

Alien Invasion

The South is vulnerable to the devastation caused by non-native plants.

By Maridith Walker Geuder

Sailing into the port of Mobile in the early 1920s, cargo ships from around the world sometimes carried a seemingly innocuous guest: a grass native to Southeast Asia that often was used as a packing material. Once on land, the plant took root and thrived in the rich Alabama alluvial soil, and it began a relentless, steady move northward.

Subsequently promoted as an ornamental by unsuspecting nursery owners, cogongrass today is considered one of Mississippi's 10 worst invasive plant species and one of the seven "worst weeds" in the world. It infests more than 1.2 billion acres worldwide.

Unless scientists identify a way to stop cogongrass, its destructive march in the South only will get worse, promising in its wake a host of environmental and economic problems.

If folks think the now-omnipresent kudzu—a Japan native—is a nuisance, they haven't seen anything yet, says John Byrd, MSU Extension weed specialist.

Cogongrass is right behind kudzu and privet in its reach and spread, and it presents an environmental nightmare. "We can't control cogongrass," Byrd says simply. "We can

temporarily suppress it using chemicals, but my concern is that we don't have economical, selective control tactics for a wide variety of invasion sites."

Byrd and colleagues in biological sciences, wildlife and fisheries, and MSU's GeoResources Institute are seeking ways to predict and minimize the spread of cogongrass and other invasive plant species. Their work is funded by a variety of state and federal agencies, including the Mississippi Department of Agriculture and Commerce, the state Department of Environmental Quality, the National Aeronautics and Space Administration, the U.S. Geological Survey, the Mississippi Department of Transportation, and the U.S. Department of Agriculture.

Coping with Cogongrass

In Mississippi, the invasion is cause for concern. Cogongrass crowds out native vegetation, is inhospitable as a forage plant for animals, and drives away ground-nesting species such as bobwhite quail and turkey. Until it became listed as a Mississippi noxious weed in 2003, cogongrass was sold as an ornamental under the names Japanese bloodgrass or Red Baron bloodgrass. Only too late did homeowners discover that it overwhelms surrounding vegetation.

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Bob Ratliff

Fast-spreading Kudzu is one of the oldest and most widespread invasive plants in Mississippi.

WINTER

Blooming in the spring with a distinct white, fluffy seed head, cogongrass in 1979 was found in only 19 of Mississippi's 82 counties. By 2004, it had spread into 53 counties. Based on moisture, temperatures, and other conditions, scientists predict cogongrass has the potential to cover the entire eastern United States to Chicago, Byrd said.

"It is a hardy plant and tolerates drought," Byrd explained. Cogongrass spreads much like Bermuda grass—by extending its dense root system, or rhizomes. It produces 80-90 plants per square foot, and the rhizomes can inadvertently be spread through topsoil moved from one place to another.

Byrd, who has tracked and studied the weed for years, said he's discovered it can't be controlled by mechanical means such as mowing. "For the past five seasons, we've mowed it back to the ground weekly, and we still have 30 plants per square foot," he said.

Currently, he's also looking at the impact commercial fertilizers have on the weed's spread, and with MSU professor Jeanne Jones of wildlife and fisheries, is beginning a study to gauge the impact of "cropping." "We're looking at whether we can use a crop like corn to attract wildlife and shade cogongrass to impede its growth," Byrd explained.

The Top 10 Troubles

Cogongrass is only one of a host of plants native to other areas that have been introduced into the South with devastating results. "The top 10 weeds in the world occur in Mississippi," said John Madsen, research professor with the MSU GeoResources Institute and a former research biologist with the U.S. Army Corps of Engineers.

The institute, which includes units specializing in remote sensing, water resources, geospatial technologies, and visualization analysis, has a focus on research applications in natural resources. It is headed by weed scientist David R. Shaw, a Giles Distinguished Professor at MSU.

To address current natural resource issues, the GeoResources Institute has pulled together nearly 100 MSU faculty members from 22 academic departments.

"We have funding from a number of federal sources, including NASA and USDA," Shaw explained. A \$1 million grant from the U.S. Geological Survey is supporting research that is developing new methods for early detection and rapid response to emerging invasive species, as well as evaluating the potential for future encroachments.

For Mississippi, the issues are significant, Madsen explains. "Every habitat in the state has invasive plants," he said. "They are changing the face and the ecology of Mississippi."

To illustrate his point, Madsen poses a hypothetical scenario: "Imagine losing Ross Barnett Reservoir near Jackson," he said. "Imagine the impact on water supply, industry, recreation, and potential flooding."

One of the state's current invasives—water hyacinth—is in that 33,000-acre body of water, and while the threat isn't yet extreme, there is cause for concern. "We're currently looking at some management practices that could minimize the impact," Madsen said.

The state's top 10 invasive weeds contain some perhaps familiar faces:



- Alligatorweed, which first appeared in the United States around 1890, now occupies large areas of wetlands in south Mississippi. It grows as a mat of interwoven plants.

- Chinese privet, first introduced as an ornamental shrub in the 1850s, crowds out native plants and is a particular threat to hardwoods. It is found throughout the South in dense stands of shrubs that can reach 10-20 feet.

- Chinese tallow tree, imported to South Carolina in the 1700s from its native Eastern Asia. It reproduces so easily and spreads so quickly that it has become a major problem in wetlands from Texas to Florida. Several states are considering banning the tree.

- Cogongrass, which arrived accidentally in the early 1900s.

- Japanese honeysuckle, first introduced to Long Island, N.Y., in 1862, is now common to the South, where it crowds out native vegetation and can stunt or kill native trees.

- Johnsongrass, native to the Mediterranean, was imported in the early 1800s as a forage plant. It is a significant weed problem in row crops, can limit visibility on highways, and under certain growing conditions can cause cyanide poisoning in animals.

- Kudzu, a native of Asia, was first showcased as an ornamental plant at the Philadelphia Centennial Exposition in 1876. Growing more than a foot a day during the summer, the vine has caused more than \$100 million in damages.

- Purple loosestrife, introduced from Eurasia in the 1800s as an ornamental, now covers nearly 4 million wetland acres nationally. It is just reaching Mississippi.

- Tropical sodaapple, introduced in 1988 in Florida, from its native South America. Within seven years of arriving, it invaded more than 1 million acres and is a serious threat for vegetable growers, livestock producers and land managers.

- Water hyacinth, native to the Amazon Basin, was imported in the 1880s as an ornamental. While it has beautiful flowers, it now is considered the world's worst aquatic weed, displacing native plants, fish and wildlife and blocking water intakes at hydroelectric power-generating dams.



Russ Houston

Seeking Solutions

One issue in solving the economic and ecological burdens of out-of-control invasives is that currently there is no comprehensive national approach to address the problem.

"There are a variety of state, agency and federal laws—including the Federal Noxious Weed Act—but not a coordinated approach," Shaw noted. "A number of different agencies at the state and federal level are putting a lot of resources into invasive species."

At Mississippi State, the GeoResources Institute is increasing its research efforts to help solve the problem. "Remote sensing provides the technologies both to detect where invasive varieties are occurring and to develop decision support systems—to decide where to put resources to look for invasives," Shaw said.

Using space-based platforms and infrared technologies, remote sensing offers the opportunity to analyze an area as small as a few square miles or one as large as a hundred square miles, the research team says.

"We can extract features to get a digital map and detect a patch of invasives the size of a room, perhaps before it can be seen by the human eye," Madsen said.

Armed with early detection of what currently exists and where potential invasion zones might occur, Mississippi State hopes to be part of a holistic approach to addressing the challenges posed by invasive species.

"Drawing on the resources the GeoResources Institute has put together, we want to expand our understanding of where we might have problems, predict the extent of them and suggest the



Marco Nicovich

John Byrd and students under his direction study cogongrass infestation statewide.

best management approach," Shaw said.

"Remote sensing is giving us techniques that can be incorporated by state and federal agencies and laying the groundwork for interagency cooperation," he said.

What You Can Do

Even as Mississippi State research is applied to an ever-expanding problem, research scientists say individuals can take action to help stop the invasion.

Their top advice: don't plant the top 10 weeds. As attractive as they may be, their long-term impact is devastating. You can help by incorporating only nursery-raised native plants into your landscape plans. For landowners, scientists suggest removing the noxious vegetation, perhaps in consultation with an Extension specialist.

With non-native species causing up to \$137 billion in damage annually, resisting an alien invasion is in everyone's best interest.