

HUNGER AND FOOD SECURITY



Hunger statistics never fail to alarm. In 2014, one in seven U.S. households was food insecure, and Ohio was even worse at one in six households. Families with children are hardest hit. 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. Faculty at The Ohio State University tackle 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.

PLANTING WITH PRECISION TO MAXIMIZE CROP YIELDS

Planting is the most critical operation of crop farming. Improperly placing seed or working a poor seedbed could cut a crop's yield potential by half.

But what if a farmer could plant just the right seed at the right rate on each patch of ground to maximize yields?

In farm fields, particularly those in central and southern Ohio, soil type can vary significantly within a matter of 50 feet. Multihybrid planters allow farmers to simultaneously plant different seeds at different rates to produce the highest yields or generate the

highest returns for their operations. In 2016, Ohio State researchers tested prescription planting protocols on approximately 600 acres across central Ohio.

On some fields, especially in northwest Ohio where soil tends to be more uniform, high-speed planters may be more beneficial. By speeding up planting by 40 to 60 percent, crops can be planted when weather narrows the planting window, as it did in spring 2016. Researchers work to help farmers determine the right equipment for their operation, whether it's high-speed, variable-rate, multihybrid or some combination of each method.

More: go.osu.edu/brutuscornfield



SAVING TONS OF FOOD WASTE

Many people don't know where their next meal will come from, yet about one-third of the world's food is wasted. In the United States, consumers throw out an estimated 80 billion pounds of food annually. Yet only half are aware that food waste is a problem, and some mistakenly perceive that pitching food can be beneficial.

In a major study, Ohio State researchers found that 68 percent of Americans believe discarding food after the package date has passed reduces the chance of foodborne illness, although experts disagree. Only 58 percent understand food waste is bad

Multihybrid planter



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
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for the environment, but it is the most destructive type of household waste in terms of greenhouse gas emissions.

The researchers followed up their study by holding a regional conference and national webinar, bringing together authorities interested in reducing food waste. Also, with Louisiana State University, they are developing a smartphone app to better track household food waste and help consumers make changes.

More: go.osu.edu/foodwaste



BETTER TASTING PORK BRINGS HIGHER PROFITS

Ohio State animal science researchers are working to improve pork quality by investigating the underlying mechanisms that control the formation of meat quality attributes in Berkshire pigs. These animals are widely considered a superior breed for producing high-quality meat. However, because the breed produces small litters, the research goal is to understand the genetic and biochemical mechanisms responsible for improved meat quality from Berkshire pigs. Ultimately, the researchers hope to use the information gained from their studies to improve quality of all commercial pig herds.

The researchers aim to help Ohio pork producers meet the increasing demand for naturally tender, juicy, all-natural pork from global and domestic consumers. This is a significant goal for pork producers statewide, considering the Ohio pork industry generates \$542.7 million in revenue and provides 8,700 jobs. Additionally, Ohio exports \$71 million in pork, resulting in 1,700 export jobs.

Ohio State's research is expected to strengthen the position of Ohio pork and provide stability in this sector of the food industry.

FIGHTING FUNGUS THAT RAVAGES RICE, WHEAT

Rice is a staple for about half of the world's population, including many people who face dire poverty and hunger. Yet, a fungal disease, rice blast, results in the loss of 10 to 30 percent of the global crop, costing an estimated \$5 billion to \$6 billion annually. A related disease, wheat blast, has caused severe losses in South America, and is a potential threat to wheat production in the United States. Few other plant pathogens have such an impact on nutrition, livelihood, culture and economic well-being.

Developing resistant varieties is the most economically and environmentally sound approach to combat this disease, but the fungus overcomes new resistance traits relatively rapidly. What's needed is a complete understanding of how this fungus destroys rice plants.

Ohio State plant pathologists are cracking the genetic code to understand precisely how the fungus undermines a natural defense mechanism in rice plants. Ohio State's findings are now being used in rice breeding programs; and working with Kansas State University, scientists are inserting the rice plant defense gene into wheat to determine if its protective effect transfers to this other staple crop, an important Ohio commodity.

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



Guo-Liang Wang with rice



Luis Rodriguez-Saona with handheld spectrometer

IMPROVING FOOD TESTING FOR CONSUMER SAFETY

Food adulteration and counterfeiting cost the food production industry an estimated \$10 billion to \$15 billion a year and sometimes pose safety risks. In 2008, baby formula tainted with the chemical melamine killed six infants in China and made 300,000 babies sick. Since then, the authenticity of olive oil, honey and other foods has been questioned.

But lab tests, whether they're checks of imported foods at the dock or production-line quality testing at U.S. facilities, can be time-intensive and costly, undermining efforts to conduct widespread tests of imports or to allow processors to make swift quality control adjustments when needed.

Today, an Ohio State researcher is using portable infrared scanners to conduct tests on-site and on various foods with almost instantaneous results.

The process seems deceptively simple: A small sample of the product is scanned with a handheld spectrometer or with a scanner. Thanks to approaches the researcher has developed, chemical attributes can be analyzed in less than a minute. This measurement could eliminate the need for lab tests that traditionally take hours or days to complete.

More: go.osu.edu/infrared