

A LEADER IN AGBIOSCIENCE

2016 ANNUAL REPORT



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

As a leader in agbioscience, the **Ohio Agricultural Research and Development Center** is making a difference in the world. In this report, OARDC focuses on four primary areas of concern to Ohioans.

Food Security

In 2014, one in six Ohio households was food insecure. Globally, authorities estimate 11 percent of the world population — nearly 800 million people — are malnourished, and they foresee mass unrest unless farmers find a way to produce 60 percent more food by 2050. OARDC faculty are tackling the issue from multiple angles by focusing on maximizing efficiencies in food production, examining how to keep food safe, and taking the lead on reducing the billions of pounds of food wasted annually.

Environment

OARDC 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.” OARDC does this by sharing its research with the citizens, industries and institutions of Ohio. The work OARDC does to keep water safe for drinking, recreation and wildlife, leads the list.

Human Health

Americans spend \$3 trillion annually on health care. But a healthy lifestyle — and an environment that promotes healthy living — can significantly reduce the illnesses and frailties that eventually require medical care. OARDC researchers are providing insights into novel ways to fight new threats such as Zika virus as well as the age-old menace of cancer.

Pest Management

With agriculture as Ohio’s No. 1 industry, helping farmers, growers and producers stay efficient and productive is important to Ohio’s economy and the achievement of food security. Stopping pests — diseases, insects or weeds — is one way OARDC scientists are continually working to help Ohio farmers increase yields and profitability while producing safe, healthy foods and food products.

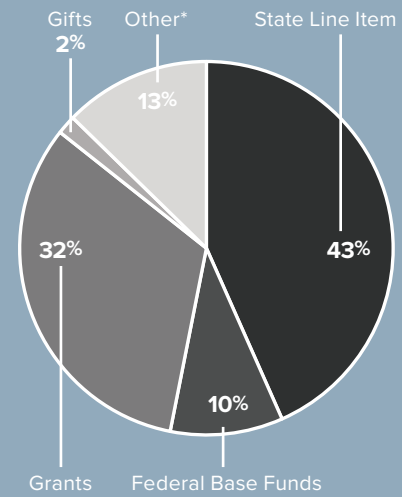
Columbus ★



Fiscal Year 2016 FINANCIAL DATA

OARDC Funding

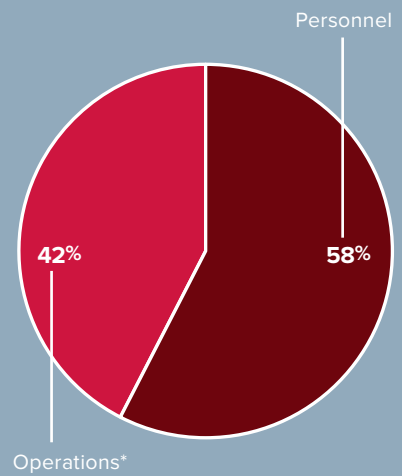
| | | |
|------------------------------|--------------------------|-------------|
| State Line Item | \$36.9M. | 43% |
| Federal Base Funds | \$8.3M. | 10% |
| Grants. | \$27.7M. | 32% |
| Gifts | \$1.4M. | 2% |
| Other* | \$10.8M. | 13% |
| TOTAL. | \$85.1M | 100% |



*Grant F&A, contracts, fees, sales, sponsorships, etc.

OARDC Spending

| | | |
|--------------------------|--------------------------|-------------|
| Personnel | \$49.9M. | 58% |
| Operations*. | \$36.8M. | 42% |
| TOTAL** | \$86.7M | 100% |



*Research operations including OARDC in Wooster; many other key food, agricultural and natural resources research facilities across Ohio; equipment and supplies, etc.

**Total expenses greater than income due to use of prior year revenue.





FOOD WASTE

The estimated 80 billion pounds of food Americans throw out every year is not only wasteful, it is also the most destructive waste in terms of greenhouse gas emissions. An OARDC study shed light on why Americans waste so much food. Its authors are helping to develop a new app to help consumers **better track household food waste.**

More: go.osu.edu/foodwaste



FOOD SAFETY TESTS

Food can now be checked for authenticity and adulteration in **less than a minute**, instead of days, thanks to work at Ohio State. Handheld spectrometers and small scanners now allow officials to react immediately to food safety issues.

More: go.osu.edu/infrared

◀ Luis Rodriguez -Saona
Professor



◀ Eric England
Assistant Professor

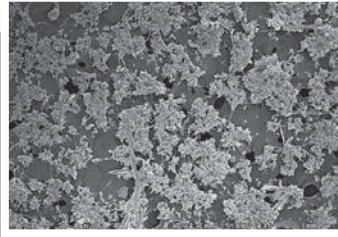
PORK QUALITY

Ohio State researchers are working to understand the genetic and biochemical mechanisms responsible for **improved meat quality** from Berkshire pigs. Ultimately, they hope to use the information gained from their studies to improve quality of all commercial pig breeds. Doing so would strengthen the Ohio pork industry, which generates **\$542.7 million in revenue** and provides **8,700 jobs.**

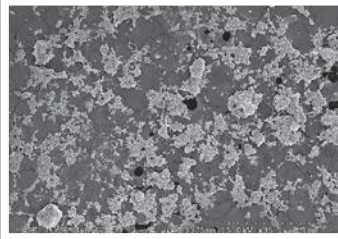


SAFE FISH

Collected in a 2013 study, Lake Erie fish did **not** contain dangerous levels of microcystin from algal blooms, but OARDC-funded scientists recommend that both **fish and water should be tested during blooms** to establish a better understanding of the levels and their risks.



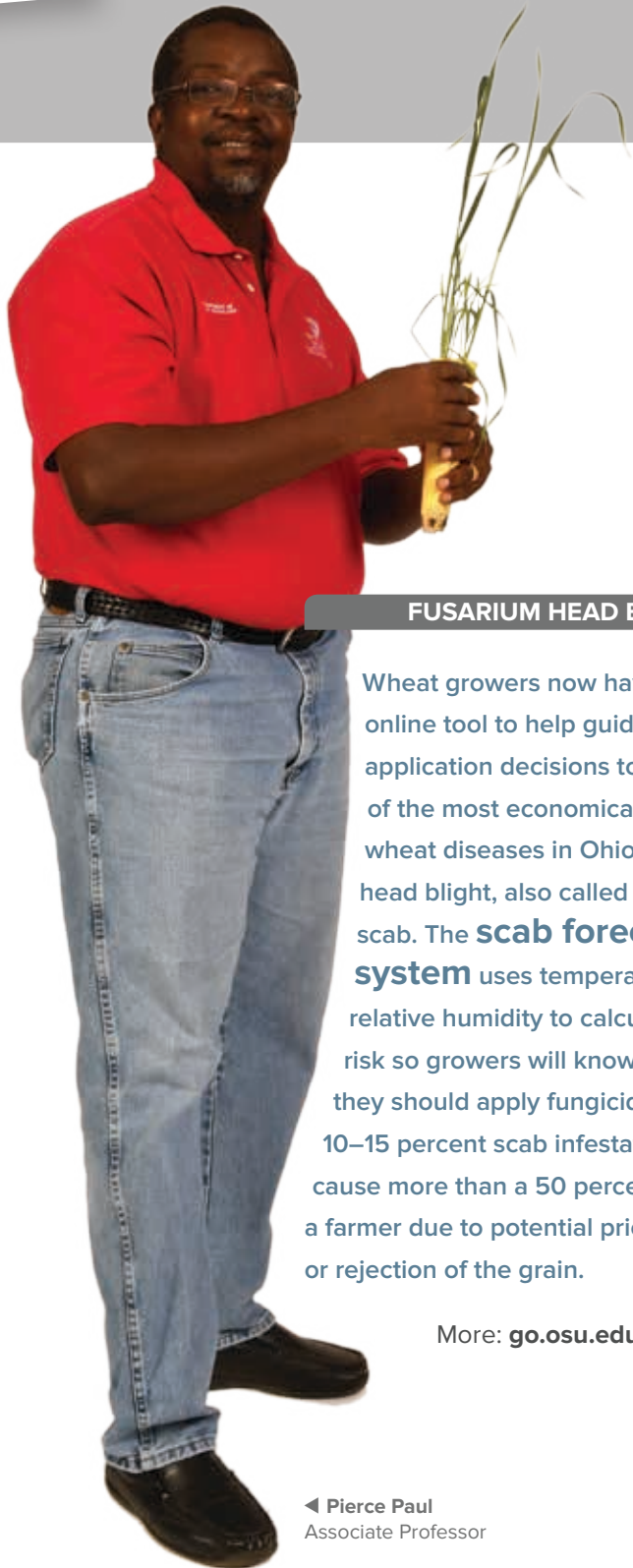
Uncavitated



Cavitated

WASTE TO FUEL

Turning sludge — what's left over after a city treats its wastewater — into biogas is now more efficient, thanks to work supported by OARDC. A sludge pretreatment step, called controlled-flow hydrodynamic cavitation, helps break down the sludge and **boosts biogas production**. The biogas is then used to make electricity or vehicle fuel.

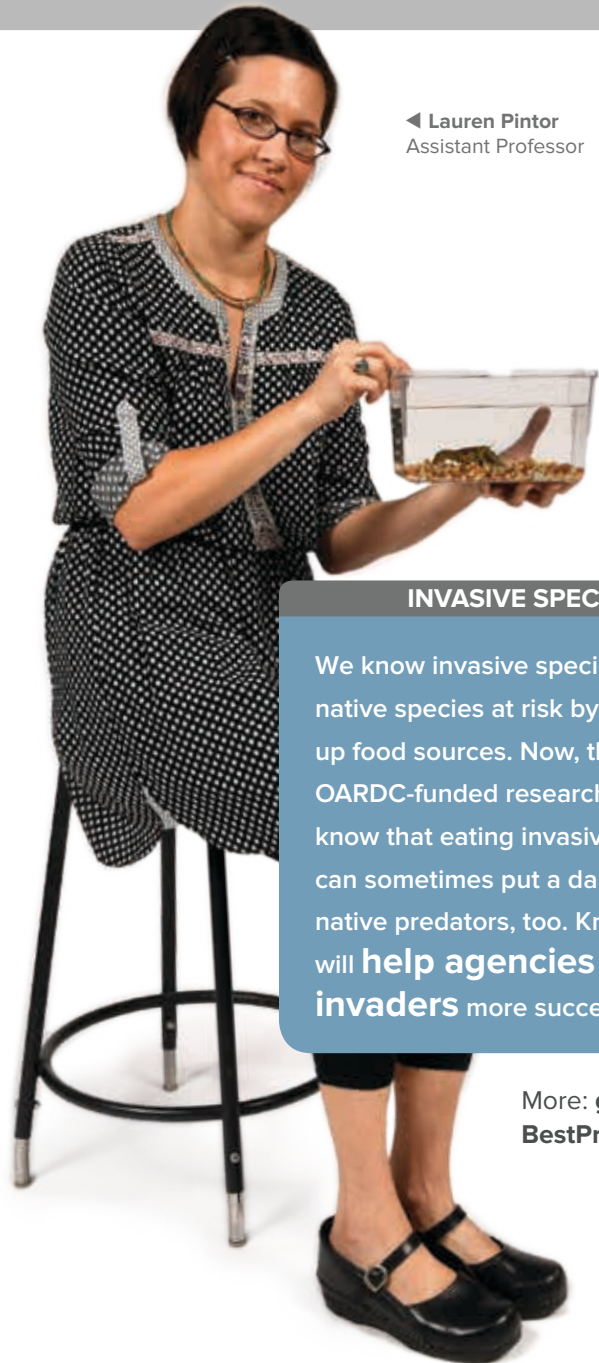


FUSARIUM HEAD BLIGHT

Wheat growers now have an online tool to help guide fungicide application decisions to combat one of the most economically important wheat diseases in Ohio: Fusarium head blight, also called head scab. The **scab forecasting system** uses temperature and relative humidity to calculate scab risk so growers will know whether they should apply fungicide. Just a 10–15 percent scab infestation can cause more than a 50 percent loss to a farmer due to potential pricing down or rejection of the grain.

More: go.osu.edu/scabtool

◀ **Pierce Paul**
Associate Professor



◀ **Lauren Pintor**
Assistant Professor

INVASIVE SPECIES

We know invasive species can put native species at risk by gobbling up food sources. Now, thanks to OARDC-funded research, we also know that eating invasive species can sometimes put a damper on native predators, too. Knowing this will **help agencies control invaders** more successfully.

More: go.osu.edu/BestPreyforWildlife



Today RICE,
tomorrow WHEAT.



▼ Emilie Regnier
Associate Professor

GIANT RAGWEED

Just one giant ragweed plant per 110-square-foot area can cut soybean yields by 50 percent, and in corn, two plants per 110-square-foot area can cut yields by 13 percent. However, researchers have now discovered the circumstances that make the fast-growing, fast-spreading, increasingly herbicide-resistant weed thrive and can now **recommend practices to help farmers stop it.**

WORLD HUNGER

Ending rice blast, which eats into the global crop at a rate of 10–30 percent, would go a long way toward **reducing world hunger.** Ohio State plant pathologists are breaking the genetic code of the fungus to understand how it undermines natural defense mechanisms in rice plants, and are applying findings to wheat, another global staple and a vital Ohio crop.

More: go.osu.edu/wang_lab and go.osu.edu/mitchell_lab

◀ Guo-Liang Wang
Professor

MOSQUITO CONTROL

Mosquitoes that transmit dengue, malaria and Zika virus are developing resistance to traditional insecticides.

Now, Ohio State entomologists believe they've uncovered a **new biological weapon** in this fight: Make mosquitoes unable to pee. They have identified a chemical that interferes with mosquitoes' "kidney" function, leading to a shorter lifespan.

More: go.osu.edu/mosquitoes



◀ Peter Piermarini
Associate Professor



CANCER-FIGHTING FOODS

In the **fight against cancer**, OARDC researchers were able to monitor the metabolites in black raspberry cells and then compile a list of the compounds effective against cancer, in order of importance. These compounds halted cancer cell division and even caused cancer cell death in some cases.

More: go.osu.edu/BjCZ

◀ Joseph Scheerens
Professor



▼ Libby Dayton
Research Scientist, with Research Associates,
Greg Peters (left) and Peter McDonough (right)

CLEAN WATER

Agricultural soil phosphorus levels held steady or trended downward in at least 80 percent of Ohio counties from 1993 through 2015, which is a step forward in the state's fight to keep water clean. Ohio State researchers are working to revise the Ohio Phosphorus Risk Index to add more management options to reduce runoff risk.

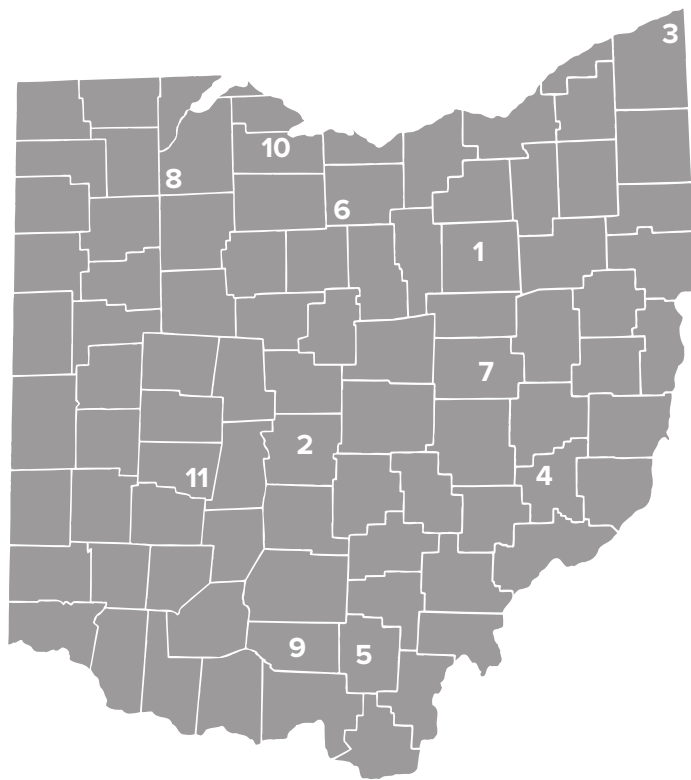


OARDC Locations in Ohio

1. Wooster
2. Columbus

Outlying Agricultural Research Stations

3. Ashtabula
4. Eastern
5. Jackson
6. Muck Crops
7. North Appalachian Experimental Watershed and Pomerene Lab
8. Northwest
9. OSU South Centers
10. North Central
11. Western



COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

The Ohio State University College of Food, Agricultural, and Environmental Sciences is a large, diverse college supporting 10 academic units, the Ohio Agricultural Research and Development Center, Ohio State University Extension, and two-year degree programs offered by the Agricultural Technical Institute. The college has campuses in Columbus and Wooster, and has a presence in all 88 Ohio counties. It serves as the home for 354 faculty members, 1,441 staff members, and 4,150 undergraduate and graduate students.

OARDC Administration

Charles Goebel, Interim Associate Dean for Research and Graduate Education, The Ohio State University College of Food, Agricultural, and Environmental Sciences

David A. Benfield, Associate Vice President for Agricultural Administration and Director of the Wooster Campus, The Ohio State University College of Food, Agricultural, and Environmental Sciences

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[youtube.com/user/oardc](https://www.youtube.com/user/oardc)
[facebook.com/osuoardc](https://www.facebook.com/osuoardc)
twitter.com/foodagenvnews

cfaes.osu.edu/impacts
oardc.osu.edu

Jerry Bigham served as Interim Associate Dean for Research and Graduate Education until December 31, 2016.

The Ohio State University is an Affirmative Action/Equal Opportunity Institution. For more information: go.osu.edu/cfaesdiversity.



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