

ENVIRONMENTAL QUALITY



The environment touches us in many ways: trees in yards, crops in fields, lakes and streams, and so on. Conserving those resources — growing and nurturing them — while also supporting their use by people are goals of The Ohio State University. Ohio State works on what Teddy Roosevelt called “the great central task of leaving this land even a better land for our descendants than it is for us;” and Ohio State specialists share what they learn with the citizens, industries and institutions of Ohio.

COMPOSTABLE FOOD CONTAINERS ARE EARTH- AND BUSINESS-FRIENDLY

Giant miscanthus — a grass that grows as tall as LeBron James can jump — is a new crop for farmers in northeastern Ohio, a new raw material for biobased product manufacturers, and a focus of development by Ohio State.

Farmers in Ashtabula County, about 70 miles east of Cleveland, started growing giant miscanthus in 2011. There are now about 4,000 acres of the crop in the county. The harvest from the crop goes to two new Ashtabula County manufacturing facilities run by Conneaut-based Aloterra Energy. One of them uses giant miscanthus fiber to make compostable food containers. The other uses it to produce biodegradable absorbents for soaking up fluid spills, such as oil.

Aloterra’s success, which has been catalyzed by the U.S. Department of Agriculture’s Biomass Crop Assistance Program, has opened the eyes of farmers and landowners about the long-term

possibilities for giant miscanthus, according to Ohio State University Extension. As part of OSU Extension’s efforts to advance the crop, educators led a tour this past winter of farmers’ plantings and Aloterra’s facilities, partly to interest potential new growers. Ohio Agricultural Research and Development Center

David Marrison with miscanthus



scientists, for their part, are studying the best ways to grow giant miscanthus in test plantings at the Ashtabula Agricultural Research Station and OSU South Centers in Piketon.

In all, Ohio State’s work supports a crop that’s green in more ways than one. Giant miscanthus grows well on marginal land, which could help farmers grow their income. It’s a perennial plant, which could save time, fuel and labor for planting. It also goes to make marketable, biodegradable products. Aloterra officials say the company now employs 50 people — 50 new jobs made possible by giant miscanthus.

More: go.osu.edu/GrowingMiscanthus

SUPPORTING FISH AND WILDLIFE, AND \$3.6 BILLION IN RECREATION

Invasive species — species that start to spread wildly in an area where they aren’t native — have a “dramatic effect

on our natural resources, human health and economy,” the U.S. Fish and Wildlife Service says. The nonprofit National Wildlife Federation estimates invasive species’ impact on ecosystems and the U.S. economy at billions of dollars each year. In Ohio, these invaders include, to name a few, Asian carp, emerald ash borer, round goby fish, Palmer amaranth, and zebra and quagga mussels.

OARDC scientists recently studied a previously unreported aspect of such invasions: How do non-native species, such as the round goby, affect the native fish and wildlife that eat them, such as Lake Erie watersnakes or smallmouth bass? They reviewed more than 100 studies on predator-prey interactions. They found that predator populations rose by as much as 57 percent after an invasion of new prey — but only when the predators’ traditional native prey remained abundant, too.

As it turns out, eating non-native prey isn’t as good for predators as eating native prey, the scientists say. This might be because the new prey isn’t nutritious; it’s basically junk food. Or the predator might not have evolved the ability to eat it or digest it well. But in all the studies, whenever a predator’s diet was restricted to non-native prey, the predator didn’t perform as well as it did on a diet of native prey.

The scientists say they hope their new findings will help environmental agencies



identify where invasive species will have the greatest impact. A result will be more targeted, more cost-effective efforts to control the invaders, support native species and protect habitat.

A better understanding of invasive species will protect economic assets, too. In northwestern Ohio alone, bird-watching generates more than \$26 million a year in economic activity, according to a study by Ohio Sea Grant. Some 1.3 million Ohioans go fishing and spend nearly \$2 billion a year in the process, according to the American Sportfishing Association. In all, a study by the U.S. Fish and Wildlife Service says wildlife-related recreation has an economic impact on Ohio’s economy of \$3.6 billion.

More: go.osu.edu/BestPreyforWildlife

TRANSFORMING WASTE PRODUCTS INTO BIOFUEL

When a city treats its wastewater, dealing with the sludge left behind — treating, sanitizing, hauling and disposing of it — can account for up to 50 percent of a wastewater treatment facility’s operating costs. Now, instead of landfilling or otherwise wasting the sludge, many of those facilities are making biogas from it. The biogas is used to generate electricity or is turned into vehicle fuel. OARDC scientists are developing ways to make that process more efficient.

Specifically, the scientists studied a pretreatment step for the sludge: controlled-flow hydrodynamic cavitation. Their findings so far suggest this step can help break down the sludge even further and boost the production of biogas. Hydrodynamic cavitation involves passing a flowing material — in this case, sewage sludge — through a constriction at high pressures. Tiny gas- or vapor-filled cavities form in the sludge, then collapse, causing chemical and physical changes in the sludge. The changes expose even more of the sludge to anaerobic digestion.

The scientists are working on the research with Cleveland-based Arisdyn Systems Inc., which makes hydrodynamic cavitation devices based on several U.S. patents. Helping, too, are municipal wastewater

treatment plants in Lima, Wooster and Rocky River, a Cleveland suburb. Together, the team hopes to provide cities with a way to make their wastewater treatment more efficient, take pressure off landfills and produce even more eco-friendly biofuel.



WHERE HAVE ALL THE BOBWHITES GONE? REPORTING THE STATUS OF BIRDS IN OHIO

Some of America’s best-loved birds, such as the eastern meadowlark and northern bobwhite, are a lot less common anymore, their numbers having fallen by an average of 70 percent in the past 40 years. As part of efforts to understand and reverse the decline, OARDC-funded scientists helped gather and publish current, detailed, long-term data specifically on the status of Ohio’s own birds.

The result of their work is a highly praised book called *The Second Atlas of Breeding Birds in Ohio*. Written for a wide range of readers — from birdwatchers to scientists — it shows the abundance, breeding locations and trends over time of more than 100 species. Key help in compiling data for the book came from 1,000 citizen scientists who submitted more than 1 million breeding-bird records from 2006 to 2011. The data collected for the atlas offers a wealth of opportunities for biologists and land managers to explore the complex relationships between species distribution and land use. OARDC scientists are already using it to study the influence of climate change on bird distributions and to assess the possible impacts on bird species from large-scale energy development.

More: go.osu.edu/StateOfOurBirds