TURF Article by Doug Brede “Seeds of Disruption” including My Holiday Lawn

December 2015


## Turf Science

By DOUG BREDE



Scientists regenerate genetically modified, or GM, grass plants from living tissue after new genes are inserted.

# Seeds of Disruption

## Two technologies are lining up to change the lawn care industry as we know it.

What do these four businesses—Insley, Koehring, Little Giant and Link-Belt—have in common?

In the 1950s, they were major manufacturers of cable-actuated backhoes, or what used to be called steam shovels. They were also among more than 30 manufacturers that failed when an innovative and disruptive technology—hydraulics—emerged in the 1960s.

Firms such as J.I. Case, John Deere, Ford, International Harvester, Caterpillar, Komatsu and Hitachi were the winners—the businesses that jumped into hydraulics and capitalized on this new technology. They endured because they not only accepted change but also used it to their advantage. Disruptive businesses may produce lower gross margins, target smaller markets and provide simpler products and services, says Clayton Christensen, Harvard Business School professor, author and leading thinker on innovation. Disruptive products are initially ones the customer doesn't want and can't use, yet they revolutionize the marketplace, just as hydraulics forever changed the excavator industry.

Two seed innovations on the horizon may prove as disruptive to the lawn service industry as hydraulics was to machinery. But opportunities exist for companies to hold their own when these new technologies come knocking rather than being left out as the marketplace evolves.

### Roundup-resistant grass seed

Over the past decade, Scotts Miracle-Gro has transformed itself from a company selling commodities such as seed and fertilizer into one of the top U.S. players in residential and commercial lawn care. Now, after 17 years in the lab, Scotts is preparing to unleash a disruptive innovation: Roundup-resistant turfgrass.

Scotts has gained federal deregulation of Roundup-resistant tall fescue, with similar innovations in Kentucky bluegrass and St. Augustinegrass close behind, according to a West Coast agricultural newspaper. This means the firm is free to plant and market

PHOTOS: DOUG BREDE

genetically modified (GM) turf without further federal regulation. GM crops are commonplace in agricultural production fields. But this will mark the first time these varieties have entered the turfgrass seed market.

By some estimates, putting a single GM variety through federal regulatory approval costs north of $20 million. With turfgrasses, it's even more costly. Why? In a cornfield, a single variety of corn grows. In a lawn, four varieties of various species may be in the mix. If a contractor intends to spray Roundup on that mixture, the seed company would have to put all four varieties through federal registration at a cost of $80 million.

How did Scotts get Roundup-resistant turf approved without breaking the bank? The answer to this question requires a little background. Unbeknownst to many, lawmakers have never created a federal agency to approve GM plants. The authority was bootlegged from existing programs based on the fact that some pathogenic organisms and virus genes are used to develop GM plants. Certain federal agencies do indeed have the authority to regulate transport of potential pathogens or parts thereof.

In a stroke of near genius, scientists at Scotts created Roundup-resistant grass without using pathogens or viruses to help insert the genes. Therefore, this innovation does not fall under federal jurisdiction, clearing the way for commercial release.

As Christensen asserts, disruptive technologies like this one initially have some warts. Five separate concerns have emerged about Roundup-resistant turfgrass:

1. Resistance isn't bulletproof. When the plant is exporting into its roots, it may become susceptible to damage from Roundup.
2. To achieve slower growth and to make its product government friendly, Scotts had to use old technology. It is uncertain whether this strategy will work or will result in uncompetitive, easily trampled plants that produce little seed.
3. Pollen escape is still a real possibility. Turfgrasses don't creep far vegetatively, but they can take a ride by way of the wind when pollen is shed. Scotts discovered this the hard way when pollen from its experimental Roundup-resistant bentgrass wafted 15 miles to cross with other bentgrasses in the landscape, creating Roundup-resistant "weeds."
4. As with all disruptive products, there is a possibility that customers may not appreciate the value of the product. Do customers really want Roundup-resistant fescue, and are they willing to pay extra for it? Will the seed be inexpensive enough to allow contractors to make a profit? Will GM turf create more problems than it solves?
5. There is the issue of exclusivity. Will Scotts be willing to share this innovation with friendly competitors or will it keep it to itself to capture market share?

### Understanding disruptive innovations

Many companies fail while fighting innovations rather than embracing them. Clayton Christensen, Harvard Business School professor, author and leading thinker on innovation, shares a few of his teachings on this topic.

- New disruptive technologies are initially embraced by the *least* profitable businesses, not the most profitable ones.
- Most often, new ideas catch fire in small, insignificant market segments. Rarely do they start with market leaders.
- The usual paradigms of sound business management—work harder and smarter, listen more—are useless when dealing with a disruptive technology.
- Companies that listen to their customers rarely invest in disruptive technologies until it is too late.
- Businesses focused on stealing competitors' customers take their eyes off of their customers' next-generation needs.
- Companies that succeed with a disruptive technology have managers who took the time to find the right customers for the product.

## Low-mow grasses

My Holiday Lawn is the brand name for a series of grasses I developed over the past 14 years that can be mowed as little as once a month rather than once or twice a week. According to Homewyse, a "vendor-neutral" online reference for consumers and trade professionals, the average homeowner could save $1,000 per year in mowing service costs. Commercial property owners stand to save even more.

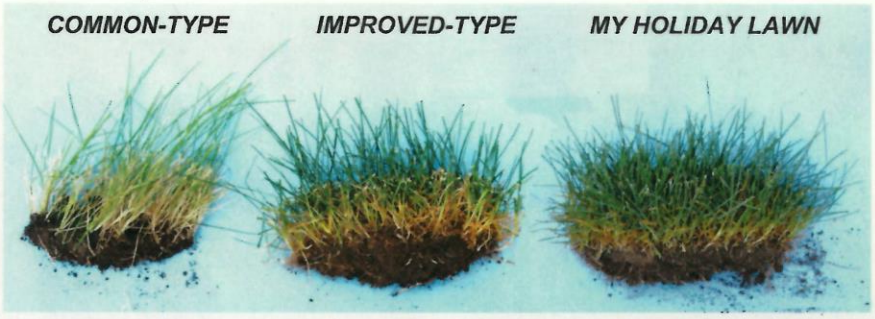
The idea for this patent-pending innovation traces back 25 years. Arden Jacklin, who founded Jacklin Seed in 1936, authored an opinion article in which he describes the most common question homeowners' groups ask him: "When will you have for us a lawn grass that doesn't have to be mowed?"

Jacklin's response: "You just think you want a grass that does not require mowing. Reduced mowing may be possible, but no mowing at all is not." He went on to explain that if a grass is not actively growing, it won't be able to heal from normal wear and tear. Some growth is desirable but too much just leads to extra mowing.

I began envisioning the possibilities back in the 1990s, when I stumbled upon some curious miniature plants growing in my breeding nursery. In plant breeding, serendipity is often the mother of invention. In 2002, I assembled a lawn trial containing plots of all the dwarf mutants I could locate at the time. It actually was a small trial of only 40 entries, but it was intended as a proof of concept. The results were something less than desirable. The grasses looked dismal with infrequent mowing. They just weren't pretty.

But I didn't give up. My eureka moment came a couple of years later when I had tractor and plow poised to recycle several large, aging turf trials. What if we turned these trials into source material for infrequent-mow varieties? The technique sounded deceptively simple: Mow the variety trials just a few times a year and see what performs best.

The technique worked amazingly well. In all, 10,000 experimental varieties were tested and rated. A rating of one was undesirable, five was minimally acceptable and nine was get-down-on-your-knees-and-kiss-the-grass beautiful. Believe it or not, out of 10,000 plots, there were a handful that got me down on my knees.




These grass plugs were extracted from one-year-old turf plots that had not been mowed for one month. The appearance of the turfgrass on right improves as it matures.

The selected varieties are somewhat shorter than a typical Kentucky bluegrass plant, but they are not miniature or dwarf. Being shorter in stature, these grasses do not produce as much seed as normal lawn grasses, so their seed price is somewhat higher, but not prohibitively expensive considering the savings in mowing costs. For homeowners, these grasses can pay for themselves after the first year or two.

The difference between a normal lawn grass and My Holiday Lawn, however, is more complex than just less top growth. In between mowings, a normal lawn grass grows substantially above the intended mowing height, whereas My Holiday Lawn grows green foliage both above and below the mowing height.

These unique grasses require a different approach to lawn care. The lawn's mowing frequency is dictated by the tallest growing component, not the shortest. Just a few tufts of fescue here or there indicate that it's time to mow when otherwise the low-growing grass wouldn't need it for another two weeks. That's why it's important to start with a clean planting bed.

Besides being susceptible to tall grasses, this turf has other quirks. First, the attractive striping pattern after a monthly cut doesn't last as long. It will dissipate in a couple of weeks, replaced by a soft, uniform appearance. Second, it will need regular mowing during its establishment year. Like any lawn grass, it needs fertilization to complete the stand. After the stand is full, fertilizing and mowing can be reduced. Third, My Holiday Lawn is a series of bluegrasses, and bluegrass is not adaptable everywhere. However, in North America alone, more than 100 million people can grow a bluegrass lawn.

One of the steps Scotts used to get Roundup-resistant fescue past government regulators was to insert genes into the new plant using a gene gun. The U.S. Department of Agriculture ruled that it doesn't have jurisdiction over such methods because they don't involve pathogenic bacteria or viruses in the gene transfer.

## Discover your niche

Roundup-resistant turf and My Holiday Lawn are scheduled for full release in 2016. Both products, which are aimed at reducing lawn mowing, could be disruptive innovations. Should contractors embrace them or continue with business as usual? Here are some thoughts on how to proceed:

- Rather than viewing these innovations as threats to the lawn service industry, look for ways to use them to advance.
- These novel lawn grasses require novel care. Become a specialist in applying Roundup to the grass and not the flowers or solve the problem of unwanted grass emerging in My Holiday Lawn.
- Become an expert at renovating lawns using these new technologies. This requires specialized expertise that is hard to copycat.
- Consider the advantages of being an early adopter. Early adopters would be first in line for second-generation products.

Doug Brede, Ph.D., has been research director for Jacklin Seed by Simplot for nearly 30 years. In that time, he and his staff have developed more than 100 popular turf varieties used around the world. He is the author of the book "Turfgrass Maintenance Reduction Handbook" and more than 400 articles on turf maintenance.

PHOTOS: DOUG BREDE