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On the cover: New MPPA board member Zack Snider with his wife, Priscilla, and son, Sawyer.

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By: Emily Schmitt

MPPA PROGRAM DIRECTOR

Meet New Board Member: Zack Snider

The Michigan Pork Producers Association would like to welcome one of its newest board members, Zack Snider. Zack is the operations manager of Snider Farms, a multi-generational farm raising turkeys, hogs, corn and soybeans, that he owns with his father, Andy.

Zack's great-grandfather started dairy farming in Ohio in the 1940's.

"My grandpa moved the farm to Hart, Michigan in 1976, and they started raising hogs shortly after that" Zack said. "In the early 90's, we started raising turkeys as a contract grower. We are a member of the Michigan Turkey Producers and market 250,000 turkeys per year. We have a 600-sow hog farm and sell weaner hogs but are currently transitioning into genetic multiplication. We are in the process of remodeling and hope to be finished in January. We also have 3,000 acres and raise mainly corn and soybeans, but have a little bit of wheat. We are on the beautiful west side of Michigan on fruit and vegetable ground. We are the goofy people that do livestock, corn and beans."

Pictured above, new MPPA board member Zack Snider, his wife Priscilla and their son, Sawyer, outside the Sinder Farms office.

Zack has always known he wanted to come back to work on the farm. He attended Michigan State University to earn a degree in Agribusiness Management.

"I raised hogs in 4-H for as many years as I could," he said. "I just knew that I wanted to come back. During college, I came home and helped on weekends. I married my wife, Priscilla, in college. We had a house in Hart and an apartment in Lansing for school. I wasn't back home on the farm full time until the spring of 2013."

Zack has seen many changes on the farm since he was a kid.

"We have adapted with a lot of technology," he said. "It has been more obvious on the cropping side, but we are starting to integrate that in our

Pictured above, Zack Snider's family farm, Snider Farms.

livestock operation too."

The farm employs 10 full-time staff, with Zack's family playing a major roll.

"We have a good team of people that I work with," he said. "My wife works in the office on the farm with my mom. It is nice to work so close to my family. My one-year-old son, Sawyer, comes to visit me on the farm. He is learning to gobble like a turkey right now."

Zack plans to take over the farm completely when his parents retire.

Along with serving on the MPPA board, Zack has been serving on the Michigan Allied Poultry Industries board of directors.

"I think it is important to get involved with state organizations to make sure that our side of the story is being told in agriculture," he said.

When Zack isn't busy on the farm, he enjoys spending time with family and working on his pulling truck.

President's **Page**

"Seasonal Updates"

By: Bob Dykhuis
MPPA PRESIDENT

I am writing this article in mid-September. It is the time of year to be ready for harvest and maybe enjoy a little bit of slow time. This year it is a very unsettling time. It feels almost itchy at times like before a big thunderstorm. It feels like something is going to happen, When? Where? Is it the President and trade? Is it the market prices and the crazy ups and downs of the hog market? Is it the grain markets? Is it the employee that does not show up? Or, is it African Swine Fever in China? Or Europe. It could be all of the above! And the stranger concept of all of this is that some could be good for us or bad, it depends on the order of how it happens. Crazy Times!

ASF is in China moving around the country without the ability to stop it anytime soon. Will it stay there or will it leak over to the US because of trade and people movements? Will they buy more pork from outside their country to meet their needs or will they eat less pork?

ASF is on both sides of Germany in the EU. Germany is like Iowa in the US in that they finish a lot of hogs there and export them. If they get ASF in their pig production, it will cut them out of some world trade markets. That would be good for our markets.

If we get ASF our exports are done and we need to rapidly bring production down to what we consume in our own country. We likely will have a collapse of prices followed by a slow recovery as we right size to our markets. Not good for us.

"We need to realize we are in a high-risk time in pork production...we need to protect our herds from outside disease."

So, what can we do? We need to realize we are in a high-risk time in pork production. Our markets could go up $30.00 Cwt., and they could go down $30.00 Cwt. We need to protect our herds from outside disease. Hedging is a lot more complicated.

We have NPPC and NPB that are working on planning, research and strategy to help as much as possible to keep ASF out, trade moving, and advocating on our behalf with support from USDA to act quickly when necessary. Have a great harvest time!

Trade News has Pork Producers Feeling Optimistic

News on the trade front is getting better for U.S. pork producers as the Trump administration announced it wants to negotiate trade agreements with the European Union, Japan and the United Kingdom. The National Pork Producers Council commended the administration for its ambitious trade agenda.

The administration recently updated agreements with Canada and Mexico and with South Korea that maintained the U.S. pork industry's zero-tariff access to those important markets, three of the top five destinations for U.S. pork exports.

"We've got the momentum on trade headed in the right direction now," said NPPC President Jim Heimerl, a pork producer from Johnstown, Ohio. "Producers are hurting because of retaliatory tariffs on pork, which were prompted by the administration's efforts to realign U.S. trade policy. But producers have been patient, and now that patience is starting to pay off, particularly if we get a trade deal with Japan."

Since Trump took office in January 2017, NPPC has been urging the White House to begin trade talks with countries in the fast-growing Asia-Pacific region, beginning with Japan, the U.S. pork industry's No. 1 export market. It also has called for deals with the Philippines and Vietnam.

NPPC also has been supportive of trade negotiations with the United Kingdom, provided that the U.K. is willing to eliminate all non-tariff barriers and embrace U.N. food-safety standards and other international standards.

While the trade news is good for U.S. pork producers, NPPC is continuing to press the Trump administration to resolve trade disputes with China and Mexico, including dropping tariffs on steel and aluminum imports from the latter. Both countries imposed retaliatory tariffs on U.S. pork in response to the U.S. metals duties.

By: Mary Kelpinski

MPPA CHIEF EXECUTIVE OFFICER

"The Halls of DC"

It is always an interesting opportunity to head to Washington, D. C. and share pork industries perspective with the people that we elect to run our country. On September 12, I was joined by Tim Kruitoff, Kent City; Ed Reed, Marcellus; and Afton Blight-Maksimchuk, Homer, for the National Pork Producers Council Fall Legislative Seminar.

In all about 100 pork producers and pork industry leaders from around the country gathered for the biannual fly-in that gives producers an opportunity to talk to their members of Congress about important industry issues.

We visited with every Michigan senator, representative, and/or their staff to discuss top priorities affecting the pork industry, including the need for a resolution to ongoing trade disputes, funding for a Foot-and-Mouth Disease (FMD) vaccine bank, visa reform to address a farm labor shortage and proper regulatory oversight of laboratory-produced cultured protein and gene editing in livestock production.

I'm not sure if it was a result of all our effects or not, but it was good news to read that Canada was joining the U.S. and Mexico on a new trade agreement that maintains zero-tariff access to U.S. pork. Mexico is the largest market by volume for U.S. pork and Canada is the fourth largest. I am hopeful the agreement will be ratified quickly, and full access will be granted. The modernized free trade agreement with South Korea, pork's fifth largest export market, recently was also exciting news.

"We visited with every Michigan senator, representative, and/or their staff to discuss top priorities affecting tne pork industry..."

On the FMD vaccine bank, we asked lawmakers to include in the Farm Bill now being finalized by a Senate-House conference committee funding of $250 million annually for the five years of the Farm Bill.

That would fund not only the vaccine bank but the network of laboratories that conduct disease diagnostics and block grants for states' disease prevention efforts. While this ask focuses a lot on FMD, the funding for the laboratories and block grants for disease prevention efforts would also be beneficial in the prevention and detection of other foreign animal diseases.

We urged our senators and representatives to support legislation that would expand or replace the existing H-2A seasonal visa to allow agricultural employers to hire year-round foreign workers. We are dealing with labor shortages on many Michigan farms that need employees for more than just a couple of months at a time.

Lawmakers also were asked to weigh in on giving the U.S. Department of Agriculture, rather than the Food and Drug Administration, regulatory oversight of laboratory-produced cultured protein and gene editing of livestock.

The fly-in was abbreviated because of impending weather from Hurricane Florence affecting the east coast but we were all able to make it home without delay.

We will be back walking the halls of D.C. in April and I am sure we will have another list of pork industry priorities to bring to our legislators. We are always well received, and I feel the legislators appreciate hearing from local Michigan farmers.

While attending the fall legislative seminar, MPPA board member Tim Kruithoff, MPPA CEO Mary Kelpinski, Representative Tim Walberg, MPPA board member Afton Blight, veterinary student Katie O'Brien, and MPPA board member Ed Reed met to discuss issues facing the pork industry.

28th Annual Taste of Elegance

By: Emily Schmitt

MPPA PROGRAM DIRECTOR

Corporate Executive Chef Josef Huber of the Amway Grand Plaza Hotel Restaurant in Grand Rapids Wins Taste of Elegance Competition

Corporate Executive Chef Josef Huber of the Amway Grand Plaza Hotel Restaurant in Grand Rapids won in the 28th Annual Taste of Elegance that took place on October 16, 2018 at the Michigan Restaurant Show in Novi, Mich. He received the title of Chef Par Excellence, with his dish *Vietnamese Pork Curry*. His dish was composed of pork shank and bone-in chop. In addition to the award-winning title, he also was awarded $1000 and a trip to the Midwest Pork Summit in 2019.

The Taste of Elegance is a competition sponsored by Michigan Pork Producers Association to bring together top chefs from around the state to create new dishes that showcase pork and pork products at their finest.

Above, Saffron Cafe Executive Chef Jimmy Hill puts the finishing touches on his People's Choice-winning entree., BBQ Ribs with King Solomon's Original Meat Glaze.

The event was a delectable feast not only for the taste buds but also the eyes. This year's contest was judged by Chef Eric Batten, Michigan State University, East Lansing, Mich.; Chef Brian Lorge, Executive Director of Michigan Chefs de Cuisine Association and Conrad Knape, Board Trustee for the Michigan Restaurant Association. Each table also had a guest judge, drawn from the attendees, who couldn't resist joining in on the fun and the food!

With dishes like *Barbeque Ribs with King Solomon's Original Meat Glaze*, from Jimmy Hill of the Saffron Café, Coldwater, and *Pork Belly Confit*, from Robert Shipman Jr. of The English Inn, Eaton Rapids, the judges had their work cut out for them and went home full.

Chef Kane Stricker from the Black Walnut Restaurant in Saugatuck came out in second with his *Primitive Modern* dish. To prepare his entrée, he used old school preparation methods with a modern presentation. In addition to the title Superior Chef, he also was awarded $500.

In third place, receiving the title of Premium Chef was the Executive Chef Lisa Green, owner of the Canal Street Café in Augusta, MI. Her dish, *Deconstructed Pork Tamale with Roasted Poblano Cream*, consisted of pork shank and polenta cake with poblano cream.

The audience also was an active participant in the contest as they selected the winner of the People's Choice award. Each dish, in its final form was set out for the public to see and vote on the dish that looked the most appealing. This year the audience chose Jimmy Hill of Saffron Café in Coldwater, with his *Barbeque Ribs with King Solomon's Original Meat Glaze* to bestow the honor.

Above, MPPA Vice President Pat Albright, Chef Robert Shipman Jr., Chef Jimmy Hill, Chef Josef Huber, Chef Lisa Green, Chef Kane Stricker,Michigan Restaurant Association President/CEO Justin Winslow and MPPA Program Director Emily Schmitt gather for a photo after the awards ceremony for the Taste of Elegance Competition. At right, the second-place pork entree, Kane Sticker's Primitive Modern dish. Below, Chef Josef Huber plates his entree, Vietnamese Pork Curry. At right below, judges Chef Eric Batten, Conrad Knape, Chef Brian Lorge and a guest judge from the audience prepare to taste the first entree.

The dangers of manure gas and strategies for mitigation

Fall is here and harvest season is upon us. With that in mind, many farms will be spreading manure and pits will be agitated and emptied. Because of the still warm temperatures and high humidity, bacterial activity increases in manure, directly increasing manure gas. Manure is an excellent and readily available source of fertilizer for many farms, however, it is important to consider the danger of gas that accompany working with manure. In June of 2015, a father and son duo from Cylinder, Iowa were both killed from manure pit gas on their Iowa hog facility (Rodgers and Eller, 2015). During a routine pumping of manure from one of the hog facility pits, the son climbed down into the pit after dropping a piece of equipment and was immediately overcome by the manure gas. His father went in after him and experienced the manure gas as well. Unfortunately, neither survived. Similarly, in 2016, a Wisconsin farmer was agitating manure in an outdoor lagoon before spreading on fields and was also overcome by manure gas (Veselka, 2016).

These stories are not new news and serve to remind all of us about the importance of knowing what manure gas we need to be aware of and how we should respond in emergency situations.

What are the gases of concern and why are they dangerous?

Four gases of major importance are ammonia (NH_3), carbon dioxide (CO_2), methane (CH_4) and hydrogen sulfide (H_2S). These gases are produced by microbial activity within the manure from the microbial respiration that occurs (rather than use oxygen for respiration, bacteria utilize inorganic sources like nitrogen and sulfur).

Ammonia: sharp, pungent smell

Ammonia (NH_3) gas in high concentrations can cause eye ulcerations and severe respiratory aggravation. While NH_3 is typically not deadly, it is important to consider long-term exposure effects on respiratory health for those that are in close proximity with it on a day-to-day basis.

Just as humans can suffer respiratory effects from inhalation of NH3, other livestock are susceptible as well. In swine, at only 50 ppm, there is an expected decrease in performance and health. Additionally, long-term exposure at 300 ppm+ will cause convulsions (Donham et al., 2010).

Carbon Dioxide: displaces oxygen

Carbon dioxide (CO_2) may not appear to pose a threat like some of the other manure gases, however, it is dangerous from the perspective that it can replace the oxygen in your blood. Moderate concentrations of CO_2 can lead to shortness of breath and dizziness (National Ag Safety Database, n.d.).

As this is a by-product of livestock respiration, animals in confined spaces can also be affected by asphyxiation from CO_2 similar to people. That being said, when examining an extension article by Donham et al. (2010), it is important to note that humans can tolerate up to 260,000 ppm+ before death, while swine can only tolerate up to 200,000 ppm.

Methane: highly flammable

Methane (CH_4) is not a concern from a human respiratory standpoint. If a building with manure storage is not ventilated properly, it can cause headaches and asphyxiation. Additionally, CH_4 tends to build up in the foam that accumulates on the top of liquid manure and is highly flammable according to the Farm and Ranch extension in Safety and Health (FRESH) Community of Practice (2012). The explosive potential of CH_4 is dangerous to both people and livestock within proximity of this gas.

Hydrogen sulfide: acutely dangerous

Hydrogen sulfide (H2S) is the gas most often associated with manure related deaths on farms and is considered to be the most acutely dangerous (National Ag Safety Database, n.d.). This gas travels readily along the ground and in confined spaces, like manure storages. It causes paralysis of the nerve cells in the nose, which deadens the smell at only 100-150 ppm (United States Department of Labor, n.d.). At 700-1,000 ppm, there is rapid loss of consciousness and death can occur in minutes. Additionally, even if someone is exposed to high concentrations

of H_2S for only a short amount of time, the reaction to the gas can be delayed up to 24 hours and can include pulmonary edema (fluid build-up in the lungs) possibly leading to death. Similarly, other long-term neurological effects from H_2S exposure are possible.

Like its counterpart gases, NH_3 and CO_2, H_2S is also a danger to livestock, specifically swine, in that it only takes about 20 ppm to start seeing signs of nervousness, fear of light and loss of appetite (Donham et al., 2010). When concentrations reach 200 ppm, swine may experience pulmonary edema and death shortly thereafter.

What are some of the signs of being overcome by manure gases?

While several signs of being overcome by manure gasses have been mentioned, there are others to be on the lookout for as well. Some of these signs include feeling hot and clammy, loss of motor skills, irregular/fast heartbeat, tightness of chest, panting, nausea/vomiting and anxiety (Meinen, 2016).

How can I measure manure gases?

There are several different types of manure gas monitors that can be utilized on the farm. The monitor used depends on the farm as well as the location of the manure storage and whether it is a confined or unconfined space. It is important to consider the type of gas you may come into contact with as well as the price that works in your budget.

What are ways to prevent a dangerous situation?

Follow manufacturer recommendations of equipment

when agitating and handling manure in an enclosed pit to ensure:

- Proper ventilation.
- Fans are on and working.
- Equipment is operating correctly.

When working around or near a manure pit:

- Let someone know where you are and what you are doing. This allows a person to know right where to look if you are not back in a timely manner.
- If someone you know or even an animal/pet is overcome by manure gas, do not go in after them unless you have proper respiratory protection.
- Should you encounter a situation where someone goes down and is unconscious, immediately call 911 as first responders have the proper respiratory equipment and training to enter into these dangerous situations.
- If it is available, wear a gas monitor or have one in the manure storage area to detect manure gas concentrations that may be approaching dangerous, life-threatening levels.
- When manure is being agitated, be aware of your positioning to the pit and where the manure gases are likely to settle.
- It is also important to be cognizant of manure tankers and how easily manure gases can settle inside this type of small and confined space.
- Gases have a tendency to settle inside tankers as well as leak out the top, which can pose a threat to those who examine and clean the tankers.
- Wear personal protective equipment, like a proper fitting respiratory mask, if you go into a confined manure storage area.

By understanding the dangerous gases found in manure, knowing the warning signs of a person who is experiencing high concentrations of manure gases and implementing safe practices when working around manure, there is the potential for fewer accidents and deaths. Who knows, you just may save a life, maybe even your life.

MSU Pork Quarterly

Information for an Industry on the Move

September 2018 Vol. 23 No.3

In This Issue...

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ANIMAL AGRICULTURE INITIATIVE

This newsletter is edited by:
Dr. Madonna Benjamin, MSU Extension Swine Veterinarian, 517-614-8875, gemus@cvm.msu.edu
& Emily Schmitt MPPA, Program Director

Oh Rats…in my barn!!!!

As fall weather approaches, fine tuning your pest management approach can have positive impacts on your biosecurity and bottom line.

Beth Ferry, MSU Extension Educator
Casey Zangaro, MSU Extension Educator

As farmers, we know that raising livestock and growing crops comes with a number of challenges; some that are out of our control and things that we can control with our practices and protocols. Also as farmers, we are accustomed to doing as much as we can with as few people as possible, knowing that payroll is one of the largest costs for our operations. There are times that things fall through the cracks on farms or we just don't have time or funds to complete every little project or task we would like. Many times we focus on what saves or makes us money, meeting the pressures of a successful bottom-line. One of the areas that sometimes slips through the cracks on many farming operations is that of pest control. We know that rodents are an issue on every farm and very rarely do we make an effort to manage our pest populations to the best of our ability. The truth of the matter is, rodent problems and pest infestations can easily affect the bottom-line and trigger other issues on the farm. As winter approaches, farmsteads and barns are at greater risk to get some unexpected tenants and harbor pest populations. Rodents such as rats and mice tend to sneak their way into barns during the colder seasons and wreak havoc on barns and animals.

Rats and mice are known to cause considerable damage to the barns and indirectly to the animals that are housed inside the barns, however, the threat goes much beyond that. Rodents can cause structural damage to the fabric, cables and electrical systems in a barn. This can lead to fires, as well as insulation and wood damage. They are also destructive to animal feed and stored foods that may be present at the facility. This can increase the risk of disease outbreaks and biosecurity issues. More importantly, rodents do cause a risk to the health and hygiene of animals and people., They are vectors in which pathogens can be transferred to both farm animals and people. Rodents have been recorded to carry up to 45

diseases than can easily be transmitted to farm animals if they are in the same vicinity (Table 1, Timm 2010).

Table 1. Pig diseases spread by rodents		
Disease	**Agent**	**Host / carrier**
Bordetellosis	Bacteria	Rats
Encephalomyocarditis	Virus	Rats & mice
Leptospirosis	Bacteria	Rats & mice
Aujeszky's disease	Virus	Rats
Salmonellosis	Bacteria	Rats
Swine erysipelas	Bacteria	Rats
Toxoplasmosis	Protozoan	Various rodents
Trichinosis	Nematode	Rats

Instituting and maintaining a pest control program on your farm will go a long way in helping mitigate the risks associated with a rodent population at your facility. There are many methods of control and a robust pest control program should include a number of different physical and biological systems. Pest control should not be considered a one-step approach and time should be taken to assess your situation to determine if you are facing a routine control issue or infestation. Simple steps such as cleaning and rodent proofing the buildings should be taken prior to the employment of eradication methods. Without these steps, continued or reinfection of the site will remain an issue. The use of physical methods, such as trapping or non-toxic baits may be the only type of rodent control that is needed if you have a limited pest population. For facilities that may have an increase population or infestation of mice and rates, biological controls like rodenticides may be the best option. High-risk sites like farms should always maintain a pest control program that involves monitoring, evaluation and treatment of problems.

By employing a pest management plan at your farm, the environmental management of your site will improve. This can be done by using a 4-step approach of; increasing hygiene or cleanliness, proofing, maintenance and repair. Making these steps routine will help you avoid pest infestations, which when established, are difficult to eradicate. The overall goal of your pest management plan is to make your site or barn less attractive to rodents. This means removing places of shelter like garbage, old equipment or piled up junk and preventing access to food and water sources for rodents. Farmers can use best practices to target rodents and mitigate harm to untended animals and the environment including:

- Keep area clear of debris, old equipment, trash and junk.
- Deny access to food and water sources.
- Clear area of harborage, places where rodents may live and feel protected.
- Remove and maintain vegetation – this allows for natural predators to have better access to rodents, helping to control the population.
- Create and maintain hard surfaces around the site or barn; this will prevent rodent burrowing.
- When needed, use physical or biological methods to help reduce and control the rodent population.

Understanding Rodent Types

Many times people assume that all rodents can be treated the same and controlled with the same practices. However, specifically the behavior of mice and rats are very different and managed differently, depending on what type of pest issue you have.

Rats are generally larger in size than field/farm mice and can cause more damage. Physically, rats have smaller ears in proportion to their bodies and are known to live up to 2 to 3 years. The heads have a blunter snout and they have long hairless tails. Rats are known to have very poor eyesight, including being completely color-blind, they are typically shy and nervous animals and this results in them taking a familiar or similar route when they travel. Generally known as creatures of habit, rats stay close to walls and structural parts of the buildings and will follow the same path to and from a feed or water source. Rats easily exploit the structure weaknesses of a building, especially in the fall and winter months. Rats also require a water source to remain viable. Obvious signs of rat infestations are defects in the building structure, broken pipes, defective covers, and channels in brick work. Rats take time to approach new objects or materials and when baiting rats, it may be beneficial to use existing materials instead of introducing something new like a bait station. This will help decrease the time it takes a rat to approach and take the bait. It is also a good practice to find the

path that rats generally take, identified by droppings and to place the bait next to their typical path. Rats also tend to carry bait away and hoard it.

On the other hand, mice are smaller in size and also have poor vision, however they can distinguish all colors except for the color red. Their ears are larger and they have been recorded to live over 5 years in the wild. Mice have triangular-shaped heads with long, thin, and hairy tails. Compared to rats, mice are more inquisitive, more likely to approach new items and do not need to travel the same path. They are known to travel in zig zag patterns, not necessarily keeping next to walls. Mice exist in the "fabric" of a building, feeding and living in the same area. They are easily introduced through materials, feed and supplies that are brought into the farm. Different from rats, mice are less responsive to seasonal changes, do not need a water source, and the population typically exists year-round. When baiting mice, the proper technique is to place small amounts of bait over a large area or location, making it easier for the mice to find and eat the bait.

Signs of Rodents

There are several signs that rodents are present in your barns. Sounds, such as squeaking, are the most distinctive. Rats and mice are known to gnaw wood and wires and climb along walls. Rodent droppings will be seen around walls, behind objects and near the food supply. Rats and mice will also cause a dust-free spot where they have been traveling, preferably around the outer walls and floorboards. Along the outside of the building, burrow patterns will be seen as they are trying to get into the barn for warmth and food. Smudge marks on the pipes and rafters where the dirt and oil are rubbed off by their fur which will typically leave a greasy film also indicates rodents are inside the barn. Most likely rodents will be active outside during the day, and come into the barn during the night due to the quiet nature of the barn at night. It is important to note that rats typically follow the same path when traveling and evidence such as defecation will be seen in the same area.

Rodent Proofing the Barn

Taking the time to rodent proof your facility is an essential component to your pest management plan., This also helps maintain the integrity of your biosecurity practices and health of the barn. Having proper construction is the first line of defense. The initial construction footings should extend down around 19 inches into the ground to deter burrowing. Routine inspections and maintenance on the facility should be done to help deter rodent infestations. Usually, rodents are known to enter the barn from cracks around the door frames, under doors, broken windows or ripped curtains, water lines and utility hook-ups, vents, and holes surrounding the feed augers and bins. These areas, in particular, should be constantly looked at to decrease the risk of rodents in the barn. Installing baffles around cables and pipes and placing kick plates on the lower edge of the doors discourage rodents and help prevent gnawing. Flaps or crushed wire mesh on inlets will also help prevent rodents from entering the facility.

Going hand-in-hand with rodent proofing is maintaining the hygiene of your barn. Barns that are above average in cleanliness are less likely to attract rodents. Best practices include cleaning up feed spills quickly and disposing of spoiled or rotten feed properly, where rodents cannot access it. Removing trash and debris from the facility will also help maintain hygiene and limit exposure to rodents.

Rodent Control

Rodent control on farms and around livestock facilities should be a multi-pronged approach as there is no exact method that is 100% effective. Due to the make-up of farms and the availability of feed and materials, farm sites are high-risk areas for rodent populations. A solid rodent control plan includes the use of physical and biological methods to remove rodent populations. Physical methods, such as traps are an effective and humane way of getting rid of small populations of rodents either inside or around the perimeter of the barn. There are different types of traps that can be used for pest control. Snap traps or break-back traps are very common rodent control methods. The most effective way to lure rats or mice into these traps is to use food and leave the trap alone near a wall or door for 4 to 5 days. Glue boards are also very effective and are used in a similar way as the trap. However, the use can be severely decreased by dust being captured on the glue and not allowing the rodent to be trapped. This method also can be seen as inhumane by different groups. Sound devices, usually ultrasonic, are effective in causing rodents to leave the premises without catching them. Physical methods are best when used to help control a rodent population and to deter infestation, however, many times the effectiveness of these methods are debatable and depend on the creativity of the user.

A second method to control rodents and the best

method to use when dealing with in infestation is the use of rodenticides. Rodenticides are basically pesticides used to kill rodents, these products must be proven substantially effective by those that sell/produce them and the efficacy data for the products must be available to the user. There are two types of rodenticides, anticoagulants and non-anticoagulants, also known as 1st and 2nd generation anticoagulants. Anticoagulants are used in 90% of all rodent baits with the most popular chemicals used being bordifacoum, bromadiolone, and difethialone. The most used non-anticoagulants are bromethalin, cholecalciferol, and zinc phosphide. It is important to know that Vitamin K_1 acts as an antidote to anticoagulants. The use of rodenticides alone does not guarantee the eradication of a rodent infestation. Many times, population numbers can quickly recover if secondary methods and subsequent treatments are not applied.

Table 2. U.S. Rodenticides Commercially Available

Compound	Classification	Trade Names	Applied Form
Warfarin	1st generation anticoagulant	Various	Meal, Water
Pindone	1st generation anticoagulant	Pival™ Pivalyn™	Meal. Water
Diphacinone	1st generation anticoagulant	Ramik™ Rampage™ Tomcat™	Blocks Blocks Liquid
Cholorphacinone	2nd generation anticoagulant	Rozol™	Pellets
Brodifocoum	2nd generation anticoagulant	Havoc™ Jaguar™	Blocks and Pellets Blocks
Bromadialone	2nd generation anticoagulant	Boothill™ Hawk™	Blocks Meal and Blocks
Difethialone	2nd generation anticoagulant	Hombre™ Fast Draw™	Blocks Soft bait
Difenacoum	Non-anticoagulant CNS toxin	DiKill™	Blocks and Pellets
Bromethalin	2nd generation anticoagulant	Cy-Kil™ Rampage™ Gunslinger™	Blocks and Pellets Blocks Blocks and Pellets
Cholecalciferol	Non-anticoagulant vitamin D3	$Agrid_3$™	Blocks and Pellets
Zinc Phosphide	Non-anticoagulant phosphine toxicity	Eraze™	Pellets

Table adapted from Timm, 2010

First generation anticoagulants like Warfarin and Pindone are less toxic and less persistent in animal tissues. Using this type of rodenticide has a lower risk to human hazard and non-targeted animals. These products can take longer to control rat populations and surplus bait should be available for the rats to feed on. It is important to note that resistance to first generation anticoagulants is wide-spread in mice. Second generation anticoagulants are considerably more toxic and have a longer half-life. These products have a greater risk to non-targeted animals when ingested and require considerable less bait to be consumed by the rodents to be effective. Second generational anticoagulants are highly effective when you are dealing with a rodent infestation. (Table 2)

The active ingredients in rodenticides vary from product-to-product and can be classified in 3 different ways; acute, sub-acute and chronic. Acute rodenticides are fast acting and normally are effective within 24 hours. If a non-lethal dose of acute rodenticides is taken, rodents can have bait shyness and not consume any more of the bait. Sub-acute rodenticides cause death after several days. The lethal dose of the rodenticide may be consumed early on and feeding of this bait may continue until death. Chronic rodenticides are slow acting and cause death as early as 2-3 days or on average from 5-7 days. Understanding what ways you will be using rodenticides, preventing, control or eradication, will help you decide what product best fits your need.

Along with the variation of active ingredients and classification of rodenticides, there are different types

of bait formations. Bait products are found in the form of meals, cut or whole grain, pellets, wax blocks, edible lards/pastes/gels, contact gels or foams and gases. Particulate baits are generally more palatable to rodents when compared to wax blocks, whereas wax blocks are better in adverse conditions and areas like sewers and drainage pipes. Depending on what types of rodents you are dealing with may dictate what bait formation you choose. When baiting outside, in burrows, grains are less likely to be moved or kicked out by the rodents. Care should be taken to cover baits or secure them so that the rodents are less likely to remove them.

Pest Control Records and Monitoring

Once you have your rodent control practices in place, you will want to make sure that you are keeping accurate written records. The type of bait, placement and how much bait should be recorded. When various employees are in charge of monitoring and maintaining the bait stations, a site map of all bait locations can be helpful. Bait stations or placement should be monitored bi-weekly or more frequently if needed. Tracking the amount of bait used will help you determine if a rodent issue has arisen. Rodent infestations are determined by increased use of bait and signs of rodents., Hoarding issues can be identified by an increased use of bait but limited signs of rodent exposure. Using intact pellets or blocks can help prevent hoarding by rodents.

When completing the monitoring process of your rodent control plan, there are some steps that should be taken. Each area of bait placement should be checked regularly and include the removal of carcasses. Bait stations should be checked to verify that enough bait is in place and that it is secure so that non-target animal access is limited. Signs of rodents should be documented and indications of increased populations should result in more bait locations. Bait should be replenished as needed. When dealing with an infestation, large quantities of bait may be utilized. Once eradicated, bait locations can be decreased and limited to those needed for prevention and control only.

Pest Treatment Failures

Pest treatment failures can happen because of a number of reasons, most often because of inappropriate, poor quality or old bait. Once bait is over a year old, it should be removed because it loses its effectiveness. Treatment failures can also happen because of inadequate quantities of baits and poor bait placement. Rodents can also suffer from bait shyness. This happens when a non-lethal dose of bait is consumed, causing the rodent to stop feeding on the bait. Other reasons for treatment failure include reinvasion or resistance. Resistance occurs when bait is eaten but there is no decrease in population. In some species of rats, there has been confirmed resistance to some bait products including, Warfarin, Chlorophacinonce, Coumatetraly, Bromadiolone and Difenacoum (Buckle et al., 2010). Behavioral resistance occurs when the rodents refuse to consume the bait. This requires a change in the pest control methods. Changing the placement of the bait, providing an alternative formation or providing different bait stations can all help alter behavioral resistance.

Conclusion

In conclusion, having an increased rodent population at your facility does come with some risks. It can be detrimental to the health of animals, reduce the structural integrity of facilities and could cause human health issues. Having a pest management plan in place with routine monitoring and being alert to the signs of an increasing rodent population will help diminish these risks. Using best practices to identify, monitor and target rodent populations will help control the pest population, mitigate risks to non-targeted animals, protect human health and improve environmental management on the farm.

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Impressions from Livestock Truck Rollover Emergency

Dave Thompson and Beth Ferry, Michigan State University - Extension/Pork Working Group

Sometimes the unexpected happens, but hopefully we are well-prepared for the unexpected. Farmers are used to rolling with the punches and taking things as they come. They are experts at dealing with things out of their control like the price of hogs or Mother Nature's mood swings as they plant, grow and harvest crops. Sometimes we can be as prepared as possible, but unexpected events still take us by surprise, like on August 8th, 2018 in Jackson County, Michigan.

It was just another summer day; the Branch county fair was in full swing and I, Dave Thompson, was talking to some 4-H kids in a barn at the fair when Dr. Madonna Benjamin's text message came in around 4:00 p.m. on August 8. A livestock transportation truck carrying sows had been involved in a rollover accident south of Jackson. "There is a rollover at Moscow and Hanover Roads. Dr. Christine Kostesich is on her way. Pigs require euthanasia in the trailer and outside. She only has a shotgun or rifle. If police are there she will ask them to use a pistol. I sent a photo of euthanasia cards."

Our MSU Extension Team had recently dedicated time and efforts into preparing for events like these, developing materials and hosting trainings for law enforcement officers and first responders. It was something that we wanted to be prepared for but never wanted to happen in our area. Knowing that I could be of assistance, I drove as fast as I could and arrived as close to the scene as was allowed at about 4:45 p.m. State police and the local sheriff's department were already on hand and as expected very strict about maintaining the integrity of the accident scene. Uniformed officers, squad cars and lots of yellow tape were strung up to prevent motorists from entering the area, with traffic being redirected along a different route. I was able to speak with law officers in charge and informed them that I work for MSU Extension and had expertise in this area. I could help with rounding up animals and, if necessary, assist with humane euthanasia of pigs that might need it. They let me park on the side of the road and walk on the grass to the accident scene a quarter mile down the road.

By this time, drivers from both vehicles involved in the accident had been taken to a local hospital. Over the course of the accident, the top of the trailer hauling the pigs had been peeled back, allowing for mobile animals to leave the trailer. Activities in progress included clean-up of glass from the streets, containment of animals and search of a nearby cornfield for stray pigs. There was some luck in this unlucky situation as the area where the accident took place was a rural community and home to several farmers. The community was able to respond to the accident with at least eight state police and county sheriff officers, a dozen neighboring farmers (some with gating, sorting boards, trailers and a front end loader) and 8-10 plant workers from the Bob Evans processing plant located 8-10 miles away in Hillsdale helping at the scene. Through the quick work of many, the accident scene took on some sense of order and the work to clear the scene and care for the animals was taking place.

It was no longer a chaotic scene, but the condition of the livestock truck and a small van involved in the accident was shocking. The truck had rolled over on its right side, and was perched, partially on the northbound lane, but mostly on a yard. Most of its metal roof had peeled back or was completely off. The cab was badly smashed on its right side and much of the glass

was missing. The left side of the van was very badly damaged. It was easy to see that with the condition of the truck and trailer, some animals would need attention.

When times of need happen, farmers lend a hand as was the case in this situation. Pigs had been rounded up and were being transferred to a neer by dairy farm. Here they would be given proper medical treatment and care until they could be moved. It was unknown how many pigs were accounted for and if there were any missing animals, so I asked an officer who seemed to be in charge if all pigs were accounted for. He said he wasn't sure, and that it's possible some were still roaming about in a nearby corn field. I asked for and was granted permission to look through the corn field, after 20 minutes of exploring no signs of pigs were found. Speaking with some of the officers and neighbors, I learned that the accident had occurred at around 2:45 p.m., and that lots of folks, including neighboring farmers, had converged on the scene to help quickly.

I waited to speak with Dr. Kostesich, who was being interviewed by a newsperson at this time. Dr. Kostesich is a local veterinarian who was contacted right after the accident and was managing pig care at the scene. My impression was that she did a great job describing her role and how folks there were trying to do the right things for the animals, advocating for agriculture. When she concluded, I introduced myself and asked if there was anything I could do to help. She asked me to go with her to the nearby farm where surviving pigs were being kept and provide a second pair of eyes to decide if additional pigs required humane euthanasia. She said that approximately 24 pigs had died at the accident scene or were badly hurt and required humane euthanasia on the spot.

We went to the farm and discussed the situation with a management representative from Bob Evans (where the load of pigs was headed). The pigs were mostly huddled in the basement area of a small barn; a few were milling around outside. Local farmers and farm staff were feeding and watering the animals and giving them excellent care. We identified a total of six additional pigs that required euthanasia. An expert animal handler from Bob Evans had a captive bolt gun and performed the humane euthanasia process by the book-- spot on with what we would have recommended. After that, we counted 68 surviving pigs, which would be sent on for processing later that evening.

Dr. Kostesich concluded that her biggest takeaway was how helpful all the neighbors were throughout the entire process, which included several farmers in the area, the Bob Evans crew and the law enforcement officers. Their willingness to help and provide manpower and equipment made this chaotic situation manageable. Although I wasn't there for the critical period following this accident, my strongest impression in the aftermath was consistent with Dr. Kostesich's.

As I reflected on this event and think about how challenging this situation would have been, from an animal rescue perspective, if a rollover like this one had occurred along a major highway like I-94 or I-69. The thought of this many 400+ pound sows, frightened and many injured, roaming along a busy highway at any time of day, is alarming. The probability would be very low that a reasonable number of farmers highly skilled in animal handling, with available equipment would be able to help law enforcement officers who are usually the first emergency responders at the scene. This leads me to believe that there would have been little chance that equipment critical to managing lose animals or humanely euthanizing those badly injured in the accident would become available in a timely fashion, if at all.

Dr. Kostesich was calm, professional and very good with the animals (and the people) throughout. This was the first livestock truck rollover emergency in her career. She said she was grateful for having the opportunity to consult with Dr. Benjamin early-on in the process. She was also grateful for all the assistance provided by the professional animal handlers who rushed to the scene from the Bob Evans processing plant. The fact that the Bob Evens plant provided a fully functional captive bolt gun to use to euthanize the animals was critical. She added that, after this experience, she would campaign to get more captive bolts in the hands of first responders in her area and encourage more folks to get trained in their use. We talked about a recent class organized by MSU Extension and taught by Jennifer Woods for first responders to livestock truck rollover emergencies. The Extension staff are pushing ahead with several follow-up activities, including collaborating with Farm Bureau to equip a livestock emergency response trailer for Branch County. Eventually, the group aims to extend that high level of preparedness to other neighboring counties along the I-94/I-69 intersection, which has become a nexus for the livestock industry in Michigan.

Potential Use of Essential Oils as an Alternative to Feed Grade Antibiotics in Pork Production

Casey Zangaro, MSU Extension

Following implementation in the U.S. of the Veterinary Feed Directive in January 2017, which bans the use of medically-important antibiotics (i.e., those also used in human medicine) in livestock except for treatment or prevention of disease, researchers have intensified their search for alternative agents that promote gut health, especially in early post-weaned piglets. A wide variety of products are being tested, including organic acids, enzymes, probiotics, antimicrobial peptides, medium-chain volatile fatty acids, spray-dried plasma products and essential oils (also known as phytogenic plant products), as alternatives to antibiotics in swine rations. This review focuses on results from studies testing selected essential oils, and describes evidence suggesting that these products could become viable alternatives for antibiotics because of their potential for consistency, high safety factors for pigs and consumers, cost-effectiveness, and the fact that they are environmentally-friendly. Essential oils have been used by pig producers in the E.U. for several years, with mixed results reported.

Essential oils are defined as natural bioactive compounds that are derived from plants. They include aromatics, volatile, oily liquids extracted from materials such as seeds, flowers, leaves, buds, twigs, herbs, bark, woods, fruits, and roots. Essential oils that have been fed to pigs in multiple research studies include carvocrol, thymol, citral, eugenol, and cinnamaldehyde which are derived from thyme, lemongrass, clove, nutmeg, cinnamon, basil, oregano, and bay leaf.

The oily and evaporate nature of essential oils leads to challenges in their effectiveness within diets and absorption to the pig's gut. Although the mechanisms underlying essential oil effects on intestinal function remain to be determined, researchers think the mechanisms have to do with the anti-oxidant and anti-inflammatory effects on the intestinal lining of mammals. These effects positively interfere with the processes by which E. coli may disrupt the pig's immune system causing post-wean diarrhea (Li et al., 2012).

In the United States, the amount of research with essential oils for sows, nursey pigs and grow-finishers is increasing (discussed in greater detail below). Aa clear path to their widespread adoption by pork producers has not been delineated. In addition to lack of definitive information around the pharmacodynamics effects (i.e., relationship between dose and the mechanistic beneficial actions), key challenges facing the use of essential oils in pork production include: some unexpected off-target/ undesirable effects (odor prevents pigs from eating feeds containing some essential oils), potential regulatory concerns, high inclusion costs, formulation and effective delivery methods.

Sows

Essential oils have been tested in sow diets in an effort to increase overall reproductive performance; key performance indicators typically measured in these studies include sow feed intake, number of piglets born alive, and sow milk production. Sows provided essential oils in their feed have shown small but significant indications of improved gut health, when compared to untreated controls, in terms of intestinal lining changes (especially microvilli density and length), lymphocyte proliferation, and various blood parameters. However, significant improvements in sow health or performance have not accompanied these changes in gut morphology (Ariza-Nieto et al., 2011; Miller et al., 2009; Allan and Bilkei, 2005). Still, some important secondary effects have been observed in pre-weaned piglets coming off of treated sows; piglets have been healthier and shown higher weaning weights. For example, Miller et al. (2009) reported that supplementation with 2 g/kg of a blend of essential oils (Biomin P. E. P., BIOMIN), from 10 days before the estimated farrowing date through weaning, improved early lactation feed intake in sows, decreased sow weight loss during the first week of lactation and enhanced piglet body weight at weaning. In a study involving 2100 sows, Allan and Bilkei (2005) reported that sows fed diets containing 1 g/kg oregano had higher voluntary feed intake, lower annual mortality rate (4.0 vs. 6.9%), reduced sow culling rate during lactation (8 vs. 14%), increased farrowing rate (77.0 vs. 69.9%), increased number of live born piglets per litter (10.49 vs. 9.95) and decreased stillbirth rate (0.91 vs. 0.81). However, Ariza-Nieto and others (2011) noted that in their study of 70 second-parity sows, feeding 250 mg/kg oregano essential oil blend during gestation and farrowing did not

result in increased growth or immune responses in the piglets.

Nursery Pigs

Most research on essential oils in pigs has been directed toward nursery pigs, due to the dietary changes and other stresses they present at this crucial time, which often negatively impacts health and performance. Based on numerous studies, it appears that feeding essential oils during this period results in changes to the gut environment favoring a healthier bacterial population (Li et al., 2012; Franz et al., 2010; Huang et al., 2010). This proliferation of healthier bacteria appears, in some cases, to over-ride the harmful bacterial pathogens that cause diarrhea and decreased feed intake and performance within the first few weeks of weaning. Li and others, (2012) noted that encapsulated essential oils (thymol and cinnamaldehyde tested in these studies) improved performance, immunity and gut microflora in 240 piglets that were 36 days old (at start of study) over a 35-day period; results showed reduced E. coli counts in feces, increased lymphocyte transformation, and reduced occurrence of diarrhea. Huang and others (2010) reported that dietary supplementation of blended essential oils fed 6 weeks to 90 weaned nursery pigs resulted in an improvement in post-weaning final ADG (487g vs 476g, $P < 0.1$) without any apparent negative effects on health or other performance indicators. However, Neill et al. (2006) showed that in-feed antimicrobials increased growth performance more effectively than a diet with essential oils in a piglet study conducted over a 28-day period after weaning at day 21. In that study, 210 piglets were fed either an oregano essential oil diet or a neomycin and oxytetracycline-supplemented diet. The antimicrobial diet slightly improved body weight (17 kg vs 15.4 kg, $P = 0.09$) significantly more than the essential oil diet. Neill and others (2006) noted that ADG, ADFI, G:F, and 28-day weights of pigs fed oregano essential oil diet (25, 50, or 100 g per ton) were similar to those of pigs fed the control diet ($P > 0.05$), and there was no effect on growth parameters of increasing dose of essential oil ($P > 0.05$).

Grow-Finish Pigs

The addition of essential oils to grow-finish pig diets has impacted growth performance and carcass merit (Janz et al., 2007; Yan et al., 2010). Feed intake increases from 9 to 12% with dietary supplementation of essential oils according to a review of European essential oil use of Franz et al., (2010). Furthermore, Zeng et al., (2015b) reported the same impact on feed intake; ranging from 3 to 19% in their review of essential oil use in Europe. While most research has found that adding essential oils to grow finisher diets increases feed intake, interestingly Janz et al., (2007) and Yan et al., (2010) failed to observe any improvement in performance generated by essential oil blends in finisher pigs in the United States. Yan and others (2010) noted that for 96 grow finish pigs starting around 24 kg to market, essential oil diets increased the longissimus muscle area. Janz and others (2007) concluded that carcass and meat quality attributes were unchanged when comparing oregano essential oil diets to conventional diets in 64 finisher pigs. There are concerns if the concentration of the essential oils within the diet could alter the flavor of the final pork product, which is now being studied. It was also noted in the same study that sensory panelists were unable to detect a flavor or aroma differences between the conventional-fed and essential oil diets (Janz et al., 2007).

Cost

Yang et al. (2015) and others have noted that the cost effectiveness of essential oils is generally not achieved in pigs when products are used at concentrations required to affect health or performance. As interest in alternatives for in-feed antibiotics in pig production grows, however, and more research and information becomes available regarding the most effective products and dose regimens, it is reasonable to speculate that economies of scale in their production and formulation will be achievable, leading to wider use of essential oils in pork production.

Conclusion

Essential oils may become useful alternatives to feed-grade antibiotics. They are being studied for their health and performance benefits for swine in all phases of production. To this point, however, none of the essential oils tested in pigs have provided the same level of consistent positive benefits in disease prevention or performance that is achievable using antibiotics. Knowledge around how these molecules lead to improvements in gut health and growth parameters in pigs is emerging from research underway on a global basis, especially in the E.U. and Asia. However, expanded use of essential oils in pork production will likely depend on more research focused on cost of production, formulation, and effective dosing/presentation.

References available upon request

Swine Erysipelas

Scott A. Kramer, Supervisory Public Health Veterinarian with the Food Safety and Inspection Service at the US Department of Agriculture

Swine erysipelas is a common and preventable disease of swine caused by infection with the bacterium, Erysipelothrix rhusiopathiae (1,2). While the bacterium may affect a variety of mammalian species including sheep, cattle, horses, dogs, turkeys as well as wild and domestic species of birds and fish; the pig is recognized as the most important reservoir of the organism (3). This particular bacterium is very pervasive, can be found on most swine farms, and is capable of surviving in soil or in fecal matter for 6 months or more (2,8, 4,5). Consequently, total elimination of the bacterium from the environment is not a practical consideration (6).

The mechanism of how the bacterium causes disease remains unclear; however, it is understood that the bacterium may gain access to the body and bloodstream through the tonsils, gastrointestinal tract, or through skin abrasions (5-8). Pigs of any age group may be affected however; it is less common in pigs under 8 weeks of age due to protection by maternal antibodies (9). Stressed or immunocompromised pigs are more likely to show clinical signs as a consequence of sudden changes in diet, transportation, and exposure to extreme temperature variations to name a few (9). Infected pigs shed the organism in feces and urine while 30-50% of asymptomatic carriers may harbor the bacterium in their tonsils (10).

The bacterium is capable of causing an acute to chronic disease in pigs.

Acute Infection (Severe and Sudden in Onset)

Acute infection may be observed within 24 hours of infection and may be characterized by sudden death and/or general signs of septicemia (11). Diamond skin lesions are an inconsistent feature however; very suggestive for E. rhusiopathiae infections (2) (Figure 1).

Sub-Acute Infection (Less Severe)

Sub-acute infections are less severe than the acute form and pigs may appear asymptomatic (11-12). Diamond skin lesions, which may occur within a few days of infection, regress and disappear with no detectable effect within 1-2 weeks (11-12).

Figure 1: "Diamond Skin Lesions" are common in the acute phase (9).

Chronic infection (Persistent)

Chronic erysipelas infections persist over months, and may manifest with arthritis as well as vegetative endocarditis (11-12). Affected pigs are lame and reluctant to rise. Additionally, affected sows may abort and boars become infertile (11).

Prevention of swine erysipelas is best accomplished through good management practices including a tailored infectious disease prevention program including proper immunization (6,13,14). Consult your swine veterinarian for the appropriate vaccine for your current production setting. Several vaccines are currently available including both injectable and oral based vaccines delivered via the drinking water. E. rhusiopathiae is also very susceptible to penicillin during the early presentation of the disease while there is no treatment for pigs affected during the chronic form of the disease (13).

Swine erysipelas continues to be associated with condemned swine carcasses, and ranks in the top 10 causes for swine condemnations and as a consequence may have a significant economic impact on both swine producers as well as packers (15). In plant condemns, skinning of carcasses, associated deductions and extra labor are recognized as costly and preventable consequences of the disease at the abattoir.

Swine erysipelas is also considered a zoonotic

disease meaning that it may affect people as well as swine (4,11). Individuals at highest risk include butchers, abattoir workers, veterinarians, farmers, and consumers in which infection may occur through open wounds and/or abrasions following exposure to the bacterium (15,16). The human infection is recognized as a localized painful inflammation and reddening of the skin known as "erysipeloid" (17) (Figure 2). Considering the occupational risk associated with this infection; several steps may be undertaken to reduce the risk of infection including containment, control, maintaining good personal health, sanitation and hygiene (18).

Figure 2: In humans, E. rhusiopathiae infection results in a characteristic inflamed reddened rash known as "erysipeloid". Image courtesy of Thomas Habif, MD (17).

Conclusion

Swine erysipelas is a common yet preventable bacterial infection of swine. A tailored infectious disease program may prevent illness as well as economic losses at the abattoir. Furthermore; an understanding and recognition of the disease caused by the bacterium, E. rhusiopathiae, may help prevent occupational zoonotic infection. Consult your local veterinary professional to maximize your protection.

Resources

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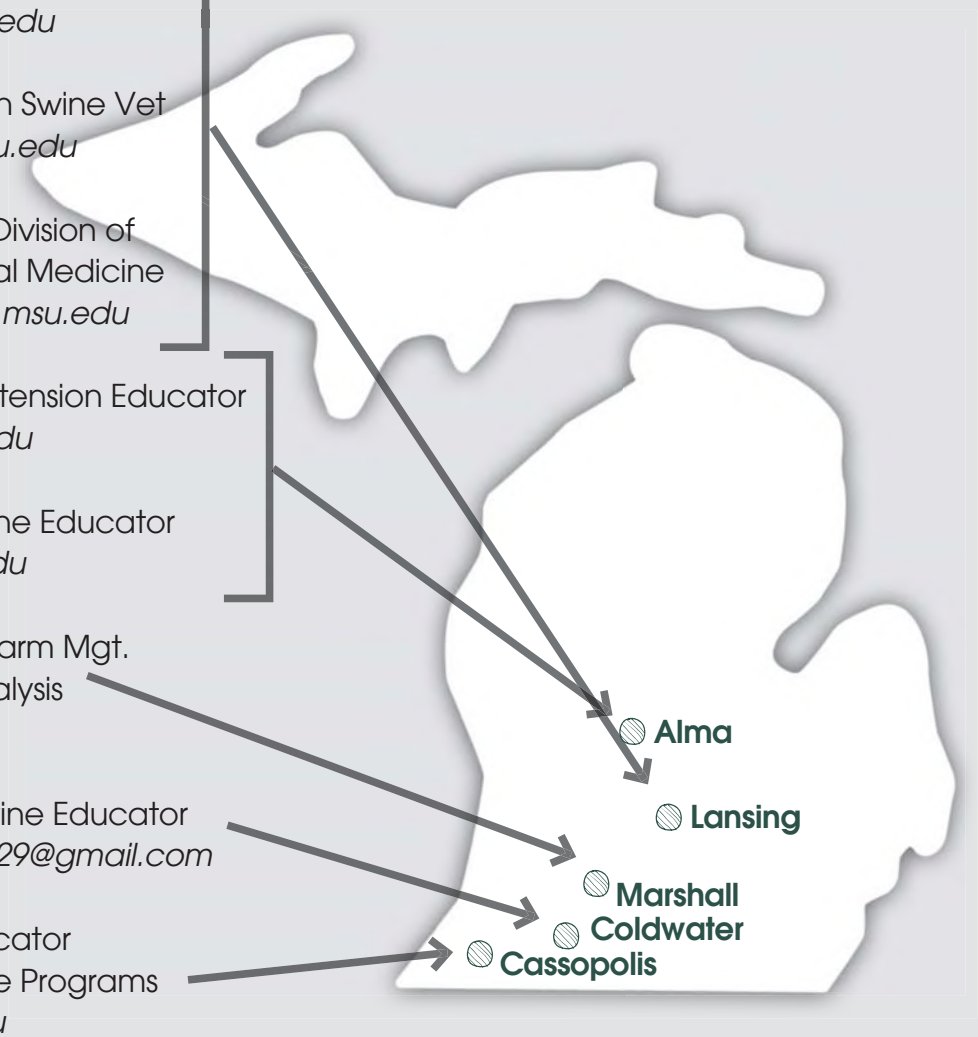

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All activities reported under this heading are financed by non-checkoff funds.

TRUMP ADMINISTRATION PURSUES NEW TRADE AGREEMENTS

The Trump administration recently announced that it will initiate trade negotiations with the European Union, Japan and the United Kingdom. NPPC has been pushing for a free trade agreement with Japan as its top offensive trade priority. It was U.S. pork's largest export market by value in 2017 and is set to implement free trade agreements with the European Union and with ten other nations through the Comprehensive and Progressive Trans-Pacific Partnership Agreement next year, threatening U.S. market share. NPPC is delighted the administration is demanding that the EU meaningfully include agriculture in trade talks with the United States. NPPC expects an aggressive posture from the administration with both the EU and the UK and will only support a deal that eliminates both tariffs and non-tariff barriers on pork in both the EU and the UK. This trade news builds on positive trade momentum represented by revised trade agreements with Mexico, Canada and South Korea that preserve zero-tariff access for U.S. pork. NPPC is continues to press the Trump administration to resolve trade disputes with China and Mexico.

NPPC SETS SIGHTS ON OPENING INDIAN MARKET TO U.S. PORK

NPPC vice president and counsel, global government affairs, Nick Giordano, was in India recently to advance progress toward opening the world's second most populous country to U.S. pork. Meat consumption is on the rise in India, a country with very little domestic pork production. NPPC is working closely with the administration to get agreement from India on the science-based veterinary export certificate that will end what is currently a de facto ban on U.S. pork shipments.

PORK GROUPS, USDA PROVIDE UPDATE ON ASF SURVEILLANCE, RESPONSE PLANNING

In September, U.S. Department of Agriculture and Food and Drug Administration officials met with U.S. pork sector groups – including the American Association of Swine Veterinarians, the National Pork Board, the National Pork Producers Council and the Swine Health Information Center – to evaluate additional measures to prevent the spread to the United States of African swine fever (ASF), currently active in China and some European nations. Diagnostic preparedness, surveillance and response to infection were among the topics discussed.

NPPC STRESSES NEED FOR REVISED FEDERAL TRUCKING RULES FOR LIVESTOCK HAULERS

In comments submitted to the U.S. Department of Transportation (DOT) recently, NPPC supported revisions to existing federal trucking regulations that allow livestock haulers to comply with the rules while maintaining the pork industry's high standards for animal welfare. Specifically, NPPC asked DOT's Federal Motor Carrier Safety Administration (FMCSA) to change the Hours of Service (HOS) rules, which limit commercial truckers to 11 hours of driving time and 14 consecutive hours of on-duty time in any 24-hour period. Once drivers reach either limit, they must wait 10 hours before driving again. NPPC supports:

- Expanding the driving-time limit for livestock

haulers from 11 hours to 14 hours.

- Adding an exemption from the driving-time limit for "adverse driving conditions," which should be defined to include not only incidences of rain, snow, ice and traffic disruptions but also excessive temperatures that would stress animals and prevent trucks from stopping.
- Allowing livestock haulers in trucks with sleeper berths to break up the required 10-hour rest period into three separate periods provided that at least one is a minimum of six hours.

NPPC also asked the transportation agency to streamline the process for restoring "satisfactory" safety ratings for livestock haulers who are otherwise in compliance with the HOS rules' safety and paperwork requirements. Often as a result of caring for animals rather than strictly adhering to the HOS regulations, some drivers have had their safety ratings downgraded from "satisfactory" to "conditional." That has reduced the pool of available drivers and significantly increased barriers for livestock haulers to remain in business

NPPC APPLAUDS U.S.-MEXICO-CANADA TRADE AGREEMENT

The National Pork Producers Council praised the Trump administration for establishing a free trade agreement that preserves zero-tariff access for U.S. pork to Mexico and Canada. The agreement, which was sent by the administration to Capitol Hill for ratification recently, will be designated by NPPC as a "key vote" to ensure that its members are informed about "yes" and "no" votes on the pact.

"We thank the administration for its diligent work to complete recent agreements that maintain zero-tariff access to three of U.S. pork's top five markets," said Jim Heimerl, NPPC president and a pork producer for Johnstown, Ohio. "The three-way pact with Mexico and Canada, our largest and fourth largest export markets, respectively, and the recently signed agreement with Korea represent welcome momentum during what has been a challenging year."

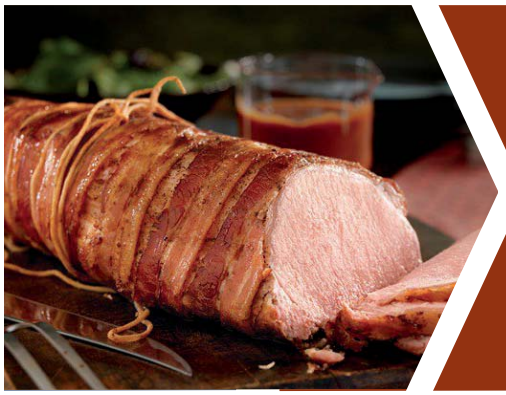
The administration formally signed a modernized free trade agreement with South Korea that retained the zero-tariff access to U.S. pork's fifth largest export market.

Heimerl added, "We urge Congress to quickly ratify the U.S.-Mexico-Canada trade agreement, and we'll closely monitor this as a key vote for our members, who have demonstrated incredible perseverance as the administration realigns U.S. global trade policy."

U.S. pork is currently on three trade retaliation lists that have placed 40 percent of total exports under punitive tariffs. NPPC continues to urge the administration to remove tariffs on Mexican steel and aluminum imports so that country will lift its 20 percent retaliatory tariff on U.S. pork.

AGRICULTURAL GROUPS SUPPORT EPA INTERPRETATION OF 'ADJACENT'

NPPC recently submitted comments to the U.S. Environmental Protection Agency (EPA) addressing how it calculates and captures emissions from agricultural facilities under the Clean Air Act. The EPA's current position is that "adjacent" facilities should focus solely on geographical proximity when making emission source determinations under the Clean Air Act permit programs. In its comments, NPPC agreed with the current EPA definition of adjacent and said that "functional interrelatedness" should not be a factor in determining single sources of emissions under the act. NPPC said that defining "adjacent" facilities based on geographic proximity is the only way to consistently and clearly implement the rule.



Pork Checkoff

Reports on checkoff-funded promotion, research and consumer information programs.

ASIA TRADE MISSION OFFERS VALUABLE MARKET INSIGHTS

A recent trade mission to Asia by the National Pork Board International Marketing Committee built lasting relationships with international customers and elevated U.S. pork as the global protein of choice. The Pork Checkoff team toured Singapore, Vietnam, Hong Kong and Macau, meeting with pork processors, distributors and retailers, importers and traders, as well as in-country staff responsible for promoting U.S. pork in the region.

"Pork is the No. 1 most-consumed protein in the world, and that was obvious on this mission," said Bill Luckey, a pork producer from Columbus, Nebraska, and chair of the Pork Checkoff's International Marketing Committee. "As the committee allocates Pork Checkoff dollars to international marketing, it is important to see how these dollars are working today and how we might better target producer resources in emerging markets in the future."

With U.S. pork production again breaking records in 2018, the Pork Checkoff is committed to growing pork demand both domestically and in international markets. Singapore and Vietnam are developing markets for U.S. pork and present huge opportunities for U.S. pork export growth in the coming years. In 2017, U.S. pork exports to Singapore increased almost 20 percent from 2016, reaching $17 million. Last year, the United States also exported over $11 million of fresh/chilled/frozen bone-in hams and shoulders to Vietnam.

"Consumers in Vietnam and Singapore are rapidly increasing pork in their diets, with pork consumption on trend to overtake seafood consumption in both markets as the No. 1 protein," said Craig Morris, the Pork Checkoff's vice president of international marketing. "This provides a great opportunity to capture a rapidly increasing market share, but we must first understand the changing consumer and retail landscapes in these countries to meet consumer needs and expectations."

While in Singapore, the committee learned that U.S. pork often is positioned as a premium product, with high-end U.S. pork selling for three to five times more than the price of competitors' products. Also, pre-prepared and processed foods are becoming popular as consumers seek convenience to meet their increasingly busy, urban lifestyles.

"U.S. pork can succeed in Singapore by delivering a high-quality product packaged in small portions and in convenient, ready-to-cook formats," Morris said.

In Vietnam, committee members learned that popular wet markets, where fresh pork is sold on the streets, are declining as consumers seek the modern conveniences of full-service grocery stores. U.S. pork is viewed as a superior product in terms of taste and quality, and it is being marketed as such by U.S. import partners and buyers, Morris noted. U.S. pork is heavily featured in restaurants throughout Vietnam, especially by those with newer, more modern menu offerings.

"It's surprising, but Vietnam is a booming market for American barbecue," Luckey said. "Many restaurants feature U.S. pork's reputation for superior quality, which they promote on menus to grow their business."

"In this challenging trade environment, it is critical that we meet with our colleagues in Hong Kong and express gratitude for their continued partnership. Building face-to-face relationships is especially important in this region," Morris said. "We met with 40 of the largest importers who play a key role In deciding what will be sold in retail stores, featured on restaurant menus and traded with other countries in Southeast Asia."

The last stop on the international mission was Macau, which is home to some of the world's largest casinos. As a large tourist destination, Macau offers many opportunities for U.S. pork to be showcased to consumers from all around the world.

Luckey called the Asian trade mission a great success.

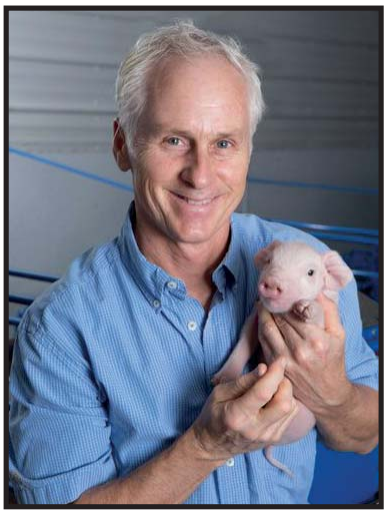
"Not only were we able to see the many different ways that pork is being promoted in these countries, but we came back with insights into how to grow our market share," Luckey said. "The committee members are excited to share these ideas with our partners here in the U.S. and to follow up with customers we met to bring U.S. pork to their shelves and menus."

ILLINOIS FARMER NAMED AMERICA'S PIG FARMER OF THE YEAR

Patrick Bane, a pig farmer from Arrowsmith, Illinois, has been named the 2018 America's Pig Farmer of the Year℠ by achieving the highest combined score from a third-party judging panel and online voting. The award recognizes a pig farmer who excels at raising pigs using the We Care℠ ethical principles and who connects with today's consumers about how pork is produced.

"We are pleased to have Patrick represent America's pig farmers. He embodies the very best in pig farming," said Steve Rommereim, National Pork Board president and a pig farmer from Alcester, South Dakota. "It's important that we tell today's consumers how we raise their food in an ethical and transparent way. Patrick's interest in sharing his farm's story, as well as putting a face on today's pig farming, will help us reach this goal."

Raising pigs has been a life-long passion for Bane, whose family has been raising pigs for three generations. Bane raises 74,000 pigs on his farm in central Illinois, where he focuses on protecting public health, hiring the best people and maintaining herd health.



Patrick Bane

"It's our responsibility to show the public that we are doing the right things to care for our animals and keep them healthy," Bane said. "We need to foster an increased understanding about how food is raised using today's modern technology. It's not only good for us as farmers, but it's good for consumers. You can't drive that point home enough. We have a lot of good, positive stories to share."

Bane was named America's Pig Farmer of the Year following a third-party audit of his on-farm practices and after taking part in a series of written and oral interviews by subject-matter experts. He has achieved excellence in all aspects of pig farming, including animal care, environmental stewardship, employee work environment and outstanding community service.

The panel of expert judges, who met in late August with the four finalists, were Robin Ganzert, president and CEO of American Humane; Sarah Hendren, RDN, nutrition and quality assurance manager at Culver's; Kari Underly, a third-generation butcher, author and principal of Range®, Inc., a meat marketing and education firm; J. Scott Vernon, professor, College of Agriculture, Food and Environmental Sciences, Cal Poly; and Leon Sheets, 2017 America's Pig Farmer of the Year from Ionia, Iowa.

To learn more about Bane and the America's Pig Farmer of the Year Award, visit americaspigfarmer.com.

USDA Launches Trade Mitigation Programs

U.S. Secretary of Agriculture Sonny Perdue recently launched the trade mitigation package aimed at assisting farmers suffering from damage due to unjustified trade retaliation by foreign nations. Producers of certain commodities can now sign up for the Market Facilitation Program (MFP), while USDA will also begin to purchase identified commodities under a food purchase and distribution program. Additionally, USDA has begun accepting proposals for the Agricultural Trade Promotion Program (ATP), which will help American farmers find and access new markets for their products. In total, USDA will authorize up to $12 billion in programs, consistent with World Trade Organization obligations.

Perdue announced in July that USDA would act to aid farmers in response to trade damage from unjustified retaliation. President Trump directed Secretary Perdue to craft a short-term relief strategy to protect agricultural producers while the Administration works on free, fair, and reciprocal trade deals to open more markets in the long run to help American farmers compete globally. These programs will assist agricultural producers to meet some of the costs of disrupted markets.

"These programs will allow President Trump time to strike long-term trade deals to benefit our entire economy, including the agricultural sector, in the long run," Perdue said. "Farmers will tell you that they would always prefer to sell a good crop at a fair price, rather than receive government aid, and that's what long-term trade deals will accomplish. But in the meantime, President Trump has promised that he will not allow American agriculture to bear the brunt of the unjustified retaliation from foreign nations. Today we are putting the President's promise into action."

USDA's Farm Service Agency (FSA) will administer the Market Facilitation Program (MFP) to provide payments to corn, cotton, dairy, hog, sorghum, soybean, and wheat producers. An announcement about further payments will be made in the coming months, if warranted.

USDA's Agricultural Marketing Service (AMS) will administer a food purchase and distribution program to purchase up to $1.2 billion in commodities unfairly targeted by unjustified retaliation. USDA's Food and Nutrition Service (FNS) will distribute these commodities through nutrition assistance programs, such as The Emergency Food Assistance Program and child nutrition programs.

Through the Foreign Agricultural Service's (FAS) Agricultural Trade Promotion Program (ATP), $200 million will be made available to develop foreign markets for U.S. agricultural products. The program will help U.S. agricultural exporters identify and access new markets and help mitigate the adverse effects of other countries' restrictions.

Market Facilitation Program

The sign-up period for MFP is now open and runs through January 15, 2019, with information and instructions provided at www.farmers.gov/mfp. The MFP provides payments to cotton, corn, dairy, hog, sorghum, soybean, and wheat producers who have been significantly impacted by actions of foreign governments resulting in the loss of traditional exports. The MFP is established under the statutory authority of the Commodity Credit Corporation CCC Charter Act and is under the administration of USDA's FSA. Eligible producers should apply after harvest is complete, as payments will only be issued once production is reported.

A payment will be issued on 50 percent of the producer's total production, multiplied by the MFP rate for a specific commodity. A second payment period, if warranted, will be determined by the USDA.

Market Facilitation Program

Est. Initial Payment**

Pork (hogs): $8.00 / head

**Initial payment rate on 50% of production

MFP payments are limited to a combined $125,000 for dairy and hog producers. Applicants must also have an average adjusted gross income for tax years 2014, 2015, and 2016 of less than $900,000. Applicants must also comply with the provisions of the Highly Erodible Land and Wetland Conservation regulations.

USDA has expanded the timeline for producers with whom the Aug. 1, 2018, date does not accurately represent the number of head of live hogs they own. Producers may now choose any date between July 15 to Aug. 15, 2018 that correctly reflects their actual operation.

For more further information or to locate and contact local FSA offices, interested producers can visit www.farmers.gov.

National Pork Board Shakes Up Lunchtime with New Deli Ham Sandwich Recipes

Inspires creativity with nutritious, kid-approved flavor combinations

The official back-to-school season has come and gone and kids, families and teachers have settled in for the school year ahead. To help combat the lunch box and hot meal monotony that comes this time each year, the National Pork Board developed easy, nutritious and creative ham sandwich ideas that bring exciting new flavors and variety to the lunch hour.

To teach parents and students how to diversify lunchtime using a meat they already know and love, the National Pork Board developed six unique sandwich recipes using deli ham, all of which were tested and approved by a select panel of grade-school children:

- The Luau Ham Sandwich – Pairs the smoky flavors of barbecue sauce and deli ham with the sweetness of pineapple and Hawaiian bread.
- The Fiesta Ham Roll-Up – Combines zesty guacamole, deli ham and your choice of string cheese, all rolled up in a tortilla.
- The Ham Jam Sandwich – The perfect salty and sweet combo, this kicks up the traditional ham and cheese sandwich with the addition of regular or sugar-free raspberry jam.
- Ham Pinwheels – Bite-size and pop-able, these pinwheels bring the unexpected element of cream cheese to the table.
- The Harvest Ham Sandwich – Apple slices and apple butter make this a festive fall lunch option.
- The Ham Pocket Sandwich – A Mediterranean take on the ham sandwich, this features hummus, veggies and a pita pocket.

In addition to offering a unique flavor profile, deli ham is also a nutrient-packed source of protein.

"Deli ham is a wholesome choice for perking up sandwiches," said registered dietitian, Pat Baird. "It's a lean, complete protein that's packed with vitamins and minerals, and has flavor that combines well with any sandwich topping."

A two-ounce serving of deli ham provides 10 grams of protein, one to two grams of fat, 60 calories and beneficial nutrients, vitamins and minerals like iron, vitamin B12 and B6, potassium and zinc, among others.

For complete recipes and more information on the benefits of ham, please visit www.pork.org/news/national-pork-board-shakes-lunchtime-new-deli-ham-sandwich-recipes/ and check out our Instagram, Facebook and Twitter.

Holding Time for Feedstuffs May Reduce Swine Disease Risk

The ongoing outbreaks of African swine fever (ASF) in China, Belgium and elsewhere, have crystallized the U.S. pork industry's focus and collaboration on finding new ways to help protect the domestic herd from costly foreign animal diseases (FADs). One new practice designed to reduce disease transmission risk involves knowing exactly how long certain feed ingredients have been securely stored before allowing their use on pig farms.

As modeling in peer-reviewed research has made clear, it's possible for swine disease viruses to survive in shipments of certain feed ingredients during transoceanic shipping to U.S. ports and even to inland points of feed manufacture. Based on this current research, a holding time of 78 days after the date of manufacture and bagging or sealing to prevent additional contamination ("born on date") for amino acids, minerals or vitamins will degrade 99.99% of viral contamination. The holding time extends to 286 days for soybean meal to allow for similar viral degradation, once shipped to prevent additional contamination.

"Working with your feed supplier to get this type of information is yet another way to help protect your pigs from potential infection from a foreign animal disease," said Dave Pyburn, DVM, senior vice president of science and technology for the National Pork Board. "It's just one more tool in our arsenal against African swine fever and other diseases that we hope will offer U.S. producers more protection against this growing global threat."

The feedstuffs studied that have shown the potential to support virus survival include: conventional soybean meal, DDGS, lysine hydrochloride, choline chloride, vitamin D, pork sausage casings, dry and moist dog food, organic soybean meal, soy oil cake, moist cat food, and porcine-based ingredients. There may be other feedstuffs that were not tested that could support survival of pathogenic viruses. Scientific study and proof-of-concept work in this area continues. To date, without an organized surveillance program, pathogenic swine viruses are not being identified in imported feedstuffs.

"It's clear from the research that certain feed ingredients can support viral survival during conditions modeled after either trans-Atlantic or trans-Pacific shipping to U.S. ports," said Paul Sundberg, DVM, director of the Swine Health Information Center. "Based on these findings, we think it's prudent that the entire U.S. pork industry look at this research and consider taking action to help us prevent a FAD from entering this country through this route."

In a related area of disease prevention, the National Pork Board, the National Pork Producers Council, the American Association of Swine Veterinarians and the Swine Health Information Center recommend that producers talk to their feed suppliers to get information about seven key areas.

- Describe the facility's biosecurity program to minimize the spread of pathogens from people, vehicles and ingredients.
- Describe the facility's employee training on feed safety.
- Describe the facility's pest control program.
- Describe the facility's

traceability program.

- Describe the facility's supplier approval program.
- Is the facility certified by a third-party certification body for food safety? Third-party certification programs may include the Feed Additives Manufacturers (FAMI-QS), the International Organization for Standardization (ISO), the Safe Quality Food (SQF), Safe Feed/Safe Food, etc.
- Does the facility utilize ingredients that were manufactured or packaged outside of the United States?

To get a better handle on your particular farm's risk of FAD transport via a feed ingredient, Sundberg advises producers to use the newly developed virus transport in feed ingredients decision tree matrix. "It was developed to help producers work with their feed suppliers to minimize risk from feed ingredients," he said.

Aside from the specific feed-related ways to reduce disease risk, Tom Burkgren, DVM, executive director for the AASV, advises producers to review their current on-farm biosecurity plan with their veterinarian. "While this is always a good thing to do periodically, it's critically important now to find any potential weaknesses in your production practices so that you can take immediate steps to fix them to help protect your animals."

The four swine groups continue to collectively reach out to USDA officials, including Chief Veterinary Officer Jack Shere, to see what can be done to enhance the protection of the domestic swine herd from ASF and all FADs.

"U.S. agriculture must bolster its defenses against the spread of animal disease as we face heightened risk," said Liz Wagstrom, chief veterinarian for the National Pork Producers Council. "These measures should include private-sector efforts like those that have informed this feed directive as well as publicly funded programs to guard against disease outbreaks that would immediately close export markets and threaten prosperity in rural America."

Calendar of Events

Dec.:

19 **MPPA Board Meeting**
East Lansing, Mich.

Feb.:

20 **Michigan Pork Symposium**
Lansing, Mich.

21 **MPPA Board Meeting**
Lansing, Mich.

March:

7-8 **Pork Forum**
Orlando, FL

13 **Ag Day at the Capitol**
Lansing, Mich.

21 **MAEAP 5000th Verification Celebration**
Lansing, Mich.

We're Listening

Dear MPPA,

Thank you for being a 2018 4-H State Award Donor! I was fortunate enough to be the Junior Swine Science recipient this year. I greatly appreciate your generous donation as this award could not be possible without your support. Thanks again for everything you do for the youth!

Jaycie Brown, Pinckney

Dear MPPA,

Thank you for your donation to the Michigan State University College of Agriculture and Natural Resources. Gifts like yours are critical to the success of our programs and our students. These dollars make it possible for scholarships, fellowships, research opportunities, techology needs and community outreach to happen. On behalf of the faculty, staff and students of CANR, thank you for your continued support.

Ronald Hendrick, Professor and Dean, MSU CANR

Dear MPPA,

Your contribution, along with numerous other donors, helps provide the majority of funds required to sustain the 4-H youth programs and activities for over 2,500 young people in the county. Every youth participating in Lapeer County 4-H benefits from this event. This year's auction was very successful and raised a net profit over $35,000. Proceeds from the auction will go to Lapeer County 4-H Council to be used for program expenses. Thank you for your important support!

Sarah Graver, Lapeer 4-H Fundraising Coordinator

Dear MPPA,

Thank you for your Flag Sponsorship as well as your door prize donation on behalf of the Michigan State University College of Agriculture and natural Resources Alumni Association. This year's Golfing for Scholarships was another great success. Thank you once again for your support.

Kathryn Reed, Director of Alumni Relations and Special Events, MSU College of Agriculture and Natural Resources

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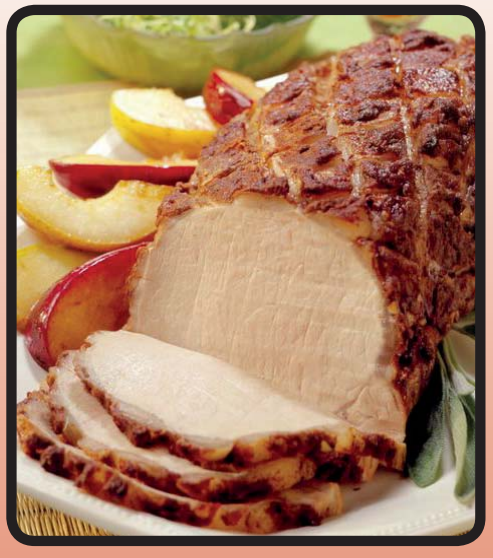
CINNAMON PORK ROAST

TOTAL TIME: 100 mins, Serves 10



INGREDIENTS

4 pounds pork loin roast, boneless

2 tablespoons cinnamon

2 tablespoons salt

1 teaspoon white pepper

2 tablespoons sugar

1 onion (finely grated)

4 cloves garlic (minced)

2 tablespoons soy sauce

INSTRUCTIONS: Combine cinnamon, salt, pepper, sugar, onion, and garlic. Blend in 1 tablespoon soy sauce. If not spreadable, add another tablespoon of soy sauce. Rub mixture into loin. Refrigerate 3 hours to overnight.

Grill pork over medium-low indirect fire 1 to 1-1/2 hours (about 20 minutes per pound) or until internal temperature on a thermometer reads 145 degrees F. Remove roast from heat; let rest about 10 minutes before cutting into thin slices.