

Biotech Turfgrass Destined for Market

By JOEL JOYNER
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WEST KINGSTON, R.I. - Like it or not, generically engineered turfgrass is on the way. Not only that, but researchers say the possible varieties are all but endless.

"I believe there will be a continuous stream of engineered turfgrass products by various companies," said Albert Kausch, visiting associate professor here at the University of Rhode Island.

"It's possible now to clone any gene from any organism

and introduce that into turfgrasses for various traits. The technology itself is so beneficial and useful that it will go forward.

"We expect to have products available, certainly within the next four to five years," added Kausch, who is also a research scientist for the bio-technology company HybriGene, headquartered in Hubbard, Ore.

In the last few years, genetically engineered crops such as corn and soybeans have taken over the market. "About 70 percent of the U.S. corn crop is now genetically engineered, and about 55 percent in the soybean market," said Kausch.

The strategies applied to corn and soybean can also be applied to improve turfgrasses. "We can change pigment to offer more variety, provide drought- and disease-resistant grasses, and provide pest-resistant as well as salt-tolerant turfgrasses," he said.

"Not only does it introduce traits that don't exist in grass, but it does it faster than conventional breeding. It's really amazing. The wish list is extensive."

WORK AT RUTGERS

At Rutgers University, bio-tech work started in turfgrass by analyzing DNA to identify one strain from another and examine the variation.

"We discovered we could transform bentgrass by introducing clone genes or foreign DNA," said Peter Day, director at the university's Institute of Biomolecular Research. "We initially introduced some genes for Roundup resistance." But Roundup ready turfgrass has not been perfected.

"More recently, we have focused extensively on various constructs that confer resistance to turf diseases, particularly dollar spot," he said.

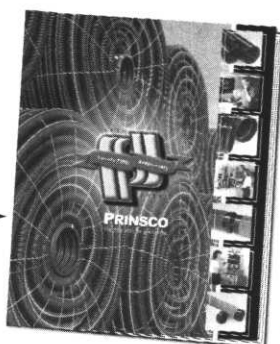
Preliminary trials look promising, according to Day. "Once an engineered variety satisfies the eagle eye of the turf breeder, it will go through performance trials," he said. "It would be very foolish to release anything prematurely.

"One concern is outcrossing and how introduced varieties are likely to be spread through pollination," he said. "The question arises: are these altered species hazardous to the environment?"

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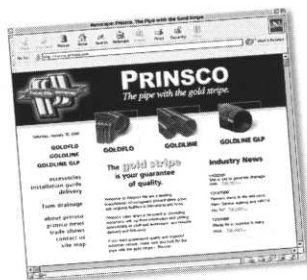
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Biotech Turfgrass—

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EXPERIMENTING WITH STERILITY

Male sterility is one option being studied as a means of controlling a released, transgenic grass variety in nature. "It's still experimental," said Day. "The technology is difficult, with limited success in some grasses. It has been done in tobacco and there's also extensive work being done on rice."

Male sterility in genetically altered turfgrass is a primary focus at Kausch's lab in Rhode Island. "It's an expensive procedure," said Kausch. "It's not something you do in your garage over the weekend or in a Dixie cup."

"Moving one gene requires a great deal of technical experience and anywhere from eight months to a year before you have a plant with an introduced gene in it," said Kausch. "We've had some positive results. We'll probably have something on the market in three to four years."

POLLEN TRAVELS 3,000 FEET

Turfgrass pollen is known to travel upwards to 3,000 feet and outcross with other grasses, said Kausch. "The industry should be concerned about companies testing with open-pollinated, engineered grasses. You don't have to worry about corn, because corn doesn't outcross with anything. Turfgrasses are capable not only of outcrossing with wild relatives, but other species of grass as well."

Transgenic turfgrass research is clearly contentious. "Critics argue that we're making superweeds," Kausch said. "Genetic modification in plants, or anything right now, is controversial."

Largely, I think the controversy is stirred by a lack of education."

SAFETY FIRST

Bio-tech will give researchers and breeders extensive tools to improve grasses.

"There will be a lot of testing, just like with any other technology, but ultimately we will have genetically engineered turfgrasses on the market, just as we have genetically engineered food crops now," said Melodee Fraser,

research director for Pure Seed Testing-East in Rolesville, N.C.

"It will also require a lot of research and evaluations to learn how to use the new turfgrasses safely and responsibly," she said, "and to make turf products that are affordable and manageable for golf course superintendents to use."

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