

Can trees control algal blooms?

January 21 2020

Griffith University researchers have shown that leaf litter can play an important role in controlling algal blooms.

After winning an ARC Linkage grant in 2016, Griffith University researchers, led by Professor Michele Burford at the Australian Rivers Institute, looked at the [organic compounds](#) leached from leaves and how this interacts with soil, to determine whether these compounds could suppress the growth of blue-green algal (or cyanobacteria) blooms.

Blue-green-algae outbreaks have major impacts on plants and animals that live in or near creeks, rivers, lakes, estuaries and the ocean. These algae can also produce toxins with major human health concerns.

Professor Burford said investigating how leaf litter can play a role in limiting those impacts could aid management authorities and environmental managers such as Healthy Land Water and Seqwater in managing, monitoring and treating impacted water.

"Trees have an even greater role in preserving water quality than we previously thought," she said.

"Nutrients from the land—via fertilizers and soil erosion, for example—are a major cause of algal blooms, and planting [trees](#) along waterways is one way to reduce nutrient runoff.

"This is because trees take up nutrients from the soil in order to grow. But trees have another role, as we have recently found.

"Trees and other plants also deliver [organic material](#) into waterways. They drop their leaves, they fall in the water or they fall on the ground, so we get [leaf litter](#) everywhere."

Among the novel techniques the team employed was to add leachate from leaves to experimental chambers in a reservoir and observe the effect the leachate had on the growth of algae. The experiment revealed that if enough leachate was added it can suppress the blue-green algal growth.

The findings explain why waterways surrounded by vegetation may have less problems with blue-green algal blooms than other waterways, suggesting that trees don't just control algal growth by shading, they also chemically control algal growth, especially problematic blue-green algae.

Professor Burford said the research project also examined the relationship between these organic leachates from leaves and chlorination process used for treating drinking water. Organic leachates, such as tannins discolor the water but the combination of chlorine and organic leachate produces disinfection byproducts that can be harmful to humans.

"Some trees are likely to be better to plant when revegetating river banks than others," she said.

"It's a difficult balance, so it's important to plant the right trees to minimize the effects on [water](#) treatment and maximize the effects on suppressing the [algal blooms](#)."

The team published findings from their investigations in the journal *Science of the Total Environment*.

More information: Amanda D. Neilen et al. Effects of photochemical

and microbiological changes in terrestrial dissolved organic matter on its chemical characteristics and phytotoxicity towards cyanobacteria, *Science of The Total Environment* (2019). [DOI: 10.1016/j.scitotenv.2019.133901](https://doi.org/10.1016/j.scitotenv.2019.133901)

Provided by Griffith University

Citation: Can trees control algal blooms? (2020, January 21) retrieved 19 April 2024 from <https://phys.org/news/2020-01-trees-algal-blooms.html>

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