

Roundup-Resistant Bentgrass Friend or Frankenweed?

Genetically modified grass that's resistant to a widely used pesticide:

Modern technology or monster unleashed? Could this supergrass crossbreed with other species to create an unstoppable "Frankenweed"?

No, it's not a horror movie. It's a reality. And it may be coming soon to a golf course near you.

Two years ago, when the Leaf-let first told you about Roundup-resistant creeping bentgrass

(<http://www.albrightseed.com/leaflitternov2002.htm>)

it

was to announce that the biotech firm Monsanto had withdrawn its proposal to commercially market the product, due to concerns that it would become "an environmental nightmare."

Now, turf expert The Scotts Company, working alongside agribusiness giant Monsanto, wants to launch its product, Roundup Ready(r) Creeping Bentgrass.

The bentgrass, used primarily on golf courses and as a forage crop, was engineered to contain the Roundup (glyphosate) resistance gene CP4 EPSPS (See The Best of the Leaf-let, Attack of the Superweeds, <http://www.albrightseed.com/superweeds.htm>).

The Scotts/Monsanto bentgrass can withstand repeated applications of Roundup-an herbicide made by Monsanto-which normally kills all grasses and other plants. Scotts and Monsanto believe that use of the GE (genetically engineered) bentgrass will make weed control easier for golf course managers and others in related fields. The Scotts Company recently petitioned the USDA to deregulate the product as it has other crops.

However, creeping bentgrass is different and-in the minds of some environmentalists-potentially more hazardous than other plants, because it is a perennial that establishes without cultivation in a variety of habitats, reproducing through seeds as well as stems. Additionally, creeping bentgrass has numerous close relatives with which it can cross-pollinate, forming natural hybrids.

Proceed With Caution

Although the Scotts and Monsanto companies are confident their new product will be a godsend to turfgrass managers, their actions seem to acknowledge that this product is being closely scrutinized by the scientific community and various governmental bodies.

According to the Scotts' Web site

(<http://www.scottsproseed.com/products/turf.cfm>):

"As part of the commercialization process, Roundup Ready(r) Creeping Bentgrass regulatory clearance will be sought from the Animal and Plant Health Inspection Service (APHIS) within the U.S. Department of Agriculture (USDA). APHIS is a key agency in the review process and must determine that the product poses no unacceptable risks to the environment or to agriculture. In addition, the EPA regulates

pesticides and has registration authority for the use of Roundup PRO(r) herbicide over the top of Roundup Ready(r) Creeping Bentgrass. Consultation with the FDA also will be part of the process, to allow the use of Roundup Ready(r) Creeping Bentgrass straw as animal feed."

The site also points out that "Roundup Ready(r) Creeping Bentgrass is not approved for sale or distribution in the United States" and that it "...is a violation of Federal Law to promote any unregistered herbicide use."

An Ill Wind

While The Scotts Company's cautionary verbiage sounds environmentally responsible, many scientists are concerned that GE bentgrass will eventually wreak havoc with other plants, creating the aforementioned Frankenweed effect.

Recent studies conducted in Oregon (see overLEAF-3) showed that wind-blown pollen from fields of the Scotts/Monsanto modified bentgrass had traveled to wild-growing plants in the area. EPA officials are not publicly speculating on possible long-term effects of cross-pollination, but other groups, including the Union of Concerned Scientists (UCS), an independent, nonprofit alliance of scientists, engineers and "concerned citizens", has expressed apprehension.

According to the UCS Web site

(http://www.ucsus.org/food_and_environment/biotechnology/page.cfm?page_I

D=13

74), potential problems in deregulating glyphosate-resistant creeping bentgrass include: "Exacerbating the harmful effects of existing bentgrass weeds; creating new or worse weeds through hybridization with wild relatives; creating new or worse weeds that are not related to bentgrass; contaminating the seed supply for nonengineered bentgrass and related grasses; causing harm to people and the environment as a result of increased exposure to highly toxic herbicides; (and) causing unknown harms as a result of genetic engineering."

The UCS recommends that the USDA delay action on glyphosate-resistant bentgrass until there's a program to better regulate genetically engineered plants-or until they're banned completely.

Safety First at S&S

Four years ago, we told Leaf-let readers that our policy is clear: At S&S Seeds, we will not knowingly sell genetically modified products until reproducible, independent, statistically significant testing proves them to be safe.

If you have questions about any of our products, please give us a call at (805) 684-0436. As always, we're here to help.

EPA Study Finds Bentgrass Blowin' in the Wind

The Leaf-let conducts an exclusive interview with Dr. Anne Fairbrother of the U.S. Environmental Protection Agency

LL:

What is your position at the EPA and where are you based?

AF:

I am the Chief of the Risk Characterization Branch in the Western Ecology Division, part of EPA's Office of Research and Development; a division of the National Health and Ecological Effects Research Laboratory. The Principle Investigator and Project Leader for this study is Dr. Lidia Watrud (of the Western Ecology Division).

LL:

In the study you performed at a test farm in Oregon, you found that pollen from genetically modified bentgrass could spread the resistance gene CP4 EPSPS as far as 13 miles. How was the study conducted?

AF:

In 2002, The Scotts Seed Company planted approximately 400 acres of Roundup-resistant creeping bentgrass in central Oregon. If the USDA allows commercialization of this crop, the seed would be marketed to golf course managers through most of the United States. Before the crop can be commercialized, USDA-APHIS needs sufficient data and information to ensure that unintended effects will be avoided and that, to the extent necessary, the innovation can be effectively managed. Additionally, EPA is interested in developing methods that can be used to predict the risk of gene flow from crops to naturally occurring plants, with the hope that such methodology can be applied to assessing potential risks of the types of GM crops that are regulated by our agency. Therefore, during the pollination period of the bentgrass in the summer of 2003, we (EPA scientists) established a large sampling grid of potted sentinel bentgrass plants to test the development of methods to determine how far pollen from fields of Roundup-resistant bentgrass would travel and if they could pollinate the potted plants and the same type of grasses that occur naturally in that area of Oregon. After pollination, the first generation of seeds were harvested and then germinated in EPA's greenhouse to determine if the gene for resistance to Roundup herbicide was transferred to the progeny seedlings. About 2% of the seedlings from the potted plants had the Roundup resistance gene, and about 0.04% of naturally occurring bentgrass and 0.03% of its close relative, redtop, also received the gene. Most of the cross-pollination occurred within two miles of the fields on the bentgrass crop, but a small percentage of the potted plants up to 13 miles from the field had also received pollen from the crop. Naturally occurring grasses as far as nine miles from the fields had been cross-pollinated.

LL:

The idea behind the development of Roundup-resistant grass is that there would be more weed control in areas such as golf courses. What are some possible environmental ramifications if the gene passes to weeds in the area?

AF:

The gene would only pass to grasses that are closely related to the bentgrass, such as naturally occurring bentgrass or redtop. There are bentgrass relatives in just about all the 48 states of the mainland U.S.

We

don't really know what the gene might do to these naturally occurring plants (particularly in the absence of any selection pressure from the use of Roundup). We are continuing our studies to develop the methods that will allow these kinds of "so what" questions to be answered for bentgrass or other genetically engineered crops.

LL:

Some believe it unlikely that genetically modified grass would spread its herbicide-resistant gene because golf greens are cut short and the grass isn't allowed to flower. What's your opinion?

AF:

That certainly is one possibility, and is something that USDA-APHIS will be considering as they conduct their Environmental Impact Assessment of the Roundup Ready(r) bentgrass, in response to The Scotts Company petition for deregulation.

LL:

At least one other company is attempting to produce an herbicide-resistant bentgrass that has sterile seeds. Since the Scotts/Monsanto product is not yet cleared for use, is it possible that it may be rejected because their seeds can cross-pollinate, or do you believe their Roundup Ready(r) Creeping Bentgrass will receive approval? If so, when?

AF:

The USDA-APHIS just published a Federal Register notice to receive public comment as part of their EIS process. It is too soon to say what the possibility of acceptance/rejection of the petition is, or to speculate on whether or not USDA-APHIS will grant approval.

LL:

Many Leaf-let readers are in turfgrass management and related fields. Is there any other information you would like to share with regard to either herbicide-resistant grass or genetically modified grasses in general?

AF:

Just to be aware that grass pollen and seeds are very small and can easily be dispersed by the wind. As with any crop, appropriate measures should be taken to reduce the potential for unwanted cross-pollination with neighboring crops or naturally occurring grasses.
