



GM PLANTS CREEPING ACROSS OREGON Julia Rosen June 25, 2018

In the failing light of an unusually warm January day, Jerry Erstrom and I race along a dirt track behind Rod Frahm's white pickup. Here, near Ontario, Oregon, a stone's throw from the Idaho border, Frahm grows onions, squash and corn. But today, he wants to show us something he's growing against his will: a genetically engineered turfgrass designed for golf courses.

Frahm slams on the brakes next to a dry irrigation ditch, jumps out and yanks up a clump, winter-brown but laced with new green shoots. Beneath his gray fedora, his dark eyes glint with anger as he holds out the scraggly specimen. "I have it in a lot of my ditches," he says.

Just to be sure, Erstrom produces a plastic vial the size and shape of a .22 caliber cartridge. He stuffs a few blades into it, adds water, and mashes the mixture with a wooden rod, like a bartender muddling mint. Then he inserts a plastic strip and hands it to me. It's like a pregnancy test: One line confirms it's working, while the other detects a gene that unmarks the intruder.

We wait, batting away gnats and breathing in the aroma of onions, whose colorful skins litter the county roads. Then the results appear: This is

indeed the variety of creeping bentgrass that agribusiness giants Scotts Miracle-Gro and Monsanto engineered to tolerate the herbicide Roundup.

The grass arrived here uninvited, after crossing the Snake River from old seed fields in Idaho. The U.S. Department of Agriculture, which vets most new genetically engineered products, had not approved the plant's release. But in 2010, landowners discovered it growing in great mats throughout the irrigation system that stretches like a spider web across Malheur County.

Creeping bentgrass has not created a catastrophe, as some anti-GMO groups warned it would. But it thrives in canals and ditches, where it collects sediment and impedes water flow, and it has proved difficult to control. That makes it a headache for Frahm and other growers — like the heavy snows that crushed their onion sheds last year, and the host of other weeds they already battle.

No one believes the bentgrass can be fully eradicated, either. And as long as it's around, some fear it could contaminate non-GMO crops and invade natural areas. "It just scares the bejeezus out of me," says Erstrom, a retired Bureau of Land Management natural resource specialist who chairs the Malheur County Weed Advisory Board.

So far, Scotts has led the battle to rein in its escapee, with some recent success. But in a series of decisions over the last several years, the USDA has relieved Scotts of future responsibility in return for the company's promise not to market the grass. Scotts has pledged not to turn its back on the problem, but after this summer, it no longer has to bankroll cleanup efforts. Now, Erstrom and others say there are no legal safeguards to keep the task — with its reported \$250,000 annual price tag — from becoming the burden of local growers and the state and county governments.

To critics, the case laid bare glaring weaknesses in the country's oversight of genetically engineered, or GE, crops. While biotechnology's defenders say the process is already overly rigorous, others have long argued that regulations, which haven't changed significantly since 1987, don't do enough to protect agriculture and the environment. Neither the USDA nor any government agency must weigh the full social, economic and ecological impacts of GE products, says Jennifer Kuzma, co-director of the Genetic Engineering and Society Center at North Carolina State University. "There's really no place that's looking at this broadly from a risk-benefit perspective."

In Malheur County, landowners must reckon with the consequences. Erstrom says the USDA's handling of bentgrass has forced a polarized community to grapple with a problem it didn't create. "They took it out of Scotts' hands and dumped it into the laps of the irrigation district and the farmers."

Creeping bentgrass is nothing special to behold. You've probably stepped on its delicate emerald blades without noticing. The plant may be native to North America, or it may have crossed the Atlantic hundreds of years ago in animal feed. Today, it grows in every state of the Union and on many golf courses. Groundskeepers prize its fine texture and its ability — as its name suggests — to creep, sending out stems that root into the soil and sprout new plants, forming a dense, even cover.

Scotts and Monsanto started working on the Roundup-resistant version in the 1990s. It was to be the first commercial GE grass. As scientists had done with corn and soy, they used bacteria to insert a segment of DNA into the bentgrass genome, which allowed the plant to survive a dose of the herbicide even as neighboring weeds withered.



Jerry Erstrom looks for genetically engineered creeping bentgrass along an irrigation ditch in Ontario, Oregon. Otto Kitsinger

Keeping golf courses weed-free is important, especially for professional tournaments with big money at stake, says Virgil Meier, a plant geneticist who worked on the grass at Scotts. “Anything other than 100 percent bentgrass makes any kind of putt on a green unreliable,” he says. But what started as a straightforward idea quickly grew messy, as Scotts — and some say the USDA — fumbled the plant’s rollout. (Scotts declined to comment for this story.)

Things went well at first. Scotts conducted dozens of field trials, marshaling evidence that its bentgrass was safe and differed from regular bentgrass only in its Roundup resistance. The USDA’s Animal and Plant Health Inspection Service, or APHIS, considers these questions when deciding whether to release new genetically engineered organisms from regulatory oversight — a necessary step for wide commercial sale. In 2003, with results in hand, Scotts and Monsanto petitioned the agency to deregulate the grass.

At the same time, Scotts got permission from the USDA to plant larger fields for seed production. Farmers sowed 80 acres of bentgrass in Canyon County, Idaho, and 420 acres in Jefferson County, Oregon, north of Bend.

The Oregon Department of Agriculture picked the site — an irrigated island in the sagebrush sea — to keep the plant far from the Willamette Valley. There, on the western side of the mountains, farmers grow forage and turf grass for a \$1 billion-a-year seed industry.

Then two windstorms swept through the eastern Oregon fields in August of 2003, scattering flea-sized seeds well beyond the designated control area. Roundup-resistant pollen fertilized conventional bentgrass plants as far as 13 miles away. There was no calling it back.

The escape didn't surprise anyone, says Carol Mallory-Smith, a weed scientist at Oregon State University. She says she warned APHIS that permitting the seed fields was tantamount to deregulation; even without the storms, the grass' biology practically guaranteed its spread. The decision to move ahead anyway reflected the agency's somewhat cavalier approach to field trials at the time. A 2005 USDA audit found that it did not, for instance, keep track of field locations or review companies' plans for containing their products. The audit warned that APHIS' procedures did "not go far enough to ensure the safe introduction of agricultural biotechnology."

In 2007, APHIS fined Scotts \$500,000 — the largest amount allowable — for losing control of the bentgrass. "There was no doubt they violated the agreement," says Meier, who had left Scotts to work for the agency by then. But he didn't think the bentgrass' escape in Oregon, or from future plantings, was cause for concern. It has never been a weed in crops like corn, soy or wheat, he says.

However, APHIS soon discovered that not everyone shared Meier's view. In particular, federal land management agencies already struggled to manage creeping bentgrass and its relatives in natural areas, and objected to the prospect of losing one of their best tools: Roundup. "The deregulation of this organism," the U.S. Forest Service wrote bluntly, "has

the potential to adversely impact all 175 national forests and grasslands.”

When the petition got mired in concerns that the grass could threaten two endangered plants and a butterfly, many assumed that APHIS had shelved it. “We all thought that the bentgrass was dead and buried,” says George Kimbrell, legal director for the Center for Food Safety, which had sued to stop the grass’ production. But the situation in Malheur County brought it roaring back to life.

At an empty café in Nyssa, 12 miles south of Ontario, Jerry Erstrom hunches over his chicken salad. At 69, he’s tall and energetic, with silver-white hair and pale blue eyes. Erstrom has lived among Malheur County’s sundried hills all his life, working as a fire manager for the BLM, and later, leading the agency’s regional weed program. His unofficial title, according to the nameplate above his desk at home, was “Weed Czar.”

When Erstrom retired in 2003, he decided to farm full-time, partly because a friend said he couldn’t do it. “I’m a little bit hard-headed,” he says. Now Erstrom grows close to 1,000 acres of alfalfa and unusual crops like yarrow and sagebrush, selling the seeds for fire restoration. Erstrom also chaired the local watershed council and serves on the State Weed Board.

Over the last few years, bentgrass has consumed more and more of his energy. And there is one thing he wants understood: “This is not about GMOs,” he says, stabbing the table with his finger. It’s about accountability. “Scotts had an ‘oh-shit,’ ” he says, “and my feeling is — and I live by this — you play, you pay.”

Of course, Scotts did pay a fine. But then Malheur County landowners noticed that Roundup no longer worked on what they thought were regular bentgrass plants in their ditches. They brought samples to OSU’s local experiment station, which sent them to Mallory-Smith in Corvallis. She soon confirmed the fugitive plant’s identity.



Genetically engineered creeping bentgrass grows along a gated irrigation pipe by a field of hay and orchard grass in Ontario, Oregon.

Otto Kitsinger

Scotts hired contractors to help the irrigation district fight the grass, but it kept getting ahead of them, says Gary Page, the Malheur County weed inspector. Workers sprayed other herbicides every spring and fall. But they struggled to keep up in summer, when the grass grew long and flowered. The ditches were full and the only herbicide approved for use near water was Roundup.

Erstrom watched with increasing worry. He feared that bentgrass might creep into alfalfa or carrot seed bound for anti-GE export markets like Japan, causing crops to get rejected. It could also hitch a ride to the Willamette Valley in the hay Malheur County supplies to many dairies, he says, and infiltrate the grass seed industry.

Contamination is a frequent source of friction over GE crops. A 2014 survey by Food and Water Watch, an opponent of biotechnology, reported that a third of all organic grain producers had found unwanted

GE products on their farms. The majority had taken preventive measures to reduce the risk — which cost individual farmers thousands of dollars. A USDA survey, published the same year, found that economic losses due to contaminated organic crops were relatively small — \$6 million in total since 2011. But it did not track impacts on non-organic, non-GE growers, who make up a much larger share of the agricultural industry.

In most cases, the offending plant is a commercial crop. But there are exceptions, as when an eastern Oregon farmer found Roundup Ready wheat growing in a field in 2013. Mallory-Smith identified it as a variety Monsanto had field-tested in the state before it abandoned its bid for deregulation. In the wake of the discovery, Japan and South Korea temporarily stopped buying wheat from the Pacific Northwest.

So far, bentgrass hasn't caused any other export problems. It's mainly a nuisance that refuses to go away. Feral plants still grow in all three counties, despite years of management, making it one of dozens of herbicide-resistant weeds whose proliferation has shadowed the adoption of GE crops. And in central Oregon, Mallory-Smith and her colleagues have documented cases where the grass has blended with two different species to form Roundup-resistant hybrids. These bear no resemblance to bentgrass and will likely evade control efforts, she says. The grass — a perennial — could spread, too; it can't survive in the dry desert, but it could migrate through waterways and invade bare riverbanks. Scotts has already treated the grass on an island in the Snake River.

Warren Chamberlain, who chairs the irrigation district west of Ontario, thinks the birds will bring bentgrass to him. The day after our lunch in Nyssa, Erstrom and I visit Chamberlain's dairy farm near the two-stop-sign community of Willowcreek. "We're going to be stuck fighting this for the rest of our lives," he laments. "All so somebody could have green grass on a golf course."

At some point after the grass invaded Malheur County, Scotts and Monsanto quietly decided to reapply for deregulation. The companies gave up on commercializing the grass and limited their petition to existing populations — raising questions about their motivation. “They saw it as a way out of their current and future liability,” speculates Kimbrell, of the Center for Food Safety. (Scotts declined to comment.) But Kimbrell and others found the USDA’s response even more perplexing.



Jerry Erstrom, right, and Terry Oft discuss genetically engineered creeping bentgrass growing along a gated irrigation pipe in a field of hay and orchardgrass in Ontario, Oregon. Otto Kitsinger

In 2015, after learning of Scotts’ intentions, the agency proposed a deal: If the company promised not to sell the grass for the life of the patent and continued control efforts for three more years, APHIS would absolve Scotts of responsibility for controlling the plants. The company would have to maintain an educational website and provide technical support for managing the grass until 2023, including if it cropped up in a new location or in someone’s harvest. But it would not have to pay for cleanup.

Sid Abel, the assistant deputy administrator for APHIS’ Biotechnology

Regulatory Services, saw the agreement as a pre-emptive measure to protect farmers and secure Scotts' cooperation. "We wanted that written out," he says. That's because, under current regulations, APHIS would likely have to approve the grass this time around. Understanding why gets at the heart of what many see as a fundamental flaw in the nation's regulatory system.

When lawmakers first confronted GE crops in the 1980s, they decided not to create new laws to regulate them. Instead, agencies used existing laws and split the authority. The Food and Drug Administration would oversee edible crops and the Environmental Protection Agency would manage pesticides and plants engineered to produce biopesticides. The USDA already had the power to guard against plant pests, a category that includes parasites, microbes, bugs and other critters that physically harm plants or plant products. And because most GE organisms were initially modified using DNA from bacteria or viruses — both pests — they came under the purview of APHIS' Biotechnology Regulatory Services.

But if a company petitioned to have a GE product deregulated, APHIS could only deny it if it concluded that the product itself was a pest, or if it could somehow boost pests. Few plants met this criteria; simply being weedy or troublesome was not enough. As a result, APHIS has not denied any of the 127 petitions it's received for deregulation, although there have been a few cases where companies withdrew them, Abel says. "Our entire decision-making process relies solely on whether this product is a plant pest."

People across the spectrum dislike the current system, which focuses more on how a product is made than on how it behaves. Wayne Parrott, a biotechnology expert at the University of Georgia, says that existing regulations create unnecessary barriers for many GE crops while ignoring the potential health and environmental risks of others.

When it came to bentgrass, Parrott says, the USDA didn't have the

authority to deny the companies' petition. Even though the grass had a proven record of causing problems for landowners, and even though the USDA itself acknowledged that bentgrass was weedy, it did not qualify as a pest. The agency argued that it was merely a management issue, and that landowners could use other means to control the grass — although it recognized the challenges of treating the grass around water. Scotts' promise not to sell the product also meant that it wouldn't be planted anywhere else, relieving many of the environmental concerns that had stymied deregulation before, like those involving endangered species.

In 2000, Congress passed a law that provided the first real opportunity to rethink GE regulation. It allows APHIS to extend its authority over noxious weeds to GE products, theoretically granting the agency greater discretion over potentially weedy crops, Kuzma says. (Notably, conventionally bred crops are far less regulated, and have also led to weed issues.) However, regulations have yet to change. APHIS has tried twice to revamp the rules to reflect the new law, and to address issues raised in the 2005 audit, but failed when new presidential administrations scrapped the proposals before they could be finalized. Today, Biotechnology Regulatory Services still operates under regulations written last century. "We'd like to change that," Abel says.

It's unclear whether the updates would have changed the outcome for bentgrass, but there's growing urgency to do something, Kuzma says. Current regulations don't allow APHIS to regulate the increasing number of products engineered with synthetic tools like gene guns. Roughly 60 GE organisms now fall outside the agency's authority because they weren't made with a plant pest, and all can be released into the environment without review. A soybean has already been commercialized, and an anti-browning button mushroom has drawn media attention. But the list also includes four grasses developed by Scotts. "There is no check to see whether the ecological implications are being thought through," Kuzma says.

Mallory-Smith fears something worse than bentgrass could creep through this gap. While Roundup resistance is a pain for growers and land managers, it's a relatively benign trait in the wild; it offers a competitive edge only when plants get sprayed with herbicide. But what about a potentially weedy plant that's been modified to tolerate drought or salt or heat? That would give the species a major advantage, she says. "All of a sudden, you are looking at something that could have very different environmental impacts."

At 5 p.m. on March 1, 2016, Scotts and the USDA held a meeting at the extension office in downtown Ontario. A few dozen people, including Erstrom, packed the conference room, taking seats at rows of tables. Others leaned against the counter along the back wall. The mood, Erstrom recalls, was tense.

In January, APHIS had announced it would consider Scotts' revised petition for deregulation, but news of its 2015 agreement with the company broke much later. The head of the Oregon Department of Agriculture first called attention to it in mid-February, in a letter rebuking the USDA for thrusting the bentgrass problem on the state's residents. Sitting in the front row, Erstrom put it more bluntly, according to a newspaper account. He called the deal "nothing more than a plan for Scotts to get off the economic hook of fixing what they broke."



Genetically engineered creeping bentgrass that has escaped weed control efforts in an Ontario, Oregon, ditch. Otto Kitsinger

At the meeting, Bob Harriman, Scotts' vice president of biotechnology, assured everyone that the company had no intention of walking away. "We have a history of being an honorable company," Harriman said. "Judge us on the actions we're taking (and) the progress we're making."

But Harriman's assurances didn't assuage locals' feeling that a bargain had been struck behind their backs. "We were never given the opportunity to give much input from our area," says Les Ito, who grows onions, beans and other crops outside Ontario. "That's been a sore spot." Erstrom and others didn't fully trust Scotts, either. The company refused to reveal where it had treated bentgrass, even to the weed board. "They keep saying they want to be open and transparent about it, but they are not willing to share the data," says Page, the county weed inspector.

So that May, at the weed board's request, the county commission unanimously voted to classify the bentgrass as a noxious weed in Malheur County. The designation requires landowners to remove it from their property, providing a backstop if Scotts ramped down its efforts.

Erstrom also hatched a plan to sue. He reached out to the Farm Bureau, an agricultural advocacy group, and to U.S. Rep. Greg Walden, a Republican whom Erstrom had supported for decades. When he called, he mentioned that he had also contacted the Center for Food Safety and the nonprofit Center for Biological Diversity, a Tucson-based environmental group with an office in Portland. Both wanted to help and had the resources to fight Scotts and the USDA. That's when the ground shifted.

Walden's office never responded, and instead of offering support, the Farm Bureau alerted Dan Andersen, a local rancher who serves as its regional director. Andersen appeared before the county commission on June 1 to say that the Farm Bureau could not support collaborating with the environmental groups. He warned that they wanted to do away with all GE crops, including the corn and sugar beets that form mainstays of the local economy.

Around the same time, Paulette Pyle, a longtime agribusiness lobbyist who now worked in PR, met with locals on behalf of Scotts. Lori Ann Burd, an attorney at the Center for Biological Diversity, says that Pyle spread false rumors that her organization planned to use bentgrass as an opening to push for designation of the nearby Owyhee Canyonlands as a national monument — a contentious proposal that many locals opposed. (Pyle did not respond to requests for comment.)

A rift opened in the community. The county commission — once receptive to the idea of a lawsuit — turned against it, as did some local growers. Erstrom tried other avenues, contacting Oregon's two Democratic senators, and proposing a plan to force Scotts to put \$4 million in an escrow account that the weed board could use to fight the grass. But APHIS' regulatory process had already lurched back into motion.

In August 2016, the agency released a preliminary assessment concluding that Roundup-resistant creeping bentgrass did not constitute a pest. And

in November, APHIS completed its final environmental analysis — now much narrower in scope — indicating its intent to deregulate.

Each stage saw waves of protest. The majority of the nearly 6,000 public comments on the petition opposed deregulation, and more negative feedback rolled in over the new year. On Jan. 9, 2017, Bruce MacBryde, a retired botanist who worked on bentgrass at APHIS from 2002 to 2006, wrote that “the decision should be no — there is still more to do that requires good regulatory oversight.” The same day, the Oregon Department of Agriculture sent a final letter to the USDA, rejecting the agency’s conclusion that bentgrass wasn’t a pest. It also noted that no herbicide had yet been approved to control the grass around water.

But on Jan. 12, as expected, the USDA relinquished control over Roundup-resistant creeping bentgrass once and for all.

Parrott says APHIS had no choice. But Mallory-Smith says the move sets a dangerous precedent for other companies that let their products get away. “I think it was a total whitewash,” she says. “I have a real problem with that.”

On my last day in Malheur County, Erstrom takes me to visit the cavernous, clanking plant where he cleans and processes his seeds. We hurtle through the blanched countryside under a robin’s-egg-blue sky, following the Snake River south, until we arrive at a cluster of buildings.

A rooster and two hens scratch around some empty seed bins while a black cat supervises from a pile of pallets. Erstrom, wearing a royal blue kerchief around his neck, leads me inside where antiquated machines shake, sift and sort seeds. In one corner, a contraption with belts and chutes separates tiny sagebrush seeds from their husks, filling the air with fragrant haze. Someday, these plants might be used to restore the landscape Erstrom wants to protect from threats like bentgrass.

For now, he's still recovering from the sting of defeat. "It really put a needle in my balloon," he says. He's lost friends over the issue, and acknowledges that his association with environmental groups may have polarized the issue. "I almost drew a line in the sand," he told me during a moment of introspection earlier in the week. But later, when he recovered his usual confidence, he reconsidered. "What would have happened in World War II if Churchill hadn't reached out to the Russians?" he asked me, exasperated.



Jerry Erstrom tests a grass sample to determine whether it's genetically engineered creeping bentgrass. Some of the grass he tested at the Oft property was positive. Otto Kitsinger

Erstrom's gamble didn't work out the way he hoped, but it may still have made a difference. Andersen, the Farm Bureau representative, always favored a cooperative approach to the problem, and he now sits on a local working group that manages the bentgrass cleanup with Scotts. But he concedes that the threat of a lawsuit may have pressured the company to step up. "They've been working at it diligently for probably four to five years," he says, but got even more serious when they realized that "there was a bigger problem here than they had anticipated."

The biggest victory came last spring, a few months after deregulation, when Scotts helped win approval for the herbicide Reckon to be used on

the grass all summer long. The results look promising, Andersen says. Scotts has been handing out free vouchers to landowners, and he is cautiously optimistic they can keep the grass at bay. But he acknowledges that it will never go away. Any plants that escape control will provide a seed source, and if people ever get lax, there's little doubt the grass will surge back. Abel says APHIS will keep an eye on it, and if landowners start losing ground, the agency will "encourage Scotts to do the right thing." But there is no legal force behind that.

Driving back into town after the tour, Erstrom turns onto a side road and peers out his window. "I've found bentgrass right over here," he says, pulling over to collect another sample. This time, however, it's just a run-of-the-mill ditch inhabitant. Erstrom somewhat grudgingly admits that's good news.

Even if the bentgrass retreats, it still bothers him that the Farm Bureau sided with Scotts and that the community fractured when it should have united. It bothers him that his elected officials kept silent. Most of all, it bothers him that the USDA seemed to protect industry over local growers. The regulatory system "failed miserably," Erstrom says, upending his faith in the government he served for decades. It's been a hard lesson to learn. "That really disillusioned me about what's going on in the world."

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Note: A previous version of this article misidentified the size of a plastic vial. It is the size of a .22 caliber cartridge, not bullet. The year that GMO creeping bentgrass first escaped from test fields has also been corrected; it was 2003, not 2013.

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