

New study in US and Europe shows how invasive plant species fare better than natives

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LSU ecologist James Cronin and colleague Laura Meyerson from the University of Rhode Island conducted an ambitious large-scale study on the native and invasive species of reed, *Phragmites australis*, in North America and Europe funded by the National Science Foundation. They found that the intensity of plant invasions by non-native species can vary considerably with changes in latitude.

"When looking at a continental scale invasion in particular, we can't assume that the invasion is uniform across the region because of latitudinal differences in species interactions like herbivore pressure and

resistance to herbivory," said Meyerson, URI associate professor of habitat restoration ecology. "Some biogeographic regions may be more susceptible to invasions while others are more resistant.

Therefore it is important to look at invasions at a macro scale, such as for an entire continent, in order to accurately interpret the invasion process and the strength of its impacts.

"Our continental-scale biogeographic perspective allowed us to have some insights into the heterogeneity of invasions that are not possible for smaller scale studies," she said.

The research was published this month in the journal *Ecology*.

In their study of native and non-native sub-species of *P. australis* on both continents, they also found that herbivores feed upon the native *Phragmites* in North America at a much greater rate than on the invasive *Phragmites*.

"Our native *Phragmites* in North America is getting hammered by both native and introduced insects, whereas the invasive *Phragmites* in North America suffers far less herbivory than it does in its native Europe," she said. "That's partly because when invasives are introduced to a new place, they leave their enemies behind and can devote their resources to greater growth."

To determine whether differences occurred in resistance to herbivory, Meyerson and Cronin surveyed 13 patches of native *Phragmites* and 17 patches of non-native *Phragmites* along the East Coast from Canada to Florida. They conducted similar surveys of 21 patches of *Phragmites* in Europe from Norway to southern Portugal. (The native European species and the invasive non-native species in North America are the same lineage.)

At each site, Meyerson and Cronin measured plant biomass and defenses against herbivores and quantified the damage caused by galling, chewing, and sucking insects such as aphids to measure the effects of herbivory on Phragmites fitness. They found that chewing and galling insects consumed a greater quantity of the native and non-native plants in the southern part of North America, while aphids were more prevalent at higher latitudes.

"Interactions between herbivores and native plants were much stronger than interactions between herbivores and invasive plants at lower latitudes, making the southern region more susceptible to [invasive species](#)," said Cronin, LSU Department of Biological Sciences professor. "This means that the [invasive plants](#) suffer less herbivory at lower latitudes than the native plants, giving the invasive Phragmites a greater opportunity to invade. The pattern weakens at [higher latitudes](#) suggesting that herbivores may be more important in limiting invasion success in the north."

Based on their results, Meyerson and Cronin believe that efforts to identify an insect that could be used as an agent of biocontrol for the invasive Phragmites may do more damage to the native [species](#) than to the invasive variety.

"Because we found that all of the insects perform better on the native than on the invasive type, it suggests to us that if a biocontrol is released in North America, it's going to harm the native Phragmites more than the invasive," they said. "Our data suggests that it would be ill- advised to release a biocontrol agent against Phragmites."

Provided by Louisiana State University

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