

A new angle for lake management

Scientists examine role of fatty acids in health of aquatic ecosystems

BY YOLANDA LUKASZEWSKI
The Battalion

Nutritional fads come and go, but one fatty acid that scientists find beneficial in human diets could also prove essential to the health of lake ecosystems.

Plankton, tiny plants and animals, form the basis of food chains in lakes, and fisheries managers know that their health translates into the overall

health of the ecosystem.

Fisheries managers trying to create ideal conditions for fish populations traditionally focused on the effects of nutrients, such as nitrogen and phosphorous compounds, on plankton communities.

These nutrients can have a rippling effect through each trophic level, or rung, of the food chain, ultimately determining which species of zooplankton are available for fish to eat.

But some researchers are now saying that di-

etary factors are also important considerations for healthy lake ecosystems.

Scientists should stop looking at just total nitrogen and phosphorous, Dr. Daniel Roelke, assistant professor of Wildlife and Fisheries Sciences, said.

"We should start looking at specific compounds and how they are controlling, or at least influencing, other trophic levels in terms of their reproductive growth and success."

A group of aquatic scientists at the University of California-Davis and the University of Washington are taking this different approach.

They found that zooplankton, the tiny animal component of plankton, thrive on certain kinds of algae but not others.

Some kinds of phytoplankton, the microscopic algae making up plankton's plant component, are rich in a certain fatty acid that may be crucial to zooplankton growth.

In laboratory experiments, the researchers fed two types of phytoplankton, cyanobacteria and diatoms, to the zooplankton Daphnia.

They found that in summer, when the cyanobacteria dominated the lake, only 5 to 26 percent of the phytoplankton eaten by the Daphnia was converted to zooplankton biomass.

During spring and winter, when diatoms dominated the lake, 50 to 65 percent of the phytoplankton Daphnia ate was converted to zooplankton biomass.

Cyanobacteria is poor in eicosapentanoic acid, commonly known as omega-3 fatty acid, while diatoms are rich in omega-3 fatty acid.

The Daphnia that consumed phytoplankton high in omega-3 fatty acid had higher egg production and growth rates, leading the researchers to conclude that the omega-3 fatty acid in diatoms made them more nutritious than cyanobacteria.

This might explain the difference in growth. Omega-3 fatty acids keep cell membranes healthy and help form important hormones in animals, Dr. Michael T. Brett, University of Washington assistant professor of Civil and Environmental Engineering, said.

Brett co-authored the study, published last month in the journal Nature.

"Eicosapentanoic acid is the same dietary fatty acid that is thought to be the healthy component of fat-rich fish like salmon and tuna in human diets," Brett said.

"Phytoplankton that are more nutritious can have a major impact on the overall food web," Brett said.

"What the study shows is that the rate at which zooplankton convert phytoplankton to biomass depends on the supply of this class of essential fatty acids. This gives us important insights into what may determine how energy moves through aquatic food webs," he said.

Scientists have known for some time that zooplankton do not grow well on cyanobacteria, but they did not know exactly why, Roelke said.

This study is unique, he said, because the researchers chose to look at a fatty acid to explain why zooplankton do not grow as well on cyanobacteria as they do on diatoms.

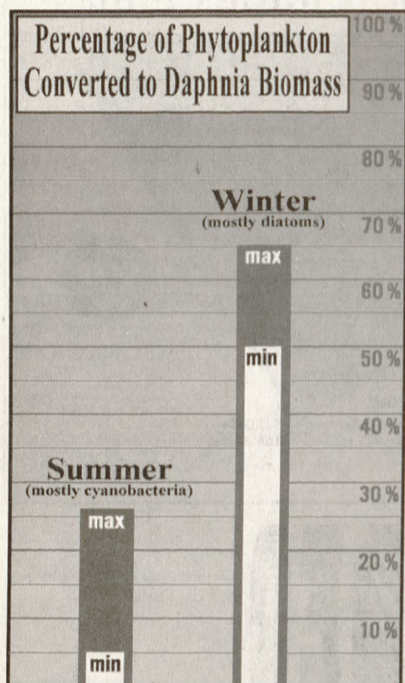
However, algae living in nutrient poor environments will not be as nutritious as algae growing in healthy conditions, regardless of the species or abundance, he said.

Roelke said the study did not address how food quality varies depending on the physiological state of the algae.

Nevertheless, studying the role that omega-3 fatty acid plays in aquatic food chains could have important implications for lake restoration and fisheries management.

Based on the results of the study, fisheries managers might want to create an environment that favors nutritious algal species over poor food quality algae.

Lake Food Web Dynamics



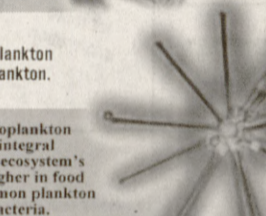
Fish populations depend on healthy supplies of zooplankton.

The zooplankton Daphnia is one of the main consumers of algae in lakes. Increasing their population allows greater control of algae blooms and provides more food for fish populations.

Herbivorous zooplankton consume phytoplankton.

Diatoms, common phytoplankton in lake ecosystems, are integral components of the lake ecosystem's food chain. They are higher in food quality than other common plankton species, such as cyanobacteria.

Phytoplankton use solar energy to transform dissolved nutrients into food.



ROBERT HYNCEK/THE BATTALION

Fisheries scientists showed that diatoms, with high concentrations of one kind of fatty acid, are a more efficient food resource than other common phytoplankton.

FDA approves new digital mammogram

WASHINGTON (AP) — The nation's digital mammograms — computerized X-rays to hunt breast cancer — were approved by the government Monday.

Digital mammograms appear as good as but not better than — regular mammograms detecting breast cancer, the Food and Drug Administration cautioned.

But the new digital mammography machine, GE Medical Inc.'s Senographe 2000, does offer potential advantages to regular X-rays:

Digital mammograms can be stored electronically so films are not lost, adjusted for under- or overexposure without needing another X-ray, and sent electronically to specialists worldwide for consultation.

Better, it is a long-awaited first step in using computers in even more sophisticated ways to better detect breast cancer, Dr. Dan Kopans, director of breast imaging at Massachusetts General Hospital, who has helped study the system, said.

"This will open a new era in mammographic detection of breast cancer," he is describing a list of research that digital mammography will enable to move forward. "This is the first step and I've got my fingers crossed these things are going to pan out. This gives the opportunity" to try.

American women undergo some 30 million mammograms every year.

The breast X-ray is the gold standard in detecting breast cancer, particularly early on. But mammograms are not foolproof. Doctors have long hoped that computerized mammograms could improve the image.

The FDA approved essentially a first in digital mammography, cautioned the agency's chief Dr. Dan Schultz.

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