

US EPA ARCHIVE DOCUMENT

Hysteria over Pfiesteria

An Atlantic Coast mystery



Pfiesteria (fee-STEER-ee-uh) has been causing hysteria along the Atlantic coast. Just the name *pfiesteria* sounds kind of scary, doesn't it? Well, you'll be glad to know that it is not contagious or infectious. You can't catch it like you can a cold. Okay, then, what is it? Pfiesteria is a marine organism that generally falls under the heading "algae."

Though it's very small (0.007 of a millimeter wide) and can't be seen without a microscope, it's not a bacterium or a virus. Pfiesteria is what biologists call a *dinoflagellate*. Dinoflagellates have tails that whip back and forth, allowing them to swim around. Half of them perform photosynthesis—the process of converting sunlight into energy—like other algae.

What's the Problem?

Recently these complicated little creatures have been wreaking havoc along the eastern seaboard. A couple of years ago, the number of dead fish in the Chesapeake Bay greatly increased. But that isn't all. The number of human problems associated with dead and sick fish also rose, leading to health warnings and closings of rivers to commercial fishing and recreational activities.

How could such tiny organisms cause such big trouble? Well, in the

presence of fish, pfiesteria transforms from an inactive cyst to a cyst that produces a poison. Pfiesteria uses this poison to stun fish, making it easier to

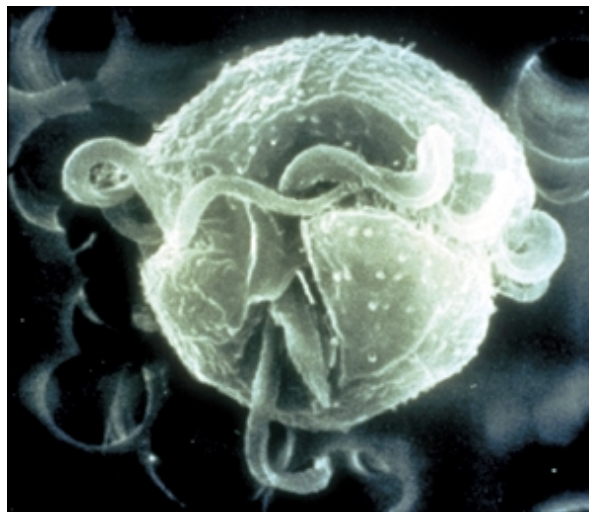


Some fish finished by pfiesteria.

feed off the victim. The same poison that stuns the fish then dissolves some of their tissues, giving them red lesions and sores. Pfiesteria also releases another toxin that eventually chokes the fish by paralyzing its ability to breathe. After the fish dies or environmental conditions change, pfiesteria forms a protective outer covering and drops to the river bottom where it becomes a dormant cyst—sort of like going into hiding.

Unfortunately, scientists still do not know a lot about pfiesteria, but research is under way in Maryland, Delaware, and North Carolina, where pfiesteria is most widespread. Many researchers believe that pfiesteria has been around for a thousand years, but no one knew of it until a North Carolina scientist discovered it in 1988.

Pfiesteria is hard to detect because it is harmful only at certain times during its 20-stage life cycle. Scientists are trying to figure out what environmental factors might be responsible for spurring these microorganisms into action in rivers along the eastern seaboard. Some scientists suspect that waters with a large supply of nutrients such as phosphorus and nitrogen (which can come from animal waste, human waste, and other sources such as fertilizer) trigger the transformations. Increases in dead fish also seem to be associated with warmer waters, higher salt contents, and frequent storms.



Toxic cyst form of pfiesteria.



Let's Go Surfing Now!

Learn about *pfiesteria*

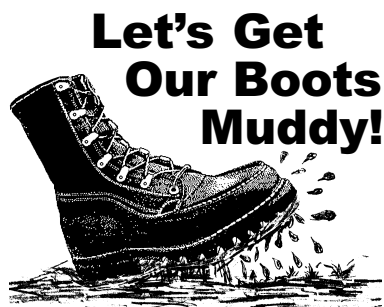
www.epa.gov/owow/estuaries/pfiesteria

EPA has developed a web site about *pfiesteria*. Check out the information on:

- * *Pfiesteria* outbreaks on the Atlantic Coast
- * How the organism can kill fish
- * What is being done to stop *pfiesteria* outbreaks

Other web sites on *pfiesteria*:

www.dnr.state.md.us/pfiesteria
www.mdsg.umd.edu/fish-health/pfiesteria
www.pfeisteria.org



Let's Get Our Boots Muddy!

Identify algae in your pond

Pfiesteria is a type of dinoflagellate, a microscopic, free-swimming, single-celled organism, usually classified as a type of alga. Most algae are not toxic. Take a sample of pond water and put it under a microscope. See if you can find some single-celled algae. An algae identification book can help you determine what you are observing.

How Can It Hurt Humans?

What exactly can *pfiesteria* do to people like you and me? Well, since it's not a virus or bacterium, *pfiesteria* isn't contagious or infectious—it can't be "caught" like the flu. There also is no evidence that *pfiesteria*-related illnesses are associated with eating fish or crustaceans such as shrimp, lobsters, and crabs.

That being said, human health problems have been linked to *pfiesteria*. Some people who have been exposed to infected waters (such as fishermen) have complained of lesions or sores, being tired, experiencing light-headedness, and having trouble breathing. Luckily, the symptoms disappeared when those people avoided contact with the infected waters.

Although studies are being done to measure health risks, no one at this point can clearly define the risks. As a result of this uncertainty, officials suggest that we take precautions and use common sense. So, in other words, avoid swimming in areas known to be filled with dying fish. And don't eat or handle fish that have sores or look diseased. That shouldn't require too much convincing, should it?



For a long time fish kills like this one along the east coast puzzled scientists. Eventually they discovered that a mysterious microorganism was causing the fish to die.

Career Corner



An *ichthyologist* studies fish and their environment.

A *health department inspector* ensures that no activities, such as using poor waste management practices at restaurants or ignoring septic system maintenance requirements, contaminate the environment.

An *epidemiologist* studies disease outbreaks that affect lots of people, such as health problems related to *pfiesteria*.

An *aquatic ecologist* studies the functioning of living communities in lakes and rivers, under pristine and contaminated conditions.