Champion of Turfgrass

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A half-century after beginning his career advancing turfgrass science, Dr. James Jim" Beard is still hard at it""""

Find a grass you don't recognize? Use an app on your Smartphone to pull up an image for identification. If nutrient issues are puzzling you, soil and tissue testing offer analysis and recommendations. If you're concerned about water use, you can check ET data and reprogram your irrigation system remotely. If you encounter a turfgrass issue you've never seen before, you can share it with a network of your peers via emailed digital images or by Skype onsite from your laptop computer.

Part of the exceptional team of graduate students gather around the greenhouse-grown turfgrass plots at Michigan State University. Dr. James Beard is in the center (in the suit and tie). Standing to his immediate left is Keith Karnok. Bob Shearman is to his immediate right, standing behind the “mower.”

So many of the tools now in our arsenal tap into the body of knowledge we’ve gained from innovative researchers and educators. At the top of that list on the international level is Dr. James B. Beard. Now director and chief scientist of the International Sports Turf Institute, Inc. headquartered in College Station, Texas, and professor emeritus of turfgrass science, Texas A & M University, he’s actively advancing the turfgrass industry.

Turfgrasses have been – and will continue to be – questioned on multiple fronts. Currently, Beard is leading the charge on one prime issue: the native/non-native/invasive/non-indigenous species issue. He says, “It’s ongoing in today’s public arena by individuals promoting laws to make non-native plants illegal.”

Introduced in late 2011, his position paper on “Origin, Biogeographical Migrations and Diversifications of Turfgrasses,” addresses those challenges.

Beard notes that no one has effectively defined the word native and admits that, after five drafts, he didn’t define it either. “Is it the anthropological event when man became active; when Europeans arrived on the continent; when the first explorers

pushed hay off the boat in some island? Or, will the newly-introduced research on turfgrasses extend the timeline back beyond the point requiring such precise definition of that term?"

He points to university research taxonomists who draw grass samples from herbariums around the world for analysis. "Recent development of paleobotanical studies using ultrastructural electron microscopic techniques and stable carbon isotope dating instrumentation and research procedures, plus molecular phylogenetic research and cladistic biogeographic analysis of large data sets are clarifying our understanding of migration patterns and dating of multiple secondary centers-of-origin for grasses.

"The results of this research propose the appearance of primitive ancestral grasses between 65 and 96 million years ago (mya) in Gondwanan Africa. Tracking migrations and diversifications shows the emergence of an ancient Poeae group known as the fine-leaf fescues (Festuca) in central-Europe around 13 mya. Subsequent migrations place them in Patagonia between 3.8 and 10 mya, which is before the anthropological effects of humans. Clearly the fine-leaf fescues are native to North America and migrated eastward across the continent after the ice age glacial melt around 1 mya."

Delving into research for this project, Beard says, "I felt like a kid with a brand-new Ph.D. I'd wake up at night with an idea or insight and couldn't wait to pursue it." The resulting paper, he says, "begins to clarify the question of whether certain turfgrasses are native to North America."

Again setting the stage for what will happen in the future, this paper will start a new series of strictly electronic publications from Michigan State University (MSU). Free access is important, Beard says, "to get it out to the people that are the policy-makers/politicians." Though he hopes hard copies also will be funded, "to get it into the state capitols and libraries of collections for even greater access."

This photo of Dr. James B. Beard checking a turfgrass root system made its way to the pages of Life magazine, where it was titled, “Headless Turfgrass Researcher at Work.”

SEEKING CHALLENGES

He’s well-prepared to face the challenges. Beard earned his B.S. in agronomy from The Ohio State University; his M.S. in crop ecology and his Ph.D. in turfgrass physiology (with an emphasis on biochemistry) from Purdue University. He completed a National Science Foundation (NSF) post-doctoral study in plant physiology at the University of California-Riverside.

With his basic training in biochemistry, Beard had the opportunity to go into sophisticated labs working at the molecular level within a highly controlled environment. He opted instead to focus on turfgrass, working outdoors in an ever-changing environment that he saw as more challenging intellectually.

Through the 1950s, few experiment stations were supporting turfgrass work and funding for turfgrass research was very limited. With the main money coming from companies seeking evaluation of their products, turfgrass research was dubbed a “squirt and peek” science. Beard says, “Yet, the targets of those products were the major problem areas at that time.”

Turfgrass science was beginning to change when Beard came to Michigan State University in 1961. “We drew an exceptional team of graduate students to turfgrass,” he says. “At one time, there were Keith Karnok, John Kaufmann, John King, Jeff Krans, David Martin and Bob Shearman, while my colleagues, Dr. Paul Rieke advised Bob Carrow and Dr. Bill Meggit advised Al Turgeon.”

With this amazing team, research flourished. “In turfgrass, we had the advantage of concentrating on the vegetative state. With crops such as corn and wheat, researchers must consider the whole complexity of flowering and seed production, which is more difficult in terms of environmental stress throughout all the stages involved,” Beard says.

This is just part of the crowd of over 200 that Michigan State University drew to its third turfgrass research field day in 1965.

Shade adaptation was one of Beard’s earliest projects. “It had always been assumed that lack of light was the major factor. Research showed it was the altered

microenvironment, including lack of light, which increased disease stress," says Beard. That major breakthrough led to work on the shade adaptation of cool-season grasses.

Other research focused on the causes of winterkill. Bob Shearman's Ph.D. work centered on the plant mechanisms that allow wear tolerance.

Graduate student Joe DiPalo constructed the first turfgrass rhizotron at TexasA&M during that period. This allowed the non-invasive viewing of root systems, aiding a variety of basic botanical studies along with a range of work on turfgrass stresses that included the discovery of spring root decline.

The root decline discovery in warm-season grasses impacted fertilization and mowing strategies that reached beyond turfgrass to forage crops. Beard says, "The body of work on turfgrass science and culture influenced the field of crop science and was used in the crop physiology courses as well."

Another legacy of that period is Beard's first of nine books, "Turfgrass: Science and Culture." It was published in 1973 by Prentice Hall and is still selling. Noted throughout the industry for what would become a tradition "of in-depth study and exhaustive investigation," it marked the change from art-dominated turfgrass maintenance to science-dominated. "That doesn't mean art is not still important. Dominance is the key word there," Beard says.

That publication also marked the beginning of the collaborative process with his wife, Harriet, the typist, fact-checker and facilitator extraordinaire.

INTERNATIONAL OUTREACH

Beard's enthusiasm and foresight spearheaded the formation of the International Turfgrass Society (ITS) in 1969 and the first International Turfgrass Research Conference. He served as the first ITS president and remained on the executive committee until 1999.

"The high visibility of turfgrass irrigation makes it a target."
—Dr. James Beard

That led to many international lecture trips, with Harriet as his support team on most of them. Typically, multiple topics are addressed as in this past November's series in Italy with: the history of turfgrass, future trends, and warm-season grasses. These travels provide additional opportunities to assess progress within the turfgrass industry.

"Italy has been dominated by England's cool-season grass influence, but is starting to move in the warm-season direction," he says. "They lacked good producers of warm-season vegetative plant material. That is changing, with more than 10 golf courses converting to warm-season turfgrasses."

CONTINUING IMPACT

Beard continued to teach and to direct and coordinate turfgrass research within the Soil and Crop Sciences Department of Texas A&M from 1975 to 1992. One of his areas of concentration that continues to evolve is the optimization of water use, the understanding of grass morphology with low water. He says, "ET technology and the impact of effluent water make that ongoing research even more relevant."

Water use issues are another area where turfgrasses are being questioned. "The high visibility of turfgrass irrigation makes it a target," says Beard. "Agriculture uses much of the available water west of the Mississippi River. Many city irrigation systems are archaic, with 30 to 40 percent leakage. Turfgrasses are a minor part of urban usage, yet more entities are restricting turfgrass irrigation. Some states are monitoring private wells and mandating how much can be pumped for various uses, including turfgrass irrigation."

In times of shortage, water needs to be available in reservoirs where it can be accessed, rather than relying totally on removal via rivers, notes Beard. Yet, over

the last four decades, single-issue activists have been able to block reservoir development in favor of endangered species.

“How hard a hit turfgrasses take will depend on how good we are in developing drought-resistant grasses; highly efficient, ET-based irrigation and conservation strategies; and effective use of effluent water,” says Beard. “There are ways around much of this, but it will take research and development, and public education. Will the money be there to get it done?”

EVOLVING ISSUES

He’s spreading the message through his “future of turfgrass” presentations and addressing other “crystal ball” issues as well. On the environmental/social-political side, he predicts opposition to genetic modification and pesticide use will continue and drive further enhancement in IPM and BMP programs. He says, “GPS for precise, targeted applications will be expected for large-area turfgrass management. I anticipate the technology used for facial recognition will extend to spreader or sprayer-mounted digital recognition systems to identify weeds and apply targeted remedies as needed. I foresee advances in controlled-release nutrients and physiological-enhancer foliar treatments. There will be expanded use of laser and computer technologies in construction and maintenance procedures.”

He’s recording progress, too. His latest turfgrass history book is working its way toward production at Michigan State University Press. In 2012, he’ll finish the documented history of turfgrasses and soils at St. Andrews. That project spanned five years of research with unprecedented access to greens committee records.

The Dr. James B. and Harriet Beard endowed graduate fellowship at MSU was established to encourage continuation of the high-quality research in the fields of turfgrass science and management they have exemplified. They’ve donated their extensive collection of turfgrass books and research materials to MSU’s Turfgrass Information Center (TIC) and the MSU Libraries.

Their legacy is noted in this statement from Dr. David Martin: “If true success and excellence as an advisor, teacher and researcher are measured by the impact that one’s research and students subsequently have on a profession, then the outstanding contributions of Dr. and Mrs. Beard are without parallel in the history of turfgrass science.”

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