Decoquinate is a quinolone feed additive intended for the control of coccidiosis, a common protozoan infection in farm animals that predominantly affects young animals. The premix is not intended for use in lactating dairy cattle, sheep, and goats, or laying chickens. It is labeled for use in ruminating and non-ruminating calves (including veal calves) and cattle, broiler chickens, and young sheep and goats. To ensure food consumers are not exposed to drug residues at potentially harmful concentrations, maximum residue limits (MRLs) for veterinary drugs in food animal tissues and products have been established. However, in the United States, no MRL has been established for decoquinate in milk; therefore, any amount detected constitutes a residue violation.

In May 2012, the Michigan Department of Agriculture and Rural Development (MDARD) was notified that dairy cattle at one farm strayed away from their paddock and consumed approximately 300 pounds of calf feed containing decoquinate (Deccox). The farmer did not realize the cattle had accessed the feed until after they had been milked and the tanker loaded. The contaminated tanker held about 30,000 pounds of milk, of which 4,000 pounds came from this farm.

Decoquinate comes with the Warning Statement: Do Not Feed to Animals Producing Milk for Food. Therefore, this load of milk posed a potential risk to human health. In lieu of human consumption, the milk cooperative requested to convert the contaminated load of milk from a food to a feed, intending to ship the milk to a veal farmer. The cooperative, which also had a current Commercial Feed License, was asked to produce a “medicated feed label.” Due to the urgency of getting the milk tested for levels of decoquinate, the firm couldn’t produce a label so that the feed could be properly fed to the veal calves (22.7 mg/100 pounds of bodyweight/head per day). Accordingly, the firm opted to have the milk land applied, generally the last resort for any milk producer.

As a result of these events, MDARD suspended the dairy farm permit until the milk was tested and found to be free of decoquinate. In the absence of having a validated method for the matrix of concern (e.g. milk), state and other diagnostic laboratories must validate tests for the analyte (drug) in milk. To the chagrin of the producer and regulatory officials, this process could take several weeks, if not longer to establish.

The Michigan State University Diagnostic Center for Population and Animal Health (MSU DCPAH) was contacted to provide assistance. In response, an emergency method was developed and validated for a quantitative assay by LC-ESI/MS/MS (liquid chromatography electrospray ionization tandem mass spectrometry). This was done, in part, by following guidance documents available from the U.S. Food and Drug Administration (FDA) that define minimum requirements for method validation in case of such emergencies. The milk sample taken from the dairy cows only five days post-exposure was negative.

In this instance, the milk producer and MDARD took the necessary steps to ensure that the milk supply remained wholesome and free of veterinary drug residues. The lack of validated methods for drugs not intended for use by dairy animals creates a quandary for regulatory officials seeking to assist the producer in a timely manner and for diagnostic laboratories, such as MSU DCPAH, attempting to ensure quality results that meet regulatory criteria. Ad hoc methods are valuable in the event of emergencies, but do not provide a long-term solution for diagnostic centers attempting to rapidly respond to the needs of the animal industry.
Ticks from Coast to Coast, Year-Round

By: Steven R. Bolin, DVM, MS, PhD

What do the diseases anaplasmosis, babesiosis, ehrlichiosis, Lyme disease, and Rocky Mountain spotted fever have in common?

The answer is ticks. All of those diseases are transmitted by ticks to humans and various species of livestock and companion animals. Ticks that carry those diseases include the lone star tick (*Amblyomma americanum*), the American dog tick (*Dermacentor variabilis*), the brown dog tick (*Rhipicephalus sanguineus*), and both the blacklegged and Western blacklegged ticks (*Ixodes scapularis* and *I. pacificus*).

The lone star tick is found throughout the southern United States and recently expanded into the northeast Atlantic coast and southern Great Lakes regions. The American dog tick is found throughout the eastern half of the United States and in California. The brown dog tick is found throughout the country. The blacklegged tick is found throughout the southern states, along the Atlantic coast to Maine, and in the western Great Lakes region. The Western blacklegged tick is found along the Pacific coast.

Many tick species are expanding their ranges and moving into areas where they have not been found historically. In addition to national data provided by the CDC ([cdc.gov/ticks](http://cdc.gov/ticks)), look for state and local information provided by government agencies such as Community Health and Agriculture for more information on specific regions. In the last 4 years, nearly 250 ticks have been submitted to DCPAH from 21 states and provinces.

Ticks can be found on pets during all seasons of the year, not just in the spring and summer, but there is a seasonal pattern for when particular species are likely to be submitted (Figure 1). These trends likely reflect numbers of adult ticks actively feeding. The months from April to July are when the highest numbers of ticks are submitted. The *Ixodes* ticks, which carry Lyme disease caused by *Borellia burgdorferi*, anaplasmosis caused by *Anaplasma phagocytophilum*, and babesiosis caused by several species of *Babesia*, are submitted most frequently from October to May. April to August yield the most submissions for *Dermacentor variabilis* and *Amblyomma americanum*. Those ticks carry *Anaplasma phagocytophilum*, *Ehrlichia spp.*, and Rocky Mountain spotted fever caused by *Rickettsia rickettsii*.

What if ticks are found on a pet?

We recommend that the pet is taken to a veterinarian for tick removal done by following the instructions available from the Centers for Disease Control: [cdc.gov/ticks/removing_a_tick.html](http://cdc.gov/ticks/removing_a_tick.html). It is important to carefully remove a tick so that the head remains attached. An intact head on the tick can aid in identification which is important for determining which diseases are of concern. If the tick cannot be identified at the veterinary clinic, the tick can be sent to the DCPAH for identification (test code 60066).

* sesame seed

Ticks are arachnids, not insects. After hatching from an egg, the tick must have a blood meal to advance from one life stage to the next. The stages in the life cycle of a tick are the egg; small, six legged larva; slightly larger, eight legged nymph; and the adult. Although larva and nymph stage ticks feed on pets and can transmit disease, those life stages are very small in size and it can be difficult find them on a pet. The adult stage is larger in size and is more easily found, especially if the tick is partially engorged with blood. Most ticks submitted to DCPAH are adults.
How do you submit a tick?

First, do not squish the tick. Preferably, place the intact tick in a screw top container or empty blood tube with a tight fitting stopper. Ticks can escape from a push-and-twist-top pill bottle. Do not place the tick in formalin solution. Do not stick the tick to a piece of tape. If the tick is dead and dried out, place it in some saline solution. The tick can be shipped without an ice pack. When the tick is identified, either at the veterinary clinic or at DCPAH, a tick PCR assay (test code 60065) can be done to detect disease-causing organisms that may be borne by the tick.

Overall, of the PCR diagnostics performed at DCPAH, positive results are most likely for Rickettsia sp. (14%). [Note: Some Rickettsia sp. in ticks are not pathogenic for people or animals.] In addition, 5% of PCRs for B. burgdorferi (the bacterium that causes Lyme disease) are positive, as well as 4% of Babesia sp. and 2% of Anaplasma sp. However, ticks collected from disease-endemic areas are more likely to be positive.

Symptoms for tick-borne diseases in animals are typically non-specific but often include fever, weakness, lethargy, lameness, lack of appetite, vomiting, and diarrhea. While much of the veterinary focus on tick-borne diseases tends to be on dogs, remember that many species, including horses, are also susceptible. Prevention, identification, diagnostic testing, and early treatment for infection are keys to decreasing the incidence of severe illness and fatalities.

If a pet is suspected of having a tick-borne disease, what can DCPAH do to help make the diagnosis?

The same PCR assays that are done on ticks to detect the organisms that cause tick-borne disease can be done on a blood sample (purple top, EDTA tube) collected from the pet. Those tests are Anaplasma PCR (90051), Lyme PCR (60059), Babesia sp PCR (60003), Ehrlichia PCR (60048), and Rickettsia PCR (60060). The PCR tests are best done in the acutely affected pet before treatment is started.

After treatment is started, or in the chronically affected pet, the preferred tests would be serum based assays such as the Tick Borne Disease Antibody Screen (60013), which includes all of the tick-borne diseases mentioned here. Tests that can be ordered individually are Anaplasma phagocytophilum IFA (60033), Babesia canis IFA titer (60001), Ehrlichia canis IFA Titer (60088), Lyme IFA (60014), and Rickettsia rickettsii IFA (60021). The antibody titer is reported for all IFA tests. This allows for meaningful comparison of acute and convalescent samples of serum.

If a tick is never found on a pet, can the pet still acquire a tick-borne disease?

Yes, remember that the larva and nymph stages of ticks are very small and easily missed when a pet is examined for ticks. Also, we have received several engorged ticks that were not found on the pet, but were found in the house in areas frequented by the pet. So it is possible even for an engorged tick to escape detection on a pet.

As always, if you have questions, need help ordering tests, or want more information on testing; call DCPAH. We enjoy the opportunity to talk with our clients!

Client Education Resources Available!

A guide on ticks and tick-borne diseases for clinicians and pet owners is available at animalhealth.msu.edu. It includes quick tick facts, resources for additional information, and resources specifically for our Michigan clients. Another guide for pet owners is also available, Leptospirosis: What Every Dog Owner Should Know. More client education resources are coming! Please let us know if you have topics you’d like us to cover by contacting Courtney Chapin, chapinco@dcpah.msu.edu.
Biennial Fee Update - A Letter from Our Director

DCPAH’s commitment to customer service has helped us to better meet the needs of our clients in such areas as test offerings and shipping options. We strive to provide state-of-the-art diagnostic service within an academic atmosphere that encourages innovation and in-depth consultation. We continue to welcome your suggestions for service improvements.

However, our operation costs are not immune from the increases seen across the economy. To offer clients the most stable pricing possible, we review our fee structure every two years. Effective October 1st, 2012, DCPAH test fees will be increased approximately 6% overall with some variation from test to test. Fee increases are a necessary but unwelcome change for all of us. Please remember that we make every effort to price our services fairly and competitively for our clients and have never charged accession or out-of-state fees for any service.

An updated schedule for the services provided by DCPAH is included with this newsletter. However, please note that the most current fee information for all the tests we offer is always available to you on our website at animalhealth.msu.edu.

Thank you for your continued business. We look forward to partnering with you to provide the best in diagnostic medicine as you work to meet the diverse needs of your clients.

Sincerely,

Carole A. Bolin, DVM, PhD
Director