Plague killing sea turtles a grim puzzle for science

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The turtle washes up on shore, dead or near dead. Hideous growths wrap around its flippers and erupt near the eyes.

The lumps look like cauliflowers gone bad, very bad.

Another turtle is lost to mysterious tumors. The green sea turtle is protected by law from human predation, but there is no statute to protect it from this disease.

Scientists have theories — but no hard answers. It's one of those scientific detective stories. Researchers in Florida, California and here are ferreting out bits of information, each on a different course.

They do know the tumors are showing up on turtles in parts of Hawaii and Florida, yet their cousins in other waters aren't getting them.

They know that while the tumors aren't new, they weren't epidemic in Hawaii's turtles until a few years ago, and in Florida only a bit longer.

The growths are frightful; they rob the turtle of its grace. People who come upon one washed up on the beach turn away revolted or stare at it morbidly. Hundreds of leeches, attracted to the blood supply in the tumors, cling to the animal. There's no hope for the turtle. It will die of the tumors, sooner or later.

The tumors grow so large around the eyes they obstruct the turtle's vision and the ones around the flippers disrupt its ability to swim properly, said George Balazs, leader of marine turtle research for the federal NOAA Fisheries service who has been studying the green sea turtle for years.

Balazs suggested that these tumors may have caused the mammals who live in Kaneohe Bay to shift their habitat slightly north. If so, he said, that might explain why turtle feces began to wash up in large numbers at Kualoa Regional Park, causing the beach to be closed for several weeks.

Balazs said about 50 percent of the turtles he and other divers have seen in Kaneohe Bay have the tumors. Of the 84 that have washed up on beaches around the islands so far this year, 48 percent had the growths.

But the diseased turtles aren't found in all Hawaii waters, nor all waters off Florida. In Florida they're found along the Atlantic Coast, near Cape Canaveral. In Hawaii it's around Kaneohe Bay and in Kailua Bay near Kawainui Channel's drainage. It's on the North Shore at Laniakea and Chun's Reef, not far from Meadow Gold Dairies, and on the South Shore near a drainage of Kapakahi Stream at Waialae Beach Park. On Maui, they're found at Kahului Bay near the power plant.

(Turtles tend to live in specific areas. Adult Hawaii turtles go every few years to breed at French Frigate Shoals but return to their home waters — Kaneohe turtles return there, Kahului turtles go back to Maui.)

Because of the locations where tumor-covered turtles are found, speculation abounds that pollution, perhaps chemical runoff from agriculture or other human activities, is a factor. It's possible, researchers say, that pollution could depress the turtle's immune sys-

Advertiser photo by Charles Okamura

George Balazs, leader of marine turtle research for the federal NOAA Fisheries service, shows a dead sea turtle which has tumors on its flippers and eyes. 1989

tem, weakening barriers against disease. But so far, there's no scientific evidence to prove this.

Some scientists speculate the growths are caused by a virus; others a parasite in the form of a flatworm.

Balazs has four turtles in a tank at Kewalo Basin. All are between two and five years old and all have tumors. One was hit by a boat; its tumors aren't too bad, Balazs said, so once it gathers strength, it will be released.

The other three will never swim in the open ocean again. They provide tumors for research, but nothing can be done for them, Balazs said, except to keep them fed and comfortable. "A hospice, that's basically what this is," he said.

Veterinarian Patrick Leadbeater operated for hours on one turtle, Balazs said, removing tumor after bloody tumor. Within a few months, they all started to grow back.

What impact all this will have on the turtle population down the line can only be guessed. It's not known how long the green sea turtle lives, Balazs said, but "without the disease, we speculate the life span is probably quite long." They don't even reach mating maturity until around 26 years.

If you find a green sea turtle on the beach and it's still alive, the first thing to do, Balazs said, is point it back to the water. If it can't swim away, then call NOAA Fisheries Honolulu Laboratory, 943-1221. Evenings and weekends, call the state Conservation and Resources Enforcement hotline, 548-5918.

Two competing theories on origins of epidemic

Scientists offer two principal theories as to why normally healthy populations of green sea turtles experience an epidemic of life-threatening tumorous growths.

Elliott Jacobson of the University of Florida is focusing on a virus. He said the tumor epidemic off East Florida began in about 1982. Single cases were reported as far back as the 1930s, he said, but not many. By mid-1986, however, 57 percent of the turtles captured in one area had the disease.

Murray Dailey of California State University at Long Beach puts parasites at the top of his list. He assumes the eggs of a parasitic flatworm are the culprit. The flatworm lives in the heart or major blood vessels. When it lays eggs, they're picked up by the circulatory system, but the eggs are a too big to get filtered out. They block an area and the tumor develops.

Dailey says it's possible that the turtle is getting the flatworm parasite from a snail that is relatively new to Hawaii waters.

Consider, Dailey said, that if a seaweed was introduced to Kailua Bay from the Caribbean or Florida and a tiny, infected snail was hiding in the seaweed when it arrived.

Snails are hermaphrodites. That is, is doesn't take two to tango. From a single snail, a whole colony could develop.

Seaweed in fact was brought into Kaneohe Bay from that part of the world, according to Isabella Abbott, a University of Hawaii botanist.

A red algae, *Hypnea musciformis*, was introduced between 1970 and 1975, she said. The people who brought it "thought it would grow here and they'd make a million bucks" selling its extract, said Abbott.

But they didn't do any studies beforehand and so didn't know "that the residue sticks to any kind of strainer and it's extremely costly to remove it."

It was planted in Kaneohe Bay, she said, and in five years, had reached to Waikiki and is now even off Maui, near Paia.

But was an infected snail hiding in it and proliferating along with the seaweed?

"Unless the snail is very small, I think I would have seen it," she said.

While Jacobson in Florida wouldn't rule out the parasite theory until he has more definite links for the viral one, he said he's seen too many of the tumor samples that don't have any of the parasites.

"I think they come in after the tumor forms," he said.

Because of federal laws enacted in 1978 to protect the green sea turtle, researchers have been sighting more younger ones, but more younger ones with tumors, too.

— **Barbara Hastings**