

Michigan Alliance for Animal Agriculture

2016 Legislative Summary



- Developing research, outreach and educational programs.
- Ensuring and improving food safety.
- Protecting the environment.
- Improving workforce development.

MESSAGE FROM M-AAA LEADERSHIP

The Michigan Alliance for Animal Agriculture (M-AAA) has made significant strides since its formation in 2014.

In fact, this year M-AAA will more than double its investment in research and outreach funding on behalf of the state's animal agriculture industry. The grant program started at \$600,000 per year; in 2017, the commitment has grown to nearly \$1.5 million.

This sizeable increase will undoubtedly equate to greater impact on the industry. Research and outreach funded through this program continue to address such major challenges as antimicrobial resistance, animal welfare and emerging infectious diseases.

It's a privilege to be involved in this relatively new initiative, which is unearthing innovative ways to secure funding for an often overlooked area of external grant funding. In fact, the animal agriculture industry receives less than 1 percent of all external federal grant funding. That's pretty alarming, especially when you consider this industry provides the primary sources of protein consumed in America.

M-AAA was modeled after Project GREEN (Generating Research and Extension to meet Economic and Environmental Needs). GREEN was founded almost 20 years ago in cooperation with plant-based agricultural commodity groups and with support from the state of Michigan. It has since become the model for several other research initiatives, including one recently at the federal level.

MSU AgBioResearch and MSU Extension have formed solid

partnerships with the animal agriculture commodity groups in Michigan. We've found ways to work together to address the critical needs facing the industry in timely fashion through M-AAA.

These rapid response systems have allowed farmers to be better equipped to face biological, environmental, social, political, economic, regulatory and operational challenges.

We look forward to growing M-AAA by developing research and educational programs in response to industry needs, ensuring and improving food safety, and protecting and preserving the quality of the environment.

I'll leave you with one last statistic to think about: for every \$1 invested in research and outreach, \$10 is returned in economic impact.

That fact comes from the U.S. Department of Agriculture Economic Services and certainly goes a long way in explaining the need for continued support of agriculture research, especially as the world faces the need to feed more than 9 billion people by 2050.

George W. Smith

Associate Director, MSU AgBioResearch

Associate Dean for Research,

MSU College of Agriculture and Natural Resources



GEORGE SMITH

LEADERSHIP TEAM

Ernie Birchmeier

Michigan Farm Bureau

Sam Hines

Michigan Pork Producers Association

Maury Kaercher

Michigan Sheep Breeders Association

Leesa Massman

Michigan Horse Industry

Dru Montri

Michigan Meat Association

Ken Nobis

Michigan Milk Producers Association

George Smith

Michigan State University

George Quackenbush

Michigan Cattlemen's Association

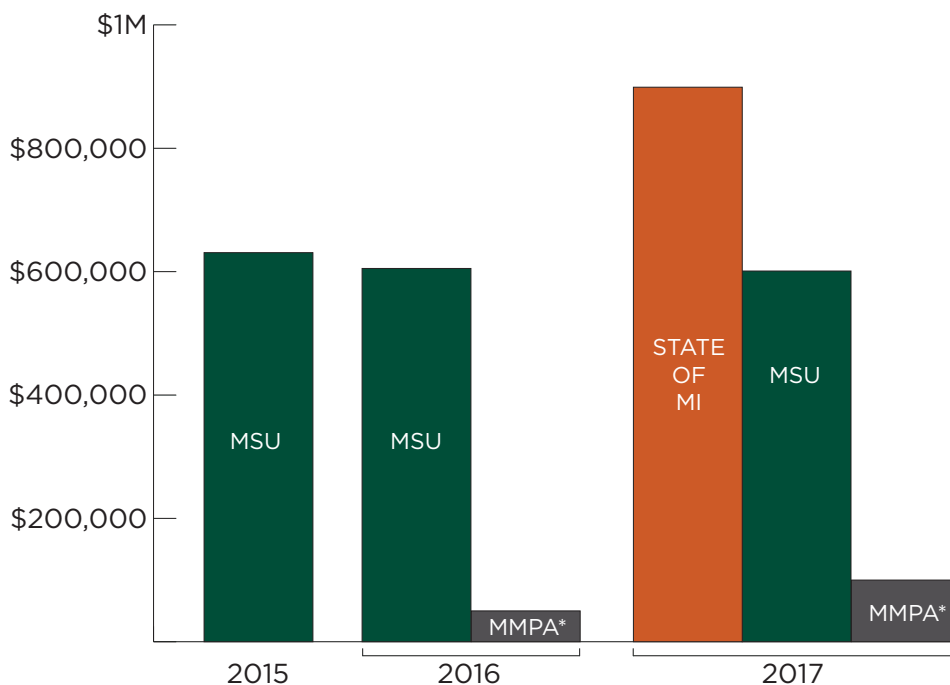
Allison Brink

Michigan Allied Poultry Industry

Ron Bates

MSU Extension

Each year since 2015, funding for the Michigan Alliance for Animal Agriculture has increased. In 2017, nearly \$1.5 million is committed to research for Michigan's animal agriculture industry.



*MMPA = Michigan Milk Producers Association

COMPLETED PROJECT SUMMARIES

Milk yield and milk component responses to commercially-available fat supplements for dairy cows: Does the fatty acid profile matter?

Adam Lock

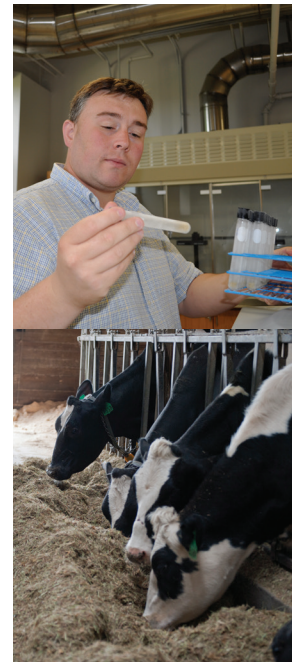
In Michigan, the yield of milk fat and protein are the major contributors to the price that producers receive for milk. The addition of supplemental fat sources to diets is a common practice in dairy nutrition to support milk production.

Although there is a wide range of commercially available supplemental fat sources for lactating cows, unfortunately there is a lack of data available for commercial nutritionists and dairy farmers to reference that directly compares different fat supplements to one another.

The objective was to determine the effects of three commercially available fat supplements on the yield of milk and milk components and feed efficiency. Researchers observed that a diet supplemented with a palmitic acid (C16:0)-enriched fat increased the yield of milk fat and protein and 3.5 percent fat-corrected milk, while a diet supplemented with a fat containing a mixture of palmitic and oleic (C18:1) acids increased body weight gain.

Based on current Michigan milk prices, feeding a palmitic acid-supplemented diet would increase gross income by 81 cents/cow/day. After accounting for price of the supplement, this would translate to an increase in income of over \$75,000/year on a 500 cow dairy.

The results have immediate impact on dairy industry recommendations and will positively influence dairy cattle production efficiency and farm income.



Distribution Patterns, Resource Use, Welfare and Productin of Four Strains of Laying Hens Housed in Commercial-Style Aviaries

Janice Siegford

The long-term sustainability of the laying hen industry requires scientific data to determine if current aviary resource-provision is optimal and having the desired impact on hen well-being. Alternatively, resource over-crowding might require current resources to have increased availability or be presented in a different manner.

This research project compared daily distributions and resource use of four strains of laying hens housed in aviaries at the MSU Laying Hen Facility. Researchers focused on the period of peak production

when resource demand was at its greatest. Results indicate that white and brown strains of hens behave differently, and there is a high degree of individual variation in how areas of the aviaries (perches, litter and nest boxes) are used.

Furthermore, white versus brown strains differ in number of eggs laid on the floor.

Additional M-AAA funding was received in 2016 to expand this project to collect data on the same flock of laying hens in the middle and end of the laying cycle.

This project focuses on the welfare and behavior of individual hens, as well as examining the impact of age on distribution and resource use. Funding for 2017 has been secured to further expand the project.



Mitigation of Lameness and Tail Injuries in Indoor Confined Slatted Floor Feedlots

Daniel Grooms

Mitigating health issues in feedlot cattle is an important animal welfare issue and has the potential to increase productivity. The project objective was to determine the utility of rubber flooring systems to reduce cattle lameness and improve productivity in indoor, confined slatted floor feedlots.

Researchers observed no differences in indices of animal welfare or performance for cattle housed on rubber flooring systems versus conventional floors.

Therefore, the incorporation of rubber flooring systems in Michigan indoor, confinement slatted floor feedlots may not be a wise investment for producers and should be carefully evaluated.



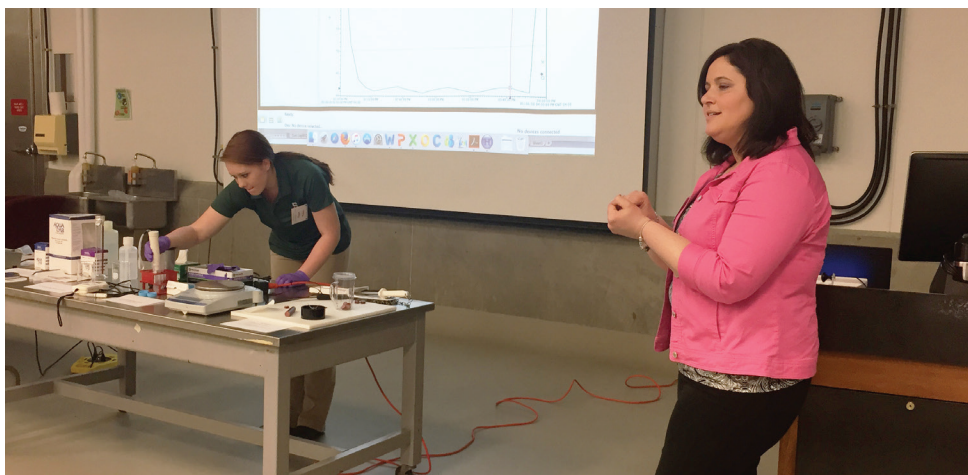
Resources for Meat Processors Implementing the Specialized Retail Meat Processing Variance

Jeannine Schweihofer

This project created online resources (online course, educational materials) and in-person trainings for meat processors and a regulatory agency (MDARD) that are implementing a Specialized Retail Meat Processing Variance.

Two in-person workshops for 30 meat processors and regulatory personnel (East Lansing and Gaylord) have been held to educate participants on requirements for implementing their Variance. These workshops also showcased equipment (i.e. data loggers, thermometer calibration equipment, pH and water activity meters) that may assist processors in implementing their Variance.

Questions from the workshops and in-person visits to meat processing facilities with a Variance will assist in creation of online



course for meat processors and regulatory personnel. Online course and educational materials are useful for meat processors, employees and inspection personnel on following the Variance. The online course will assist meat processors in training their employees on the Variance, the importance of it, and how to follow it.

Overall, researchers anticipate improved compliance with the Variance for meat processors will result from this project.

2017 FUNDED PROJECTS

- **Janice Siegford**, associate professor of animal behavior and animal welfare – *Impacts of extended pullet housing on production, behavior and welfare; Can laying hens adapt to aviaries if they have already begun to lay in a pullet housing facility?*
- **James Pursley**, professor of reproductive management of dairy cattle – *Impact of body condition loss during early lactation on embryonic survival following first and subsequent artificial insemination services.*
- **Robert Tempelman**, professor of statistical genetics and animal breeding – *Use of mid-infrared spectral data to improve milk nutritional value, reproduction and health outcomes in Michigan dairy cattle.*
- **Juan Steibel**, associate professor of animal breeding, statistical genetics and molecular genetics, and **Janice Siegford**, associate professor of animal behavior and animal welfare – *Automating detection of social behavior phenotypes and improving modeling of indirect genetic effects to breed swine for less aggression in group housing.*
- **Michael Allen**, distinguished professor of dairy cattle nutrition – *Modulating metabolic stress in early postpartum period through dietary strategies; Hepatic metabolism of propionate in relation to the control of feeding behavior of dairy cows in postpartum period.*
- **Paul Bartlett**, professor of large animal clinical sciences, and **Steven Rust**, professor of beef cattle nutrition and management – *Use of real-time chute-side differential blood counts to reduce mass antimicrobial treatments of feedlot cattle.*
- **Michael Vandehaar**, professor of dairy nutrition and metabolism – *Increasing the profitability and efficiency of protein use of lactating dairy cows; Feed intake prediction system to identify inefficient cows on commercial farms.*
- **Adam Lock**, professor of dairy cattle nutrition – *How does long-term feeding of palmitic acid to post-peak dairy cows impact milk production, body weight gain, lipolysis and inflammation?; Does the interaction between supplemental amino acids and fatty acids alter nutrient efficiency and the yield of milk components of dairy cows?*
- **Brian Nielsen**, professor of equine exercise physiology – *Quantifying weekly exercise necessary for equine skeletal strength.*
- **Jeannine Schweihofer**, meat quality Extension educator and adjunct assistant professor of animal science – *Developing a pilot workforce training program for meat cutters.*
- **Christine Skelly**, associate professor of animal science and adult equine Extension specialist – *Developing a model to revise MSU Extension online curriculum to meet MSU accessibility standards.*
- **Stanley Moore**, senior Extension dairy educator – *Monitoring cow performance during milking to evaluate and improve worker training, cow udder health and milk quality.*
- **Ronald Erskine**, professor of large animal clinic sciences – *Herd-specific employee education and training for milk protocols.*
- **Catherine Ernst**, professor of molecular genetics – *Transcriptional profiling and investigation of RNA editing in peripheral blood mononuclear cells of swine after mixing into new social groups.*
- **Ming Yang**, assistant professor of animal science – *Regulation of estradiol production and primordial follicle formation by microRNAs in bovine fetal ovaries.*

A SILENT ANIMAL SICKNESS: BOVINE LEUKEMIA VIRUS



Phil Durst, an MSU Extension senior educator, leads a bovine leukemia virus project funded by M-AAA.

For many years, the U.S. dairy industry has primarily focused its attention on a few costly diseases, including mastitis (an infection of the udder), bovine viral diarrhea and lameness. But that lens is slowly shifting to a lesser-known virus that is a likely contributor to many other cattle illnesses. Researchers, including a team at Michigan State University (MSU), are looking at bovine leukemia virus (BLV) – a retrovirus that causes infection in dairy and beef cattle, and can lead to many other diseases.

In the 1970s, less than 10 percent of U.S. dairy cows were affected by the virus. Today, MSU experts estimate that more than 40 percent are BLV-positive. Surveys by the U.S. Department of Agriculture (USDA) suggest that 83 percent of dairy herds in the country have at least one BLV-infected cow.

Experts say the large escalation in occurrence is primarily because not much attention has been paid to the virus. About 5 percent of BLV cases result in a cancerous tumor known as lymphoma. Tumors can appear in numerous places from easily visible lymph nodes in the neck to ones hidden inside organs. In fact, the USDA reports that BLV-induced lymphoma is the chief reason for U.S. cattle condemnation at slaughter, accounting for nearly 14 percent of beef and 27 percent of dairy cattle rejections.

While the tumors are relatively rare, about 30 percent of BLV infections result in persistent lymphocytosis — a very high number of blood lymphocytes that are associated with immune system dysfunction.

A complicating factor in controlling BLV is that transmission from one cow to another is possible in many ways. Infected white blood cells can appear in several bodily fluids, such as blood, semen and colostrum, meaning that some routine on-farm practices can lead to new infections. The most common sources of transmission include reusing hypodermic needles and obstetrical sleeves, as well as dehorning, tattooing, ingesting contaminated colostrum and milk by calves and fly bites. Researchers are further testing whether blood exchange during breeding leads to infection.

With any retrovirus such as BLV, there is the potential for spread across multiple species. Current research suggests that BLV is not a health threat to humans, but studies are ongoing. More than 20 countries in Europe, Asia and Africa have eradicated the illness through testing and culling positive animals. The size of the U.S. cattle herd, coupled with the pervasiveness of BLV, makes that method largely unrealistic. In most instances, producers wanting to address BLV in the U.S. must consider management strategies to reduce transmission. As researchers

learn more about BLV, the urgency behind solving the problem heightens. Since 2010, MSU has received nearly \$2.5 million to study BLV, which includes funding from the Michigan Alliance for Animal Agriculture (M-AAA) to assist outreach efforts to producers.

Research Findings

Using M-AAA funding in 2016, MSU's Paul Coussens showed that BLV-infected cows displayed a reduced responsiveness to immunization for other diseases. Additionally, MSU's Phil Durst, Ronald Erskine, Daniel Grooms, Paul Bartlett and Bo Norby engaged in an extension project led by Durst aimed at controlling the spread of BLV in Michigan. The group tested 38 herds from Michigan and Ohio, finding that 35 were BLV-positive. The average prevalence of the disease in each herd was 41 percent.

"The greater purpose of the project was to help dairy producers identify the disease and develop a plan," Durst said. "Our team visited each producer to discuss the steps that could be taken to reduce further transmission."

Producers most commonly cited the need to change needles and sleeves for each animal as ways to mitigate the spread of BLV. The team will test the herds again in 2017 and 2018 to monitor the prevalence, which will inform researchers on the best ways to manage BLV moving forward.

For more, visit blv.msu.edu.

ECONOMIC IMPACT OF RESEARCH

“Michigan State University research has led to knowledge and practices the industry uses to efficiently produce high-quality beef. Research is vital to the success of the beef industry as we strive to meet the changing expectations of consumers now and in the future.”

- George Quackenbush
Executive Vice President,
Michigan Cattlemen's Association



**\$1 Research Investment
=
\$10 Economic Return**

Source: USDA Economic Services



THANK YOU, INDUSTRY PARTNERS!

Research through the Michigan Alliance for Animal Agriculture would not be possible without the support of the animal agriculture industry. This partnership is critical to making advancements that allow the industry to grow and flourish.

- Michigan Allied Poultry Industry
- Michigan Cattlemen's Association
- Michigan Farm Bureau
- Michigan Horse Industry
- Michigan Meat Association
- Michigan Milk Producers Association
- Michigan Pork Producers Association
- Michigan Sheep Breeders Association
- MSU AgBioResearch
- MSU College of Agriculture and Natural Resources
- MSU College of Veterinary Medicine
- MSU Extension