Grazing zooplankton severely impacted by nanoplastic particles, researchers find

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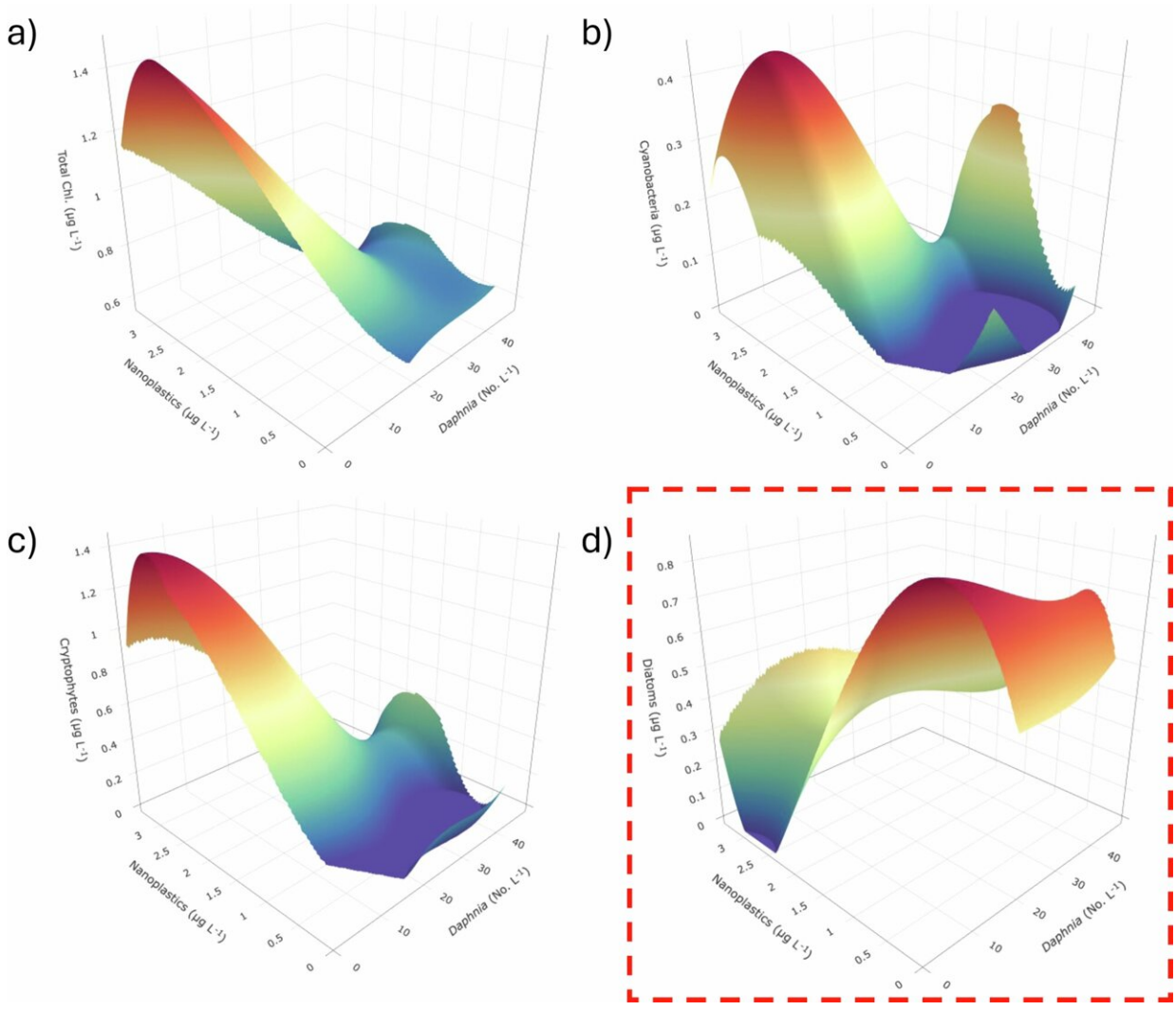

Contrasting responses among phytoplankton taxa to nanoplastic particles and zooplankton grazing. Credit: *Communications Earth & Environment* (2024). DOI: 10.1038/s43247-024-01646-7

Researchers at Lund University in Sweden are studying how nanoplastics affect aquatic organisms in lakes and rivers. Their findings are surprising, and the researchers are the first to show that some species are being wiped out, while others—such as cyanobacteria that contribute to algal blooms—are completely unaffected.

The work is published in the journal *Communications Earth & Environment*.

Every year, the amount of plastic in the world's oceans increases by between 5 and 13 million tons. Over time, plastic breaks down into micro- and nanoparticles that are invisible to the naked eye. Researchers at Lund University have investigated how these small plastic particles affect organisms in aquatic ecosystems.

They found that some species of grazing zooplankton, daphnia, which are an important source of food for fish, were particularly vulnerable. Phytoplankton diatoms were also severely impacted. However, other types of algae, such as blue-green algae (cyanobacteria), which contribute to algal blooms, were completely unaffected.

"We don't yet know why some collapse while others continue to thrive as usual. If the concentrations of nanoplastics increase, even those that can handle a few particles at present will also likely suffer," says Lars-Anders Hansson, professor of aquatic ecology.

The researchers conducted the study in artificial wetlands, which are made as similar to natural systems as possible. Therefore, the results are likely to be transferable to natural ecosystems. Variations in the impact on different organisms lead to significant changes in the food chain and ecosystem processes, such as fewer grazing zooplankton and more

extensive algal blooms.

"The concentrations of nanoplastics we used are low, quite close to the concentrations already present in our waters," says Hansson.

The researchers will now continue their experiments to find out how these insidious nanoplastic particles, which can penetrate cell membranes, affect different species in lakes and rivers.

"Taking a broader perspective, our study provides knowledge and the basis for future decision-making on how to deal with the obvious problems posed by plastic, even if it is also an excellent material in many aspects of our everyday lives," says Lars-Anders Hansson.

More information: Mikael T. Ekvall et al, Nanoplastics rewire freshwater food webs, *Communications Earth & Environment* (2024). DOI: 10.1038/s43247-024-01646-7

Provided by Lund University