Tainted Greens

Carl Nagin

Late in August 2006, the federal Centers for Disease Control and Prevention (CDC) in Atlanta began investigating cases of severe food poisoning reported by health officials in 26 states and one Canadian province. Over the next six weeks, a rare and particularly virulent strain of *Escherichia coli* 0157:H7 sickened more than 200 people, hospitalizing half of them, some with severe kidney damage, and killing two elderly women and a child. For epidemiologists, the outbreak presented a breakthrough because a DNA-fingerprinting system enabled CDC investigators to trace back the source of the infections from clusters of cases nationwide.

Bacteria in stool samples of hospitalized patients were genetically matched to pathogens in pre-packaged, "ready to eat" Dole brand spinach that they had recently purchased and consumed. Further, product codes on the bags indicated that the contaminated greens had been processed during one shift on August 15 at a plant then owned and operated by Natural Selection Foods. The company's records showed that the spinach had been harvested from four fields in Monterey and San Benito counties.

Just how the spinach became contaminated and where in the process from field to package the bacteria originated will probably never be known. An investigative report released last March by the Food and Drug Administration (FDA) could make "no definitive determination" as to "how E. coli 0157:H7 pathogens contaminated spinach in this outbreak."

The consequences of the crisis fell heavily on Central Coast farmers, who are now being pressed by buyers to comply with a conflicting array of new food safety measures, some of which are costly, scientifically unproven, and environmentally harmful. Some violate state regulations, and may even be counterproductive to food safety. But the growers must follow these measures in order to market their crops to the larger contractors or handlers.

The farmers' predicament is jeopardizing the future of sustainable agriculture and of the habitat and clean water it supports, according to the Nature Conservancy's Monterey Project Director Chris Fischer: "Farmers and conservationists in California have been working together for more than 20 years to develop practices that help protect water quality and wildlife habitat, but since last fall, farmers have been under enormous pressure from their buyers to go the other direction," she said. "To stay in business, they are being forced to build miles of fences along streams, cut down trees, and bulldoze ponds. Some actions, like creating bare-earth buffers along waterways, may actually increase the risk of contamination downstream."

Search for the Source

The E. coli outbreak of August 2006 was "one of the worst ever reported in produce," stated a 2006 "Critical Issues" report by the nonprofit Organic Center, which conducts peer-reviewed scientific research on organic food and farming. It prompted investigations by the FBI and FDA and led to one of the largest product recalls in U.S. history: On

September 14, 2006, the FDA issued a consumer and retailer advisory not to eat or sell any bagged or fresh spinach. This advisory remained in effect until September 22.

Hank Giclas, vice president for science and technology for Western Growers, a produce industry group, remembered the day the nation's spinach industry was shut down. "I was in my office, and we were frantically summoned to a conference call with FDA officials. Their advisory took everyone by surprise. It was an unprecedented action. They'd never before issued any kind of blanket 'Do not consume spinach' warning. The industry ground to a halt."

Members of Western Growers in California and Arizona grow, pack, and ship nearly half the nation's fresh fruits, vegetables, and nuts. Giclas estimated that the shutdown cost the spinach industry roughly $100 million and affected other bagged salad produce as well.

On September 20, five weeks after the Natural Selection Foods plant had processed the spinach for Dole, FDA investigators began taking soil and water samples from four of the ranches where it had been grown and harvested. Samples from one ranch in San Benito County had E. coli pathogens indistinguishable from the strain identified by the CDC's DNA fingerprinting system, PulseNet. These were found in soil, river water, and cow and feral pig feces at Paicines Ranch, a large grass-fed beef operation that had leased a small amount of its land to a spinach grower. But these E. coli-infested samples were found nearly a mile away from the implicated spinach field. None were found on the plot itself.

Whatever the origin and pathways of the outbreak, the washing procedures at the processing plant failed to eliminate the pathogens, and its quality assurance protections failed to detect it after the processing. The FDA report was heavily redacted for "proprietary reasons," advantageous to Natural Selection Foods' operators, who were quick to divert attention back to the fields and away from the manufacturing end.

In an October 15, 2006 article in the *New York Times* ("The Vegetable-Industrial Complex"), author Michael Pollan, who has written widely about food and its production, noted that "a great deal of spinach from a great many fields gets mixed together in the water at that plant, giving microbes from a single field an opportunity to contaminate a vast amount of food. The plant in question washes 26 million servings of salad every week. In effect, we're washing the whole nation's salad in one big sink."

The FDA, which is responsible for safeguarding 80 percent of the nation's food supply, had known about contamination problems in spinach and other Central Coast and Salinas Valley produce for years. Over the last decade, nine other E. coli outbreaks associated with the area's leafy greens had been documented. Prior warnings from the FDA and the California Department of Public Health included letters to Salinas packers, Western Growers, and other industry groups, calling for implementation of safer manufacturing and sanitation practices and, more recently, alerts about wells and irrigation systems contaminated with animal wastes.

However, the FDA has little enforcement authority over the food industry, in contrast with the U.S. Department of Agriculture (USDA), which monitors and regulates meat, poultry, and eggs. The USDA has

onsite inspectors at the nation's slaughterhouses with the authority to shut them down if they fail inspections. The FDA's food safety oversight has been the target of intense criticism from congressional critics, including John Dingell (D-MI), chair of the House Committee on Energy and Commerce, and from advocacy groups who complain about its coziness with the produce industry. The FDA's inspection capacity has been decimated by budget cuts in recent years. Between 2003 and 2006, the number of safety tests for U.S.-produced food decreased nearly 75 percent, from 9,748 to 2,455, according to FDA statistics. Last April, Robert E. Brackett, director of the FDA's food safety division, told the Washington Post that he believes manufacturers are better equipped to "build safety into their products rather than us chasing after them."

Industry Shapes a Safety Plan

Immediately following the outbreak, prompted by the FDA and California's public health and agriculture departments, Western Growers began developing a Leafy Greens Marketing Agreement, with guidelines that would serve as a standard for certifying the safe handling, shipment, and sale of produce marketed by its signatories. This agreement would be administered by the California Department of Food and Agriculture (CDFA), which would use a USDA-designed inspection program that has been applied in other states.

The Secretary for Food and Agriculture, A.G. Kawamura, is a past president of Western Growers. Last February, he appointed an advisory board for the marketing agreement composed almost exclusively of representatives from the bigger "handlers"--those who process, package, ship, and distribute leafy green products. Conservation groups and resource agencies that had been working for years with Central Coast farmers had complained from the outset that the Western Growers' initiative was a closed-door process designed to serve the interests of handlers and big buyers. California Certified Organic Farmers, one of the nation's oldest and largest certifiers of organic produce, criticized the "lack of transparency in the process."

When word got out about some of the measures proposed in discussions, such as plowing up riparian buffers, eliminating wildlife, and erecting high fences around fields, alarm spread through the farming, regulatory, and conservation communities.

On October 25, 2006, Roger W. Briggs, executive officer of the Central Coast Regional Water Quality Control Board (RWQCB), aired his agency's concerns in a letter to Brackett at the FDA, with copies sent to Giclas at Western Growers and other industry groups. The emerging guidelines (known variously as metrics and GAPs--good agricultural practices), "may conflict with the [RWQCB's] mission to protect water quality and may increase water quality violations in farming areas," Briggs wrote. "We are aware of concerns that riparian or on-farm vegetation may attract wildlife that may spread the 0157:H7 E. coli, but are not aware of any research to support those concerns." He requested a meeting with the FDA and the opportunity "to review any future proposed food safety guidelines or suggested farm practices that may affect water quality."

Almost three months later, on January 10, 2007, with Briggs still awaiting a response to his letter, the water board's chairman, Jeffrey Young, wrote to CDFA and Western Growers, noting that 92 percent of the region's total irrigated acreage--including all the acreage farmed by the large growers of leafy greens--was enrolled in collaborative

programs designed to improve water quality. "We know that vegetated conservation practices are among the most effective tools for protecting and improving water quality," Young wrote. "Millions of federal and state taxpayer dollars have been invested in researching and promoting conservation practices, and in assisting farmers in implementing such practices." He warned that a "major accomplishment on the part of the agricultural industry" was now at risk.

Not until after Young's letter, as well as letters from the EPA, the Department of Commerce, and other agencies were fired off, did Western Growers respond to these concerns. It amended an early draft of the marketing agreement to incorporate the conservation concerns and comments of resource agencies, including this language:

Fencing, vegetation removal, and destruction of habitat may result in adverse impacts to the environment. Potential adverse impacts include loss of habitat to beneficial insects and pollinators; wildlife loss; increased discharges of sediment and other pollutants resulting from the loss of vegetative filtering; and increased air quality impacts if bare soil is exposed to wind. It is recommended that producers check for local, state, and federal laws and regulations that protect riparian habitat, restrict removal of vegetation or habitat, or restrict construction of wildlife deterrent fences in riparian areas or wildlife corridors.

The Marketing Agreement addresses a wide range of food safety issues, including sanitizing farm equipment; preventing transfer of pathogens from field workers; wildlife encroachments from deer, goats, pigs, cattle, and sheep; soil amendments; and water usage. (See Western Growers' website, www.wga.com, for the June 2007 draft.)

Among those who thought that the agreement fell short of what was necessary was Dr. Charles Benbrook of the Organic Institute, who sent comments to Western Growers, some of which, he acknowledges, were adopted in various drafts of the agreement. But Benbrook found the document remains most seriously flawed with respect to water testing requirements. The required test is based on the wrong organism, and the standard applied to testing for E. coli in irrigation water is "unscientific and indefensible," because it relies on "an outmoded recreational water quality risk assessment" from the mid-1980s used by the EPA to test swimming water, he states in a June, 2007 report, "Unfinished Business: Preventing E. Coli 0157 Outbreaks in Leafy Greens" (available at www.organic-center.org).

The metrics do not require testing irrigation water specifically for E. coli 0157, only for generic E. coli, Benbrook states. He concludes: "Water with detectable levels of E. coli 0157 should not be used to irrigate leafy greens. Period."

Numerous phone calls to Hank Giclas of Western Growers asking for comment went unanswered.

The Marketing Agreement went into effect last April, and as of June, 111 produce handlers, who process nearly all the leafy greens produced in California, have signed on to it. However, the conflict over ways to ensure safety is far from over, and farmers are hard-pressed in its midst. Some major handlers and contractors who have signed the agreement, including packaged salad giant Fresh Express, are individually demanding that farmers take additional safety measures, including some that have little science or common sense behind them.

No Dogs No Frogs

Fresh Express, purchased in 2005 for $855 million by Chiquita Brands International, is the nation's top producer of packaged salads, producing 40 percent of those sold in supermarkets. Last year the company processed 1.2 billion pounds of raw lettuce and spinach. Although it signed the Western Growers agreement in April, Fresh Express has its own far more demanding requirements for greens it buys.

Jim Lugg, senior food safety scientist with Fresh Express, has worked with the Salinas-based company since 1963. He said the company supplies growers with its own set of field management guidelines and good agricultural practices, but would not provide me with these, saying they are a "proprietary document protected by copyright." Instead, he referred me to an October 23, 2006 article in *USA Today* ("Fresh Express leads the pack in produce safety") that outlines some general requirements.

According to this article, Fresh Express will not accept produce from fields grown within a mile of a cattle feed lot or dairy operation, or if they are within 150 yards of rivers or habitats that attract wildlife. Fields that show evidence of wild pig visitation cannot be harvested for two years. The company also demands fences and rodent traps every 50 feet around field perimeters.

"If we find animal tracks in a field," Lugg told me, "then we don't believe that the product is safe to harvest." That means, he said, any animals--from frogs to dogs. "We don't like to see animals in a field of lettuce. We don't think people like the idea." Asked if this were more about cosmetic issues than food safety, he replied: "What you need to realize is that many more bovine intestines have been studied than mice to see if they are carriers of E. coli. Maybe mice and kangaroo rats are just as risky as large animals." He added that among studies the company has funded is one to examine whether insects are disseminating 0157.

Asked whether he had talked with environmental agencies about the impact of Fresh Express food safety guidelines on riparian habitats in the Salinas Valley, Lugg responded: "It's not our place to do that. Some public agencies need to do that."

Steve Church is a co-owner of the Salinas-based Church Brothers, a large grower, shipper, and processing company known for its True Leaf Farms brand. Shortly after the outbreak, Church Brothers announced that it would install six miles of additional fencing around its lots "to prevent any wildlife intrusion into our fields." In late May, the company announced a price increase of 20 cents per package on all True Leaf and Church Brothers produce. It justified the increase as a cost of its new food safety measures, including fencing. Steve Church is a member of the California Leafy Green Handler Marketing Board, which makes recommendations to the secretary of agriculture and the CDFA on the operation of Western Growers' Marketing Agreement and the inspection program intended to give it teeth.

I asked Church about the apparent contradiction between the Marketing Agreement and Fresh Express's more aggressive stance toward fencing and wildlife.

"We [Church Brothers] adhere to Fresh Express guidelines," he said. "You gotta do that if you want to be a vendor, or not sell to them. If you grow for Fresh Express, you're more limited in the land you can

use. Their recommendations go beyond the agreement."

Farmers in the Crossfire
Bob Martin, a past president of the Monterey County Farm Bureau, is general manager of Rio Farms, one of the largest growers and employers in King City. These days he spends much of his time trying to make sense of demands imposed in the name of safety by various buyers and handlers who contract for his produce and market it.

"I grow for several different companies, and each one is requiring a different level of compliance," he said. "They're fighting for customer bases in the big box stores, Costco and Wal-Mart. They're battling for those accounts by saying 'My product is safer than yours.'"

"I understand we have to get consumers' confidence back," he continued. "Spinach sales haven't recovered. We're only selling 75-80 percent of our produce, and bagged salads have taken a big hit. But a lot of this is all smoke and mirrors. We need good solid research that will tighten up some of these metrics. How long does the bacterium survive in soil? In water? Are deer really an issue? How far will E. coli 0157:H7 travel in the wind? People are looking for answers."

Last April, speaking at a conference on water quality and food safety in San Luis Obispo, Martin told of farmers being asked to fence their fields and tear out riparian habitat that they have restored to comply with environmental regulations. He pleaded to his audience, which included researchers from the National Science Foundation, the USDA, and the FDA, as well as academic microbiologists, environmental scientists, and crop and food safety specialists: Farmers need help, now. He urged the researchers to talk to industry leaders.

Safeguards or Marketing Ploys?
The crisis has everyone involved in the leafy greens business, especially farmers, on high alert--and nervous. "Maybe some of these things we should have been doing years ago," said a Salinas Valley grower who asked not to be identified. Keeping cattle pasture a distance away from crops was a good idea, he said. How great that distance should be is another question. Another farmer told of a grower who was asked to remove a grassy waterway to get rid of frogs and rodents. A story is going around that the crop of one field was rejected because crows had been seen flying over it.

Kirk Schmidt, executive director of the nonprofit Central Coast Water Quality Preservation, Inc., which is involved in environmental monitoring and helping farmers preserve water quality, believes that the debate over safety measures for leafy greens is being driven by people who work in risk management and the legal departments of the big producers and supermarket chains--people "who don't understand that crops are grown outside in the dirt." That's bad news for water quality and sustainable agriculture in the Central Coast.

Liability, along with branding and creating a positive image for produce, is not a trivial concern for big handlers and packagers like Dole and Fresh Express, which together control 90 percent of the retail market for packaged salads, according to the Produce Marketing Association. The Seattle law firm Marler Clark successfully represented victims of last fall's E. coli outbreak in lawsuits against Dole. Since 1973, the firm has won settlements and verdicts for food sickness victims totaling $300 million. That amount is nearly three times the total production value of Monterey County's entire spinach crop in 2006. Monterey County's $3.5-

billion agriculture industry has been turned upside down by the food safety crisis.

Amidst all the distress and anger in the farming community, Martin relies on caution and vigilance. "I look to our work force," he said, "anyone in the field. The awareness of employees is so heightened that I think if it had been at that level before, this wouldn't have happened. They see a deer--they bring it to the managers' attention. They find lettuce with bird poop on it--where before they might have just taken off the leaf, now they drop it."

Fencing the River

In June, I drove with Martin along a stretch of the Salinas River to see first-hand what some of the new, so-called "clean farming" practices imposed by buyers and contractors were all about. (Martin asked that I not identify any of the growers whose fields we observed.) We took a dirt-and-gravel backroad to a field of spring mix planted near the riparian thicket of cottonwoods, willows, and grasses that marks the outer edge of the Salinas floodplain. What was striking about those plots of red and green baby lettuces were the new eight-foot-high chain-link fences installed to guard and tower above them, like some satellite yard of Soledad Prison, 20 miles north. "To keep out the deer," Martin said.

Deer were not implicated in the FDA's March 21, 2007 investigative report on the matter, which focused on cows and feral pigs roaming the ranches close to the suspect spinach plots and on conditions at the processing plant. The fencing I saw going up along river corridors of south Monterey County, much of it visible only from secondary roads, runs about $5 per foot, Martin said, or $45,000 per mile. For the bigger growers that can add up to $150,000 in new costs, not a penny of which will be paid for by their buyers and contractors, who now require it.

A boom in orders for fencing and rodent traps is part of the new world of clean farming around King City, where, as Martin points out, none of the nine E. coli outbreaks associated with Salinas Valley agriculture in the last decade have occurred. It is hotter here, he explains, and one thing scientists *do* know about E. coli is that, airborne, it's very unstable: It can be irradiated and neutralized by sunlight and hot winds.

Terry Palmisano, a senior wildlife biologist with the California Department of Fish and Game, warns that food safety concerns have the potential to create a 100-mile stretch of fencing on both sides of the river. If that happens, "you lose that as a corridor, a way for wildlife to come down out of the hills and cross the river," she said. "And when it floods, the wildlife can't escape."

On June 7, Martin attended a workshop with the agency's wardens and chief biologists at the Monterey County Agricultural Center in Salinas. Scores of farmers packed the room, along with officials and representatives of industry groups and environmental agencies concerned with what's happening to Central Coast agriculture.

"Buyers are concerned about animal tracks from deer, pigs, cattle, sheep, and goats," Martin told the gathering. "Say you've got a 20-acre block of head lettuce or romaine out there and all of a sudden you're two days from harvest, and you go to the field and there's a lot of animal tracks. The deer came in the night before. They may not have done anything. They just walked through the field. But it's up to the scrutiny of the buyers, who can say: 'You know what? I don't want that

deal.' So we're forced to protect our ground from these 'animals of significant risk' and put up fences. You can't [fence around] every little bend [in the river], and you don't want to forfeit a bunch of farmland that you're already using. So you're going to cut some corners in riparian habitat. Nobody wants to talk about this issue. We've never had to be concerned about this before."

Martin was a leader in voicing farmers' concerns to Western Growers as it developed its guidelines, and he now serves as a technical advisor to the organization. Over the years, he has worked with a number of nonprofit organizations and governmental agencies that seek to protect water quality in the Salinas Valley. Like many growers, he finds himself in a crossfire between environmental and food industry interests. He worries that the buyers who are demanding stricter measures are far removed from the realities and consequences of what they are asking.

His views were echoed by many growers at the Salinas workshop, including Benny Jefferson, another member of the Farm Bureau Board and chairman of the Salinas River Channel Coalition. "Anyone from Costco here?" Jefferson asked from the podium. "Wal-Mart? Safeway?" Nobody answered.

Nobody from the industry was there to help the farmers who feel trapped between food safety guidelines they must follow to earn their livelihood and resource agencies' rules they must violate to comply with industry metrics. Nor have Fish and Game or Water Quality Board staff provided clear answers to the farmers' dilemma.

Local regulations prohibited fencing over six feet high along the river until July 10, when the Monterey County Board of Supervisors, under pressure from processors, passed an "interim urgency" ordinance allowing eight-foot fences. The *Monterey County Herald* noted that the new ordinance waived both 50-foot setback requirements and state environmental regulations.

The pressures on growers are mounting. Vegetation removal in the name of food safety is also a concern for the California Department of Transportation (Caltrans), which has been warning growers about encroachments on land abutting state highways. Caltrans District Director Richard Krumholtz wrote the Monterey County Farm Bureau last spring that his department had observed an increasing number of ranchers and farmers removing plant life "in direct violation of Caltrans vegetation management policies, environmental law and permits."

It's Counterproductive

"The industry is still in crisis mode, and they are making tremendous errors in standards," said Kirk Schmidt, a former owner of Quail Mountain Herbs, who represents agriculture on the Monterey Bay National Marine Sanctuary's Advisory Council. "It will take at least a year to undo the screwups before we can talk about restoring environmental requirements to the [food safety] auditing standards. The most important single thing you can do to improve water quality is to keep the sediments on your field, and the second most important thing is keep irrigation on your fields. And that's easier with grassy buffer strips and grass roadways." Farmers along the Salinas River are being forced by the bigger produce buyers to remove these, according to Schmidt, even though such vegetative buffers mitigate the hazards of toxins, including E.coli.

"There's a ton of evidence," said Dr. Charles Benbrook, "that buffers are

effective in filtering out pesticides contained in runoff, and recent studies suggest that 40-foot-wide riparian shrubs and thick grass cover filter out large quantities of E. coli."

That view was supported in a U.C. Santa Cruz research brief published in fall 2006 by the Center for Agroecology and Sustainable Food Systems. Citing more than 80 studies, it noted that removing vegetation-based practices such as filter and contour buffer strips, grassed waterways, vegetative barriers, and constructed wetlands, "would not only reverse progress towards addressing water quality issues, but could also potentially increase the presence and transport of pathogens." Although food safety and environmental protection are interconnected, the research brief argued, they are now on a collision course in the Salinas Valley.

"Millions of dollars of taxpayer money have been invested in helping farmers develop sustainable agriculture and address non-point source pollution," said Jovita Pajarillo, associate director of EPA's Region 9 water division. "Now we're hearing horror stories about growers going out with bulldozers to remove hedgerows. You can't blame them; they've lost millions. But such practices may result in an enforcement action against them because of water quality concerns."

Pajarillo works with the California Roundtable, a coalition of environmental groups and agencies that, along with food safety and agricultural industry representatives, is trying to address the conflict. They hope to bring the major buyers to the table and begin a dialogue. So far that hasn't happened.

"I see both sides digging in their heels," said Michael Payne of the Western Institute for Food Safety and Security at U.C. Davis. "What's needed here is common sense and individualized risk assessment for a particular farm. . . . Some practices are no-brainers, and others we don't have research on." Payne hopes the money that industry is now pouring into the Institute's research will help it become a meeting ground.

Dr. Benbrook was less enthusiastic about the priorities of the industry-funded research. "Are people being honest about what farmers need to do?" he asked. "I'm not super-impressed with the lack of focus on critical variables such as managing cow manure. There's been a systematic effort to leave the cattle industry out of the dialogue. 'Let's not look under that rock.' And that's ridiculous. . . . There's no feral pig lobby, and pigs are a convenient scapegoat for this. Let's learn something new about this bacterium [E. coli 0157:H7] and find some different ways to prevent and deal with it."

The science of how E. coli gets into produce is still in its infancy. According to Linda Harris, a U.C. Davis food safety researcher, "It's less than a decade old." She believes that "we will never eliminate food-borne illness entirely." Meanwhile, the conflict between food safety and environmental protection has left Central Coast growers twisting in the wind.

If and when the next outbreak occurs, will the onus again be put on them?

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