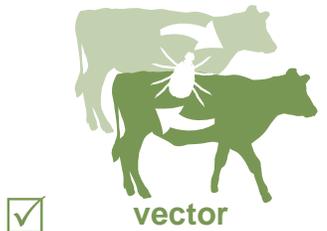
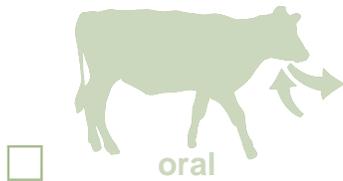
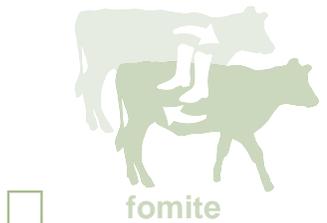


# Heartwater

## Prevention Practices

### Route(s) of Transmission:



## Introduction

Heartwater is caused by a bacteria that is spread through ticks and affects:

- Cows
- Sheep
- Goats
- Antelope
- Buffalo

Signs of illness include:

- High fever
- Convulsions
- Sudden death
- Stop eating
- Depression
- Breathing problems

This disease does not affect humans.

Heartwater is transmitted to other animals through vectors.

The following pages contain more information about Heartwater. Prevention practices are also included.

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**If you notice any signs of illness in your cattle that resemble Heartwater, or unexplained illness or death, contact your local veterinarian immediately.**

## Heartwater

### What is heartwater and what causes it?

Heartwater is a disease of domestic and wild cattle, deer, sheep and goats. It is caused by the bacteria *Ehrlichia ruminantium* (air-lick-EEah ROO-mi-NAN-tium), is spread by infected ticks, and commonly causes death of infected animals. Heartwater is widespread in most of Africa and is also found on a few Caribbean islands. Currently, heartwater is not found in the United States.

### What animals get heartwater?

Wild and domestic ruminants (cattle, sheep, goats, antelope and buffalo) can get heartwater.

### How can my animal get heartwater?

Animals become infected with heartwater after being bitten by an infected tick (**vector**). Ticks from the family *Amblyomma* (am-blee-OHM-ah) are responsible for the spread of the disease. Two species of ticks from this family are present in the United States. Although they do not carry the bacteria that cause heartwater, they are very similar to the tick (*Amblyomma variegatum*, also known as the Bont Tick) that does. Also, the Bont Tick has been found on imported tortoises in Florida and has the possibility to arrive on cattle egrets flying in from the Caribbean Islands.

### How does heartwater affect my animal?

There are four forms of heartwater: peracute, acute, subacute, and the mild form (known as heartwater fever).

In the peracute form of the disease, animals experience a fever, convulsions, and sudden death.

Animals with the acute form first develop a sudden high fever, loss of appetite, depression, and breathing problems. Nervous system problems may follow, including excessive chewing motions, incoordination, circling, and a high-stepping gait. Some animals may experience convulsions. Death usually occurs within a week once signs are noticed.

The subacute form is rare, and animals experience a prolonged fever, coughing, and mild incoordination. The animal will either recover or die within 1 to 2 weeks.

Heartwater fever is a mild form of heartwater, and may occur in some breeds that have a natural resistance to the disease. A brief fever is the only sign of this form of the disease. Animals with heartwater fever usually recover.

If heartwater was introduced into the United States, the peracute and acute forms would probably be seen.



### Can I get heartwater?

No. People cannot become infected with the bacterium that causes heartwater.

### Who should I contact, if I suspect heartwater?

#### In Animals –

Contact your veterinarian.

### How can I protect my animal from heartwater?

Heartwater is considered a foreign animal disease and is not present in the United States. The best approach to prevention is controlling ticks and monitoring your cattle.

To control ticks, use an approved insecticide on your cattle. Consult with your herd veterinarian for advice on approved and effective products.

It is also essential to inspect your livestock frequently for the presence of ticks and remove them promptly if found.

### For More Information

CFSPH Technical Fact Sheets. Heartwater at <http://www.cfsph.iastate.edu/DiseaseInfo/>

Heartwater: Another Potential Foreign Animal Disease. [http://www.vetmed.ucdavis.edu/vetext/INF-DA/INF-DA\\_HEARTWATER.HTML](http://www.vetmed.ucdavis.edu/vetext/INF-DA/INF-DA_HEARTWATER.HTML)

USDA APHIS factsheet. Heartwater. [http://www.aphis.usda.gov/lpa/pubs/fsheet\\_fa\\_notice/fs\\_ahheartw.html](http://www.aphis.usda.gov/lpa/pubs/fsheet_fa_notice/fs_ahheartw.html)

# PREVENTION PRACTICES FOR HEARTWATER

If a case of heartwater is confirmed in the United States, it could spread to other parts of the nation through infected ticks. If any animal on your farm is confirmed to have heartwater, all animals on the farm that could get sick (cattle, sheep and goats) may be removed and isolated or euthanized and disposed of to control the further spread of disease.

There are steps you can take to help prevent heartwater from entering your farm. **Strict biosecurity practices** can help you and your neighbors **minimize the chances** that your animals will have to be destroyed.

A General Precautions handout (found on the CFSPH website) provides prevention steps that should always be used on a farm.

The biosecurity practices outlined here should be put into place **immediately** if heartwater is confirmed anywhere in the U.S. and maintained until the U.S. is once again declared heartwater free.

## General Precautionary Measures

Prevention measures to minimize the introduction and spread of heartwater onto your farm fall into three general categories.

1. Restrict or stop all animal movement to prevent entry or spread of the disease.
2. Examine cattle for the Gulf Coast tick, the tick that spreads heartwater disease.
3. Observe, detect and report any disease or unusual signs to your herd veterinarian as quickly as possible.

Specific steps you can take upon heartwater being confirmed in the United States are listed below. Many should already be in place on your farm but should be enhanced and more strictly enforced in the event heartwater is confirmed in the U.S. This will minimize the chance of the disease being introduced onto your farm.

## Farm Entrance

- **Limit access to your farm.**
  - The entrance to your farm is a major control point.
  - Have only one gated entrance to the animal areas on your farm to better control and monitor all visitors and vehicles arriving at your farm.
  - Keep the gate locked when not in use.
- **Stop all movement of animals on and off your farm.**
  - If heartwater is confirmed in the U.S., movement restrictions may be implemented locally, regionally and possibly nationally.

- Restrictions will depend on the scope of the outbreak.
  - These measures will minimize the spread of heartwater to other areas, including your farm.
- **Post signs at the farm entrance to inform visitors of procedures to follow on your farm. (See Appendix A)**
    - Stay off this farm unless given permission to enter.
    - Honk before getting out of vehicle (to announce your arrival).
    - Check-in with farm personnel upon arrival. (Direct visitor to "where" they should check-in).
    - Follow farm visitor policies.

## Gulf Coast Tick

### Distribution

- **The Gulf Coast tick (*Amblyomma maculatum*), is a tick species that could spread heartwater disease to cattle, sheep, goats and white-tailed deer.**
- **It is NOT found in all parts of the U.S.**
  - It has been reported in Kansas south to Texas, east across the Gulf Coast States to the Atlantic seaboard, approximately 100 miles in from the coast. (See Appendix B)
- **Gulf Coast ticks do not feed on people but could travel on them or other animal species to other areas.**
  - These ticks will also feed on wildlife, horses and dogs. Horses and dogs will not develop heartwater disease.
  - White-tailed deer are VERY sensitive to heartwater disease and die if infected.
- **The African tortoise tick (*Amblyomma marmoreum*) has established itself in Florida. It prefers to feed on tortoises but is a known spreader of heartwater disease.**
- **There are other *Amblyomma* ticks that currently are not present in the U.S. that also spread heartwater disease.**
  - The tropical bont tick (*Amblyomma variegatum*) lives in the Caribbean and could travel to Florida and beyond on cattle egrets, a wild bird.
  - The bont tick (*Amblyomma hebraeum*) from Africa could survive in Florida and Texas and easily spread heartwater disease if it were introduced into the U.S.

# PREVENTION PRACTICES FOR HEARTWATER (CONT'D)



## Gulf Coast Tick (cont'd)

### Life Cycle

- **Gulf Coast ticks are considered 3 host ticks, meaning they attach to a different animal to blood feed for each of their life stages. (See Appendix C)**
  - The first stage is the egg; the second is a larva with 6 legs; the third is a nymph with 8 legs and the fourth stage is adult.
- **Each life stage, besides the egg, attaches itself to an animal, feeds on blood, and then drops off to change (molt) to the next stage.**
  - The tick will carry heartwater disease through its entire life, spreading it each time they feed.
- **Ticks molt on the ground in grass or areas with lots of vegetation.**
  - Nymphs, larvae and adult ticks "quest" or seek out animals by climbing to the top of a blade of grass and latching on to animals legs as they pass by.
- **Adult Gulf Coast ticks can be found on animals at various times of the year.**
  - Oklahoma and Kansas:
    - Adults- winter active
    - Larvae, nymphs - late spring, summer active
  - Texas and Gulf Coast states:
    - Adults- August through October active
    - Larvae, nymphs- winter active
  - Tick control strategies must be applied accordingly.

## Animals

### Livestock

- **Monitor animals closely and frequently for any presence of ticks or developing illness. (See Appendix C for examples of the Gulf Coast tick)**
- **Following exposure to the tick, an animal usually shows illness in 2 to 4 weeks.**
- **Know the signs of heartwater in animals (photos found in Appendix D)**
  - Educate yourself and train your employees to recognize the signs of illness
  - Signs result from injury to the blood vessel walls which causes "leaking"
    - The name heartwater is due to the fluid that forms around the heart during the disease and is seen on post mortem exams
  - There are different forms of heartwater disease
- The most common form can cause:
  - Sudden death
  - Sudden high fever (up to 107°F)
  - Death in less than one week after onset of fever
  - Loss of appetite
  - Depression, recumbency leading to death
  - Rapid, difficult breathing
  - Fluid in lungs, chest cavity
  - Nervous signs in some cases: chewing, eyelid twitching, tongue sticking out, walking in circles with a high stepping gait, convulsions
- **Calves born to infected cows must be removed and euthanized because heartwater can spread during pregnancy and through colostrum.**
- **Contact your herd veterinarian immediately if ticks or unusual signs are noticed.**
- **Tetracycline antibiotics are only effective if given EARLY in the course of the disease, by day 2 or 3 after fever appears and before nervous signs.**
- **Isolate sick animals from the herd to minimize disease spread.**
  - If these animals are carrying heartwater disease, they should be euthanized and destroyed as they will serve as a source of disease on farm for other ticks to spread.
  - Quarantine all animals that were in contact with the sick animal.
  - Treat the herd with tetracyclines and dip them in an acaricide to prevent ticks.
- **Use separate facilities, equipment and staff to handle isolated livestock.**
  - Since heartwater is carried in the blood of animals, NEVER share needles or syringes between animals.
  - If this is not possible, handle or visit the isolated animals LAST.
- **Any animals that have recently been purchased or have returned to the farm should be quarantined for 30 days.**
  - New or returning animals (e.g. shows, competitions) can be infected with heartwater without showing signs right away.
  - Quarantine allows time for a disease to develop in the animal, without exposing your entire herd to the disease agent. The animal can then be examined, diagnosed and treated.
  - Animals exposed to heartwater can take 2-4 weeks before illness is seen.
  - Ideally animals should be quarantined at a separate location (premises).

# PREVENTION PRACTICES FOR HEARTWATER (CONT'D)



## Wildlife and Other Animals

- **Limit exposure to free roaming animals (wildlife, birds, small mammals).**
  - Wildlife, birds and small mammals can carry the ticks that spread heartwater.
  - White-tailed deer are very sensitive to heartwater disease and die if infected; alert your herd veterinarian immediately if you notice multiple dead deer in your area.
  - Dogs should be restricted to the farm (tied up, kenneled) and examined daily for ticks as they could introduce infected ticks to the cattle.
  - There are topical products available for dogs, applied monthly, that protect against certain species of tick infestation; consult your veterinarian for more details.
- **Control of wildlife will be difficult, but should be attempted.**
  - Keep farm access routes, parking areas, yards, and storage areas clean and tidy to avoid attraction of birds or small mammals.

- **Record any visitors onto the farm with a log sheet. (See Appendix E)**
  - Maintain accurate record keeping onto and off of your farm to help with surveillance and tracking should it become necessary.
  - Do not rely on your ability to recall visitors and vehicles that have accessed your farm.
- **All visitors should be accompanied by someone from the farm at all times.**
- **Visitors should avoid livestock areas, pens, barns unless absolutely necessary.**

## Neighbors

- **Discuss the threat of heartwater with your neighbors.**
- **Determine steps you can take together to protect your area and farms from becoming infected.**
  - Keep vegetation mowed short to eliminate tick habitats.
  - Prevent free roaming dogs.

## Record Keeping

- **Maintain thorough and accurate records of animal movement.**
  - Document all animal movements, including the dates of introduction into the herd and where they came from and movements between separate units.
  - Each farm location must be treated as a separate unit or premise.
  - This information will be essential to help trace where the disease came from.
- **Record the location of any ticks found on animals- head, ears, back, legs, etc.**
  - Indicate if the ticks were blood filled (engorged) or newly attached (unengorged).
- **Know the health status and source of any animal(s) brought onto your farm.**
  - Do not bring animals onto your farm unless they have been proven to be from heartwater-free areas, especially if they are imported from the Caribbean or Africa.

## People

### Employees and Visitors

- **Employees or visitors that have contact with livestock at other locations (including their own home), should check themselves for ticks and remove them before entering your farm.**

## Tick Control

### Acaricides

- **Acaricides are products aimed at killing ticks and should be applied to cattle every 2-4 weeks (see Appendix F) in affected areas.**
  - These are available as direct applications to animals as pour-ons, sprays or impregnated ear tags.

### Animals, pastures

- **Cattle in affected areas should be examined daily, especially parts of the body difficult to groom, for the presence of the Gulf Coast tick.**
  - Nymph stage ticks can be found around the withers, along the top of the back, near the tail head and on the soft tissue between the hooves.
  - Adult ticks can be found near the udder, inside the legs, around the testes or prepuce, and above and under the tail.
  - If found, isolate the animal and contact your herd veterinarian immediately.
- **Pastures should be inspected weekly for the presence of the Gulf Coast tick.**
  - Keep pastures short by grazing and mow those that are not routinely grazed to minimize vegetation where ticks could live.

# PREVENTION PRACTICES FOR HEARTWATER (CONT'D)



## References

- Williams HR, Teel PD, Strey OF, Wright RE, Mock DE. Zoogeography of the Gulf Coast tick, *Amblyomma maculatum* Koch accessed July 7, 2005 at <http://ticsys.tamu.edu?HEATHERSPROJ.htm>
- Texas A&M Discover Entomology website. 'Honey, I'm Ready': Signals of Gulf Coast Tick accessed November 4, 2005 at <http://insects.tamu.edu/feature/tick/>
- Kansas Insect Newsletter, Department of Entomology, Kansas State University, Gulf Coast ticks make their presence felt in Kansas accessed November 4, 2005 at [http://www.oznet.ksu.edu/dp\\_entm/extension/KIN/KIN\\_2005/kin-8/05ksnew8.htm](http://www.oznet.ksu.edu/dp_entm/extension/KIN/KIN_2005/kin-8/05ksnew8.htm)
- Auburn University Highlights of Ag Research, Volume 47, Number 3, 2000. Alabamians vulnerable target for ticks accessed November 4, 2005 at <http://www.ag.auburn.edu/aaes/communications/highlightsonline/fall00/tick.html>
- USDA APHIS VS Heartwater Fact sheet July 2002 accessed November 4, 2005 at [http://www.aphis.usda.gov/lpa/pubs/fsheet\\_faq\\_notice/fs\\_ahheartw.html](http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahheartw.html)

# PREVENTION PRACTICES FOR HEARTWATER

## APPENDIX A



**Sample signs to post at the farm entrance in the event of a Heartwater outbreak in the U.S.**  
 (Available from your state livestock extension specialist or the CFSPH web site at [www.cfsph.iastate.edu](http://www.cfsph.iastate.edu))

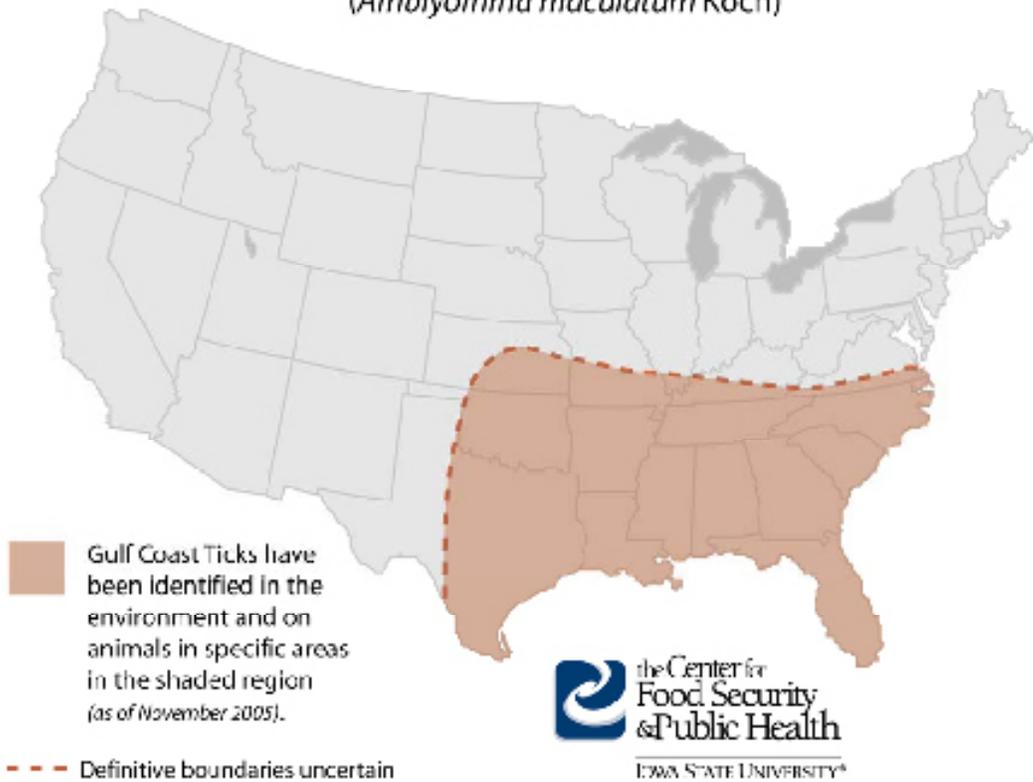


**Additional signage available from private companies**  
 (Those listed below are available from Gempler's).



## APPENDIX B

### Approximate Distribution of the Gulf Coast Tick (*Amblyomma maculatum* Koch)



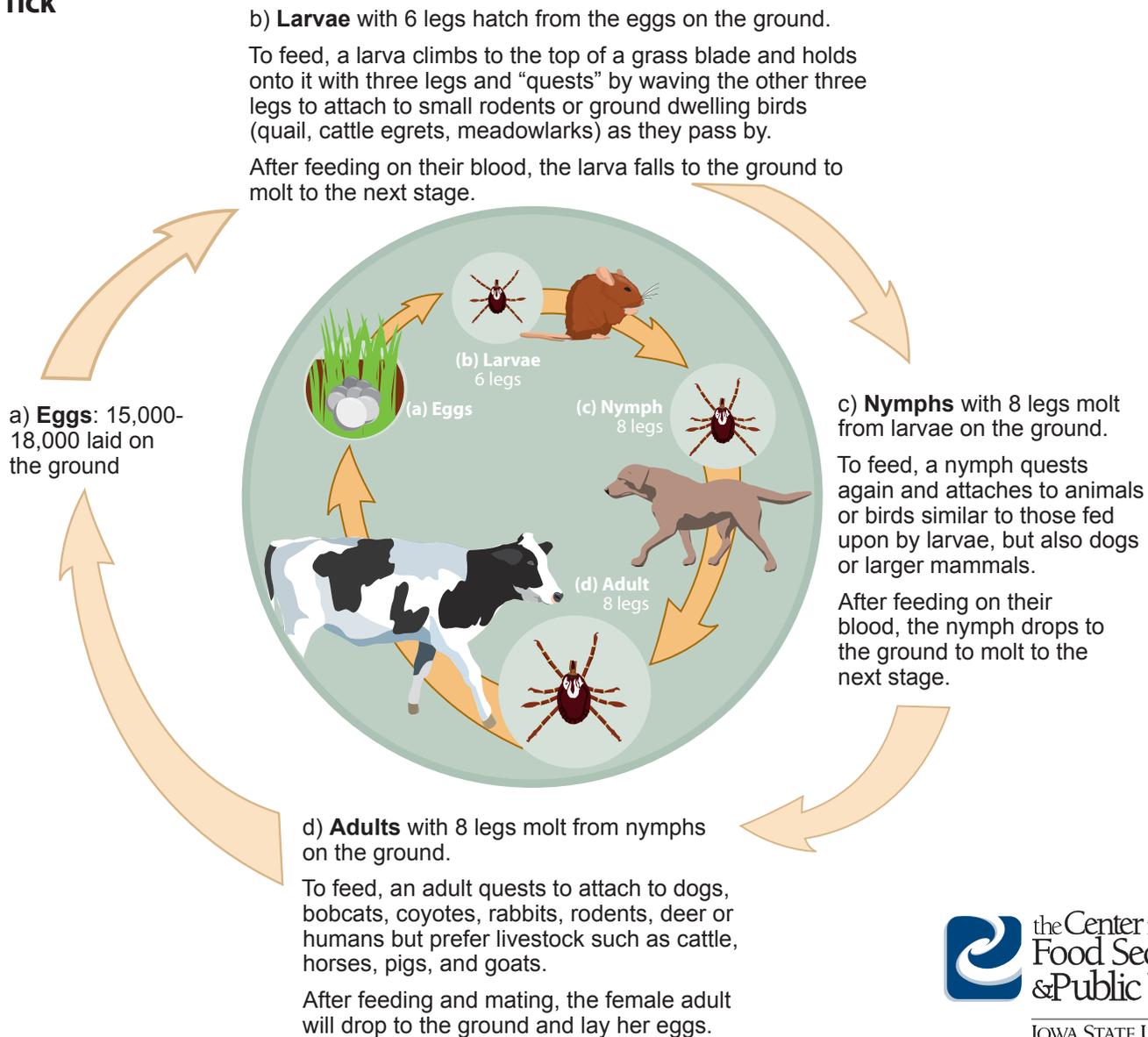
# PREVENTION PRACTICES FOR HEARTWATER

## APPENDIX C



### Life Cycle of the *Amblyomma* Tick

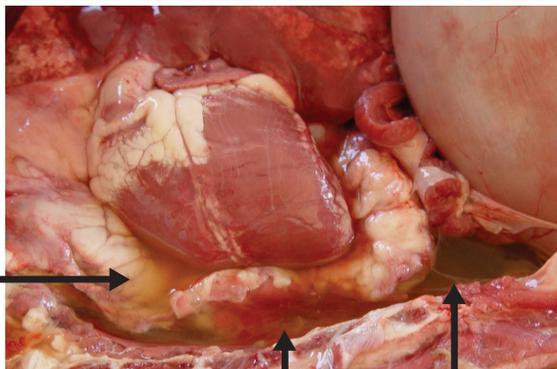
#### A THREE HOST TICK



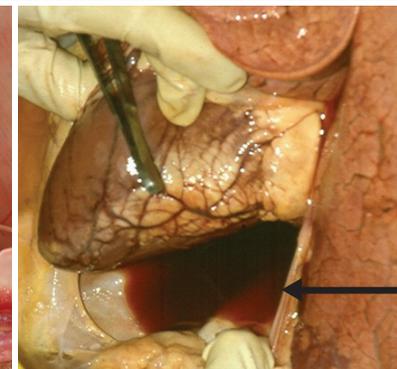
# PREVENTION PRACTICES FOR HEARTWATER APPENDIX D



## IMAGES OF HEARTWATER Signs of Illness in Cattle



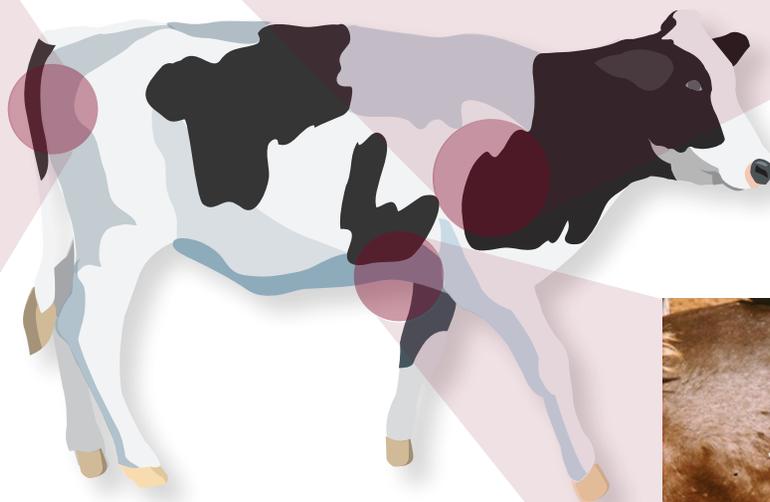
Fluid in chest cavity



Heart with fluid in the sac around it



Blood-filled ticks can be found under the tail



Blood-engorged ticks can also be found inside the front legs and on the underbelly region- hard to groom areas





# TICK CONTROL MEASURES

## APPENDIX F



### Acaricides: products that kill ticks

- Many products are available; check with your herd veterinarian or local extension office for approved products in your area.
- Directly applied animal products
  - Pour-ons or sprays with amitraz, coumaphos, or permethrins should prevent the Gulf Coast tick on cattle for 2-3 weeks depending on environmental conditions (rain, level of tick infestation).
  - Read all label directions and apply accordingly including the use of proper personal protective wear, like gloves (if indicated).
  - Since Gulf Coast ticks attach to areas that are hard to groom (ears, tail area, inside of legs, top of back), spray acaricide to get adequate coverage (hair coat must be thoroughly soaked to make sure the skin is wet with product). Dipping is also effective.

**It is a violation of state and federal law to use a pesticide in any manner that differs from the product label. Use only according to label directions to avoid meat or milk residue hazards, environmental damage, and animal or human injury.**

- Insecticide cattle ear tags
  - Ear tags should contain an organophosphate (OP), a pyrethroid or combination OP-pyrethroid to be effective against the Gulf Coast tick.
  - Read all labels and apply accordingly (only specifically labeled ear tags are to be used with lactating dairy animals). One tag in each ear is recommended for Gulf Coast tick prevention.

- Examples of OP containing tags include ethion 36%, diazinon 20 or 40%, coumaphos 20% with diazinon 20%, or chlopyrifos 10% with diazinon 30%.
- Examples of pyrethroid ear tags include beta-cyfluthrin 8%, fenvalerate 8.6%, permethrin 10%, and zeta-cypermethrin 10%.
- Examples of combination ear tag products include cypermethrin 7% with chlorpyrifos 5%.
- Work with your herd veterinarian to select the best impregnated ear tags for your cattle.

### Animals, pastures

- Cattle in affected areas should be examined daily, especially parts of the body difficult to groom, for the presence of the Gulf Coast tick.
- Dogs and other small mammals can transport the Gulf Coast tick and should also be examined daily.
  - There are topical products available for dogs, applied monthly, that protect against certain species of tick infestation; consult your veterinarian for more details.
- Pastures should be inspected weekly for the presence of the Gulf Coast tick.
  - Walk through pastures wearing light colored clothing (long pants tucked into socks) and watch for the dark little ticks to attach. See below for removal and identification information.
- Keep pastures short by grazing or mowing to minimize vegetation where ticks could live.

### Tick removal and identification

- To remove a tick attached to an animal, apply slow steady pressure near its mouthparts with a narrow-tip tweezers.
  - Never squeeze an attached tick as it will inject its body fluids into the animal and it could be carrying heartwater disease.
  - Humans cannot get heartwater disease, but if you find a tick attached to a person, use the same removal technique. Leaving part of the tick embedded in the skin can cause an infection.
- Place the tick in a sealed container with a small piece of a damp paper towel.
  - Place the container in a sealed bag and give it to your local veterinarian or extension office for identification.
  - To make identification easier, only place the ticks from the same species (cattle separate from dogs or humans) into the same container.
  - Identification of the actual Gulf Coast tick is important because they are small and many can look alike. Other tick species do not spread heartwater disease.

### For More Information

University of Nebraska-Lincoln Neb Guide on Controlling Ticks published electronically August 1995 and accessed November 7, 2005 at <http://ian-rpubs.unl.edu/insects/g1220.htm>.

D.P. Furman and E.C. Loomis. 1984. The Ticks of California. University of California Publications, Bulletin of the California Insect Survey, Vol. 25. University of California Press, California.

Kansas Insect Newsletter, Department of Entomology, Kansas State University, Gulf Coast ticks make their presence felt in Kansas accessed November 4, 2005 at [http://www.oznet.ksu.edu/dp\\_entm/extension/KIN/KIN\\_2005/kin-8/05ksnew8.htm](http://www.oznet.ksu.edu/dp_entm/extension/KIN/KIN_2005/kin-8/05ksnew8.htm)

# HEARTWATER PREVENTION PRACTICES CHECKLIST



## General Precautionary Measures

- Y N Have you restricted or stopped all animal movement on or off your farm to prevent entry or spread of heartwater disease?
- Y N Do you use strict biosecurity measures for animals and people?

## Farm Entrance and Perimeter

- Y N Do you limit access to your farm?
- Y N Do you have only one gated entrance to the animal areas on your farm to better control and monitor visitors and vehicles?
- Y N Do you keep the gate locked when not in use?
- Y N Have you posted signs at the farm entrance to inform visitors to stay off your farm unless absolutely necessary?
- Y N Have you posted a visitor biosecurity sign that clearly lists specific measures to follow when on your farm?
- Y N Do you require visitors to follow your farm's biosecurity procedures?
- Y N Do you require visitors to check-in with farm personnel upon their arrival?

## Gulf Coast Tick

- Y N Do you house your cattle in an area that is free of the Gulf Coast Tick?
- Y N Do you know what seasons the Gulf Coast Tick actively feeds on animals if found in your area of the U.S.?

## Animals- Livestock

- Y N Do you closely monitor animals for ticks, especially in the areas difficult to groom (ears, udder, tail head, inside legs)?

PROMPTLY REMOVE ANY TICKS AND SUBMIT THEM TO YOUR VETERINARIAN OR LOCAL EXTENSION OFFICE TO BE IDENTIFIED.

## HEARTWATER PREVENTION PRACTICES CHECKLIST (CONT'D)



- Y N Do you closely monitor animals every day for any developing illness?
- Y N Have you educated yourself about heartwater and the signs of infection?
- Y N Have you educated your employees about heartwater disease and the signs of infection?
- Y N Do you isolate sick animals from the herd to minimize disease spread?
- Y N Do you use separate facilities, equipment, and staff to handle isolated livestock, especially needles and syringes?
- Y N Do you require that any animals that have recently been acquired or have returned to the farm be quarantined for a minimum of 30 days?

**CONTACT YOUR HERD VETERINARIAN IMMEDIATELY IF ANY UNUSUAL SIGNS OF ILLNESS ARE OBSERVED.**

### Animals- Wildlife, Other

- Y N Do you limit exposure between your livestock and wildlife, birds, and small mammals?
- Y N Do you keep dogs kenneled or tied securely to avoid contact with livestock?
- Y N Do you closely monitor your dogs for ticks or apply monthly topical treatments to prevent them from infestation?
- Y N Do your neighbors prevent their dogs from roaming off their farm?
- Y N Do you keep your farm, yards, and storage areas clean and tidy to avoid attraction of birds and small mammals?

### Record Keeping

- Y N Do you maintain thorough and accurate records of animal movement?
- Y N Is each farm location treated as a separate unit?
- Y N Do you know the health status and the source of the animal(s) brought onto your farm?
- Y N Do you only bring animals onto your farm if they are proven to be from heartwater-free areas?

## HEARTWATER PREVENTION PRACTICES CHECKLIST (CONT'D)



### People

- Y N Do you require employees or visitors check themselves for ticks before entering your farm?
- Y N Do you maintain a log sheet to record any visitors or vehicles that come onto your farm?
- Y N Are visitors accompanied by someone from the farm at all times?
- Y N Do you require that visitors avoid livestock areas, pens, and barns unless absolutely necessary?

### Neighbors

- Y N Have you discussed the threat of heartwater disease with your neighbors and determined precautions you can take together to protect your farms from becoming infected?
- Y N Do you work together to keep vegetation mowed short to eliminate tick habitats?

### Tick Control

- Y N Have you discussed acaricide treatment with your veterinarian and established a plan for your animals?
- Y N Do you inspect pastures weekly for the presence of the Gulf Coast tick?

### Conclusion

**Total number of:**      **Yes responses**      \_\_\_\_\_      **No responses**      \_\_\_\_\_

If you have 1 or more No responses, you have identified areas for improvement on your farm. Not all questions are equal in their risk of disease transmission, so it is important to work with your veterinarian to develop a management plan addressing the biggest risks first. This will help minimize the chance of heartwater disease from entering your farm. Each farm will be unique in their ability to prevent disease transmission because management styles, herd sizes and finances vary.