

# National 1991 zoysiagrass test progress report for 1993

| Name           | AL1 | AR1 | AZ1 | CA1 | CA2 | CA3 | GA1 | GA2 | IL1 | IL2 | KS2 | KY1 | MD1 | MO1 | MS1 | NE1 | OK1 | TX1 | TX2 | UB1 | UB2 | VA1 | Mean |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| DALZ 8507      | 7.2 | 8.1 | 6.2 | 7.0 | 6.5 | 6.4 | 7.2 | 4.1 | 4.5 | 8.9 | 8.0 | 5.7 | 7.3 | 6.1 | 7.3 | 3.0 | 6.4 | 5.4 | 4.5 | 6.2 | 5.8 | 5.3 | 6.2  |
| *Emerald       | 7.0 | 7.6 | 6.1 | 7.0 | 6.3 | 5.9 | 6.7 | 3.6 | 4.3 | 8.7 | 8.3 | 5.0 | 6.2 | 6.5 | 7.4 | 4.8 | 6.0 | 6.2 | 5.9 | 6.4 | 7.0 | 3.7 | 6.2  |
| CD 2013        | 6.9 | 7.5 | 5.9 | 6.3 | 5.3 | 5.9 | 6.9 | 3.8 | 5.1 | 8.8 | 8.0 | 4.0 | 7.0 | 6.8 | 6.7 | 5.6 | 6.8 | 5.0 | 4.9 | 6.7 | 5.9 | 5.0 | 6.1  |
| TC 2033        | 6.9 | 7.0 | 5.4 | 6.6 | 5.9 | 6.1 | 6.3 | 3.8 | 4.4 | 8.5 | 8.3 | 5.4 | 7.5 | 6.3 | 7.1 | 4.8 | 7.1 | 5.9 | 5.3 | 5.6 | 5.7 | 4.2 | 6.1  |
| DALZ 8508      | 7.0 | 8.3 | 5.6 | 6.8 | 6.1 | 6.2 | 7.1 | 3.3 | 3.9 | 9.0 | 8.0 | 4.1 | 7.0 | 6.0 | 7.5 | 3.5 | 6.1 | 5.0 | 5.5 | 6.4 | 6.5 | 4.8 | 6.1  |
| QT 9006        | 6.9 | 7.6 | 5.9 | 6.5 | 6.2 | 6.3 | 6.9 | 3.4 | 4.2 | 9.0 | 7.0 | 5.7 | 7.5 | 5.9 | 7.4 | 2.9 | 5.6 | 6.0 | 5.3 | 6.3 | 6.1 | 4.7 | 6.1  |
| QT 2004        | 6.8 | 7.5 | 6.0 | 6.1 | 5.2 | 5.8 | 6.8 | 4.3 | 4.9 | 8.8 | 7.7 | 3.5 | 7.0 | 6.7 | 6.0 | 6.3 | 6.0 | 5.1 | 4.6 | 6.9 | 6.3 | 3.9 | 6.0  |
| Sunburst       | 7.0 | 6.2 | 6.0 | 5.2 | 5.8 | 5.5 | 6.8 | 4.3 | 5.3 | 6.4 | 6.3 | 5.9 | 6.7 | 6.3 | 5.9 | 6.4 | 6.1 | 4.9 | 4.9 | 7.0 | 6.5 | 4.8 | 5.9  |
| DALZ 8514      | 7.0 | 5.8 | 6.0 | 5.1 | 6.1 | 5.8 | 6.2 | 5.0 | 4.8 | 5.8 | 8.0 | 4.9 | 6.5 | 5.6 | 5.9 | 3.9 | 6.9 | 5.5 | 5.9 | 5.3 | 5.3 | 6.9 | 5.8  |
| TC 5018        | 7.0 | 5.5 | 5.6 | 5.1 | 5.5 | 5.4 | 6.0 | 3.9 | 5.5 | 5.5 | 7.3 | 6.3 | 6.7 | 6.3 | 5.8 | 6.2 | 6.1 | 5.8 | 5.1 | 6.0 | 6.2 | 5.1 | 5.8  |
| DALZ 8512      | 7.2 | 5.7 | 6.1 | 5.2 | 6.3 | 5.9 | 6.4 | 4.8 | 5.7 | 4.6 | 7.3 | 4.8 | 7.0 | 5.2 | 6.1 | 3.7 | 6.4 | 5.4 | 5.5 | 5.6 | 4.9 | 6.8 | 5.8  |
| *Meyer         | 4.8 | 7.0 | 5.9 | 5.9 | 4.8 | 5.5 | 6.5 | 3.0 | 4.9 | 8.2 | 7.7 | 4.5 | 6.8 | 6.8 | 5.9 | 6.7 | 5.8 | 4.9 | 4.8 | 5.2 | 6.3 | 3.5 | 5.7  |
| *El Toro       | 6.9 | 5.6 | 6.0 | 5.3 | 6.2 | 5.9 | 6.1 | 3.9 | 5.7 | 5.5 | 7.3 | 4.1 | 7.0 | 5.8 | 5.8 | 3.2 | 6.0 | 5.7 | 5.2 | 5.0 | 5.0 | 6.6 | 5.6  |
| *Belair        | 4.5 | 6.5 | 5.7 | 5.2 | 5.5 | 5.2 | 6.3 | 3.8 | 5.2 | 5.4 | 8.0 | 5.7 | 6.2 | 7.0 | 5.0 | 7.4 | 6.0 | 3.7 | 5.2 | 5.5 | 6.3 | 3.5 | 5.6  |
| CD 259-13      | 5.9 | 5.7 | 5.6 | 5.4 | 5.8 | 5.4 | 6.6 | 3.2 | 5.7 | 5.3 | 6.3 | 5.5 | 6.3 | 5.9 | 5.3 | 6.1 | 5.6 | 4.4 | 3.9 | 6.3 | 6.5 | 5.2 | 5.5  |
| DALZ 8516      | 6.2 | 6.7 | 5.6 | 6.1 | 4.8 | 6.0 | 6.0 | 4.0 | 2.6 | 8.8 | 8.7 | 2.6 | 5.8 | 5.7 | 7.0 | 2.3 | 6.0 | 4.4 | 5.8 | 5.6 | 5.1 | 3.3 | 5.4  |
| QT 2047        | 6.7 | 5.3 | 5.4 | 5.0 | 5.1 | 4.2 | 5.8 | 3.4 | 5.1 | 6.5 | 6.7 | 5.7 | 6.2 | 6.5 | 5.7 | 6.5 | 5.2 | 5.0 | 4.3 | 4.7 | 5.6 | 4.1 | 5.4  |
| √TGS-W10       | 5.8 | 5.5 | 6.1 | 4.3 | 5.0 | 5.4 | 6.1 | 3.7 | 5.3 | 3.7 | 6.7 | 6.0 | 6.0 | 6.4 | 5.1 | 6.7 | 5.8 | 4.0 | 5.3 | 5.6 | 6.1 | 3.7 | 5.4  |
| √TGS-B10       | 5.9 | 5.5 | 5.8 | 4.4 | 5.4 | 5.3 | 6.0 | 2.8 | 5.9 | 3.0 | 6.3 | 5.9 | 5.8 | 6.2 | 4.8 | 5.8 | 5.8 | 4.7 | 4.6 | 5.7 | 5.7 | 4.3 | 5.2  |
| DALZ 8502      | 6.8 | 5.1 | 5.5 | 6.0 | 6.9 | 6.1 | 5.5 | 3.3 | 1.4 | 7.7 | 7.7 | 2.0 | 3.5 | 3.2 | 6.8 | N/A | 4.9 | 6.3 | 6.3 | 5.1 | 3.7 | 1.8 | 5.0  |
| √JZ-1          | 5.3 | 5.5 | 5.6 | 4.4 | 5.1 | 4.8 | 5.8 | 3.3 | 5.3 | 2.8 | 5.7 | 4.9 | 5.8 | 5.9 | 4.4 | 5.3 | 5.4 | 4.6 | 4.3 | 4.7 | 4.5 | 4.0 | 4.9  |
| *√ Korean Com. | 5.3 | 5.0 | 5.5 | 4.3 | 5.0 | 4.8 | 5.7 | 3.7 | 5.3 | 2.2 | 5.3 | 4.9 | 5.7 | 6.1 | 4.2 | 4.8 | 5.9 | 4.0 | 4.8 | 4.9 | 4.9 | 3.9 | 4.8  |
| DALZ 8501      | 5.8 | 4.4 | 4.8 | 5.7 | 5.9 | 4.9 | 5.7 | 2.3 | 1.4 | 8.5 | 5.7 | 1.3 | 2.7 | 2.2 | 6.4 | N/A | 5.2 | 3.9 | 5.5 | 3.8 | 3.1 | 1.3 | 4.3  |
| DALZ 8701      | 6.2 | 3.9 | 5.0 | 4.1 | 6.6 | 6.0 | 5.5 | 2.7 | 1.3 | 8.2 | 5.7 | 1.5 | 1.0 | 1.0 | 5.5 | N/A | 5.2 | 5.1 | 5.7 | 3.1 | 1.8 | 1.0 | 4.1  |
| LSD Value      | 0.9 | 1.1 | 0.5 | 0.6 | 0.6 | 0.5 | 0.7 | 1.8 | 0.7 | 0.5 | 1.6 | 2.0 | 0.8 | 0.8 | 0.6 | 1.2 | 0.9 | 1.6 | 0.8 | 0.6 | 0.9 | 1.5 | 0.2  |

√ — Seeded varieties.

\* — Commercially available in 1994. To determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical differences occur when this value is equal to or larger than the corresponding LSD Value.

The following are conditions at the sites of the zoysiagrass national tests, including, in order, location, soil texture, soil pH, nitrogen applied (in pounds per 1,000 square feet), mowing height (in inches) and irrigation practiced:

- AL1 — Auburn University, Ala., N/A.
- AR1 — Fayetteville, Ark., N/A.
- AZ1 — Tucson, Ariz., sandy loam, 7.6-8.5, 2.1-3.0, 1.1-1.5, to prevent stress.
- CA1 — Santa Clara, Calif., loam, 6.6-7.0, 2.1-3.0, 1.6-2.0, to prevent stress.
- CA2 — Santa Ana, Calif., sandy loam, 6.6-7.0, 3.1-4.0, 0.6-1.0, to prevent stress.
- CA3 — Riverside, Calif., sandy loam, 6.6-7.0, 3.1-4.0, 0.6-1.0, to prevent stress.
- GA1 — Griffin, Ga. (high soil pH), sandy loam, 4.6-5.5, 2.1-3.0, 1.1-1.5, to prevent stress.
- GA2 — Griffin, Ga. (low soil pH), sandy loam, 3.6-4.5, 2.1-3.0, 1.1-1.5, no irrigation.
- ID2 — Post Falls, Idaho, silt loam and silt, 6.1-6.5, 3.1-4.0, 1.1-1.5, to prevent stress.
- IL1 — Urbana, Ill., N/A, N/A, N/A, 1.6-2.0, only during severe stress.
- IL2 — Carbondale, Ill., silty clay loam, 6.1-6.5, 3.1-4.0, 1.1-1.5, no irrigation.
- KS2 — Wichita, Kan., sandy loam, 6.6-7.0, 2.1-3.0, 1.6-2.0, to prevent dormancy.
- KY1 — Lexington, Ky., silt loam and silt, 6.1-6.5, 1.1-2.0, 0.6-1.0, only during severe stress.
- MD1 — Silver Spring, Md., sandy loam, 5.6-6.0, 3.1-4.0, 0.6-1.0, to prevent dormancy.
- MS1 — Mississippi State, Miss., sandy clay loam, 7.1-7.5, 3.1-4.0, 2.1-2.5, only during severe stress.
- MO1 — New Franklin, Mo., silt loam and silt, 6.1-6.5, 2.1-3.0, 1.6-2.0, to prevent stress.
- NE1 — Lincoln, Neb., sandy clay loam, 6.6-7.0, 1.1-2.0, 2.1-2.5, to prevent dormancy.
- OK1 — Stillwater, Okla., loam, 7.1-7.5, 2.1-3.0, 0.6-1.0, to prevent stress.
- TX1 — Dallas, Texas (full sun), silty clay and clay, 7.6-8.5, 2.1-3.0, 0.6-1.0, to prevent stress.
- TX2 — Dallas, Texas (partial shade), silty clay and clay, 7.6-8.5, 0.0-1.0, 2.1-2.5, to prevent stress.
- UB1 — Beltsville, Md. (high maintenance), loam, 4.6-5.5, 2.1-3.0, 0.6-1.0, to prevent dormancy.
- UB2 — Beltsville, Md. (low maintenance), silt loam and silt, 4.6-5.5, 0.0-1.0, 1.6-2.0, no irrigation.
- VA1 — Blacksburg, Va., silty loam and silt, 6.1-6.5, 3.1-4.0, 0.6-1.0, to prevent dormancy.

Entries and sponsors of the national zoysiagrass tests:

- Belair, Emerald, Meyer and JZ-1: Jacklin Seed
- CD series and Korean Common: Crenshaw Douget Turfgrass
- DALZ series: Texas A&M
- El Toro: University of California
- QT series: Quality Turfgrass
- Sunburst: Grasslyn, Inc.
- TC series: Turfgrass Germplasm Services
- TGS series: Turfgrass Germplasm Services

## Zoysias solve many concerns — water and pest use among them

Continued from page 1

ment of Agriculture. "With pesticide and water issues being more critical now, more and more people are looking to grasses like zoysia, that will survive with less input and less pesticides, and have fewer disease problems."

Researchers have apparently overcome previous obstacles that inhibited use of zoysias — mainly, a snail-like growth rate.

"In the new zoysiagrasses, we see three crops in two years," said Dr. Milt Engelke of Texas A&M, a leading turfgrass breeder. "That's comparable to Bermudagrass or buffalograss."

But how improved is that? Meyer, the leading zoysia for years, needs 15 to 24 months to produce one crop.

Growth rate translates into recuperative ability when put on a golf course. That, along with water use and texture, are "substantial improvements over old varieties," Engelke said. "I've got some zoysias that will be in the same water-use range as buffalograss. I'm running them side-by-side with Prairie [buffalograss] and I'm not sure which one's going to win. Their range is an 18- to 20-inch water requirement a year. I call that 'irrigation is optional.'"

Golfers enjoy zoysia because its leaves are upright and stiff and the ball sits on top. Superintendents like the idea that zoysia

takes few divots, but they will have to weigh it against other grasses to decide if they will use it. A number in the Southeast are deciding to replace their Bermudagrasses with zoysias to avoid future winter kills such as experienced this spring (see stories, pages 1 and 15).

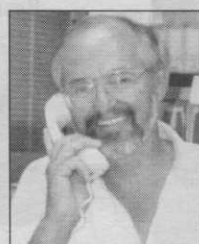
Engelke also thinks zoysias have the upper hand versus bluegrasses, which have "a fairly high water requirement and fairly low heat tolerance. In the South, Southwest and central U.S., we find that bluegrasses have a lot of disease and insect problems that cause degradation. Zoysiagrasses offer an alternative, not only in the rough areas but throughout the golf course."

For some, the choice may simply be whether to sod, sprig, plug or seed their course with zoysia.

Engelke made the blanket statement: "A seeded variety, unless it is apomictic, will never create the uniformity of appearance and performance as a vegetative variety will. A seeded variety has a lot of plants in it. A vegetative variety is a single plant."

Morris was more hopeful for seeded varieties. "The seeded types are not as fine or dense as Meyer right now," he said. "But, this is first-generation material that will be improved over time."

Vegetative types, Morris said, "vary all



*In the new zoysiagrasses, we see three crops in two years.*  
— Dr. Engelke

over the board as far as growth habit and so forth are considered. Some, especially from Engelke, are very fine-textured and would have a place on tees and greens. Some are winter-tender. But in areas where adapted they probably would do an excellent job."

He said that using seeded zoysias, "we've been able to use other cool-season grasses with them — to either seed them together, or seed zoysia and overseed the other cool-season grass into it and keep the two together."

Adding tall fescue, he said, gives the turf stand better density. "Tall fescue also greens up earlier and stays green later. When you mix zoysia and fescue together, zoysia also greens up earlier because of a micro-climate the tall fescue creates," he said.

Will zoysia replace buffalograss?

"I don't think so," Morris said. "Buffalograss has a place. It is very drought

tolerant. But with zoysias you can mow down closer, they are more disease-tolerant, and there are more situations they can be used. Buffalo won't be used so much on the East Coast. But on West Coast it will, because it is more drought-tolerant."

Engelke believes golfers in some places will accept or reject zoysia based on the fact it goes dormant in the winter.

"The upper Midwest is far more amenable to allowing warm-season grasses to go dormant and brown than we are here in the South," he said. "The Californians are adamant it has to be green. Consequently, they aren't as apt to accept zoysias. They're used to more tall fescue. That will change as water becomes more an issue."

Research is progressing in a timely way in genetic improvements and "increasing the awareness level of the zoysias that will very quickly be available to the consuming public," Engelke said.

"Two years ago, Meyer and Emerald were dominant. Today, more seeded varieties are coming on. Two years from now, more vegetative types will come on, and they will be using 20 to 30 percent of the water required by Meyer, which translates to 50- to 70-percent less water than used for hi-bred Bermudagrass. These also have excellent cold hardiness and have very low fertility requirements."