

Strides for *Stressed* Turf

Researchers focus on the best cultivars for heat, drought and salt tolerance

By John Torsiello

Drought conditions resulting from searing heat and lack of natural water are two of the most pressing problems facing superintendents. And with increasing vagaries in weather patterns and more stringent government regulations concerning water use, these issues likely will intensify in the future.

That's why industry researchers have been burning the laboratory lights late into the night to find ways to enhance the heat and drought

tolerance of turfgrass. Their efforts have produced new strategies and grasses that promise to meet the increasing pressure placed on turfgrass managers.

"Superintendents always look for superior turf quality, but more frequently, they're asking about other characteristics that don't sacrifice quality," says Leah Brillman, Ph.D., director of research and technical services at Seed Research of Oregon. "Many superintendents have learned they can reduce watering on many species as long as their course has a good irrigation system.

Salt tolerance is critical in areas with effluent usage."

UNDER FIRE

The most desirable bentgrass characteristic expressed in a recent survey was better heat tolerance, says Douglas Brede, Ph.D., research director and operating officer of Jacklin Seed. Tests in Arizona demonstrated that Jacklin's T-1 creeping bentgrass surpassed other varieties in heat tolerance, according to Brede.

Corroborating this evidence is a study con-

Leah Brillman, Ph.D., says superintendents have learned they can reduce watering on many species of turfgrass as long as their course has a good irrigation system. Photo: Seed Research of Oregon





ducted by Dave Kopec of the University of Arizona that showed the T-1 bentgrass sailed through the hottest summer on record without a blemish, Kopec says.

Brede cites another study that showed Jacklin's L-93 creeping bentgrass variety had a higher plant and tiller density, greater root-to-tiller ratio, and more and finer roots than other bentgrass under high temperature conditions.

Researchers attributed the better performance of L-93 under heat stress to its morphological characteristics, including tillering and root growth. Such research suggests that plant breeders concentrate on varieties with narrow leaves, small plants, dense tillers, big root systems and a high root-to-shoot ratio to select heat-tolerant cultivars.

THIRSTY TURF

Drought is a huge issue because water is restricted throughout

Sea Spray (not pictured) is slightly more expensive than other seed, but less is needed per square foot, says Bill Rose.
Photo: Epic Creative



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the world, says Christiaan Arends, turf product manager for Barenbrug USA, which developed a seed-coating technology called Yellow Jacket. It contains a natural, corn syrup-based product called Zeba, which holds as much as 600 times its own weight in water.

Studies at the University of New Mexico showed seed coated with Yellow Jacket established faster and required less water, Arends says. The coating is available on various kinds of seed such as bentgrass, Bermudagrass, bluegrass, tall fescue, *Poa trivialis* and fine fescue, among others.

Barenbrug produced a Kentucky bluegrass called Baroness and a rhizomatous tall fescue, both highly rated for their drought tolerance.

When used in an overseeding program, Barenbrug's SOS system, which combines annual and perennial ryegrasses, creates a turf that makes an easier transition from cool- to warm-season grass in the spring, according to the company.

"Because of this improved transition, superintendents don't have to spray chemicals or water the cool-season grass late in spring, all of which helps conserve the environment," Arends says.

COMPARING CULTIVARS

The industry continues to make a wide variety of grasses, including fine fescues and Kentucky bluegrass, that are more tolerant to extreme heat and drought conditions, says Stacy Bonos, Ph.D., a researcher with the department of plant biology and pathology at Rutgers University in New Jersey.

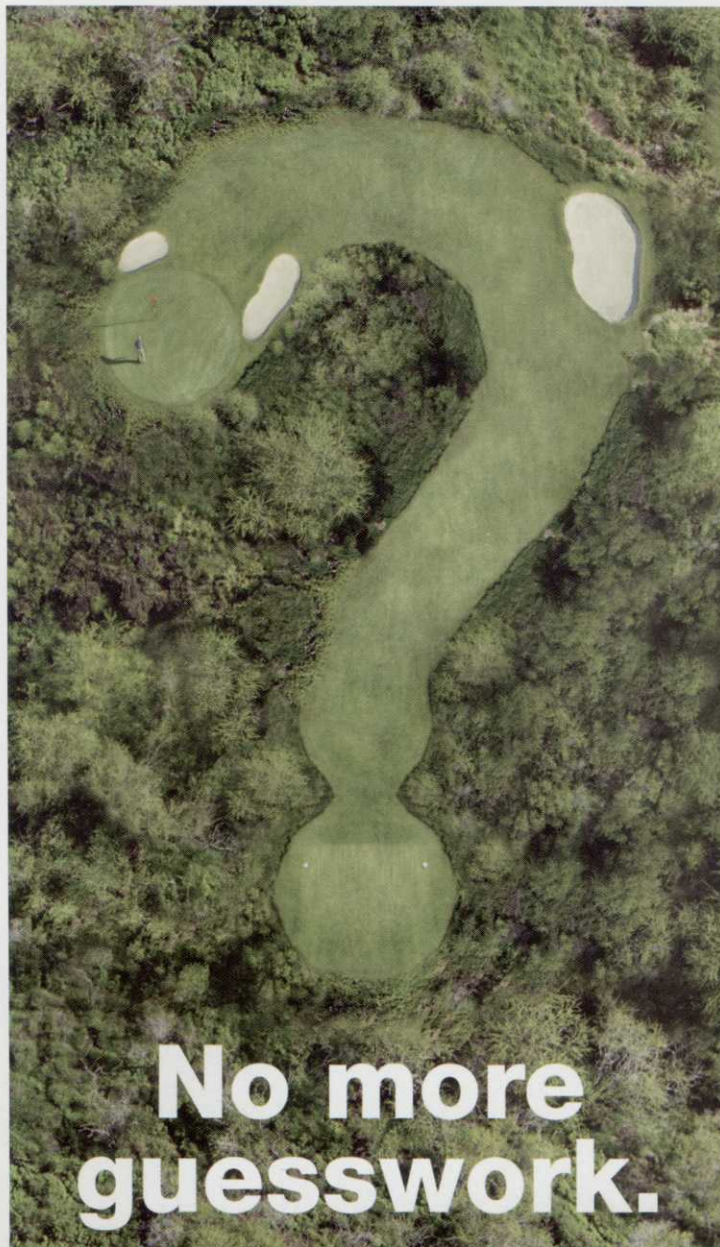
"More of the recently released fine fescues that have improved turf quality will have better heat and drought tolerance than other less-adapted cultivars," Bonos says. "But one problem with fine fescues is they generally don't have good wear tolerance."

Typically, hard and blue fescues have superior drought tolerance, Brillman says. But Chewings and strong creeping red fescues have been improved significantly for drought tolerance.

"These species aren't just for shade mixtures but for low maintenance turf in full sun," she says.

Kentucky bluegrass in the Mid-Atlantic has high heat and drought tolerance and tends to produce roots under heat stress that penetrate to lower soil depths to exploit water reserves deeper in the soil profile, Bonos says. Breeders use interspecific hybridization between Texas bluegrass and Kentucky bluegrass to combine the heat and drought tolerance from

Barenbrug USA developed a seed-coating technology that holds as much as 600 times its own weight in water. Photo: Barenbrug USA



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Texas bluegrass with the improved turf quality of Kentucky bluegrass. Texas X Kentucky bluegrass hybrids have been shown to have better heat tolerance than some Kentucky bluegrass varieties, Brillman says.

"Drought avoiders tend to put down extensive root systems and mine water deeply but often require more water," she says. "Tall fescues can be drought avoiders, but in the Western United States, because they use more water, they might not be the best choice if you don't get sufficient rainfall or don't have deep soils. Drought tolerance of hybrid bluegrasses and Kentucky bluegrass needs to be looked at by individual cultivars."

Only certain hybrid bluegrasses have shown superior drought tolerance, but most demonstrate excellent recovery after being under drought stress.

Recent developments at The Scotts Co. include crossing the Texas and Kentucky bluegrasses to produce a strain that demands less maintenance, less water and stands up well to high temperature.

"Bluegrass will go dormant if it doesn't get water and then greens up when it rains," says Wayne Horman, director of Scotts seed sales and marketing. "Some might say that's drought tolerant and others might not. Sometimes it's a question of semantics."

Scotts is marketing Solar Green, Thermal Blue Blaze and Dura Blue, all varieties of heat tolerant bluegrass.

Sea Spray, developed by Pure-Seed Testing and marketed by Scotts, is the industry's first seeded seashore paspalum. Sea Spray, which has a high salt tolerance, is ideal for use in areas ir-



rigated with effluent water or subject to naturally high saline conditions. The variety is capable of germinating with water containing less than 2,000 parts per million of salt in soil that ranges between 4.5 and 9 in pH.

"Sea Spray actually prefers seawater over freshwater after it has been established," says Bill Rose, president of Tee-2-Green and Rose Agri-Seed and founder of Pure-Seed Testing. "The grass was found to be growing in sea inlets in the south, and after more than 10 years of research and selective testing, a variety was developed that made seed. This is ground breaking stuff."

Sea Spray is slightly more expensive than other seed – between \$50 and \$60 a pound – but less seed is needed per square foot, about a pound for every 1,000 square feet, Rose says.

HOW THEY MEASURED UP

Last year, superintendent Steve Yarotsky used Sea Spray for his grow-in of tees, fairways and rough at Moody Gardens Golf Club in Galveston, Texas. The course on the ocean is buffeted by salt air, has salt-laden soil and is exposed to salt water during storms.

"Because of these issues, plus the fact that we use effluent water in our irrigation system, we decided to go with the Sea Spray paspalum," Yarotsky says. "This paspalum grass is the wave of the future."

Ed Kutt, superintendent at Annandale Golf Club in Pasadena, Calif., used turf with a mix of Thermal Blue Blaze, Solar Green and Dura Blue seed when the club completely resodded its rough – about 50 acres – last fall.

"We wanted to have a green look year round without overseeding, which is costly and time consuming," Kutt says. "Plus, we have a property that has a lot of trees, and we feared common Bermudagrass in the rough would soon be inundated with *Poa annua*. We did some test plots using the heat-tolerant grasses before we made the decision to use them in the rough areas."

While refraining from making final judgment, Kutt says rough areas that have been heat stressed have bounced back with added water.

"It looks good aesthetically," he says. "During the wintertime, the slight difference in color between the rough and fairway made the course look fantastic." **GCI**

The most desirable bentgrass characteristic is better heat tolerance, says Doug Brede, Ph.D.

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