Lethal *Listeria* surfaces on fresh vegetables

In a survey of 10 types of fresh produce, scientists have uncovered potentially deadly *Listeria monocytogenes* bacteria in samples of cabbage, cucumbers, potatoes and radishes. Only a small percentage of the cabbages and cucumbers harbored the bacteria – the only *Listeria* species known to cause illness and death in humans – but about 26 percent of the potatoes and 30 percent of the radishes were contaminated. The researchers found no *L. monocytogenes* in broccoli, carrots, cauliflower, lettuce, mushrooms or tomatoes, says study leader Judy E. Heisick of the FDA's Center for Microbiological Investigation in Minneapolis.

The study, in which Heisick and her coworkers tested 1,000 vegetable samples obtained from two Minneapolis supermarkets, represents the most extensive work to date documenting the organism's presence on fresh produce, says Robert E. Brackett, a food microbiologist at the University of Georgia Agricultural Experiment Station in Griffin.

Systematic searches in the past have failed to detect the organism on large numbers of produce samples. However, researchers have proved it the perpetrator in at least two epidemics of foodborne illness and death. In 1985, scientists found it in a type of soft cheese that caused human deaths and stillbirths in southern California. And in 1981, researchers linked *L. monocytogenes* in coleslaw to a cluster of Canadian deaths, Heisick says.

In most healthy adults, the bacteria cause no symptoms or, at worst, a flu-like illness. But in fetuses, newborns and people with depressed immune systems, such as chemotherapy patients and some elderly individuals, the organism can enter the brain, leading to meningitis and often to death, says Sita R. Tatini of the University of Minnesota at Minneapolis-St. Paul. The brain infection, called listeriosis, afflicts an estimated 1,600 people annually in the United States, killing about 400, Heisick says.

Scientists do not know what levels of the bacteria are required to cause listeriosis in humans, and Heisick says she did not calculate the levels in her samples because no reliable methods exist for such calculations.

To reduce contamination, she recommends thoroughly scrubbing fresh vegetables, which may bear bacteria-harboring dirt on their surfaces or within pores or cracks. However, she and her coworkers write in the August APPLIED AND ENVIRONMENTAL MICROBIOLOGY, "it is not known what, if any, degree of cleaning would eliminate contamination of fresh produce by *L. monocytogenes*."

– I. Wickelgren

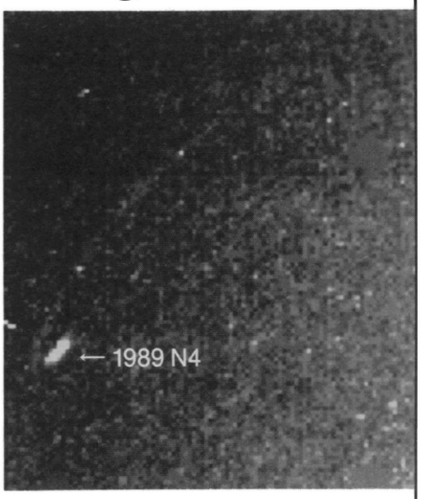
Voyager sees Neptunian ring-arcs at last

It's an unconventional idea, a "ring" structure unlike any known in the solar system, but since the mid-1980s scientists have wondered whether Voyager 2's flyby of Neptune might show the planet surrounded by short arcs rather than whole rings like those encircling Jupiter, Saturn and Uranus. Early on Aug. 11, with the spacecraft about 13 million miles out from Neptune and less than two weeks from its closest approach to the planet, Voyager photographed two "ring-arcs."

The pictures show two arcs, one of them about 30,000 miles long and wrapping about 45° around the planet. That arc, visible in the photo detail at right, sits a few hundred miles outside 1989 N4, one of four recently discovered Neptunian moons (SN: 8/12/89, p.193). N4 orbits about 38,500 miles out from Neptune's center.

The other arc stretches about 6,000 miles and lies some 32,300 miles from the planet's core. Barely visible in the Voyager pictures, it appears to lag behind 1988 N3, another of the newly found moons, trailing the moon by about 90°.

Scientists at NASA's Jet Propulsion Laboratory in Pasadena, Calif. – the Voyager control center – say they expect to discover more arcs and moons. The spacecraft detected these first arcs early enough to allow controllers to re-aim some of the remaining photos for a more detailed look. Both arcs show brightness variations along their lengths, possibly resulting from differences in density, particle size or rock type. Similar brightness variations appear in the F-ring of Saturn and a pair of narrow rings in Saturn's Encke division. Some planetary scientists suggest the arcs consist of fragments of former moons ground up by collisions with other moons (SN: 8/5/89, p.87).



JPL

Bay area shock may foreshadow strong quake

While residents of the town of Los Gatos cleared away broken windows and mourned the young man who jumped to his death during last week's earthquake, a few seismologists sought to decipher a message from the temblor that shook the San Andreas fault 13 miles southwest of San Jose. Experts say the magnitude 5.2 quake indicates this region is storing stress that will someday generate a strong earthquake, although that event might lie decades in the future.

In June 1988, a magnitude 5 shock hit the same place along the fault, where it runs a broken, complex course through the Santa Cruz mountains. The two tremors followed a 74-year-long quiet period during which this patch caused no jolts of magnitude 5 or greater. The segment is the southernmost part of the San Andreas that moved during the great 1906 San Francisco quake. To the east, the Calveras fault has spawned several magnitude 5 and magnitude 6 quakes in the last decade after a long quiet period.

Seismologist Allan G. Lindh of the U.S. Geological Survey in Menlo Park says the renewed activity fits a pattern researchers have observed in Japan and elsewhere. Called the seismic cycle, this pattern describes how faults enter a period of quiescence after a large earthquake releases most of the stress in the nearby crust. Quiet lasts until the relentless movement of Earth's plates builds enough stress to generate moderate – magnitude 5 – quakes. After a period of such ruptures, which are too small to release much of the stress, another large quake resets the stress levels toward zero and the cycle resumes.

Historical records indicate the southern Bay area was quite active during the century preceding the 1906 rupture. In 1865, a strong shock estimated at about magnitude 6.5 hit the region that broke last week.

In 1981, Lindh, William L. Ellsworth and two colleagues observed that renewed activity in the Bay area seemed to fit the seismic cycle model, suggesting the area was building toward a large quake. Lindh says the quakes of recent years, including last week's, leave little doubt in his mind.

It's not clear when or where the large Bay area quake will strike. But in an open-file report last year (SN: 7/16/88, p.37), the U.S. Geological Survey offered some assessment of the hazard, saying there was a 50 percent probability that a magnitude 7 shock would hit the area in the next 30 years.

– R. Monastersky

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