

# The New York Times

Late Edition

Today, cloudy, a few showers and a thunderstorm, high 80. Tonight, thunderstorms, low 70. Tomorrow, clouds and sun, a morning shower, high 84. Weather map, Page 18.

VOL. CLXII . No. 56,211

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NEW YORK, SUNDAY, JULY 28, 2013

\$6 beyond the greater New York metropolitan area.

\$5.00

## WORRIES MOUNT AS SYRIA LURES WEST'S MUSLIMS

### Radicals Seen as Threat After Gaining War Experience

By ERIC SCHMITT

WASHINGTON — A rising number of radicalized young Muslims with Western passports are traveling to Syria to fight with the rebels against the government of Bashar al-Assad, raising fears among American and European intelligence officials of a new terrorist threat when the fighters return home.

More Westerners are now fighting in Syria than fought in conflicts in Iraq, Afghanistan, Somalia or Yemen, according to the officials. They go to Syria motivated by the desire to help the people suffering there by overthrowing Mr. Assad. But there is growing concern that they will come back with a burst of jihadist zeal, some semblance of military discipline, enhanced weapons and explosives skills, and, in the worst case, orders from affiliates of Al Qaeda to carry out terrorist strikes.

"Syria has become really the predominant jihadist battlefield in the world," Matthew G. Olsen, the director of the National Counterterrorism Center, told a security conference in Aspen, Colo., this month. He added, "The concern going forward from a threat perspective is there are individuals traveling to Syria, becoming further radicalized, becoming trained and then returning as part of really a global jihadist movement to Western Europe and, potentially, to the United States."

Classified estimates from Continued on Page 10



**Champion for Women**  
Lindy Boggus, who served Louisiana for nine terms in Congress, has died at 97. Page 20.

## Egypt's Ruling Military Kills Scores of Islamists at Rally



A supporter of the ousted president, Mohamed Morsi, mourns a relative killed in a clash with the authorities in Cairo.

## HUNDREDS ARE INJURED

### A Crackdown Widens Three Weeks After Morsi's Ouster

By KAREEM FAHIM and MAYY EL SHEIKH

CAIRO — The Egyptian authorities unleashed a ferocious attack on Islamist protesters early Saturday, killing at least 72 people in the second mass killing of demonstrators in three weeks and the deadliest attack by the security services since Egypt's uprising in early 2011.

The attack provided further evidence that Egypt's security establishment was reasserting its dominance after President Mohamed Morsi's ouster three weeks ago, and widening its crackdown on his Islamist allies in the Muslim Brotherhood. The tactics — many were killed with gunshot wounds to the head or the chest — suggested that Egypt's security services felt no need to show any restraint.

"They had orders to shoot to kill," said Gehad el-Haddad, a Brotherhood spokesman. The message, he said, was, "This is the new regime."

In Washington, Secretary of State John Kerry called this "a pivotal moment for Egypt" and urged its leaders "to help their country take a step back from the brink."

The killings occurred a day after hundreds of thousands of Egyptians marched in support of the military, responding to a call by its commander for a "mandate" to fight terrorism. The appeal by Gen. Abdul-Fattah el-Sisi, who has emerged as Egypt's de facto leader since the military removed Mr. Morsi from power, was widely seen as a green light to the security forces to increase their repression of the Islamists.

In the attack on Saturday, civilians joined riot police officers in firing live ammunition at the protesters as they marched toward a bridge over the Nile. By early morning, the numbers of wounded people had overwhelmed doctors at a nearby field hospital.

One doctor sat by himself, crying as he whispered verses from the Koran. Nearby, medics tried to revive a man on a gurney. When they failed, he was quickly lifted away to make room for the many others.

With hundreds of people Federal Reserve to share economic stewardship, expressed confidence that the trends could

## G.O.P. Senators See an Upside In a Problematic Issue: Abortion

By JEREMY W. PETERS

WASHINGTON — It reads like a who's who of the next generation of Republican Party leaders: Marco Rubio, Ted Cruz, Rob Portman.

But what is bringing all these marquee political names together is not the Iowa State Fair or a Tea Party rally on the National Mall. Rather, they are all talking discreetly about how to advance a bill in the Senate to ban abortion at 20 weeks after fertilization.

A similar ban passed the House last month, and Senate Democrats quickly pronounced it doomed to fail in their chamber. It is almost certain to be defeated there, and even if it were not, President Obama would veto it. But backers of the ban are eager to bring to the floor of the Senate the same impassioned debate over abortion that has been taking place in state legislatures around the country.

Plans under discussion among the staff members of a handful of Republican senators would involve bringing the measure up for a vote, probably as part of debate over a spending measure, sometime after Congress returns from its August recess. Because of the Senate's porous rules for introducing amendments, people on both sides of the issue say they believe a vote is more than likely if the legislation comes together.

"I think there's significant support across the country for the idea that after 20 weeks, abortion should be significantly limited," said Mr. Rubio, who has taken a leading role in trying to generate support for the bill. "Irrespective of how people may feel about the issue," he added, "we're talking about five months into a pregnancy. People certainly feel there should be significant restrictions."

Continued on Page 4

## President Says Income Gap Is Fraying U.S. Social Fabric

By JACKIE CALMES and MICHAEL D. SHEAR

GALESBURG, ILL. — In a week when he tried to focus attention on the struggles of the middle class, President Obama said in an interview that he was worried that years of widening income inequality and the lingering effects of the financial crisis had frayed the country's social fabric and undermined Americans' belief in opportunity.

Upward mobility, Mr. Obama said in a 40-minute interview with The New York Times, "was part and parcel of who we were as Americans."

"And that's what's been eroding over the last 20, 30 years, well before the financial crisis," he added.

"If we don't do anything, then growth will be slower than it should be. Unemployment will not go down as fast as it should. Income inequality will continue to rise," he said. "That's not a future that we should accept."

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## A Race to Save the Orange by Altering Its DNA

### Contagion Raging, Florida Industry Tries to Build a Better Tree

By AMY HARMON

CLEWISTON, Fla. — The call Rickie Kress and every other citrus grower in Florida dreaded came while he was driving.

"It's here" was all his grove manager needed to say to force him over to the side of the road.

The disease that sours oranges and leaves them half green, already ravaging citrus crops across the world, had reached the state's storied groves. Mr. Kress, the president of Southern Gardens Citrus, in charge of two and a half million orange trees and a factory that squeezes juice for Tropicana and Florida's Natural, sat in silence for several long moments.

"O.K.," he said finally on that

fall day in 2005, "let's make a plan."

In the years that followed, he and the 8,000 other Florida growers who supply most of the nation's orange juice poured everything they had into fighting the disease they call citrus greening.

To slow the spread of the bacterium that causes the scourge, they chopped down hundreds of thousands of infected trees and sprayed an expanding array of pesticides on the winged insect that carries it. But the contagion could not be contained.

They scoured Central Florida's half-million acres of emerald groves and sent search parties around the world to find a naturally immune tree that could serve as a new progenitor for a

crop that has thrived in the state since its arrival, it is said, with Ponce de León. But such a tree did not exist.

"In all of cultivated citrus, there is no evidence of immunity," the plant pathologist heading a National Research Council task force on the disease said.

In all of citrus, but perhaps not in all of nature. With a precipitous decline in Florida's harvest predicted within the decade, the only chance left to save it, Mr. Kress believed, was one that his industry and others had long avoided for fear of consumer rejection. They would have to alter the orange's DNA — with a gene from a different species.

Oranges are not the only crop

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A test plot in Florida contains genetically modified orange trees alongside regular ones.

INTERNATIONAL 4-13

**Israel May Release Palestinians**  
Prime Minister Benjamin Netanyahu agreed to free 104 prisoners, a move that he said was painful, but tied to progress in peace talks. PAGE 12

NATIONAL 14-19

**U.S. Scrutiny of Local Police**  
Federal intervention in local police departments over civil rights violations has become more common under the Obama administration. PAGE 14

**A Merging of Ad Agencies**

Two of the world's largest advertising companies are expected to announce their merger on Sunday, supplanting the industry leader. PAGE 19

SPORTSUNDAY

**Finding a Sanctuary**

As another wireless season passes at Carroll Academy, run by the Carroll County (Tenn.) Juvenile Court, basketball remains a source of stability. PAGE 1

SUNDAY REVIEW

**Maureen Dowd**

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# The New York Times

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Contagion Raging, Florida Industry Tries to Build a Better Tree



RICHARD PERRY/THE NEW YORK TIMES

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By AMY HARMON

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Oranges are not the only crop that might benefit from genetically engineered resistance to diseases for which standard treatments have proven elusive. And advocates of the technology say it could also help provide food for a fast-growing population on a warming planet by endowing crops with more nutrients, or the ability to thrive in drought, or to resist pests. Leading scientific organizations have concluded that shuttling DNA between species carries no intrinsic risk to human health or the environment, and that such alterations can be reliably tested.

But the idea of eating plants and animals whose DNA has been manipulated in a laboratory — called genetically modified organisms, or G.M.O.'s — still spooks many people. Critics worry that such crops carry risks not yet detected, and distrust the big agrochemical companies that have produced the few in wide use. And hostility toward the technology, long ingrained in Europe, has deepened recently among Americans as organic food advocates, environmentalists and others have made opposition to it a pillar of a growing movement for healthier and ethical food choices.

Mr. Kress's boss worried about damaging the image of juice long promoted as "100 percent natural."

"Do we really want to do this?" he demanded in a 2008 meeting at the company's headquarters on the northern rim of the Everglades.

Mr. Kress, now 61, had no particular predi-

lection for biotechnology. Known for working long hours, he rose through the ranks at fruit and juice companies like Welch's and Seneca Foods. On moving here for the Southern Gardens job, just a few weeks before citrus greening was detected, he had assumed his biggest headache would be competition from flavored waters, or persuading his wife to tolerate Florida's humidity.

But the dwindling harvest that could mean the idling of his juice processing plant would also have consequences beyond any one company's bottom line. Florida is the second-largest producer of orange juice in the world, behind Brazil. Its \$9 billion citrus industry contributes 76,000 jobs to the state that hosts the Orange Bowl. Southern Gardens, a subsidiary of U.S. Sugar, was one of the few companies in the industry with the wherewithal to finance the development of a "transgenic" tree, which could take a decade and cost as much as \$20 million.

An emerging scientific consensus held that genetic engineering would be required to defeat citrus greening. "People are either going to drink transgenic orange juice or they're going to drink apple juice," one University of Florida scientist told Mr. Kress.

And if the presence of a new gene in citrus trees prevented juice from becoming scarcer and more expensive, Mr. Kress believed, the American public would embrace it. "The consumer will support us if it's the only way," Mr. Kress assured his boss.

His quest to save the orange offers a close look at the daunting process of genetically modifying one well-loved organism — on a deadline. In the past several years, out of public view, he has considered DNA donors from all over the tree of life, including two vegetables, a virus and, briefly, a pig. A synthetic gene, manufactured in the laboratory, also emerged as a contender.

Trial trees that withstood the disease in his greenhouse later succumbed in the field. Concerns about public perception and potential delays in regulatory scrutiny put a damper on some promising leads. But intent on his mission, Mr. Kress shrugged off signs that national campaigns against genetically modified food were gaining traction.

Only in recent months has he begun to face the full magnitude of the gap between what science can achieve and what society might accept.



RICHARD PERRY/THE NEW YORK TIMES

**RAVAGED CROPS** To avoid spreading a scourge further, orange trees infected by disease are cut down and burned in Clewiston, Fla., at groves owned by Southern Gardens Citrus.

## Millenniums of Intervention

Even in the heyday of frozen concentrate, the popularity of orange juice rested largely on its image as the ultimate natural beverage, fresh-squeezed from a primordial fruit. But the reality is that human intervention has modified the orange for millennia, as it has almost everything people eat.

Before humans were involved, corn was a wild grass, tomatoes were tiny, carrots were only rarely orange and dairy cows produced little milk. The orange, for its part, might never have existed had human migration not brought together the grapefruit-size pomelo from the tropics and the diminutive mandarin from a temperate zone thousands of years ago in China. And it would not have become the most widely planted fruit tree had human traders not carried it across the globe.

The varieties that have survived, among the many that have since arisen through natural mutation, are the product of human selection, with nearly all of Florida's juice a blend of just two: the Hamlin, whose unremarkable taste and pale color are offset by its prolific yield in the early season, and the dark, flavorful, late-

season Valencia.

Because oranges themselves are hybrids and most seeds are clones of the mother, new varieties cannot easily be produced by crossbreeding — unlike, say, apples, which breeders have remixed into favorites like Fuji and Gala. But the vast majority of oranges in commercial groves are the product of a type of genetic merging that predates the Romans, in which a slender shoot of a favored fruit variety is grafted onto the sturdier roots of other species: lemon, for instance, or sour orange. And a seedless midseason orange recently adopted by Florida growers emerged after breeders bombarded a seedy variety with radiation to disrupt its DNA, a technique for accelerating evolution that has yielded new varieties in dozens of crops, including barley and rice.

Its proponents argue that genetic engineering is one in a continuum of ways humans shape food crops, each of which carries risks: even conventional crossbreeding has occasionally produced toxic varieties of some vegetables. Because making a G.M.O. typically involves adding one or a few genes, each containing instructions for a protein whose function is

known, they argue, it is more predictable than traditional methods that involve randomly mixing or mutating many genes of unknown function.

But because it also usually involves taking DNA from the species where it evolved and putting it in another to which it may be only distantly related — or turning off genes already present — critics of the technology say it represents a new and potentially more hazardous degree of tinkering whose risks are not yet fully understood.

If he had had more time, Mr. Kress could have waited for the orange to naturally evolve resistance to the bacteria known as *C. liberibacter asiaticus*. That could happen tomorrow. Or it could take years, or many decades. Or the orange in Florida could disappear first.

## Plunging Ahead

Early discussions among other citrus growers about what kind of disease research they should collectively support did little to reassure Mr. Kress about his own genetic engineering project.

“The public will never drink G.M.O. orange juice,” one grower said at a contentious 2008 meeting. “It’s a waste of our money.”

“The public is already eating tons of G.M.O.’s,” countered Peter McClure, a big grower.

“This isn’t like a bag of Doritos,” snapped another. “We’re talking about a raw product, the essence of orange.”

The genetically modified foods Americans have eaten for more than a decade — corn, soybeans, some cottonseed oil, canola oil and sugar — come mostly as invisible ingredients in processed foods like cereal, salad dressing and tortilla chips. And the few G.M.O.’s sold in produce aisles — a Hawaiian papaya, some squash, a fraction of sweet corn — lack the iconic status of a breakfast drink that, Mr. Kress conceded, is “like motherhood” to Americans, who drink more of it per capita than anyone else.

If various polls were to be believed, a third to half of Americans would refuse to eat any transgenic crop. One study’s respondents would accept only certain types: two-thirds said they would eat a fruit modified with another plant gene, but few would accept one with DNA from an animal. Fewer still would knowingly eat pro-

duce that contained a gene from a virus.

There also appeared to be an abiding belief that a plant would take on the identity of the species from which its new DNA was drawn, like the scientist in the movie “The Fly” who sprouted insect parts after a DNA-mixing mistake with a house fly.

Asked if tomatoes containing a gene from a fish would “taste fishy” in a question on a 2004 poll conducted by the Food Policy Institute at Rutgers University that referred to one company’s efforts to forge a frost-resistant tomato with a gene from the winter flounder, fewer than half correctly answered “no.” A fear that the genetic engineering of food would throw the ecosystem out of whack showed in the surveys too.

Mr. Kress’s researchers, in turn, liked to point out that the very reason genetic engineering works is that all living things share a basic biochemistry: if a gene from a cold-water fish can help a tomato resist frost, it is because DNA is a universal code that tomato cells know how to read. Even the most distantly related species — say, humans and bacteria — share many genes whose functions have remained constant across billions of years of evolution.

“It’s not where a gene comes from that matters,” one researcher said. “It’s what it does.”

Mr. Kress set the surveys aside.

He took encouragement from other attempts to genetically modify foods that were in the works. There was even another fruit, the “Arctic apple,” whose genes for browning were switched off, to reduce waste and allow the fruit to be more readily sold sliced.

“The public is going to be more informed about G.M.O.’s by the time we’re ready,” Mr. Kress told his research director, Michael P. Irey, as they lined up the five scientists whom Southern Gardens would underwrite. And to the scientists, growers and juice processors at a meeting convened by Minute Maid in Miami in early 2010, he insisted that just finding a gene that worked had to be his company’s priority.

The foes were formidable. *C. liberibacter*, the bacterium that kills citrus trees by choking off their flow of nutrients — first detected when it destroyed citrus trees more than a century ago in China — had earned a place, along with anthrax and the Ebola virus, on the Agriculture Department’s list of potential agents of bioterrorism. Asian citrus psyllids, the insects that



ROBYN BECK/AGENCE FRANCE-PRESSE — GETTY IMAGES

**OPPOSITION** A rally against Monsanto, which dominates the crop biotechnology business, in Los Angeles in May was one of hundreds held that day. More information and photographs are at [nytimes.com/national](http://nytimes.com/national).

suck the bacteria out of one tree and inject them into another as they feed on the sap of their leaves, can carry the germ a mile without stopping, and the females can lay up to 800 eggs in their one-month life.

Mr. Kress's DNA candidate would have to fight off the bacteria or the insect. As for public acceptance, he told his industry colleagues, "We can't think about that right now."

### The 'Creep Factor'

Trim, silver-haired and described by colleagues as tightly wound (he prefers "focused"), Mr. Kress arrives at the office by 6:30 each morning and microwaves a bowl of oatmeal. He stocks his office cabinet with cans of peel-top Campbell's chicken soup that he heats up for lunch. Arriving home each evening, he cuts a rose from his garden for his wife. Weekends, he works in his yard and pores over clippings about G.M.O.'s in the news.

For a man who takes pleasure in routine, the uncertainty that marked his DNA quest was

disquieting. It would cost Southern Gardens millions of dollars just to perform the safety tests for a single gene in a single variety of orange. Of his five researchers' approaches, he had planned to narrow the field to the one that worked best over time.

But in 2010, with the disease spreading faster than anyone anticipated, the factor that came to weigh most was which could be ready first.

To fight *C. liberibacter*, Dean Gabriel at the University of Florida had chosen a gene from a virus that destroys bacteria as it replicates itself. Though such viruses, called bacteriophages ("phage" means to devour), are harmless to humans, Mr. Irey sometimes urged Mr. Kress to consider the public relations hurdle that might come with such a strange-sounding source of the DNA. "A gene from a virus," he would ask pointedly, "that infects bacteria?"

But Mr. Kress's chief concern was that Dr. Gabriel was taking too long to perfect his approach.

A second contender, Erik Mirkov of Texas

A&M University, was further along with trees he had endowed with a gene from spinach — a food, he reminded Mr. Kress, that “we give to babies.” The gene, which exists in slightly different forms in hundreds of plants and animals, produces a protein that attacks invading bacteria.

Even so, Dr. Mirkov faced skepticism from growers. “Will my juice taste like spinach?” one asked.

“Will it be green?” wondered another.

“This gene,” he invariably replied, “has nothing to do with the color or taste of spinach. Your body makes very similar kinds of proteins as part of your own defense against bacteria.”

When some of the scientist’s promising trees got sick in their first trial, Mr. Kress agreed that he should try to improve on his results in a new generation of trees, by adjusting the gene’s placement. But transgenic trees, begun as a single cell in a petri dish, can take two years before they are sturdy enough to place in the ground and many more years to bear fruit.

“Isn’t there a gene,” Mr. Kress asked Mr. Irey, “to hurry up Mother Nature?”

For a time, the answer seemed to lie with a third scientist, William O. Dawson at the University of Florida, who had managed to alter fully grown trees by attaching a gene to a virus that could be inserted by way of a small incision in the bark. Genes transmitted that way would eventually stop functioning, but Mr. Kress hoped to use it as a stopgap measure to ward off the disease in the 60 million citrus trees already in Florida’s groves. Dr. Dawson joked that he hoped at least to save the grapefruit, whose juice he enjoyed, “preferably with a little vodka in it.”

But his most promising result that year was doomed from the beginning: of the dozen bacteria-fighting genes he had then tested on his greenhouse trees, the one that appeared effective came from a pig.

One of about 30,000 genes in the animal’s genetic code, it was, he ventured, “a pretty small amount of pig.”

“There’s no safety issue from our standpoint — but there is a certain creep factor,” an Environmental Protection Agency official observed to Mr. Kress, who had included it on an early list of possibilities to run by the agency.

“At least something is working,” Mr. Kress

bristled. “It’s a proof of concept.”

A similar caution dimmed his hopes for the timely approval of a synthetic gene, designed in the laboratory of a fourth scientist, Jesse Jaynes of Tuskegee University. In a simulation, Dr. Jaynes’s gene consistently vanquished the greening bacteria. But the burden of proving a synthetic gene’s safety would prolong the process. “You’re going to get more questions,” Mr. Kress was told, “with a gene not found in nature.”

And in the fall of 2010, an onion gene that discouraged psyllids from landing on tomato plants was working in the Cornell laboratory of Mr. Kress’s final hope, Herb Aldwinckle. But it would be some time before the gene could be transferred to orange trees.

Only Dr. Mirkov’s newly fine-tuned trees with the spinach gene, Mr. Kress and Mr. Irey agreed, could be ready in time to stave off what many believed would soon be a steep decline in the harvest. In the fall of 2010, they were put to the test inside a padlocked greenhouse stocked with infected trees and psyllids.

## The Monsanto Effect

Mr. Kress’s only direct brush so far with the broader battle raging over genetically modified food came in December 2010, in the reader comments on a Reuters article alluding to Southern Gardens’ genetic engineering efforts.

Some readers vowed not to buy such “ Frankenfood.” Another attributed a rise in allergies to genetic engineering. And dozens lambasted Monsanto, the St. Louis-based company that dominates the crop biotechnology business, which was not even mentioned in the article.

“If this trend goes on, one day, there will be only Monsanto engineered foods available,” read one letter warning of unintended consequences.

Mr. Kress was unperturbed. Dozens of long-term animal feeding studies had concluded that existing G.M.O.’s were as safe as other crops, and the National Academy of Sciences, the World Health Organization and others had issued statements to the same effect.

But some of his researchers worried that the popular association between G.M.O.’s and Monsanto — and in turn between Monsanto and the criticisms of modern agriculture — could turn consumers against Southern Gardens’ trans-





**FIELD TEST** Shoots grown in a laboratory to resist the disease citrus greening are grafted onto normal orange trees in a test plot. The shoots are endowed with a gene from spinach that produces a protein that attacks invading bacteria. Florida growers turned to transgenic trees after citrus greening began infecting millions of orange trees.

genic oranges.

“The article doesn’t say ‘Monsanto’ anywhere, but the comments are all about Monsanto,” Dr. Mirkov said.

It had not helped win hearts and minds for G.M.O.’s, Mr. Kress knew, that the first such crop widely adopted by farmers was the soybean engineered by Monsanto with a bacteria gene — to tolerate a weed killer Monsanto also made.

Starting in the mid-1990s, soybean farmers in the United States overwhelmingly adopted that variety of the crop, which made it easier for them to control weeds. But the subsequent broader use of the chemical — along with a distaste for Monsanto’s aggressive business tactics and a growing suspicion of a food system driven by corporate profits — combined to forge a consumer backlash. Environmental activists vandalized dozens of field trials and protested brands that used Monsanto’s soybeans or corn, introduced soon after, which was engineered to prevent pests from attacking it.

In response, companies including McDonald’s, Frito-Lay and Heinz pledged not to use G.M.O. ingredients in certain products, and some European countries prohibited their cultivation.

Some of Mr. Kress’s scientists were still fuming about what they saw as the lost potential for social good hijacked both by the activists who opposed genetic engineering and the corporations that failed to convince consumers of its benefits. In many developing countries, concerns about safety and ownership of seeds led governments to delay or prohibit cultivation of needed crops: Zambia, for instance, declined shipments of G.M.O. corn even during a 2002 famine.

”It’s easy for someone who can go down to the grocery store and buy anything they need to

be against G.M.O.’s,” said Dr. Jaynes, who faced such barriers with a high-protein sweet potato he had engineered with a synthetic gene.

To Mr. Kress in early 2011, any comparison to Monsanto — whose large blocks of patents he had to work around, and whose thousands of employees worldwide dwarfed the 750 he employed in Florida at peak harvest times — seemed far-fetched. If it was successful, Southern Gardens would hope to recoup its investment by charging a royalty for its trees. But its business strategy was aimed at saving the orange crop, whose total acreage was a tiny fraction of the crops the major biotechnology companies had pursued.

He urged his worried researchers to look at the early success of Flavr Savr tomatoes. Introduced in 1994 and engineered to stay fresh longer than traditional varieties, they proved popular enough that some stores rationed them, before business missteps by their developer ended their production.

And he was no longer alone in the pursuit of a genetically modified orange. Citrus growers were collectively financing research into a greening-resistant tree, and the Agriculture Department had also assigned a team of scientists to it. Any solution would have satisfied Mr. Kress. Almost daily, he could smell the burning of infected trees, which mingled with orange-blossom sweetness in the grove just beyond Southern Gardens’ headquarters.

## A Growing Urgency

In an infection-filled greenhouse where every nontransgenic tree had showed symptoms of disease, Dr. Mirkov’s trees with the spinach gene had survived unscathed for more than a year. Mr. Kress would soon have 300 of them planted in a field trial. But in the spring of 2012, he asked the Environmental Protection Agency,

the first of three federal agencies that would evaluate his trees, for guidance. The next step was safety testing. And he felt that it could not be started fast enough.

Dr. Mirkov assured him that the agency's requirements for animal tests to assess the safety of the protein produced by his gene, which bore no resemblance to anything on the list of known allergens and toxins, would be minimal.

"It's spinach," he insisted. "It's been eaten for centuries."

Other concerns weighed on Mr. Kress that spring: growers in Florida did not like to talk about it, but the industry's tripling of pesticide applications to kill the bacteria-carrying psyllid was, while within legal limits, becoming expensive and worrisome. One widely used pesticide had stopped working as the psyllid evolved resistance, and Florida's citrus growers' association was petitioning one company to lift the twice-a-season restrictions on spraying young trees — increasingly its only hope for an uninfected harvest.

Others in the industry who knew of Mr. Kress's project were turning to him. He agreed to speak at the fall meeting of citrus growers in California, where the greening disease had just been detected. "We need to hear about the transgenic solution," said Ted Batkin, the association's director. But Mr. Kress worried that he had nothing to calm their fears.

And an increasingly vocal movement to require any food with genetically engineered ingredients to carry a "G.M.O." label had made him uneasy.

Supporters of one hotly contested California ballot initiative argued for labeling as a matter of consumer rights and transparency — but their advertisements often implied the crops were a hazard: one pictured a child about to take a joyful bite of a pest-resistant cob of corn, on which was emblazoned a question mark and the caption "Corn, engineered to grow its own pesticide."

Yet the gene that makes corn insect-resistant, he knew, came from the same soil bacte-



PHOTOGRAPHS BY RICHARD PERRY/THE NEW YORK TIMES

*"The consumer will support us if it's the only way."*

**RICKE KRESS**, the president of Southern Gardens Citrus, who believes that the only way to save Florida's entire citrus crop is to alter the orange trees' DNA

rium long used by organic food growers as a natural insecticide.

Arguing that the Food and Drug Administration should require labels on food containing G.M.O.'s, one leader of the Environmental Working Group, an advocacy group, cited "pink slime, deadly melons, tainted turkeys and BPA in our soup."

Mr. Kress attributed the labeling campaigns to the kind of tactic any industry might use to gain a competitive edge: they were financed largely by companies that sell organic products, which stood to gain if packaging implying a hazard drove customers to their own non-G.M.O. alternatives. He did not aim to hide anything from consumers, but he would want them to understand how and why his oranges were genetically engineered. What bothered him was that a label seemed to lump all G.M.O.'s into one stigmatized category.

And when the E.P.A. informed him in June 2012 that it would need to see test results for how large quantities of spinach protein affected honeybees and mice, he gladly wrote out the \$300,000 check to have the protein made.

It was the largest single expense yet in a project that had so far cost more than \$5 million. If these tests raised no red flags, he would need to test the protein as it appears in the pollen of transgenic orange blossoms. Then the agency would want to test the juice.

"Seems excessive," Dr. Mirkov said.

But Mr. Kress and Mr. Irey shared a sense of celebration. The path ahead was starting to clear.

Rather than wait for Dr. Mirkov's 300 trees to flower, which could take several years, they agreed to try to graft his spinach gene shoots to mature trees to hasten the production of pollen — and, finally, their first fruit, for testing.

## Wall of Opposition

Early one morning a year ago, Mr. Kress checked the Agriculture Department's Web site from home. The agency had opened its 60-day public comment period on the trees modified to



**KEEPING A THREAT IN CHECK** In Southern Gardens' groves, trees that are infected with citrus greening are marked, cut down and burned.

produce "Arctic apples" that did not brown.

His own application, he imagined, would take a similar form.

He skimmed through the company's 163-page petition, showing how the apples are equivalent in nutritional content to normal apples, how remote was the likelihood of cross-pollination with other apple varieties and the potentially bigger market for a healthful fruit.

Then he turned to the comments. There were hundreds. And they were almost universally negative. Some were from parents, voicing concerns that the nonbrowning trait would disguise a rotten apple — though transgenic apples rotten from infection would still turn brown. Many wrote as part of a petition drive by the Center for Food Safety, a group that opposes biotechnology.

"Apples are supposed to be a natural, healthy snack," it warned. "Genetically engineered apples are neither."

Others voiced a general distrust of scientists' guarantees: "Too many things were presented to us as innocuous and years later we discovered it was untrue," wrote one woman. "After two cancers I don't feel like taking any more unnecessary risks."


Many insisted that should the fruit be approved, it ought to be labeled.

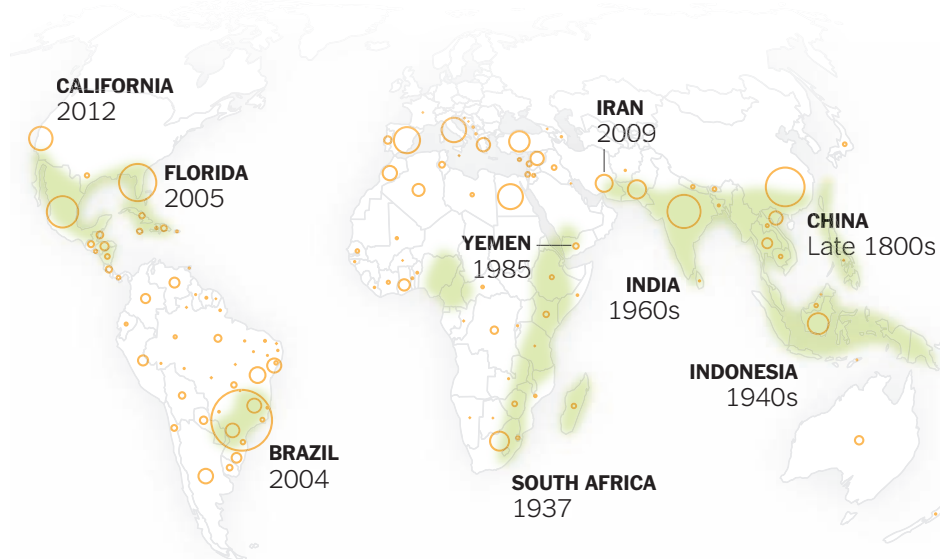
That morning, Mr. Kress drove to work late. He should not be surprised by the hostility, he

## Where Crops Are Threatened

Only in the last decade has citrus greening spread to the world's top orange-producing countries, the United States and Brazil.

15  
5  
 **ORANGES PRODUCED**  
in 2011, in millions of tons.

 Areas known to be **INFECTED BY CITRUS GREENING**, with selected years of first observation.



Production numbers for Brazil and the United States are shown by state. All others are shown by country.

Sources: U.N. Food and Agriculture Organization, U.S. Department of Agriculture, Brazilian Institute of Geography and Statistics, academic papers

THE NEW YORK TIMES

told himself.

Mr. Irey tried to console him with good news: the data on the honeybees and mice had come back. The highest dose of the protein the E.P.A. wanted tested had produced no ill effect.

But the magnitude of the opposition had never hit Mr. Kress so hard. “Will they believe us?” he asked himself for the first time. “Will they believe we’re doing this to eliminate chemicals and we’re making sure it’s safe? Or will they look at us and say, ‘That’s what they all say?’”

The major brands were rumored to be looking beyond Florida for their orange juice — perhaps to Brazil, where growers had taken to abandoning infected groves to plant elsewhere. Other experiments that Mr. Kress viewed as similar to his own had foundered. Pigs engineered to produce less-polluting waste had been euthanized after their developer at a Canadian university had failed to find investors. A salmon modified to grow faster was still awaiting F.D.A. approval. A study pointing to health risks from G.M.O.’s had been discredited by scientists, but was contributing to a sense among some con-

sumers that the technology is dangerous.

And while the California labeling measure had been defeated, it had spawned a ballot initiative in Washington State and legislative proposals in Connecticut, Vermont, New Mexico, Missouri and many other states.

In the heat of last summer, Mr. Kress gardened more savagely than his wife had ever seen.

Driving through the Central Valley of California last October to speak at the California Citrus Growers meeting, Mr. Kress considered how to answer critics. Maybe even a blanket “G.M.O.” label would be O.K., he thought, if it would help consumers understand that he had nothing to hide. He could never prove that there were no risks to genetically modifying a crop. But he could try to explain the risks of not doing so.

Southern Gardens had lost 700,000 trees trying to control the disease, more than a quarter of its total. The forecast for the coming spring harvest was dismal. The approval to use more pesticide on young trees had come through that day. At his hotel that night, he slipped a new

slide into his standard talk.

On the podium the next morning, he talked about the growing use of pesticides: “We’re using a lot of chemicals, pure and simple,” he said. “We’re using more than we’ve ever used before.”

Then he stopped at the new slide. Unadorned, it read “Consumer Acceptance.” He looked out at the audience.

What these growers wanted most, he knew, was reassurance that he could help them should the disease spread. But he had to warn them: “If we don’t have consumer confidence, it doesn’t matter what we come up with.”

## Planting

One recent sunny morning, Mr. Kress drove to a fenced field, some distance from his office and far from any other citrus tree. He unlocked the gate and signed in, as required by Agriculture Department regulations for a field trial of a genetically modified crop.

Just in the previous few months, Whole Foods had said that because of customer demand it would avoid stocking most G.M.O. foods and require labels on them by 2018. Hundreds of thousands of protesters around the world had joined in a “March Against Monsanto” — and the Agriculture Department had issued its final report for this year’s orange harvest showing a 9 percent decline from last year, attributable to citrus greening.

But visiting the field gave him some peace. In some rows were the trees with no new gene in them, sick with greening. In others were the 300 juvenile trees with spinach genes, all healthy. In the middle were the trees that carried his immediate hopes: 15 mature Hamlins and Valencias, seven feet tall, onto which had

been grafted shoots of Dr. Mirkov’s spinach gene trees.

There was good reason to believe that the trees would pass the E.P.A.’s tests when they bloom next spring. And he was gathering the data the Agriculture Department would need to ensure that the trees posed no risk to other plants. When he had fruit, the Food and Drug Administration would compare its safety and nutritional content to conventional oranges.

In his office is a list of groups to contact when the first G.M.O. fruit in Florida are ready to pick: environmental organizations, consumer advocates and others. Exactly what he would say when he finally contacted them, he did not know. Whether anyone would drink the juice from his genetically modified oranges, he did not know.

But he had decided to move ahead.

Late this summer he will plant several hundred more young trees with the spinach gene, in a new greenhouse. In two years, if he wins regulatory approval, they will be ready to go into the ground. The trees could be the first to produce juice for sale in five years or so.

Whether it is his transgenic tree, or someone else’s, he believed, Florida growers will soon have trees that could produce juice without fear of its being sour, or in short supply.

For a moment, alone in the field, he let his mind wander.

“Maybe we can use the technology to improve orange juice,” he could not help thinking. “Maybe we can find a way to have oranges grow year-round, or get two for every one we get now on a tree.”

Then he reined in those thoughts.

He took the clipboard down, signed out and locked the gate. ■

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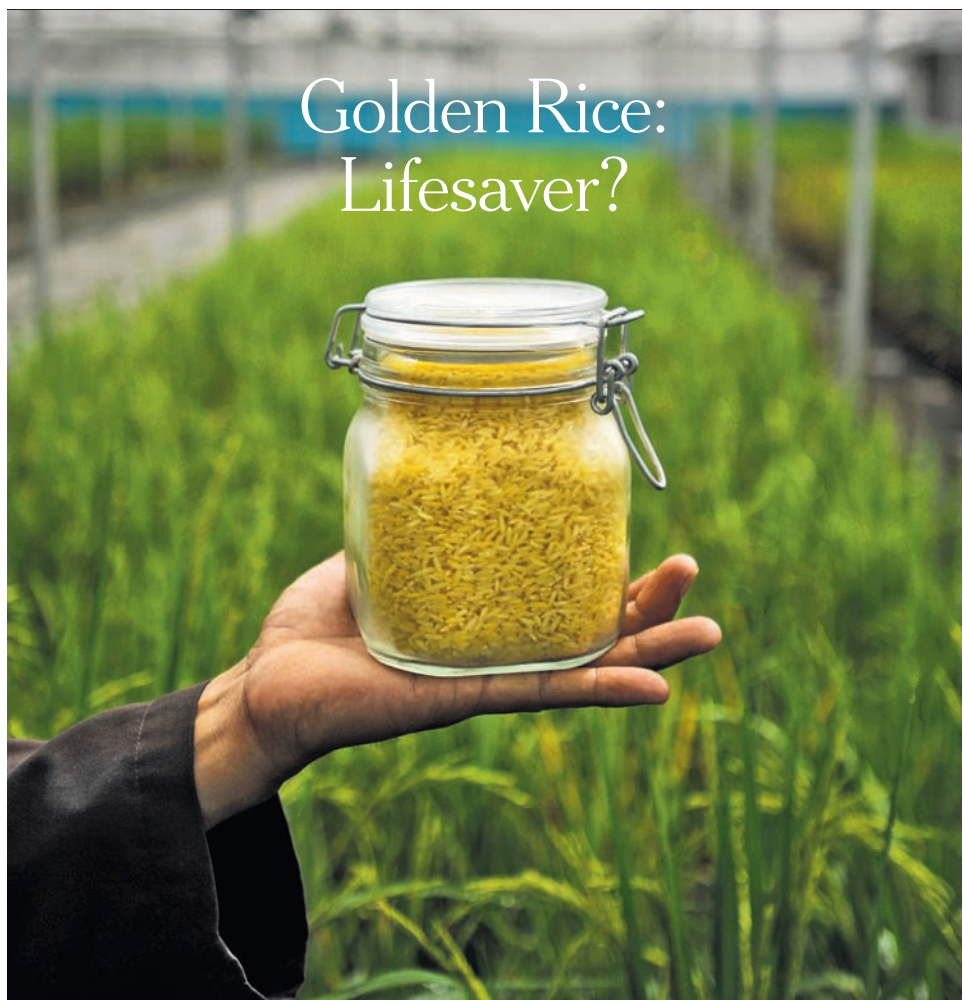
For mayor of New York.

IDEAS | OPINION | NEWS ANALYSIS

# Sunday Review

The New York Times

SUNDAY, AUGUST 25, 2013



REUTERS FOR THE NEW YORK TIMES

## Golden Rice: Lifesaver?

The fight over genetically modified crops has gone global. Is hysteria impeding science?

**NEWS ANALYSIS**  
BY AMY HARMON  
*A national correspondent for The New York Times.*

ONE bright morning this month, 400 protesters smashed down the high fences surrounding a field in the Bicol region of the Philippines and uprooted the genetically modified rice plants growing inside. Had the plants survived long enough to flower, they would have betrayed a distinctly yellow tint in the otherwise white part of the grain. That is because the rice is endowed with a gene from corn and another from a bacterium, making it the only variety in existence to produce beta carotene, the source of vitamin A. Its developers call it "Golden Rice." The concerns voiced by the participants in the Aug. 8 act of vandalism — that Golden Rice could pose unforeseen risks to human health and the environment, that it would ultimately profit big agrochemical companies — are a familiar refrain in the long-running controversy over the merits of genetically en-

gineered crops. They are driving the desire among some Americans for mandatory "G.M.O." labels on food with ingredients made from crops whose DNA has been altered in a laboratory. And they have motivated similar attacks on trials of other genetically modified crops in recent years: grapes designed to fight off a deadly virus in France, wheat designed to have a lower glycemic index in Australia, sugar beets in Oregon designed to tolerate a herbicide, to name a few. "We do not want our people, especially our children, to be used in these experiments," a farmer who was a leader of the protest told the Philippine newspaper Remate. But Golden Rice, which appeared on the cover of Time Magazine in 2000 before it was quite ready for prime time, is unlike

Genetically engineered Golden Rice grown in a facility in Los Baños, Laguna Province, in the Philippines.

Continued on Page 6

THOMAS L. FRIEDMAN

## Foreign Policy by Whisper and Nudge

IF you follow the commentary on American foreign policy toward Egypt and the broader Middle East today, several themes stand out: People in the region argue: "Whatever went wrong, the United States is to blame." Foreign policy experts argue: "Whatever President Obama did, he got it wrong." And the American public is saying: "We're totally fed up with that part of the world and can't wait for the start of the N.F.L. season. How do you like those #bers?"

*In the Arab world, you can only do so much without the will of the people.*

There is actually a logic to all three positions. It starts with the huge difference between cold-war and post-cold-war foreign policy. During the cold war, American foreign policy "was all about how we affect the external behavior of states," said Michael Man-

delbaum, the Johns Hopkins University foreign affairs expert. We were ready to overlook the internal behavior of states, both because we needed them as allies in the cold war and because, with the Russians poised on the other side, any intervention could escalate into a superpower confrontation. Post-cold-war foreign policy today is largely about "affecting the internal composition and governance of

Continued on Page 11

THE GREAT DIVIDE: DAVID H. AUTOR AND DAVID ROSEN

# How Technology Wrecks the Middle Class

In the three years since the Great Recession officially began, the productivity of American workers has risen more than 10 percent. But the productivity of American workers has risen more than 10 percent. But the productivity of American workers has risen more than 10 percent.

David H. Autor is a professor of economics at the Massachusetts Institute of Technology. David Rosen is an assistant professor of economics at the Center for Monetary and Financial Studies at MIT.

## Computerization squeezes jobs — but at the upper and lower ends of the spectrum.

Most business there is only a finite amount of work to do. While productivity is rising, the total amount of work to do is not rising as fast. This means that some jobs are being lost.



Robot arms weld a car body at a General Motors plant in Lansing, Mich., in 2010.

Computers have historically replaced what we call the "rump of labor." Robots have replaced the jobs that are most routine and repetitive. This has led to a polarization of the labor market.

Jobs that require human flexibility, like those of highly educated workers, are in demand. These jobs are not being replaced by computers. This has led to a polarization of the labor market.

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# The Problem That Has Two Names

Fifteen years after Philip Friedman's "Promises, Promises" and countless hypothetical-but-undeniably-hypnotized names later, the problem of married versus maiden names should be good and solved.

Like others wanting it both ways, I hold on to my professional name while also taking my husband's. For years, I've gone by my husband's name. But now I'm going by my own name.

DISPATCH BY FRANCESCA PAUL, The author of The New York Times Book Review.

# Can Golden Rice Save Lives?

From Page 1  
any of the genetically engineered crops in wide use today, designed to either withstand herbicides or to produce their own insecticidal compounds. Golden Rice is the only one of these crops that is not yet in the marketplace.

At stake, they say, is not just the health of the world's poor, but also a real test case to evaluate a technology whose promise to improve nutrition is still unproven.



High-nutrient purpose, Golden Rice has drawn suspicion from biotechnology skeptics beyond the biotechnology industry.

High-nutrient purpose, Golden Rice has drawn suspicion from biotechnology skeptics beyond the biotechnology industry. This is an essay, not a review, and it is not intended to disparage companies.

## The rice could help prevent blindness.

But detractors point to unknown risks that may not be understood. The rice is being developed by a nonprofit organization in the Philippines.

Golden Rice is being developed by a nonprofit organization in the Philippines. It is designed to produce beta-carotene, which can be converted into vitamin A.

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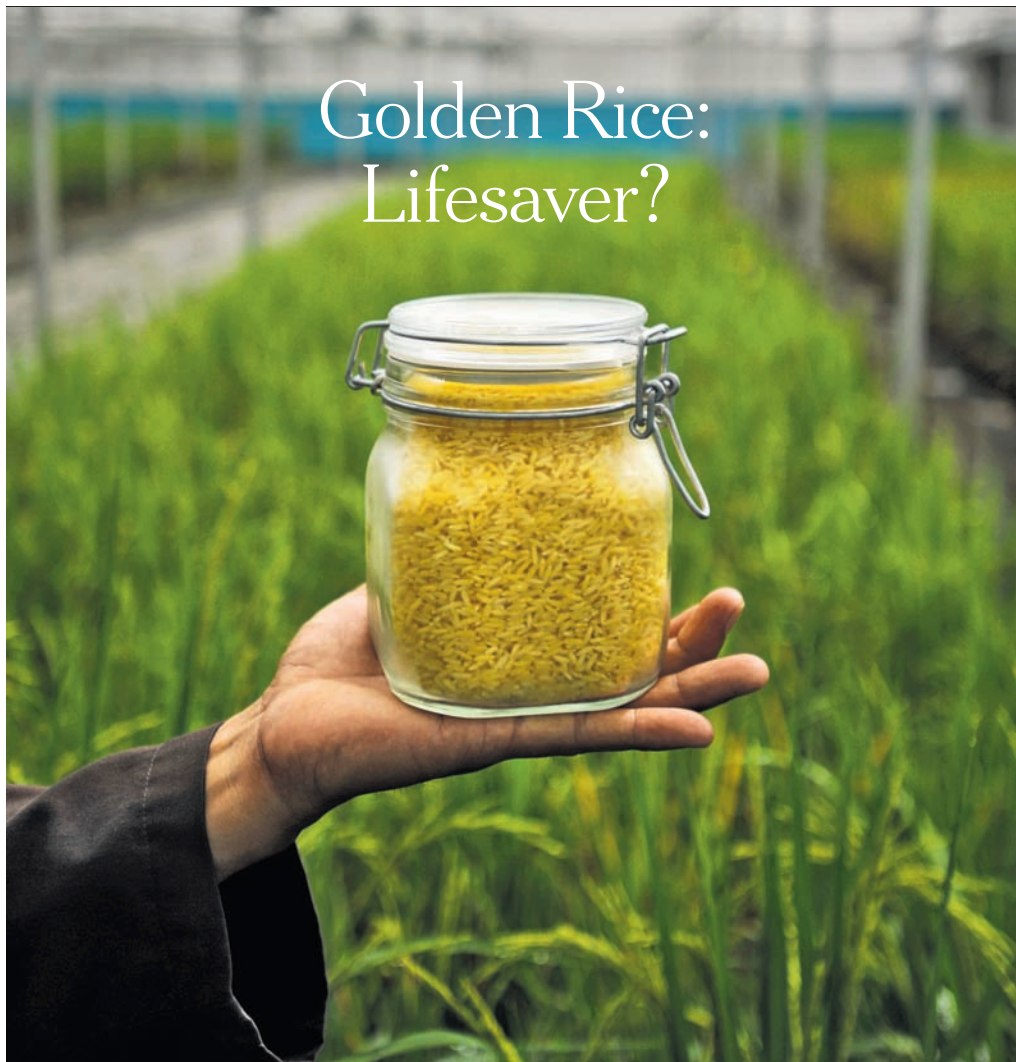
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DISPATCH BY FRANCESCA PAUL, The author of The New York Times Book Review.

# Sunday Review

The New York Times



Genetically engineered Golden Rice grown in a facility in Los Baños, Laguna Province, in the Philippines.

JES AZNAR FOR THE NEW YORK TIMES

## The fight over genetically modified crops has gone global. Is hysteria impeding science?

ONE bright morning this month, 400 protesters smashed down the high fences surrounding a field in the Bicol region of the Philippines and uprooted the genetically modified rice plants growing inside.

### NEWS ANALYSIS

BY AMY HARMON

*A national correspondent for The New York Times.*

Had the plants survived long enough to flower, they would have betrayed a distinctly yellow tint in the otherwise white part of the grain. That is because the rice is endowed with a gene from corn and another from

a bacterium, making it the only variety in existence to produce beta carotene, the source of vitamin A. Its developers call it “Golden Rice.”

The concerns voiced by the participants in the Aug. 8 act of vandalism — that Golden Rice could pose unforeseen risks to human health and the environment, that it would ultimately profit big agrochemical companies — are a familiar refrain in the long-running controversy over the merits of genetically engineered crops. They are driving the desire among some Americans for mandatory “G.M.O.” labels on food with ingredients made from crops whose DNA





ERIK DE CASTRO/REUTERS

has been altered in a laboratory. And they have motivated similar attacks on trials of other genetically modified crops in recent years: grapes designed to fight off a deadly virus in France, wheat designed to have a lower glycemic index in Australia, sugar beets in Oregon designed to tolerate a herbicide, to name a few.

“We do not want our people, especially our children, to be used in these experiments,” a farmer who was a leader of the protest told the Philippine newspaper *Remate*.

But Golden Rice, which appeared on the cover of *Time Magazine* in 2000 before it was quite ready for prime time, is unlike any of the genetically engineered crops in wide use today, designed to either withstand herbicides sold by Monsanto and other chemical companies or resist insect attacks, with benefits for farmers but not directly for consumers.

And a looming decision by the Philippine government about whether to allow Golden Rice to be grown beyond its four remaining field trials has added a new dimension to the debate over the technology’s merits.

Not owned by any company, Golden Rice is being developed by a nonprofit group called the International Rice Research Institute with the aim of providing a new source of vitamin A to people both in the Philippines, where most households get most of their calories from rice, and eventually in many other places in a world where rice is eaten every day by half the popu-

Mothers with masks made from baby bathtubs protested Golden Rice in Quezon City, the Philippines, in June.

lation. Lack of the vital nutrient causes blindness in a quarter-million to a half-million children each year. It affects millions of people in Asia and Africa and so weakens the immune system that some two million die each year of diseases they would otherwise survive.

The destruction of the field trial, and the reasons given for it, touched a nerve among scientists around the world, spurring them to counter assertions of the technology’s health and environmental risks. On a petition supporting Golden Rice circulated among scientists and signed by several thousand, many vented a simmering frustration with activist organizations like Greenpeace, which they see as playing on misplaced fears of genetic engineering in both the developing and the developed worlds. Some took to other channels to convey to American foodies and Filipino farmers alike the broad scientific consensus that G.M.O.’s are not intrinsically more risky than other crops and can be reliably tested.

At stake, they say, is not just the future of biofortified rice but also a rational means to evaluate a technology whose potential to improve nutrition in developing countries, and developed ones, may otherwise go unrealized.

“There’s so much misinformation floating around about G.M.O.’s that is taken as fact by people,” said Michael D. Purugganan, a professor of genomics and biology and the dean for science at New York University, who sought to calm health-risk concerns in a primer on GMA

News Online, a media outlet in the Philippines: “The genes they inserted to make the vitamin are not some weird manufactured material,” he wrote, “but are also found in squash, carrots and melons.”

Mr. Purugganan, who studies plant evolution, does not work on genetically engineered crops, and until recently had not participated in the public debates over the risks and benefits of G.M.O.’s. But having been raised in a middle-class family in Manila, he felt compelled to weigh in on Golden Rice. “A lot of the criticism of G.M.O.’s in the Western world suffers from a lack of understanding of how really dire the situation is in developing countries,” he said.

Some proponents of G.M.O.’s say that more critical questions, like where biotechnology should fall as a priority in the efforts to address the root causes of hunger and malnutrition and how to prevent a few companies from controlling it, would be easier to address were they not lumped together with unfounded fears by those who oppose G.M.O.’s.

“It is long past time for scientists to stand up and shout, ‘No more lies — no more fear-mongering,’ ” said Nina V. Fedoroff, a professor at the King Abdullah University of Science and Technology in Saudi Arabia and a former science adviser to the American secretary of state, who helped spearhead the petition. “We’re talking about saving millions of lives here.”

Precisely because of its seemingly high-minded purpose, Golden Rice has drawn suspicion from biotechnology skeptics beyond the demonstrators who forced their way into the field trial. Many countries ban the cultivation of all genetically modified crops, and after the rice’s media debut early in the last decade, Vandana Shiva, an Indian environmentalist, called it a “Trojan horse” whose purpose was to gain public support for all manner of genetically modified crops that would benefit multinational corporations at the expense of poor farmers and consumers.

In a 2001 article, “The Great Yellow Hype,” the author Michael Pollan, a critic of industrial agriculture, suggested that it might have been developed to “win an argument rather than solve a public-health problem.” He cited biotechnology industry advertisements that featured the virtues of the rice, which at the time had to be ingested in large quantities to deliver

a meaningful dose of vitamin A.

But the rice has since been retooled: a bowl now provides 60 percent of the daily requirement of vitamin A for healthy children. And Gerard Barry, the Golden Rice project leader at the International Rice Research Institute — and, it must be said, a former senior scientist and executive at Monsanto — suggests that attempts to discredit Golden Rice discount the suffering it could alleviate if successful. He said, too, that critics who suggest encouraging poor families to simply eat fruits and vegetables that contain beta carotene disregard the expense and logistical difficulties that would thwart such efforts.

Identified in the infancy of genetic engineering as having the potential for the biggest impact for the world’s poor, beta-carotene-producing rice was initially funded by the Rockefeller Foundation and the European Union. In a decade of work culminating in 1999, two academic scientists, Ingo Potrykus and Peter

## The rice could help prevent blindness. But detractors point to unknown risks.

Beyer, finally switched on the production of beta carotene by adding daffodil and bacteria DNA to the rice’s genome. They licensed their patent rights to the agribusiness company that later became Syngenta, on the condition that the technology and any improvements to it would be made freely available to poor farmers in the developing world. With the company retaining the right to use it in developed countries, potentially as an alternative to vitamin supplements, Syngenta scientists later improved the amount of beta carotene produced by substituting a gene from corn for the one from daffodil.

If the rice gains the Philippine government’s approval, it will cost no more than other rice for poor farmers, who will be free to save seeds and replant them, Dr. Barry said. It has no known allergens or toxins, and the new proteins produced by the rice have been shown to break down quickly in simulated gastric fluid, as required by World Health Organization guidelines. A mouse feeding study is under way in a laboratory in the United States. The potential that the Golden Rice would cross-pollinate with

other varieties, sometimes called “genetic contamination,” has been studied and found to be limited, because rice is typically self-pollinated. And its production of beta carotene does not appear to provide a competitive advantage — or disadvantage — that could affect the survival of wild varieties with which it might mix.

If Golden Rice is a Trojan horse, it now has some company. The Bill and Melinda Gates Foundation, which is supporting the final testing of Golden Rice, is also underwriting the development of crops tailored for sub-Saharan Africa, like cassava that can resist the viruses that routinely wipe out a third of the harvest, bananas that contain higher levels of iron and corn that uses nitrogen more efficiently. Other groups are developing a pest-resistant black-eyed pea and a “Golden Banana” that would also deliver vitamin A.

Beyond the fear of corporate control of agriculture, perhaps the most cited objection to

G.M.O.’s is that they may hold risks that may not be understood. The decision to grow or eat them relies, like many other decisions, on a cost-benefit analysis.

How food consumers around the world weigh that calculation will probably have far-reaching consequences. Such crops, *Scientific American* declared in an editorial last week, will make it to people’s plates “only with public support.”

Greenpeace, for one, dismisses the benefits of vitamin supplementation through G.M.O.’s and has said it will continue to oppose all uses of biotechnology in agriculture. As Daniel Ocampo, a campaigner for the organization in the Philippines, put it, “We would rather err on the side of caution.”

For others, the potential of crops like Golden Rice to alleviate suffering is all that matters. “This technology can save lives,” one of the petition’s signers, Javier Delgado of Mexico, wrote. “But false fears can destroy it.” ■

The New York Times

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'All the News That's Fit to Print'

Late Edition

Today, rain, patchy freezing rain at first, high 44. Tonight, rain, rising temperatures. Tomorrow, a.m. shower, windy, high 50 early, then falling. Weather map, Page 14.



DANIEL HEZELKAR FOR THE NEW YORK TIMES

An 8-Month-Old Afghan, Aging Fast From Malnutrition
A boy named Samuilah is among the rising number of victims taxing hospitals and confounding experts in Afghanistan. Page 6.

WASHINGTON MEMO

50 Years Later, War on Poverty Is a Mixed Bag

By ANNIE LOWREY
WASHINGTON — To many Americans, the war on poverty declared 50 years ago by President Lyndon B. Johnson has largely failed. The poverty rate has fallen only to 15 percent from 18 percent in two generations, and 46 million Americans live in households where the government considers their income scarcely adequate.

But looked at a different way, the federal government has succeeded in preventing the poverty rate from climbing far higher. There is broad consensus that the social welfare programs created since the New Deal have hugely improved living conditions for low-income Americans. At the same time, in recent decades, most of the gains from the private economy have gone to those at the top of the income ladder.

Half a century after Mr. Johnson's now-famed State of the Union address, the debate over the government's role in creating opportunity and ending deprivation has flared anew, with inequality as acute as it was in the Roaring Twenties and the ranks of the poor and near-poor at record highs.

President Lyndon B. Johnson visiting Appalachia in 1964.

Banished for Questioning the Gospel of Guns

By RAVI SOMAIYA
BARRY, Ill. — The byline of Dick Metcalf, one of the country's pre-eminent gun journalists, has gone missing. It has been removed from Guns & Ammo magazine, where his widely-read column once ran on the back page.

In late October, Mr. Metcalf wrote a column that the magazine titled "Let's Talk Limits," which debated gun laws. "The fact is," wrote Mr. Metcalf, who has taught history at Cornell and Yale, "all constitutional rights are regulated, always have been, and need to be."

The backlash was swift, and fierce. Readers threatened to cancel their subscriptions. Death threats poured in by email. His television program was pulled from the air.

Just days after the column appeared, Mr. Metcalf said, his editor called to tell him that two major gun manufacturers had said "in no uncertain terms" that they

could no longer do business with InterMedia Outdoors, the company that publishes Guns & Ammo and coproduces his TV show, if he continued to work there. He was let go immediately. "I've been vanished, disappeared," Mr. Metcalf, 67, said in an interview last month on his gun range here, about 100 miles north of St. Louis, surrounded by snow-blanketed fields and towering grain elevators. "Now you see him. Now you don't."

He is unsure of his next move, but fears he has become a pariah

in the gun industry, to which, he said, he has devoted nearly his entire adult life.

His experience sheds light on the close-knit world of gun journalism, where editors and reporters say there is little room for nuance in the debate over gun laws. Moderate voices that might broaden the discussion from within are silenced. When writers stray from the party line promoting an absolutist view of an unlettered right to bear arms, their publications — often under

Continued on Page 20



DICK METCALF WAS FIRED AFTER A NUANCED COLUMN IN GUNS & AMMO.

On Hawaii, a Lonely Quest for Fact

Debate on Genetically Modified Crops Entangles a Novice Politician

By AMY HARMON
KONA, Hawaii — From the moment the bill to ban genetically engineered crops on the island of Hawaii was introduced in May 2013, it garnered more vocal support than any the County Council here had ever considered, even the perennially popular bids to decriminalize marijuana.

Public hearings were dominated by recitations of the ills often attributed to genetically modified organisms, or G.M.O.s: cancer in rats, a rise in childhood allergies, out-of-control superweeds, genetic contamination, overuse of pesticides, the disappearance of butterflies and bees.

Like some others on the nine-member Council, Gregor Ilagan was not even sure at the outset of the debate exactly what genetically modified organisms

were: living things whose DNA has been altered, often with the addition of a gene from a distant species, to produce a desired trait. But he could see why almost all of his colleagues had been persuaded of the virtue of turning the island into what the bill's proponents called a "G.M.O.-free oasis."

"You just type 'G.M.O.' and everything you see is negative," he told his staff. Opposing the ban also seemed likely to run anyone's re-election prospects.

Yet doubts nagged at the councilman, who was serving his first two-year term. The island's papaya farmers said that an engineered variety had saved their fruit from a devastating disease. A study reporting that a diet of G.M.O. corn caused tumors in rats, mentioned often by the ban's supporters, turned out to have been thoroughly debunked.

And University of Hawaii biologists urged the Council to consider the global scientific consensus, which holds that existing genetically engineered crops are no riskier than others, and have provided some tangible benefits.

"Are we going to just ignore them?" Mr. Ilagan wondered.

Urged on by Margaret Wille, the ban's sponsor, who spoke passionately of the need to "act before it's too late," the Council declined to form a task force to look into such questions before its November vote. But Mr. Ilagan, 27, sought answers on his own. In the process, he found himself, like so many public and business leaders worldwide, wrestling with a subject in which popular beliefs often do not reflect scientific evidence.

At stake is how to grow healthful food

Continued on Page 18



PAPAYA GENETICALLY MODIFIED TO RESIST A VIRUS BECAME ONE PART OF A CONTROVERSY.

NEW YORK STATE IS SET TO LOOSEN MARIJUANA LAWS

MEDICAL CANNABIS PLAN

In Turnaround, Cuomo Joins National Trend of Easier Access

By SUSANNE CRAIG and JESSE MCKINLEY

ALBANY — Joining a growing group of states that have loosened restrictions on marijuana, Gov. Andrew M. Cuomo of New York plans this week to announce an executive action that would allow limited use of the drug by those with serious illnesses, state officials say.

The shift by Mr. Cuomo, a Democrat who had long resisted legalizing medical marijuana, comes as other states are taking increasingly liberal positions on it — most notably Colorado, where thousands have flocked to buy the drug for recreational use since it became legal on Jan. 1.

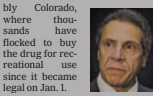
Mr. Cuomo's plan will be far more restrictive than the laws in Colorado or California, where medical marijuana is available to people with conditions as mild as backaches. It will allow just 20 hospitals across the state to prescribe marijuana to patients with cancer, glaucoma or other diseases that meet standards to be set by the New York State Department of Health.

While Mr. Cuomo's measure falls well short of full legalization, it nonetheless moves New York, long one of the nation's most punitive states for those caught using or dealing drugs, a significant step closer to policies being embraced by marijuana advocates and lawmakers elsewhere.

New York hopes to have the infrastructure in place this year to begin dispensing medical marijuana, although it is too soon to say when it will actually be available to patients.

Mr. Cuomo's shift comes at an interesting political juncture. In neighboring New Jersey, led by Gov. Chris Christie, a Republican whose presidential prospects are talked about even more often than Mr. Cuomo's, medical mari-

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# The New York Times

NEW YORK, SUNDAY, JANUARY 5, 2014

## On Hawaii, a Lonely Quest for Fact

### Debate on Genetically Modified Crops Entangles a Novice Politician

By AMY HARMON

KONA, Hawaii  
FROM the moment the bill to ban genetically engineered crops on the island of Hawaii was introduced in May 2013, it garnered more vocal support than any the County Council here had ever considered, even the perennially popular bids to decriminalize marijuana.

Public hearings were dominated by recitations of the ills often attributed to genetically modified organisms, or G.M.O.s: cancer in rats, a rise in childhood allergies, out-of-control superweeds, genetic contamination, overuse of pesticides, the disappearance of butterflies and bees.

Like some others on the nine-member Council, Greggor Ilagan was not even sure at the outset of the debate exactly what genetically modified organisms were: living things whose DNA has been altered, often with the addition of a gene from a distant species, to produce a desired trait. But he could see why almost all of his colleagues had been persuaded of the virtue of turning the island into what the bill's proponents called a "G.M.O.-free oasis."

"You just type 'G.M.O.' and everything you see is negative," he told his staff. Opposing the ban also seemed likely to ruin anyone's re-election prospects.

Yet doubts nagged at the councilman, who was serving his first two-year term. The island's



JIM WILSON/THE NEW YORK TIMES

Papaya genetically modified to resist a virus became one part of a controversy.

papaya farmers said that an engineered variety had saved their fruit from a devastating disease. A study reporting that a diet of G.M.O. corn caused tumors in rats, mentioned often by the ban's supporters, turned out to have been thoroughly debunked.

And University of Hawaii biologists urged the Council to consider the global scientific consensus, which holds that existing genetically engineered crops are no riskier than others, and have provided some tangible benefits.

"Are we going to just ignore them?" Mr. Ilagan wondered.

Urged on by Margaret Wille, the ban's sponsor, who spoke passionately of the need to "act before it's too late," the Council

declined to form a task force to look into such questions before its November vote. But Mr. Ilagan, 27, sought answers on his own. In the process, he found himself, like so many public and business leaders worldwide, wrestling with a subject in which popular beliefs often do not reflect scientific evidence.

At stake is how to grow healthful food most efficiently, at a time when a warming world and a growing population make that goal all the more urgent.

Scientists, who have come to rely on liberals in political battles over stem-cell research, climate change and the teaching of evolution, have been dismayed to find themselves at odds with their traditional allies on this issue. Some compare the hostility to G.M.O.s to the rejection

of climate-change science, except with liberal opponents instead of conservative ones.

“These are my people, they’re lefties, I’m with them on almost everything,” said Michael Shintaku, a plant pathologist at the University of Hawaii at Hilo, who testified several times against the bill. “It hurts.”

But, supporters of the ban warned, scientists had not always correctly assessed the health and environmental risks of new technology. “Remember DDT?” one proponent demanded.

Ms. Wille’s bill would ban the cultivation of any genetically engineered crop on the island, with the exception of the two already grown there: corn recently planted by an island dairy to feed its cows, and papaya. Field tests to study new G.M.O. crops would also be prohibited. Penalties would be \$1,000 per day.

Like three-quarters of the voters on Hawaii Island, known as the Big Island, Mr. Ilagan supported President Obama in the 2012 election. When he took office himself a month later, after six years in the Air National Guard, he planned to focus on squatters, crime prevention and the inauguration of a bus line in his district on the island’s eastern rim.

He had also promised himself that he would take a stance on all topics, never registering a “kanalua” vote — the Hawaiian term for “with reservation.”

But with the G.M.O. bill, he often despaired of assembling the information he needed to definitively decide. Every time he answered one question, it seemed, new ones arose. Popular opinion masqueraded convincingly as science, and the science itself was hard to grasp. People who spoke as experts lacked credentials, and G.M.O. critics discounted those with credentials as being pawns of biotechnology companies.

“It takes so much time to find out what’s true,” he complained.

So many emails arrived in support of the ban that, as a matter of environmental responsibility, the Council clerks suspended the custom of printing them out for each Council member. But Mr. Ilagan had only to consult his inbox to be reminded of the prevailing opinion.

“Do the right thing,” one Chicago woman wrote, “or no one will want to take a toxic tour of your poisoned paradise.”

## **Distrust on the Left**

Margaret Wille, 66, had the island’s best interests at heart when she proposed the ban, Mr. Ilagan knew.

She majored in cultural anthropology at Bennington College in Vermont and practiced public advocacy law in Maine before moving a decade ago to the island, where her brothers once owned a health food store.

And her bill, like much anti-G.M.O. action, was inspired by distrust of the seed-producing biotechnology companies, which had backed a state measure to prevent local governments from regulating their activity.

That bill, which passed the State Senate but stalled in the House, appeared largely aimed at other Hawaiian islands, which were used by companies like Monsanto, Syngenta and Dow as a nursery for seeds. On Kauai, for instance, activists had been talking about how to limit the companies’ pesticide use.

The companies had no corporate presence here on the Big Island, which lacks the large parcels of land they preferred. Still, Ms. Wille said at a “March Against Monsanto” rally last spring, if the island allowed farmers to grow genetically modified crops, the companies could gain a foothold. “This represents nothing less than a takeover of our island,” she told the crowd. “There’s a saying, ‘If you control the seed, you control the food; if you control the food, you control the people.’”

Ms. Wille, chairwoman of the Council’s Agriculture Committee, warned her colleagues that what mattered was not the amount of food produced, but its quality and the sustainability of how it was grown.

“My focus is on protecting our soil and the farms and properties that are not G.M.O.,” she said, noting also that there was a marketing opportunity for non-G.M.O. products.

Such sentiments echoed well beyond Hawaii, as Mr. Ilagan’s early research confirmed.

College students, eco-conscious shoppers and talk show celebrities like Oprah Winfrey, Dr. Oz and Bill Maher warned against consuming food made with genetically modified ingredients. Mr. Maher’s audience, in turn, recently hissed at a commentator who defended genetic modification as merely an extension of traditional breeding.

New applications of the technology, so far



Greggor Ilagan initially thought a ban on genetically modified organisms was a good idea.



Margaret Wille, the sponsor of the ban on G.M.O.s, spoke of the need to “act before it’s too late.”



The idea of the ban was popular, but not universally so, as pro-G.M.O. T-shirts made clear.



used mostly on corn, soybeans, cotton, canola and sugar beets to make them more resistant to weeds and pests, have drawn increased scrutiny. A recent Organic Consumers Association bulletin, for instance, pictures the first genetically modified animal to be submitted for regulatory approval (a faster-growing salmon) jumping from a river to attack a bear, with the caption “No Frankenfish!” In a 2013 New York Times poll, three-quarters of Americans surveyed expressed concern about G.M.O.s in their food, with most of those worried about health risks.

As Ms. Wille’s bill was debated here throughout 2013, activists elsewhere collected 354,000 signatures for a petition asserting that G.M.O.s endanger public health. In the Philippines, protesters, citing safety concerns, ripped up a test field of rice genetically engineered to address Vitamin A deficiency among the world’s poor. A new children’s book turned its heroine into a crusader against genetic modification: “These fruits and vegetables are not natural,” she declares.

And bills were proposed in some 20 states to require “G.M.O.” labels on foods with ingredients made from genetically engineered crops (about three-quarters of processed foods now have such ingredients, mostly corn syrup, corn oil and soy meal and sugar).

The legislation is backed by the fast-growing organic food industry, which sees such labeling as giving it a competitive advantage. It has also become a rallying cry among activists who want to change the industrial food system. Rachel Maddow declared the narrow failure of ballot initiatives to require G.M.O. labeling in California and Washington a “big loss for liberal politics.”

Whole Foods has pledged that by 2018 it will replace some foods containing genetically modified ingredients and label others; signs in Trader Joe’s proclaim, “No G.M.O.s Sold Here.” General Mills announced last week that it would stop using genetically modified ingredients in its Cheerios.

But the groundswell against genetically modified food has rankled many scientists, who argue that opponents of G.M.O.s have distorted the risks associated with them and underplayed the risks of failing to try to use the technology to improve how food is grown. Wading into a debate that has more typically pitted activists against industry, some have argued that oppo-

sition from even small pockets of an American elite influences investment in research and the deployment of genetically modified crops, particularly in the developing world, where hunger raises the stakes.

“Just as many on the political right discount the broad scientific consensus that human activities contribute to global warming, many progressive advocacy groups disregard, reject or ignore the decades of scientific studies demonstrating the safety and wide-reaching benefits” of genetically engineered crops, Pamela Ronald, a professor of plant pathology at the University of California, Davis, wrote on the blog of the nonprofit Biology Fortified.

And other scientists, including two Nobel Prize winners, wrote an opinion article for the journal *Science* last fall titled “Standing Up for G.M.O.s.”

As he traversed the island and the Internet, Mr. Ilagan agreed with constituents that there was good reason to suspect that companies like Monsanto would place profit above public safety. He, too, wished for more healthful food to be grown more sustainably.

But even a national ban on such crops, it seemed to him, would do little to solve the problems of an industrial food system that existed long before their invention. Nor was it likely to diminish the market power of the “Big Ag” companies, which also dominate sales of seeds that are not genetically modified, and the pesticides used on both. The arguments for rejecting them, he concluded, ultimately relied on the premise that they are unsafe.

Making up his mind about that alone would prove difficult enough.

## **The Rainbow Papaya**

The papaya farmers appeared, pacing restlessly, outside Mr. Ilagan’s office shortly after Ms. Wille introduced the proposal for a G.M.O. ban in May.

There were only around 200 of them on an island with a population of about 185,000, but many lived in his district. They wanted to be sure he understood that genetically modified papayas, the only commercially grown G.M.O. fruit in the United States, account for three-quarters of the 30 million pounds harvested annually here.

“They’re treating us like we’re criminals,”



JIM WILSON/THE NEW YORK TIMES

Mr. Ilagan with Alberto Belmes, one of the growers of genetically modified papayas whose views helped change Mr. Ilagan's mind.

said Ross Sibucan, the head of the growers' association.

Another Council member favored razing every genetically modified papaya tree on the island.

But under Ms. Wille's bill, the modified papaya, known as the Rainbow, was grandfathered in, as long as farmers registered with the county and paid a \$100 annual fee.

"You're exempted," Mr. Ilagan reassured Mr. Sibucan.

Even so, Mr. Sibucan replied, the bill would stigmatize any genetically modified food, making the Rainbow harder to sell.

Many of the island's papaya farmers, descendants of immigrants who came to work on sugar plantations, have links to the Philippines, as does Mr. Ilagan, who immigrated from there as a child. As the plantations faded in the 1980s, some began growing papayas. But after an outbreak of Papaya ringspot virus in the mid-'90s, only the Rainbow, endowed with a gene from the virus itself that effectively gave it immunity, had saved the crop, they told him.

If Mr. Ilagan worried about big biotechnology companies, the farmers told him, the Rainbow should reassure him. Developed primarily by scientists at academic institutions, it was a model for how the technology could benefit small farmers. Its lead developer, the Hawaiian-born Dennis Gonsalves, was, along with others on the team, awarded the 2002 Humboldt Prize for the most significant contribution to United States agriculture in five years.

Japanese as well as American regulators had approved the papaya. And because the virus was spread by insects, which growers had sought to control with pesticide sprays, the Rainbow had reduced the use of chemicals.

Mr. Ilagan took their point. "If we as a body pass this," he said, thinking aloud at the second public hearing in July, "it shows we think all G.M.O.s are wrong."

### Superweeds and Rats

Instructed by the chairman not to applaud, the residents who packed the County Council chamber in Kona on July 3 erupted in frequent

silent cheers, signaled by a collective waving of hands and wiggling of fingers.

A few, like Richard Ha, an island farmer who hoped that the diseases afflicting his bananas and tomatoes might be solved with a genetic modification, were there to testify against the ban. Ranchers also were opposed; they wanted the option to grow the genetically modified corn and soybeans for cattle feed that are common elsewhere.

But a vast majority were there in support. Some were members of G.M.O. Free Hawaii Island, a mix of food activists and entrepreneurs, who argued that the organisms were bad for human health, the island's ecosystem and eco-conscious business. Others, veterans of the campaign for a partial ban already in place here, reminded the Council of the precedents for Ms. Wille's bill: In 2008, organic Kona coffee farmers successfully lobbied for a ban on any cultivation of genetically modified coffee. The presence of a G.M.O. crop, they argued, would hurt their reputation and their ability to charge a premium.

At the same time, the county had banned the cultivation of genetically engineered taro, a root vegetable cultivated for centuries in Hawaii.

In the three minutes allotted to each speaker at the July hearing, some told personal tales of all manner of illness, including children's allergies, cured after going on a "non-G.M.O." diet. One woman took the microphone "on behalf of Mother Earth and all sentient beings." Nomi Carmona encouraged Council members to visit the website of her group, Babes Against Biotech, where analyses of Monsanto's campaign contributions are intermingled with pictures of bikini-clad women.

Many of the most impassioned speakers came from Mr. Ilagan's district of Puna, known for its anti-establishment spirit. "These chemical companies think they're going to win," one woman said. "Hell, no, they're never going to win here."

Organic farmers worried that their crops would be contaminated also made an impression on the councilman, though he felt that the actress Roseanne Barr, who owns an organic macadamia nut farm here, could have been kinder to the papaya farmers in the room.

"Everybody here is very giving," she had

told them. "They will bend over backwards to help you burn those papayas and grow something decent."

More striking to Mr. Ilagan was the warning of Derek Brewer, 29, an Army veteran who served in Iraq and Afghanistan before coming to Hawaii to help found an eco-hostel. "We don't fully understand genetics," Mr. Brewer said, his dark hair tied back in a ponytail. "Once you change something like this, there is no taking it back."

What really stuck with Mr. Ilagan were the descriptions of tumorous rats. Reading testimony submitted before the hearing, he had blanched at grotesque pictures of the animals fed Monsanto's corn, modified with a gene from bacteria to tolerate an herbicide. According to the French researcher who performed the study, they developed more tumors and died earlier than those in the control group.

"Are we all going to get cancer?" Mr. Ilagan wondered.

### **Sifting Through Claims**

The next week, when his legislative assistant alerted him that the rat study encountered near-universal scorn from scientists after its release in autumn 2012, doubt about much of what Mr. Ilagan had heard began to prick at his mind.

"Come to find out, the kind of rats they used would get tumors anyway," he told his staff. "And the sample size was too small for any conclusive results."

Sensitive to the accusation that her bill was antiscience, Ms. Wille had circulated material to support it. But in almost every case, Mr. Ilagan and his staff found evidence that seemed to undermine the claims.

A report, in an obscure Russian journal, about hamsters that lost the ability to reproduce after three generations as a result of a diet of genetically modified soybeans had been contradicted by many other studies and deemed bogus by mainstream scientists.

Mr. Ilagan discounted the correlations between the rise in childhood allergies and the consumption of G.M.O.s, cited by Ms. Wille and others, after reading of the common mistake of confusing correlation for causation. (One graph, illustrating the weakness of conclusions based on correlation, charted the lock-step rise in organic food sales and autism diagnoses.)

Butterflies were disappearing, but Mr. Ilagan learned that it was not a toxin produced by modified plants that harmed them, as he had thought. Instead, the herbicide used in conjunction with some genetically modified crops (as well as some that were not) meant the milkweed on which they hatched was no longer found on most Midwestern farms.

He heard many times that there were no independent studies of the safety of genetically modified organisms. But Biofortified, which received no funding from industry, listed more than a hundred such studies, including a 2010 comprehensive review sponsored by the European Union, that found “no scientific evidence associating G.M.O.s with higher risks for the environment or for food and feed safety than conventional plants and organisms.” It echoed similar statements by the World Health Organization, the National Academy of Sciences, the Royal Society of Medicine and the American Association for the Advancement of Science.

A blog post on the website of NPR, a news source Mr. Ilagan trusted, cataloged what it called “Top Five Myths of Genetically Modified Seeds, Busted.” No. 1 was a thing he had long believed: “Seeds from G.M.O.s are sterile.”

One of the more alarming effects of G.M.O.s that Ms. Wille had cited was suicides among farmers in India, purportedly driven into debt by the high cost of patented, genetically modified cotton seeds.

Biotechnology companies, she said, “come in and give it away cheap, and then raise prices.”

Monsanto’s cotton, engineered with a gene from bacteria to ward off certain insects, had “pushed 270,000 farmers to suicide” since the company started selling it in India in 2002, the activist Vandana Shiva said in a Honolulu speech Ms. Wille attended.

But in *Nature*, a leading academic journal, Mr. Ilagan found an article with the subhead “GM Cotton Has Driven Farmers to Suicide: False.”

According to the *Nature* article, peer-reviewed research in 2011 found that suicides among farmers were no more numerous after the new seeds were introduced than before. And a 2012 study found that farmers’ profits rose because of reduced losses from pest attacks.

“There’s farmers committing suicide because of the whole debt issue, but it’s not be-



JIM WILSON/THE NEW YORK TIMES

The Rainbow papaya is genetically modified to resist a virus that devastated other papaya varieties on Hawaii.

cause of the G.M.O. issue,” Mr. Ilagan said he concluded in mid-August.

Still, it was hard not to be spooked by material emailed by constituents and circulated on Facebook: images of tomatoes with syringes stuck in them and of pears and apples stapled together, warnings of children harmed by parents serving genetically modified food. The specter of genetic contamination still haunted him. And his mother, who had always served papaya at home, had stopped because of her new concerns about the Rainbow variety.

### Learning From a Researcher

The scientists at the national agriculture research center here were not accustomed to local Council representatives dropping by unannounced.

But one day in August, Mr. Ilagan recalled, when he turned up in search of someone who could answer questions about genetic contamination, he found a molecular biologist willing to help.

“It’s kind of a loaded term,” the councilman remembered the scientist, Jon Suzuki, saying. “What they’re talking about is cross-pollination, which is something that happens all the time within species.”

The councilman knew little about how food was grown. He enlisted in the Air National Guard immediately after high school and abandoned his first semester of community college classes when he decided to run for the Council seat.

Dr. Suzuki gave him a tutorial on plant re-

production, Mr. Ilagan recalled, explaining that with the wind, insects and animals spreading pollen and seeds, cross-pollination can never be entirely avoided.

But, Mr. Ilagan learned, by staggering planting times and ensuring a reasonable distance between crops, it is usually possible to avoid large-scale mingling. Also, plants have different fertilization methods: The Rainbow papaya, for instance, was largely self-fertilizing. If it is planted about 12 feet away from other varieties, the chance of cross-pollination is exceedingly low.

“But what about the papaya contaminating” — Mr. Ilagan recalls correcting himself — “cross-pollinating with a pineapple?”

This was the part he had trouble explaining to himself. Was the virus gene from the papaya also in Ms. Barr’s macadamia nuts and the organic coffee farmer’s beans?

Dr. Suzuki paused.

“With plants of different species — it’s kind of like how you don’t cross a cat with a dog and expect to have offspring,” he said.

“Duh!” exclaimed Mr. Ilagan. “I should have realized that.”

In the following weeks, Mr. Ilagan sometimes called Dr. Suzuki with his question du jour. For instance, do weeds near genetically modified crops turn into “superweeds” because of a rogue gene?

The scientist, he recalled, helped him understand that “superweeds” were weeds that had evolved resistance to a widely used herbicide — most likely faster than they would have if farmers had not used it so much on crops genetically engineered to tolerate it.

Biotechnology firms were already selling seeds that tolerated other, less benign herbicides, Mr. Ilagan learned. But that was a different problem from the specter conjured by a woman at one of the hearings, who said that “G.M.O.s are cross-pollinating with weeds that now can’t be controlled.”

Asked about the danger of moving genes among species where they had not originated, Dr. Suzuki explained that for millenniums, humans had bred crops of the same species to produce desired traits. But with the advent of genetic engineering, it became possible to borrow a feature from elsewhere on the tree of life. An example Mr. Ilagan later learned about was

the rice being tested in the Philippines. Modified with genes from bacteria and corn, it can provide Vitamin A, the deficiency of which is a scourge of the world’s poor.

That did not mean genetically engineered food could never cause harm. But the risks of such crops could be reliably tested, and they had so far proved safe. “With scientists, we never say anything is 100 percent certain one way or another,” Dr. Suzuki said. “We weigh conclusions on accumulated knowledge or evidence — but often this is not satisfactory for some.”

## **Silencing the Scientists**

On Oct. 1, Mr. Ilagan voted to block the bill from moving out of committee, shortly after a day of what Ms. Wille and Brenda Ford, another Council member who was a proponent of the ban, had described as expert testimony.

At the hearing on Sept. 23, he had grown increasingly uneasy as his fellow Council members declined to call several University of Hawaii scientists who had flown from Oahu, instead allotting 45 minutes to Jeffrey Smith, a self-styled expert on G.M.O.s with no scientific credentials.

One University of Hawaii at Manoa biologist, Richard Manshardt, responded to a question from Ms. Ford about the effect on honeybees of corn engineered to resist pests: none, he said, because the protein it produced affected only certain insect groups, and was not toxic to bees.

“I don’t agree with the professor,” Ms. Ford told her colleagues.

Many University of Hawaii scientists had already registered their opposition to the bill, in written and oral testimony and letters in the local papers.

If the ban passed, local farmers could not take advantage of projects underway at the university and elsewhere, they noted, including drought-tolerant crops and higher-yield pineapple plants. Genetic engineering is a precise technique that “itself is not harmful,” the dean of the school’s College of Tropical Agriculture and Human Resources, Maria Gallo, wrote in one op-ed.

But Ms. Wille had largely dismissed the opinions of university researchers, citing Monsanto contributions to the university. In 2012, she noted, the company made a one-time donation of



JIM WILSON/THE NEW YORK TIMES

Farmers outside the County Council chamber listened to a discussion about the ban.

\$600,000 for student scholarships at the College of Tropical Agriculture and Human Resources, an amount that the college said represented about 1 percent of its annual budget that year.

“It is sad that our state has allowed our university departments of agriculture to become largely dependent upon funding grants from the multinational chemical corporations,” Ms. Wille told reporters, suggesting that the university’s professors were largely a “mouthpiece for the G.M.O. biotech industry.” She did, however, rely on the opinion of a specialist in organic agriculture practices at the university, Hector Valenzuela, who supported the bill.

Mr. Smith, known for “Genetic Roulette,” a movie he produced based on his book of the same title that had been shown at one of the island’s “March Against Monsanto” events, appeared at the hearing by Skype from Arizona.

He praised the Council for stepping in where he believes that federal regulatory agencies have failed, and suggested that the Rainbow papaya could harm people because of a protein produced by the viral gene added to it, adding that no human or animal feeding studies had ever been conducted on the fruit.

Mr. Ilagan was genuinely curious to hear the author’s take on his own latest realization: Each genetically modified organism was differ-

ent, and came with its own set of trade-offs.

“I don’t see a blanket ban,” he told his staff that week. “It seems like it should be a case-by-case thing.”

“Aloha, Mr. Smith,” Mr. Ilagan said when he had his turn. “Or is it Dr. Smith?”

“No, Jeffrey’s fine,” Mr. Smith said over Skype.

“In your world,” Mr. Ilagan asked, “is there any room for any G.M.O.?”

Mr. Smith replied that there was not.

In the afternoon, Dr. Gonsalves, who led the development of the Rainbow papaya, was given time to respond to Mr. Smith’s allegations. He laid to rest a lingering question about papaya safety that had troubled Mr. Ilagan.

He explained that any papaya infected by the ringspot virus contains the protein Mr. Smith had mentioned as potentially dangerous in the genetically modified Rainbow. Moreover, plant viruses do not infect people. “Everyone was eating virus-infected papaya in the 1990s,” Dr. Gonsalves said. “And now you want to do feeding studies?”

With one member absent, only one other Council member joined Mr. Ilagan in opposing the bill. The Council deferred a decision on creating a task force to discuss the implications of banning genetically modified organisms.

Ms. Wille assured her colleagues that, upon the bill's passage, she would support the formation of such a group. But it was better not to delay, she said: "I want to draw a line in the sand until we can take a closer look."

## Angry Voters

The response to Mr. Ilagan's vote was swift and unambiguous.

He was mocked on Facebook and pilloried in letters from constituents. "You have been influenced by the contrived arguments from the pro-G.M.O. interests," one letter read. "Many of my fellow Puna residents will seriously consider more progressive candidates for the next Council term."

"Greggor, what do you think you're doing?" his campaign manager, Kareen Haskin, 70, a close family friend, asked him. "The main thing I told people was you would listen to them."

He told her that though a vocal minority supported the ban, many other constituents knew little about the complex issue. "I have to do what's right for them, too."

He told Ms. Haskin what he had learned about health and environmental aspects of genetic engineering. But as he had found often happened in conversations about G.M.O.s, the subject quickly shifted. "We don't want corporations to own all the seeds," she said.

Mr. Ilagan was as opposed as Ms. Haskin was to big businesses controlling a market, in part by using patents that prohibit farmers from replanting or selling their seeds. But banning crops because they were made with genetic engineering would not change the patent laws, he told her.

Mr. Ilagan had been alarmed by testimony from farmers who said they could be sued by Monsanto and other patent-holders when patented seeds ended up in their fields by accident. But he found there was no evidence that Monsanto had ever initiated such a lawsuit.

"I'm still trying to voice this out," he said, "but to me it just seems symbolic. Like doing something that seems good, but not really achieving what you want to achieve."

Ms. Haskin took his hand. "You have to vote for this bill," she pleaded. "What about all the pesticides being sprayed on our food?"

The conversation, he noticed, had turned again.

## Emotional Testimony

The Council meeting on Oct. 15 started with public testimony that lasted more than seven hours.

Again, Mr. Ilagan found himself touched by the emotion of the crowd. A mother brought her 8-year-old to testify. Mr. Brewer, the eco-hostel owner, was in the audience with his wife, who is deaf, signing so she could follow the debate. Invoking the Hawaiian word for "land," several speakers — not necessarily of Hawaiian descent — begged for "our aina" to be preserved. "Our island can be the uncontaminated seedbed for the world," one said.

Those in favor of the bill outnumbered those opposed by more than five to one.

Lukas Kambic, a biology major at the University of Hawaii at Hilo, sought to use his own experience to counter the anecdotes others voiced that night. "My mom ate organic food exclusively and did yoga all the time, and she died of a brain aneurysm," Mr. Kambic said. "According to the logic of people here, she was killed by organic food and yoga."

The room was silent.

Knowing that the final vote on the ban was yet to come, Mr. Ilagan voted "no" after the hearing. Then nearly 1,000 people quickly signed a petition demanding that he change his vote at the final hearing, scheduled for Nov. 18. For the first time in his career as councilman, he began to consider voting "kanalua" — yes, with reservation.

In early November, he sought to escape with a friend to a condo in Kona, only to be accosted at the pool by a voter demanding answers.

And on Nov. 14, Mr. Brewer, the veteran who runs an eco-hostel, visited him in his office. They discussed Mr. Brewer's conviction that cross-pollination by G.M.O.s would do unknown harm to the environment and detract from the island's image.

"We need all the votes we can get to override" a possible veto by the mayor, Mr. Brewer said. "Do you think you can vote for this bill, Greggor?"

Mr. Ilagan still had questions of his own. One scientist he had spoken to said the built-in pesticide in corn should not worry him, because many plants contain their own natural pesticides. "I still want to track that down," he told his staff. "What is an example of a natural pesticide?"

Maybe, he thought, he would join the long-promised task force, which would weigh the implications of banning G.M.O.s on the island and report back to the Council.

The final hearing on the bill was not unlike the first. Superweeds were mentioned. Indian suicides. Contamination.

Ms. Wille urged a vote for the ban. "To do otherwise," she said, "would be to ignore the cries from round the world and on the mainland."

"Mr. Ilagan?" the Council member leading the meeting asked when it came time for the final vote.

"No," he replied.

The ban was approved, 6 to 3.

The mayor signed the bill on Dec. 5.

At the Council meeting on Dec. 17, Ms. Wille's motion to create a committee to study the impact of banning genetically modified organisms on the island was not seconded, and she withdrew it. Stunned, Mr. Ilagan briefly considered making his own motion to form a task force. But he could see he would not have enough support.

It was time to move on. A fast-growing subdivision in his district needed a community park. Last week, Mr. Ilagan turned his focus to drumming up support for the bond issue he would need from the county to plan and design it. ■