



MICHIGAN STATE
UNIVERSITY
EXTENSION

Outcomes for Michigan's Future

Reducing Preventable Economic Losses in Agriculture and Natural Resources

In Brief

Today's Successes

- In 2003, about 40 percent of the state's soybean crop was treated for soybean aphid using MSUE recommendations, **preventing more than \$55 million in losses.**
- MSUE has partnered with the Michigan Department of Agriculture and the Michigan Department of Community Health in providing educational programming on West Nile virus. Educational efforts were a significant reason for the **dramatic drop in WNV incidence in 2003.**
- MAES scientists determined that wood from emerald ash borer-infested ash trees could safely be used to make products such as flooring, kitchen cabinetry, paneling and benches. Moving some of the hundreds of millions of infested ash trees to higher value uses **will add to the economy and create jobs** in communities where emerald ash borer is prevalent.

Tomorrow's Results

- **MSUE will teach 500 producers how to protect their crops and livestock and to recognize signs and indicators of terrorism threats** during 25 educational programs across the state in 2005.
- MSUE veterinarians have led educational campaigns on emerging infectious diseases and foreign animal disease and agroterrorism threats to the animal industry. **Veterinarians throughout the state have been linked through e-mail for rapid dissemination of information.**
- The MAES and MSUE will be prepared to address any outbreak of disease in animal agriculture, such as foot-and-mouth disease or mad cow disease, that may threaten **Michigan's \$1.4 billion livestock industry.**
- MSUE will provide education relating to existing threats to Michigan agriculture, such as *Phytophthora capsici*, a water mold. In Michigan, *Phytophthora* affects more than 80,000 acres of vegetables - including 37,500 acres of cucumbers — **worth nearly \$134 million.**

Michigan's Priorities in Agrosecurity and Protection Against Preventable Loss

Reducing agricultural losses due to natural disasters: This vital sector of the Michigan economy is constantly at risk of suffering severe, unanticipated losses from biological and environmental threats. These include natural disasters such as drought, flooding and frost; diseases such as bovine tuberculosis (TB), Asian soybean rust and ramorum blight, also known as sudden oak death; and outbreaks of insect pests such as soybean aphid and emerald ash borer (EAB). These threats can increase input costs (reseeding, fuel and fertilizer) or cause dramatic market losses due to falling crop or livestock prices. It's essential that the state be prepared to address threats to the viability of the agricultural economy.

Preventing economic losses due to bioterrorism: Security and terrorism experts consider our agricultural system to be among our country's most vulnerable targets, whether a terrorist's goal is to instill fear, damage the economy, or directly affect human lives and health. Many threats to agriculture are often impossible to anticipate.

MSU Capacity:

- **Reach:** The MAES and MSUE conduct research and deliver information quickly and efficiently to a wide range of agricultural audiences. Research conducted on the MSU campus and at 15 field stations across the state is disseminated to farmers, business operators and individuals by MSUE offices serving every Michigan county.
- **Experience:** The MAES and MSUE have well-established track records of helping Michigan's agricultural industry remain economically viable. From research efforts aimed at helping farmers protect crops to diagnosing disease and responding to disaster, MSU research and Extension programs have long provided farmers answers in times of need.
- **Expertise:** The MAES and MSUE draw on the wealth of knowledge across the university, including the MSU-U.S. Department of Energy Plant Research Laboratory on the MSU campus, MSU Plant Diagnostic Services and the Diagnostic Center for Population and Animal Health (DCPAH).
- **Track record:** The seamless movement of information from the laboratory to the classroom and the field means the difference between profit and loss time and time again.
- **"Feet on the street":** MAES scientists conduct research not only on the MSU campus but at field stations around the state that allow them to study plant and animal responses under the same weather, soil and seasonal conditions that Michigan producers face. MSUE educators transfer this knowledge through a network reaching every Michigan county.
- **Trust:** In a 2002 national survey, agricultural and horticultural producers were asked, "To whom would you turn if you discovered a crop disease outbreak on your farm that you didn't recognize?" Eighty percent stated that Extension would be their first contact.
- **Content:** MSUE educational programs are set apart from other informational sources by their foundation in MAES-generated research. Researchers rigorously adhere to the scientific method, and their work faces strenuous peer review before it is considered for dissemination or publication.

Sampler of Success:

The best defense against potential disaster is preparation through research and education. The MAES and MSUE have effectively responded to many threats to the agricultural economy in recent years. Just a few recent examples of results include:

- MSUE has partnered with the MDA, the Michigan Department of Natural Resources and the U.S. Department of Agriculture to educate producers, veterinarians and the public about bovine TB. **MAES research improved a laboratory technique for isolating the TB-causing bacteria** on a farm, which makes it possible to assess whether *M. bovis* still exists there after livestock are removed.
- During spring 2004 much of the state experienced excessive rain and flooding that caused serious problems including crop loss, delayed planting and potential nitrogen loss. The MSUE Field Crop team quickly deployed educational resources to aid producers in dealing with the severe conditions. These included community meetings and a special issue of the Field Crop Advisory Team Alert.
- Soybean aphid was first confirmed in Michigan in 2000. In 2001, infestations caused yield losses of up to 40 percent. In 2003, about 40 percent of the state's crop was treated for soybean aphid according to MSUE recommendations, **preventing more than \$55 million in losses**. MAES research will likely lead to new soybean varieties with improved resistance to soybean aphid.
- The emerald ash borer (EAB) has infested and killed an estimated 10 million Michigan ash trees since it was discovered in 2002. MAES scientists determined that infested ash wood could safely be used to make products such as flooring, kitchen cabinetry, paneling and benches. Moving even some of the hundreds of millions of infested ash trees to highvalue uses will add to the economy and create jobs in communities where EAB is prevalent.
- MSU, the MDA and the state's largest veterinarian organization have come together to form the Michigan Emergency Veterinary Network, or "Vet Net," as part of Michigan's homeland security efforts in animal health and protection. Led by an MAES scientist and MSUE specialist, Michigan's Vet Net is **geared toward the state's nearly 3,600 licensed veterinarians** and aimed at improving awareness, preparedness and response to animal disease-related emergencies.

Outcomes for Michigan's Future:

Agricultural production and food processing make up Michigan's second largest industry annually contribute more than \$40 billion to the state's economy and employ 500,000 individuals. MAES and MSUE conduct studies and educational programs to help farmers, agribusiness owners, processors and others address potential and current threats to agriculture and related Michigan industries.

Both the MAES and MSUE draw on the university's expertise in disciplines ranging from crop and soil sciences and animal sciences to entomology and agricultural economics. Maintaining the needed capacity at Michigan State University will allow scientists and educators to address these threats, including natural disasters, pest outbreaks and economic challenges. This capacity includes:

- A critical mass of faculty and staff members with cutting-edge expertise.
- Facilities and equipment needed to address new threats rapidly.
- Rapid plant diagnosis through MSU Plant Diagnostic Services.
- Animal disease diagnosis and examination through the MSU Diagnostic Center for Population and Animal Health.
- An effective network of MSUE educators to facilitate the rapid transfer of knowledge and information to and from the agricultural community.
- Preservation of flexible resources to address disasters as they occur.

Our MAES research initiatives over the next year will include:

- Considering risk analysis and management tools for agricultural industries.
- Utilizing plant biotechnology tools to increase environment stress tolerance of Michigan plant commodities.
- Identifying Michigan's food and environmental safety and biosecurity needs.
- Developing genetic plant improvements to minimize the impact of biotic and abiotic stresses.

Reducing Preventable Economic Losses in Agriculture

- Testing integrated pest management and treatment options for Michigan agronomic enterprises.
- Studying the control and management of disease in livestock.
- Identifying weed management options for agronomic crops.
- Determining and managing the impact of climatic stresses on Michigan fruits, vegetable, field, nursery and floral crops.
- Identifying methods to enhance preharvest food safety.
- Developing improved treatment and prevention of infectious diseases of livestock, companion animals and humans.
- Considering options in increased soil-borne plant pathogen control.

MSUE has networks and people in place to address potential threats proactively. Some examples include:

- **In 2005, MSUE will teach 500 producers how to protect their crops and livestock and to recognize signs and indicators of terrorism threats** during 25 educational programs.
- The MAES and MSUE will be prepared to address any outbreak of disease in animal agriculture, such as foot-and-mouth disease or mad cow disease, that may threaten **Michigan's \$1.4 billion livestock industry**.
- MSUE will provide education relating to existing threats to Michigan agriculture, such as *Phytophthora capsici*, a water mold. In Michigan, *Phytophthora capsici* affects more than 80,000 acres of vegetables — including 37,500 acres of cucumbers — **worth nearly \$134 million**. Water mold also infects tomatoes, peppers, eggplant and, most recently, snap beans. Together, these crops account for another 27,000 acres worth at least \$48 million per year.
- In 2002, **West Nile virus (WNV)** was confirmed in birds found in 73 Michigan counties and in 341 horses in 45 counties. **There were 644 human cases and 51 human deaths attributed to the virus**. MSUE has partnered with MDA and Michigan Department of Community Health in providing educational programming on West Nile virus. Educational efforts were a significant reason for the dramatic drop in WNV incidence in 2003, when infected birds were found in 33

counties, confirmed equine cases were reduced to 10 and **human cases were reduced to 19**. Continued educational efforts will be directed at maintaining the vigilance necessary to control this important animal and human health threat.

- MSUE specialists are providing education and training on identifying and controlling **Asian soybean rust**, training that will reach all Michigan soybean growers. Keeping this pathogen out of Michigan is imperative for **the state's \$4 million soybean industry**. Asian soybean rust has devastated the South American soybean industry and was discovered in the southern United States in late 2004.

Spotlight on Success

"We can get an opinion from a salesman that's producing a product to take care of a disease problem, but we've always turned to MSU for their unbiased opinion about whether it's economical. I'm looking to MSU for my guidance and direction as to how I handle the potential soybean rust problem."

John Spero, Saginaw County crop farmer

MSU is an affirmative-action, equal-opportunity institution.

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