

Invasive kudzu is major factor in surface ozone pollution, study shows

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Kudzo Vine

Kudzu, an invasive vine that is spreading across the southeastern United States and northward, is a major contributor to large-scale increases of the pollutant surface ozone, according to a study published the week of May 17 in the journal *Proceedings of the National Academy of Sciences*.

Kudzu, a leafy vine native to Japan and southeastern China, produces the chemicals [isoprene](#) and nitric oxide, which, when combined with nitrogen in the air, form ozone, an air pollutant that causes significant health problems for humans. Ozone also hinders the growth of many kinds of plants, including crop vegetation.

"We found that this chemical reaction caused by [kudzu](#) leads to about a 50 percent increase in the number of days each year in which [ozone](#)

[levels](#) exceed what the [Environmental Protection Agency](#) deems as unhealthy," said study co-author Manuel Lerdaу, a University of Virginia professor of environmental sciences and biology. "This increase in ozone completely overcomes the reductions in ozone realized from automobile pollution control legislation."

Lerdaу and his former graduate student, lead author Jonathan Hickman - now a postdoctoral fellow at Columbia University - used field studies at three sites in Georgia to determine the gas production of kudzu. They then worked with Shiliang Wu and Loretta Mickley, atmospheric scientists at Harvard University, who used atmospheric chemistry computer models to evaluate the potential 50-year effect of kudzu invasion on regional air quality.

"Essentially what we found is that this biological invasion has the capacity to degrade air quality, and in all likelihood over time lead to increases in [air pollution](#), increases in health problems caused by that air pollution, and decreases in agricultural productivity," Lerdaу said.

"This is yet another compelling reason to begin seriously combating this biological invasion. What was once considered a nuisance, and primarily of concern to ecologists and farmers, is now proving to be a potentially serious health threat."

Ozone acts as an irritant to the eyes, nose and throat, and can damage the lungs, sometimes causing asthma or worsening asthma symptoms. It also is a mutagen and can cause lung cancer.

[Ozone](#), while essential to the health of the Earth in the upper atmosphere where it shields the surface from excess ultraviolet radiation, is hazardous to human health when it forms at the earth's surface. This occurs most often in the summertime as plants grow and produce chemicals that react with the air.

Introduced to the United States in the late 19th century, kudzu, with its unique nitrogen-fixing physiology, allows a rapid, nearly uninhibited rate of growth, about three times the rate of trees and other vegetation. The vine was cultivated more extensively in the 1920s and 1930s as a control for soil erosion and rapidly became known as "the vine that ate the South."

In recent, milder winters, Kudzu has expanded its range northward into Pennsylvania and New York.

"What was once a Southern problem is now becoming an East Coast issue," Lerdaun said.

Various strategies are used for controlling and eradicating kudzu, including livestock grazing, burning, mowing and herbicides.

Provided by University of Virginia

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