COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT, LEXINGTON, KY 40546

UK UNIVERSITY OF KENTUCKY College of Agriculture, Food and Environment

AGRICULTURE & NATURAL RESOURCES

June 2016

Cooperative Extension Service
Adair County
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ADAIR COUNTY FARMER'S MARKET

The Adair County Farmer's Market is now open featuring exclusively Adair County grown fruits and vegetables. The Adair County Farmers Market is located in the parking lot of the County Extension Office at 409 Fairground Street in Columbia. The Farmer's Market 2016 hours are as follows…

- Tuesdays – 6:00 am to 10:00 am
- Fridays – 6:00 am to 10:00 am

The Adair County Farmers Market proudly accepts Senior vouchers.
For more information, contact the Extension Office at 270-384-2317.

ADAIR COUNTY FAIR

June 25 – July 2

Livestock Shows
June 25 – 9:00 am CT - **Beef**
June 27 – 9:00 am CT – **Dairy**

For information on any of the educational programs, call the Adair County Extension Office at 270-384-2317 or email nick.roy@uky.edu

Nick Roy
County Extension Agent
For Agriculture & Natural Resources

Adair County Cattlemen's Summer Beef Conference

July 25th
5:30 pm
Adair County Extension Office

SPEAKERS & TOPICS INCLUDE:
Beef Management Decisions for 2016
by Dr. Jeff Lehmkuler, UK Beef Nutritionist
Beef Market Outlook
by Dr. Kenny Burdine, UK Ag Economist

KEYNOTE SPEAKER:
Warren Beeler –
Director of KY Governor's Office of Ag Policy

UKAg EXTENSION

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DAIRY MONTH

Appreciation Picnic

LIVE RADIO BROADCAST
Compton's Dairy
Thanks to Tony & Ben Compton for hosting the June Dairy Month radio broadcast on June 21st.
And many thanks to 92.7 The WAVE Radio and 93.5 WAIN Radio.
Tune in to these stations!

Dairy Farmers

June 24
6:30 pm CT
Adair County Fairgrounds

All Adair County dairy farmers, their families, and their employees are invited to attend the dairy picnic.

For more information, call the Extension Office at 270-384-2317.

In the event of inclement weather, the picnic will be moved to the Adair County Extension Office. Listen to the local radio stations.

PINKEYE IN CATTLE – Michelle Arnold, DVM (UK Ruminant Veterinarian)

Infectious Bovine Keratoconjunctivitis (IBK) or "Pinkeye" is a costly disease for the beef producer. Preventing the disease is difficult because many factors are involved in the development of pinkeye including environment, season of the year, concurrent diseases, the strain of bacteria involved, and the animal's genetic makeup and immune system. Once pinkeye begins, it is highly contagious and can spread rapidly within the herd. Careful attention to control of contributing factors and prompt, effective treatment in the face of an outbreak are necessary to reduce the spread and limit the damaging effects of the disease.

The cause of pinkeye is the bacteria Moraxella bovis (M. bovis) which is located in the eyes and nasal cavities of infected cattle. A newly isolated strain of bacteria "Moraxella bovoculi" may play an important role as well but research has yet to confirm this. M. bovis has two known factors that are important for causing pinkeye: pili and cytotoxin. "Pili" are hairlike projections that enable M. bovis to stick to a damaged or injured surface of the eyeball (on the cornea). There are 7 different serogroups of pili (A through G). "Cytotoxin" gives the bacteria the ability to kill corneal epithelial cells leading to an ulcer. It is also believed to be responsible for killing white blood cells needed to fight infection in the eye. The rupture of these white blood cells releases enzymes that further break down the cornea, making the ulcer even worse. Cattle are the only known reservoir of Moraxella bovis and infected carrier animals may harbor this organism year round without showing any signs of eye problems. Once pinkeye begins in a herd, it is highly contagious and can spread rapidly by direct contact through nasal and ocular discharges and by vectors such as flies.

Prevention of pinkeye is difficult because it is a complicated, multifaceted disease. The best plan is to reduce or remove as many risk factors as possible that can result in damage to the cornea which allows the bacteria to take hold of the corneal surface. Many different combinations of contributing factors such as ultraviolet rays from the sun, face flies, excessive eye irritation, and stress may work together within a herd at one time. Prevention is based on maximizing herd immune status, minimizing exposure to the bacteria, and maintaining as irritant-free environment as possible.

Steps to Preventing Pinkeye:

1. Maximize Herd Immune Status- An overall good level of nutrition, adequate vitamin and trace mineral intake, a comprehensive vaccination program including the respiratory viral diseases IBR and BVD, parasite control, and basic biosecurity practices are all exceptionally important in improving the cow's or calf's ability to fight off any disease process (not just pinkeye). There is no scientific evidence to support feeding excessive levels of any vitamin or mineral, including Vitamin A, will prevent diseases of the eye. Biosecurity measures such as quarantine of new arrivals to the farm (including show animals) for three weeks before commingling with the herd are important in case any of these animals is carrying the disease.

2. Maintain an irritant free environment- Any irritation to the eye allows Moraxella bovis to invade and cause pinkeye. Prevent eye irritation with good face fly control, mow tall grass with seed heads, provide shade and clean water, and reduce sources of stress (such as overcrowding) if possible. Control face flies with ear tags impregnated with insecticide and topically administered insecticides by way of back and face rubbers or dust bags they must walk under to get to water or mineral (see UK Extension Publication ENT-11: Insect Control on Beef Cattle). Removal of fly breeding grounds and the use of certain feed additives will decrease the number of flies. Provide shade to protect from the harmful UV rays of the sun. Cool,

clean drinking water (instead of stagnant pond water) is critical because intake is greater with clean water and this helps provide plenty of fluid in the eye, especially important in dry, dusty, and/or windy conditions. Tears are essential in eye defense mechanisms as tears wash away pathogens and tear proteins are an important part of protective mechanisms. Do not forget to regularly check and clean automatic waterers.

3. Minimize exposure to M. bovis [and M. bovoculi]- Early detection of animals with the first clinical signs (tearing, squinting, and blinking) and then prompt, effective treatment are essential to reducing spread to herd mates and limiting damage to the eye. Long-acting antibiotics such as long-acting tetracycline or the prescription antibiotic tulathromycin (Draxxin®) are labeled for treatment of pinkeye. Your veterinarian may prescribe the antibiotics florfenicol (Nuflor®) or ceftiofur (Excede®) to be used in an off-label manner for treatment as well. Injectable antibiotics are generally the best option because of their long duration of activity and effectiveness in eliminating bacteria. Topical sprays only remain in the eye a few minutes before tears wash them away so application is generally required 3-4 times daily to be effective. When severe ulceration exists, the eyeball may need extra protection with either a patch or the eyelids may need to be sutured (stitched) together. Remember, preventing spread by treating affected animals is the single most important factor in controlling a disease outbreak. Active cases of pinkeye with excessive tearing attract flies that widely spread the bacteria. Topical application of a fly repellant to the face will also help reduce spread.

4. Does vaccination work? Immune responses to pili have been shown to be protective in some studies where animals are vaccinated with pili of a certain type and then challenged with a similar strain. This fact is likely responsible for why some herds might see a benefit from vaccination while other herds do not; if the vaccine strain stimulates immunity to a pilus type that is also present in the herd, there should be good protection. In clinical trials, approximately half reported significant protection from commercial vaccines. Therefore, it is unlikely that vaccination is the solution to all pinkeye problems although it may reduce the overall incidence of disease and severity of clinical signs. When commercial vaccines are not effective, a vaccine can be made from bacteria cultured from pinkeye cases from one particular farm or farms in a certain area. All cultures must be taken early in the course of disease; preferably when the eye is just beginning to tear excessively and before any medications are used. These specialty vaccines can be effective if the "correct" M. bovis antigen is used. However, autogenous vaccines often lose effectiveness within one to two years as the bacteria mutates and a new batch needs to be made from new cultures.

In summary, pinkeye is one of the most common diseases of cattle and is of major economic importance in Kentucky. The keys to prevention and control of an outbreak are maximizing the herd's immune status, minimizing exposure to Moraxella bacteria, and maintaining as irritant-free environment as possible. Treatment decisions are influenced by numerous factors such as effectiveness of the drug, cost, labor availability, withholding times, facilities, and availability of a veterinary prescription. Vaccines are not consistently effective in disease prevention and cannot be completely relied upon to prevent pinkeye. The best strategy of treatment, prevention and control of pinkeye for a particular herd is best accomplished with the help of the local veterinarian.

VEGETABLE DISEASES TO SCOUT FOR: EARLY BLIGHT & SEPTORIA LEAF SPOT

Kentucky vegetable growers should be on the lookout for early blight and Septoria leaf spot of tomato. As the most common diseases of tomato in Kentucky, homeowners or growers not on a preventative spray program always have at least some Septoria leaf spot and early blight pressure. Both diseases commonly occur in fields under wet, humid conditions. They may also occur in greenhouses or high tunnels, particularly near side walls or when plants are grown in natural soil without plastic mulch. Prevention, early identification, and management will help reduce plant losses. Here are the symptoms to look for, preventative tactics, and brief suggestions on how to treat crops once disease is confirmed.

EARLY BLIGHT

Early blight is caused by the fungal pathogens *Alternaria solani* and *A. tomatephila*. These pathogens overwinter in plant debris from the previous season. Spores are initially splashed onto the lowest leaves, where symptoms are first apparent, but frequent rain or overhead watering can spread spores throughout the plant. Leaves, stems, and fruit may become infected at any stage during the growing season, which can result in fruit or plant loss. Early blight is favored by moderate temperatures, high humidity, and frequent rainfall. Once established the disease can spread rapidly in dense plantings. Potatoes are also susceptible to early blight, and symptoms, preventative tactics, and management are similar to tomato.

Symptoms

Dark-brown lesions with a concentric ring pattern develop on leaves or stems, sometimes with a chlorotic (yellow) halo around the lesion (Figure 1). Older leaves are usually affected first, with the disease spreading up the plant to affect newer growth. Lesions enlarge and may coalesce to result in blight (rapid death). Affected fruit develop dark-brown lesions with a concentric ring pattern, typically at the attachment end (Figure 2).

Figure 1: Early blight results in the development of dark-brown lesions with concentric rings or bulls-eye patterns. (Photo: Kim Leonberger, UK)

Figure 2: Fruit affected by early blight develop dark-brown lesions with concentric rings (Photo: Yuan-Min Shen, Taichung District Agricultural Research and Extension Station, Bugwood.org)

SEPTORIA LEAF SPOT

Septoria leaf spot is caused by the fungal pathogen *Septoria lycopersici*. The pathogen overwinters in plant debris from the previous season. Spores are initially splashed onto the lowest leaves, but frequent rain and overhead watering will spread the disease throughout the plant.

Figure 3: Tomato plants infected with Septoria leaf spot develop circular lesions with darkened borders and tan-brown centers on stems, petioles, and leaves. (Photo: Kenny Seebold, UK)

Only leaves, stems, or petioles may become infected, which can result in significantly reduced plant vigor. Septoria leaf spot is favored by moderate temperatures, high humidity, and rainfall. Once established the disease can spread rapidly in dense plantings of tomatoes.

Symptoms

Small circular lesions with darkened borders and tan-brown centers are characteristic of this disease (Figure 3). The number of spots increases as disease severity increases. Blighting (rapid death) may occur in severe cases, which may kill plants while leaving a few unblemished fruit. The fungus produces additional spores in pycnidia, which are small, black specks seen in the centers of older lesions.

EARLY BLIGHT & SEPTORIA LEAF SPOT MANAGEMENT

Cultural Practices

- Select varieties with resistance or tolerance to early blight and/or Septoria leaf spot
- Do not set transplants with visible leaf spots
- Remove plant debris or weeds from the growing area
- Remove and destroy heavily infected leaves from indeterminate tomatoes
- Use drip irrigation (instead of overhead watering) to reduce leaf wetness
- Improve greenhouse ventilation to reduce humidity
- Use recommended plant spacing to facilitate air movement and leaf drying
- Practice crop rotation

Chemical Approaches

Start plants on a preventative fungicide program within 2 (field) or 3 (greenhouse) weeks of setting plants.

- Greenhouses: Apply mancozeb and/or copper on a 7 to 10 day schedule early in the season. If moderate disease pressure continues as harvest approaches, replace mancozeb with a systemic fungicide; otherwise continue with copper every 7 to 10 days. For specific systemic fungicide options with shorter preharvest intervals, see ID-36, page 18.
- Fields: Apply mancozeb or chlorothalonil on a 7 to 10 schedule early in the season; incorporate copper for bacterial disease management. Shorten spray intervals under rainy conditions. Use a systemic fungicide tank-mixed with a protectant (mancozeb, chlorothalonil) at the third spray, and alternate between protectants and systemic fungicides as the season continues. A sample fungicide program for tomatoes may be found on page 97 in ID-36.

As always, all label recommendations must be followed when applying fungicides to crops. Pay particularly close attention to pre-harvest intervals.

Resources

- IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky (ID-172)
- Home Vegetable Gardening (ID-128)
- Vegetable Production Guide for Commercial Growers (ID-36)
- Managing Greenhouse & High Tunnel Environments to Reduce Plant Diseases (PPFS-GH-01)
- Greenhouse Sanitation (PPFS-GH-04)