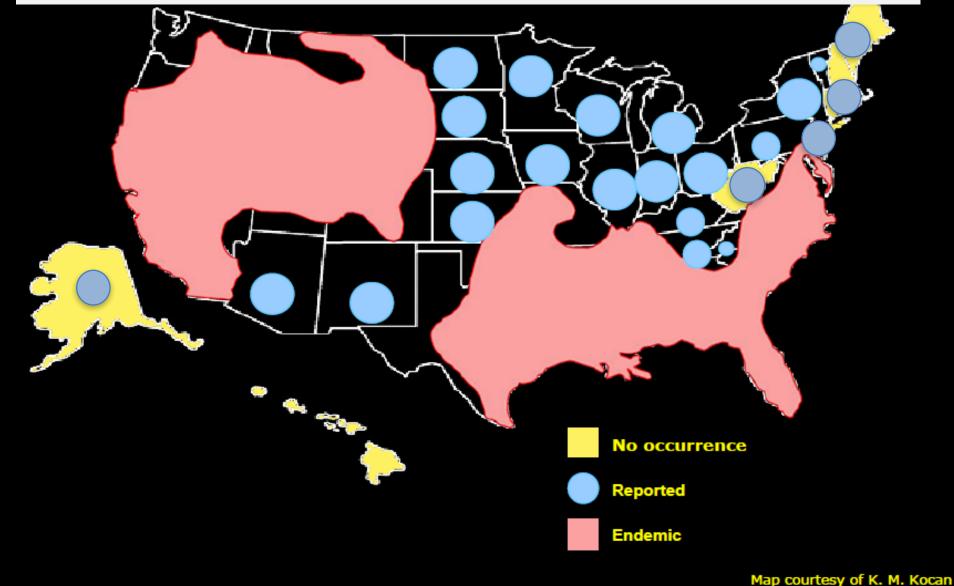
# Anaplasmosis: What it is and what it isn't

Dr. Mike Apley College of Veterinary Medicine Dr. Gregg Hanzlicek Kansas State Veterinary Diagnostic Laboratory

### Anaplasmosis is reported in every state except Hawaii

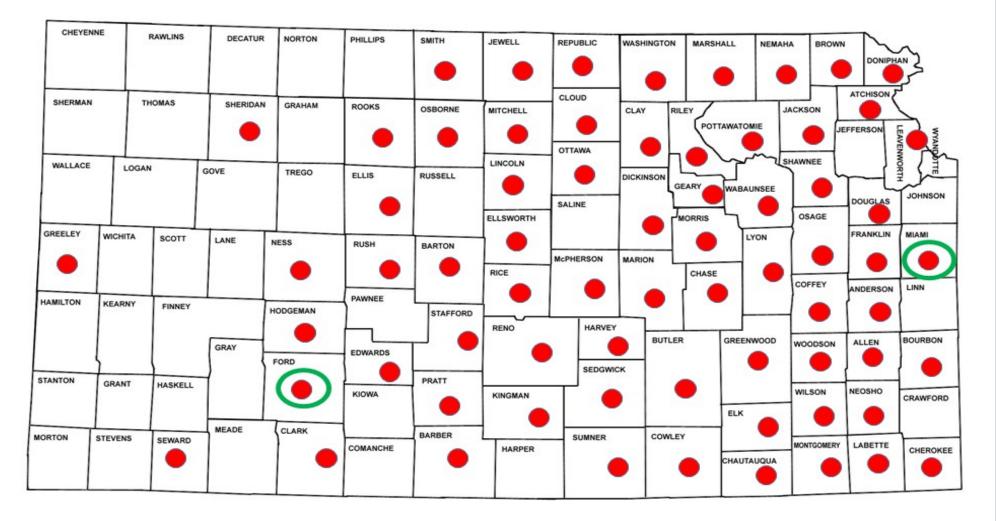


### 2013: Kansas Positive Counties

| CHEYEN   | NNE    | R     | AWLINS  | DECATUR  | NORTON   | PHILLIPS |          | r         |               |              |              |            | -          |                |
|----------|--------|-------|---------|----------|----------|----------|----------|-----------|---------------|--------------|--------------|------------|------------|----------------|
|          |        |       |         | DEGRICIN | NORTON   | PHILLIPS | SMITH    | JEWELL    | REPUBLIC      | WASHINGTON M | ARSHALL NEMA | HA BROWN   |            | ~              |
|          |        |       |         |          |          |          |          |           |               |              |              |            | DONIPH     | AN S           |
|          |        |       |         |          |          |          |          |           | 1.022780-0222 |              |              | /          | ATCHISON 7 | ک <sub>ت</sub> |
| SHERMAN  | I      | тно   | OMAS    | SHERIDAN | GRAHAM   | ROOKS    | OSBORNE  | MITCHELL  | CLOUD         | CLAY RILEY   | 7            | JACKSON    |            |                |
|          |        |       |         |          |          |          |          |           |               |              | POTTAWATOMIE | <u>ل</u>   | FFERSON    |                |
|          |        |       |         |          |          |          |          |           | OTTAWA        |              |              |            |            | WYANDOTTE      |
| WALLACE  |        | LOGAN |         |          |          |          |          | LINCOLN   | UTTAWA        |              | ) ~~~~{      | SHAWNEE    |            |                |
|          |        | LUGAN |         | GOVE     | TREGO    | ELLIS    | RUSSELL  |           |               |              |              |            |            |                |
| 1        |        |       |         |          |          |          |          |           | SALINE        |              | WABAUNSEE    |            | DOUGLAS    | JOHNSON        |
|          |        |       |         |          |          |          |          | ELLSWORTH | OALINE        |              |              | OSAGE      |            |                |
| GREELEY  | WICH   | ITA   | SCOTT   | LANE     | NESS     |          |          | ι Ι       |               |              | LYON         | 1          | FRANKLIN   | міамі          |
|          |        |       |         |          | NEGO     | RUSH     | BARTON   |           | McPHERSON     | MARION       |              |            |            |                |
|          |        |       |         |          |          |          |          | RICE      |               |              | HASE         |            |            |                |
|          | 4      |       |         |          |          | PAWNEE   | -        |           |               |              |              | COFFEY     | ANDERSON   | LINN           |
| HAMILTON | KEAR   | NY    | FINNEY  |          | HODGEMAN |          | STAFFORD |           |               |              |              |            |            | (              |
|          |        |       |         |          |          | F-       |          | RENO      | HARVEY        |              |              |            |            |                |
|          |        |       |         | GRAY     |          | EDWARDS  |          |           |               | BUTLER       | GREENWOOD    | WOODSON    | ALLEN      | BOURBON        |
|          | 1      |       |         |          | FORD     |          |          |           | SEDGWIC       | ж            |              |            | 🔴          |                |
| STANTON  | GRAN   | ΙТ    | HASKELL | 7        |          |          | PRATT    |           | ᆔ 👩           |              |              | WILSON     | NEOSHO     |                |
|          |        |       |         |          |          | KIOWA    |          | KINGMAN   |               |              |              | WILSON     |            | CRAWFORD       |
|          |        |       |         | MEADE    | Tours    |          |          |           |               |              |              |            |            |                |
| MORTON   | STEVEN | IS    | SEWARD  |          | CLARK    | COMANCHE | BARBER   |           | SUMNER        | COWLEY       |              | MONTGOMERY | LABETTE    | <b>\</b>       |
|          |        |       |         |          |          | COMANCHE |          | HARPER    |               |              | CHAUTAUQUA   | 1          |            | CHEROKEE       |
|          |        |       |         |          |          |          |          |           |               |              |              |            |            |                |
|          | _      |       |         |          |          |          |          |           |               |              | -            |            |            |                |

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#### **2015:** Kansas Positive Counties

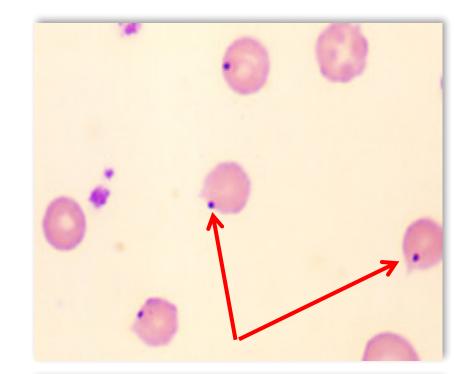


#### www.ksvdl.org "Disease Trend" button

### Anaplasma marginale

### •<u>Rickettsia (gram (–) bacteria</u>) infect red blood cells



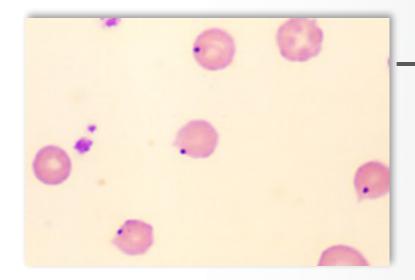


Normal red blood cells

Anaplasma infected red blood cells

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### Red blood cell destruction



#### Animal becomes infected

Spleen removes Anaplasma infected red blood cells Anemic **Clinical signs** 

# Clinical signs only in Adults >2 years age

### Time from infection to clinical signs (prepatent period) 6-70 days Average 28 days

Kocan; 2003, Audry; 2011



# **Clinical signs**

- Adult cows/bulls found dead in the pasture/calving
- Lethargy
- Difficulty breathing (especially when moved)
- Aggressive behavior!!!
- Abortion: KSVDL— 4 herds in spring 2015
- Icterus (yellow membranes)/enlarged spleen

Fever Weight loss Constipation

Radostits, Smith

# How does infection occur?

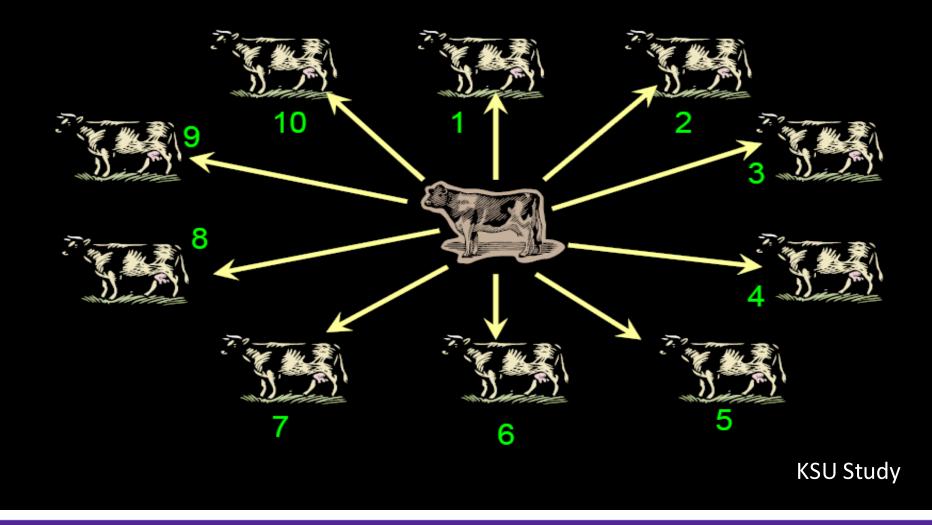
### **Blood transfer**

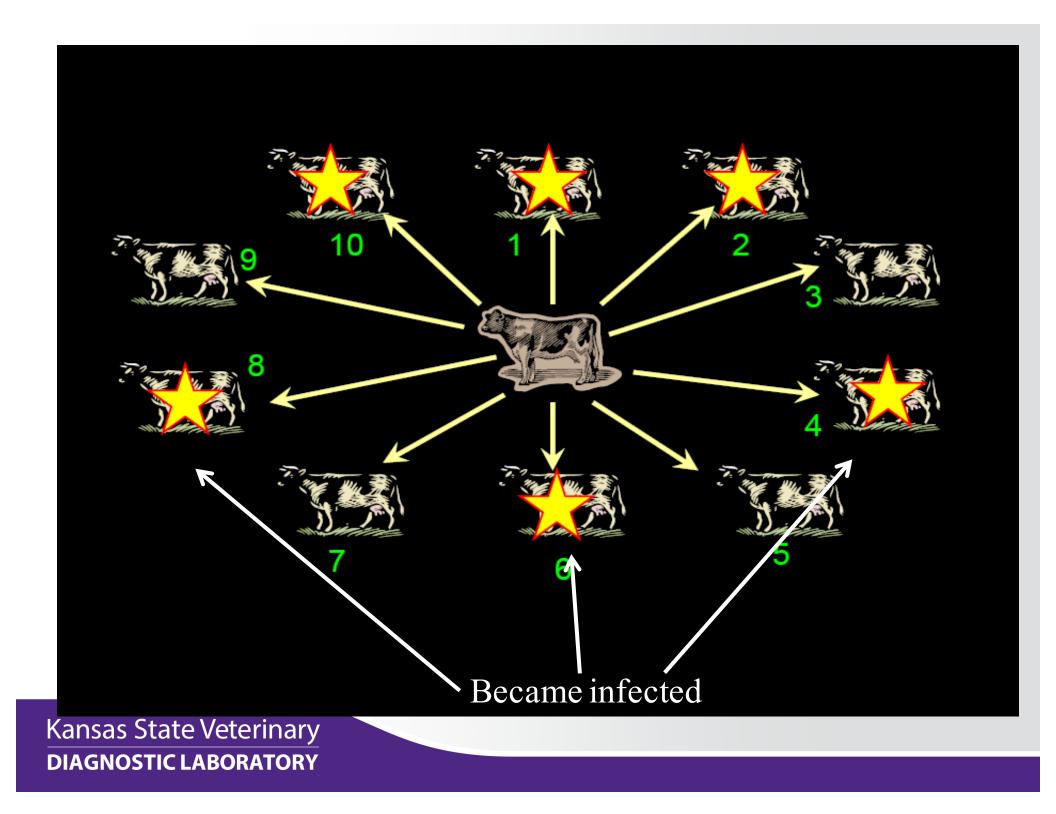
- ✓ Some tick species
- ✓ Some fly species
- During gestation
- ✓ Needles, Tattoo pliers, etc.





Injection sequence using the same needle: Index cow, 2% A. marginale parasitemia





# All ages of cattle can become infected

### Younger animals are more resistant to infection "inverse age immunity"

Kocan; 2003, Aubry; 2011



# <u>All</u> recovered animals will remain lifelong carriers!!!

Kansas State Veterinary DIAGNOSTIC LABORATORY Richey; 1991, Kocan; 2007

# Lifelong carriers <u>will not</u> experience clinical Anaplasmosis in subsequent years

Viseshaual; 2000, Kocan; 2003



# Life-long carriers

# Are the source of infection for other animals, but....

# Difficult to eliminate the carrier state, and.....

# If remove lifelong carrier state: these animals will be

# Susceptible to CLINICAL Anaplasmosis if re-infected in subsequent years

Richey; 1991, Reinbold; 2010, Audry: 2011



## Anaplasmosis is not...

- A bacterial disease.
  - It is a Rickettsial disease in which the pathogen must parasitize red blood cells to survive.
  - This disease has a very narrow choice for therapy
- A uniform disease caused by a consistent parasite.
  - There are different serotypes which originated from different areas of the country.
  - Research tells us that the ability to cause disease and the response to therapy may be quite different for the different serotypes.
- A disease that goes away if the animal survives clinical disease.

## Anaplasmosis is...

- A disease with different clinical outcomes based on the age of cattle infected.
- A disease that can be spread in multiple ways.
  - Ticks are a host where the male tick can be a carrier in which the disease replicates
  - Flies can pass the disease by mechanical means through carrying infected red blood cells between cattle.
  - We can spread the disease through fomites such as injection needles, dehorners, and implant needles.

## Anaplasmosis is...

- A disease for which some of our thinking has been informed by older studies that used relatively insensitive tests.
- A disease with limited data related to the efficacy of treatment and control programs.

Mike Apley 785-532-4167 mapley@vet.k-state.edu

Gregg Hanzlicek 785-532-4853 gahanz@vet.k-state.edu

# Thank you

### Icterus



### Icteric eye



Normal eye



### Icteric vulva

