



Land, Air & Water

KENTUCKY ENERGY AND ENVIRONMENT CABINET'S WEBZINE

Honeysuckle: An Unlikely Culprit in the Case of Water Quality

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By Madeline Pruszenski



A section of Three Mile Creek surrounded by Bush Honeysuckle. Photo by Richard Durtsche.

The yellow and white flowers of the bush honeysuckle fill the spring air with sweet fragrance. Its green leaves hold on throughout the fall, a reminder of warm days before winter sets in. So it may come

as a surprise that this seemingly pleasant plant is actually an aggressive invasive species.

Scientists have long known that bush honeysuckle (*Lonicera maackii*), brought to North America from Asia as an ornamental plant, competes with native plant species and reduces their chances of survival. However, they only recently have begun to understand the negative effect it has on aquatic ecosystems.

Richard Durtsche, the Research and Education Field Station director at Northern Kentucky University, and his team investigated the effects of invasive honeysuckle on aquatic communities. They found that something as simple as its leaf litter — leaves that fall into water bodies in autumn — can be harmful to water quality and aquatic life.



Left Photo: Bush honeysuckle flowers in the spring. Right Photo: Bush honeysuckle berries in the fall

Photo courtesy of Boone County Conservation District.

This finding is important considering how abundant bush honeysuckle is in the Kentucky region and where it is often found.

“It proliferates along roadsides, and dominates aquatic edges of streams, rivers, lakes, and ponds,” Durtsche said. “You will find these areas loaded with honeysuckle.”

What the Leaves Say

To study leaf litter in a lab setting, the team created test “ponds” using one-liter containers of water and dry leaf litter from both bush honeysuckle and native plants. They calculated the amount of leaves that would be in one liter of water, put them in tea bags and placed them in the containers.

Among its findings, the NKU team observed high microbial activity on the bush honeysuckle leaves. The direct effects of the microbes on aquatic organisms are not yet known. However, they noted the microbes appear to decrease the dissolved oxygen levels in the water while breaking down the leaves in the water.



An ephemeral pond overtaken with Bush Honeysuckle. Photo by Richard Durtsche.

“The leaves decompose so much faster because the bacteria break down the leaves quickly while using up the oxygen in the water,” Durtsche said. This leaves less oxygen for organisms to thrive.

The team found that bush honeysuckle leaves decompose 3-5 times faster than the native sycamore leaves, also commonly found along aquatic edges.

This is of particular concern for aquatic communities surrounded by a large number of bush honeysuckle, since leaf litter is an important part of the food chain. If bush honeysuckle makes up of the majority of the leaf litter, this food source will become depleted faster than if native leaves were in the water.

A Danger to Frogs

Durtsche's team also found that bush honeysuckle appears to affect amphibians, such as wood frogs. As bush honeysuckle leaves decompose in water they release tannin chemicals, a "defense mechanism by the plant to reduce digestibility in herbivores," Durtsche said.

To see how the release of these chemicals impacted the fitness of young frogs, the team raised tadpoles in two aquatic environments: one with bush honeysuckle leaves and one without. After the tadpoles grew into froglets, the team measured the froglets' ability to escape predators and overall health.

The froglets that spent time in the bush honeysuckle leaf litter test appeared to have reduced fitness and reduced overall health compared to the wood frogs in the control test, the team said.

Additionally, honeysuckle transpiration — in which water moves up plant roots and evaporates from the plants' leaves — occurs at a higher rate than native shrubs. This can decrease the amount of water available in these ponds, as well as the duration of time that water is available.

"Honeysuckle increases transpiration from a forest by 10 percent," said NKU Research and Education Field Station Assistant

Director Richard Boyce, who worked with Durtsche to analyze the effects this has on aquatic habitats. “In return, it reduces water that flows out of wetlands and can actually affect stream flow”.

This concern is specific to amphibians because amphibians lay their eggs in ponds, some of which only hold water certain times of the year. If the “pond’s life is too short,” Durtsche said, “then amphibians won’t lay eggs there.”

Looking Toward the Future

Boyce, citing his new research, offered some optimism: honeysuckle leaf blight attacks, and eventually kills, honeysuckle leaves, and it appears to have little impact on native species.

The leaf blight might not eliminate bush honeysuckle, Boyce said, but there is “potential that it will knock back its competitive advantages, making it a more normally growing plant.”

Landowners wanting to prevent the negative effects of bush honeysuckle can look around their properties to see if bush honeysuckle has taken residence on the land. Properly identify the plant as honeysuckle by looking at the characteristics described here (<https://www.knps.org/2020/04/30/invasive-plant-corner-bush-honeysuckle-Ionicera-spp/>).

Boyce said the best way to kill small bush honeysuckle is by pulling it up, but make sure to get all of the roots. If it’s a bigger plant, Boyce says the most effective way is to cut it at the stump and spray the stump with a glyphosate-based herbicide. Contact your local UK Extension office (<http://extension.ca.uky.edu/county>) for the correct application and mixture rates.

Getting rid of bush honeysuckle can be labor intensive, but working to stop the spread of this aggressive plant will in the end help improve the land and aquatic ecosystems.

Madeline Pruszenski is an environmental scientist with the Kentucky Division of Water. She has a passion for ecology, especially regarding freshwater systems, and works to educate the public about water quality.