance and do well under cloudy/foggy (slight shade) conditions. The potential problem with growing these cool season types, however, whether here in San Luis Obispo or in San Diego, are the dry summer conditions and the poor quality water resulting in salt and carbonate accumulations (Bowman, et.al., 2006). As an aside, Kentucky bluegrass does not perform well in southern California because of the occasional high summer temperatures and the water requirements for its survival.

MANAGEMENT STRATEGIES

Managing bermudagrass on the California Coast involves treating the stand as if it were growing in shaded condition, because ultimately it is. Shaded bermudagrass develops thin, etiolated leaves, increases internode



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length, and a poorly developed root system.

Over time, shade results in a thin canopy intolerant to traffic. Under traffic stress, the stand will rapidly thin to the point of stand failure, weed intrusion, and finally, poor surface performance.

Therefore managing bermudagrass under these conditions require maximizing photosynthetic efficiency and traffic control. Managers should be aware that “normal” management strategies need adjustment.

One of the most important considerations is how much and what kind of nutrition to employ. The principle being to avoid excessive succulent growth by using high rates of soluble nitrogen sources which leads to plants ill equipped to handle stress.

As the plant will use any and all carbohydrate reserves for leaf growth and not for stolon and rhizome growth, re-growth potential from heavy stress will be reduced.

Potassium should be used judiciously to promote carbohydrate synthesis and leaf hardening as well as increased water conservation and winter hardiness.

Mowing height should be maintained at the higher limit allowed for the intended use. For instance, using bermudagrass for fairways vs. athletic fields vs. home lawns require different mowing practices and, therefore, different tolerances.

Managers may have to cultivate more often yet less aggressively. Compaction relief and aeration are important but recovery from these activities, especially if they are intensive, may be slow and therefore, may promote poor recovery, quality, and weed envision.

Overseeding is a very popular and important practice to those that manage athletic fields during the winter months. Overseeding involves planting (seeding) a cool season (CS) grass into an existing canopy of a warm season (WS) grass (usually bermudagrass). This process starts in the fall as the bermudagrass is going dormant and results in good color and playing conditions during the winter from the CS grass.

On the California coast, those that overseed have very interesting concerns as it relates “spring transition.” This is when management switches away from the CS grass and shifts to promoting the annual recovery (green-up) of the WS grass.

Trade Name	Slow Activity (3-6 Wk), Applied late April - May	Fast activity (1-2 Wk) Applied mid-May - late May
Kerb 50WP	1 lb / A	---
Manor or Blade 60DF	0.5 - 0.75 oz / A	---
Revolver 0.19SC	9 oz / A	17-26 oz / A
TranXit 25DG	0.5 oz / A	1-2 oz / A
Monument 75WG	0.1 oz / A	0.3 oz / A

Figure 1. Chemical products used to remove cool season grasses from overseeded bermudagrass during spring transition.

In the coastal regions of California, it is critical that the spring recovery (transition) of the bermudagrass not be delayed. Bermudagrass relies on stored carbohydrates, accumulated the previous summer and early fall, for re-growth of new shoots in the spring. As we may assume that bermudagrass grown on the California coast may not have stored a great deal of sugar, we can also assume that there may be times when there may not be enough sugar to overcome a highly competitive CS grass during transition, especially if the perennial ryegrass is growing at its best.

Therefore, managers on the California coast should consider a well timed chemical approach to removing the CS grass. Something like Revolver, Manner, or Kerb can provide quick reliable removal of the CS grass during the spring (Figure 1).

Using Figure 1 you can see that timing is the critical factor. I would recommend applying the product when the bermudagrass has reached approximately 50% green-up of any un-overseeded areas (create a test area). It is important to consult the label and your service professionals as there are several considerations for use, specifically grass species tolerances, movement of the material along the soil, and soil temperature at application.

Using bermudagrass cultivars tolerant to either cold, shade, or both may provide another possibility. Although not everyone can or will renovate to new species of one grass or another, there are some new bermudagrasses available that may provide choices for quality turfgrass in these difficult coastal conditions.

For instance, the University of Georgia’s Wayne Hanna recently released a new “Tifton” bermudagrass called TifGrand which

has been developed as a shade tolerant bermudagrass. This hybrid will be available sometime in 2010.

Another shade tolerant bermudagrass already available is Bull’s Eye (West Coast Turf). It was recently installed on the baseball field at PETCO Park, home of the San Diego Padres. It was chosen for its color, durability, and tolerance for shade. This grass is also found on the Bank One Ballpark, home of the Arizona Diamondbacks.

Lastly, in a 2-year study conducted by Baldwin and Lui, they were able to rank several different bermudagrasses for response to shade. They found, using 64% continuous shade that the best cultivars for shade tolerance were Celebration, TifNo.4 (TifGrand), TifNo.1 and Transcontinental based on turfgrass quality, chlorophyll content, root biomass, and root length.

I think that it is easy to see that growing bermudagrass on the California coast can be difficult at times. Cloudy conditions with periods of less than ideal high summer temperature make growing bermudagrass a challenge. With good management, though, and the right cultivar choices whenever possible can make management easier.

Actually, whether growing a warm season or a cool season grass on the beautiful California coast practitioners will experience problems. Whether it is the climate, the soil, or the water turfgrass managers in California must stay on top of their management strategies to ensure the best turfgrass quality possible. ■

Dr. Terry L. Vasey is an assistant professor at California Polytechnic State University, San Luis Obispo, CA. For references, see www.sportsturfonline.com.