

Office of Veterinary Services

*VIRGINIA DEPARTMENT  
OF AGRICULTURE AND  
CONSUMER SERVICES*

Transboundary and Emerging Animal Disease  
Field Manual



2020

**A Resource Guide for USDA Accredited Veterinarian Duties in the  
Commonwealth of Virginia**

**VIRGINIA DEPARTMENT OF AGRICULTURE  
& CONSUMER SERVICES**

**TRANSBOUNDARY & EMERGING ANIMAL DISEASE  
FIELD MANUAL**

Adapted from:

Foreign Animal Disease Fact Sheets  
Center for Food Security and Public Health  
College of Veterinary Medicine  
Iowa State University

Emerging and Exotic Diseases of Animals  
4<sup>th</sup> ED. Iowa State University  
Ames, IA 2010

Atlas of Transboundary Animal Diseases  
OIE (World Organization of Animal Health) 2010

OIE (World Organization of Animal Health)  
Technical Disease Cards  
<https://www.oie.int/animal-health-in-the-world/technical-disease-cards/>

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## **BIOSECURITY PROCEDURES**

### **LEVEL GREEN**

- Avoid driving your vehicle into or through animal production sites
- If you drive through production area, assure tires and wheel wells are free of organic debris and disinfected prior to leaving premises
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Clothes and footwear should be free of organic debris and disinfected prior to leaving premises
- If possible, avoid livestock areas, pens, barns, etc.
- Assure hands are clean before entering and leaving premises
- Remove as many insect vectors from vehicle as possible

### **LEVEL YELLOW**

Apply procedures from level green plus the following:

- Contact State or Federal Animal Health Officials
- Wear clean rubber boots or new disposable boot covers upon exiting vehicle. Disposable should be worn only in activities where damaging the plastic and compromising biosecurity is possible
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Clean and disinfect any reusable equipment such as rubber boots with a brush and USDA approved disinfectant
- If wearing disposable boots, remove and dispose in a nearby trash receptacle on farm, or in garbage bag in your vehicle to dispose later
- Contact local veterinarian or the Virginia Department of Agriculture

### **LEVEL ORANGE**

Apply procedures from level yellow plus the following:

- Contact State or Federal Animal Health Officials
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Removed soiled clothing before entering vehicle and place in a plastic bag
- Designate separate “clean” and “dirty” areas in your vehicle to dispose of / store clothing and equipment

- At end of day, dispose of “dirty” items in a manner that prevents exposure to livestock, launder all clothing, and shower while making sure to shampoo hair and clean under fingernails

## **LEVEL RED**

Apply procedures from level orange plus the following:

- Set up a disinfection point just outside the premises before entering
- Approved personal protective clothing and equipment must be worn
- Vehicles must be parked on a public road right-of-way and personnel must walk to premises
- Appropriate disinfectants for disease situation must be used
- Disposable (Tyvex) suit must be worn with rubber or disposable boots, disposable gloves, disposable head covering, and surgical mask using duct tape to seal gloves to Tyvex sleeves and boots to Tyvex pant leg
- A waterproof suit (pants and long sleeve jacket) may also be necessary
- Eye and respiratory protection should be used in cases of airborne pathogens
- Minimize the amount of equipment taken on premises and leave any items taken on site until disinfected or disposed there
- Maintain necessary devices (watches, phones, etc.) that cannot be disinfected in sealed waterproof bags
- **STAY ON THE SITE** until directed to leave by a State Agricultural Response Team member

## STATE VETERINARIAN CONTACT NUMBERS

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State Veterinarian  
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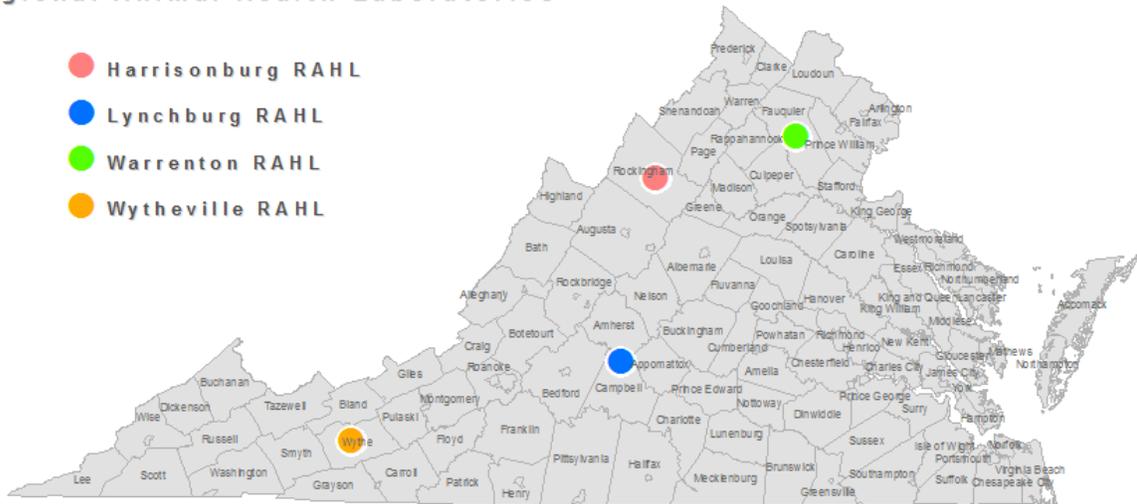
Lynchburg Laboratory  
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**Virginia Department of Agriculture  
and Consumer Services**

**Regional Animal Health Laboratories**

- Harrisonburg RAHL
- Lynchburg RAHL
- Warrenton RAHL
- Wytheville RAHL



## PRELIMINARY INVESTIGATION HISTORY FORM

Owner information:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Location of the Animal(s): \_\_\_\_\_

long: \_\_\_\_\_ lat: \_\_\_\_\_

Circle which livestock species are on the premise:

Beef Dairy Swine Sheep Goats Poultry Other: \_\_\_\_\_

Circle how many rats and / or mice are on the premise:

None Few Moderate Abundant

Describe potential insect or arachnid vector burden:

None Few Moderate Abundant

List insect or arachnid vector(s) of concern: \_\_\_\_\_

Total number of animals on premises: \_\_\_\_\_

For the following questions, circle the appropriate response:

Have any domestic livestock (ruminants or swine) on the premises been sick in the last month? Y N

Have any domestic livestock (ruminants or swine) moved onto the premises in the last 90 days? Y N

Have any domestic livestock (ruminants or swine) moved off of the premises in the last 90 days? Y N

Do farm employees live on other farms or have contact with other livestock? Y N

Are any family members or employees employed off the farm? Y N

Have any family members or employees visited a foreign country in the last 90 days? Y N

If yes, which country? \_\_\_\_\_



## AFRICAN HORSE SICKNESS

**AGENT:** AHFV - family *Reoviridae*, genus *Orbivirus*,

**SPECIES AFFECTED:** Horse, mule, donkey, zebra, occasionally other animals

### TRANSMISSION:

- Not directly contagious
- Vector: *Culicoides* spp., occasionally mosquitoes

### CLINICAL APPEARANCE:

- Clinical Signs:
  - Pulmonary Form - Acute to peracute form of the disease
    - Fever up to 106° F, depression, injection of the conjunctivae, dyspnea, paroxysmal coughing, copious frothy nasal discharge
    - Disease progression may last hours to several days after onset
  - Cardiac Form - Subacute form of the disease
    - Fever up to 41° C depression, supraorbital non-pitting edema, swelling, petechiation and eversion of the conjunctivae, edema of the head (eyelids, lips, cheeks and tongue), neck, thorax, pectorals and shoulders
  - Mixed Form - Combination of pulmonary and cardiac forms of the disease
  - African Horse Sickness Fever
    - Mildest (subclinical) form of disease, seldom diagnosed clinically
    - Moderate malaise, remittent fever of 40-40.5° C occasionally mild edema of the supraorbital fossa and dyspnea
- Lesions
  - Respiratory form – pulmonary edema, pericardial and pleural effusion, edema of thoracic lymph nodes, petechial hemorrhages of pericardium
  - Cardiac form – subcutaneous and intramuscular gelatinous edema, epicardial and endocardial ecchymoses, myocarditis, gastritis

**INCUBATION PERIOD:** 3 – 14 days

**DIFFERENTIAL DIAGNOSIS:** Heart failure, acute pleuropneumonia equine viral arteritis, equine infectious anemia, purpura hemorrhagica, anthrax, plant toxicosis, chemical poisoning, heat stress, piroplasmiasis, equine encephalosis, Getah or Hendra virus infection and trypanosomiasis.

**MORBIDITY & MORTALITY:** Equid mortality can reach 70-95%

**BIOSECURITY LEVEL:** Yellow

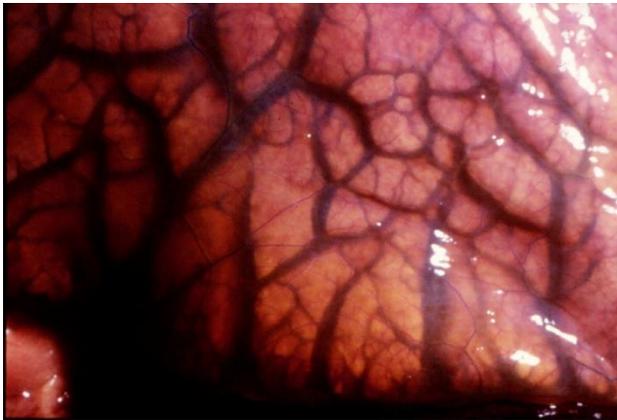
## AFRICAN HORSE SICKNESS



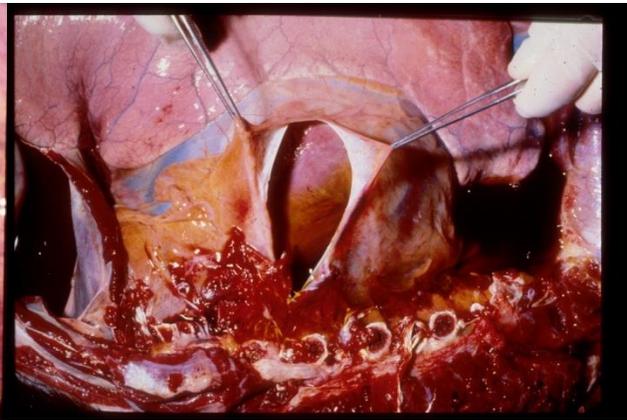
Terminal froth



Supraorbital edema



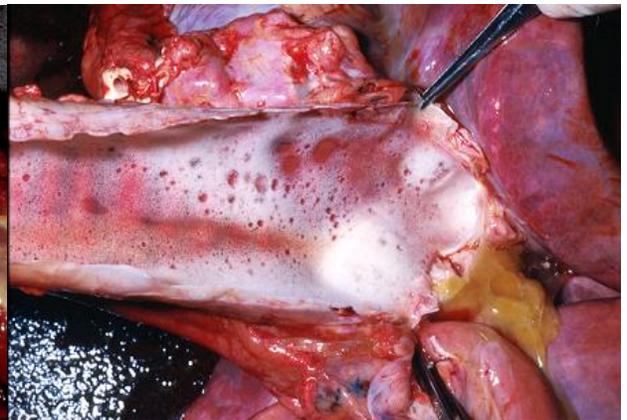
Pulmonary edema



Hydropericardium



Edema between cervical muscles



Pulmonary fluid in trachea

## **AFRICAN SWINE FEVER**

**AGENT:** African swine fever virus, family *Asfarviridae*

**SPECIES AFFECTED:** Domestic and wild pigs

### **TRANSMISSION:**

- Direct: contact with infected animals
- Indirect: feeding on garbage containing infected meat
  - ASFV can remain infectious 3– 6 months in uncooked pork products
- Fomites: premises, vehicles, implements, clothes
- Vector: *Ornithodoros* spp. ticks
  - transstadial, transovarial, and sexual transmission occur

### **CLINICAL APPEARANCE:**

- Clinical signs: Can be acute, peracute, subacute or chronic
  - Sudden death
  - High fever (105-107<sup>0</sup> F) and anorexia
  - Skin reddening in white pigs
  - Cyanotic blotching on ears, tail, lower legs, or hams
  - Painless swelling of joints, especially carpal and tarsal joints
  - Bloody diarrhea, vomiting, dyspnea, and abortion sometimes seen
- Lesions
  - Very large, friable, dark red to black spleen
  - Swollen, hemorrhagic gastrohepatic lymph nodes
  - Hemorrhages, petechiae, and ecchymoses of other organs
  - Dark red or purple area on the skin of the ears, feet, and tail

**INCUBATION PERIOD:** 2 – 15 Days

**DIFFERENTIAL DIAGNOSIS:** Classical swine fever, PRRS, porcine dermatitis and nephropathy syndrome, eperythrozoonosis, salmonellosis, erysipelas, actinobacillosis, Glasser's disease, Aujeszky's disease, thrombocytopenic purpura, warfarin poisoning, and heavy metal toxicity

**MORBIDITY & MORTALITY:** Mortality can reach 60 – 100%

**BIOSECURITY LEVEL:** Orange

## AFRICAN SWINE FEVER



Pig with reddening of skin



Pigs with bloody diarrhea



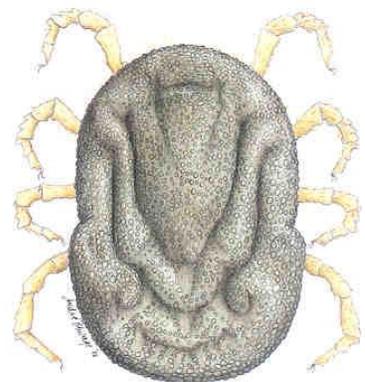
Enlarged, black, friable spleen



Hemorrhagic gastric lymph nodes



Hemorrhagic renal lymph nodes



*Ornithodoros* spp. tick

## **ANTHRAX**

**AGENT:** *Bacillus anthracis* (spore forming, Gram positive aerobic rod)

**SPECIES AFFECTED:** All livestock and **humans**; chickens resistant

### **TRANSMISSION:**

- Ingestion of spores in soil or on plants in pastures
  - Associated with heavy rainfall, flooding or drought
- Inhalation
- Contact with infected tissues (human) – do not necropsy!
- Biting flies

### **CLINICAL APPEARANCE:**

- Clinical Signs
  - Sudden death (may be only sign)
  - Staggering, trembling, and dyspnea
  - Rapid collapse with terminal convulsions
  - Bloody discharge from nose, mouth, and anus – infectious material
- Lesions
  - Swelling of neck, sternum, lower abdomen, and lymph nodes
  - Dark red blood that does not clot
  - “Blackberry jam” spleen
  - Absent or incomplete rigor mortis
  - DO NOT NECROPSY!

**INCUBATION PERIOD:** 1-20 days

**DIFFERENTIAL DIAGNOSIS:** Electrocution, heart water, lead poisoning, peracute blackleg, acute leptospirosis, acute bloat, hypomagnesemia

**Morbidity and Mortality:** Very high in ruminants; relatively low in carnivores

**BIOSECURITY LEVEL:** **Orange**

# ANTHRAX



Zebra with anthrax



Cow that died of anthrax



Gazelle with anthrax



Transmission via contact with hides



Cutaneous anthrax



Cutaneous anthrax

## **BLUETONGUE & EPIZOOTIC HEMORRHAGIC DISEASE**

**AGENT:** BTV, EHDV *Orbivirus*, family *Reoviridae*

**SPECIES AFFECTED:** BTV – Most ruminants (sheep noted)  
EHDV – Most ruminants (deer noted)

**TRANSMISSION:** Biological vectors – *Culicoides* species  
Once a midge is infected it stays infective for life

### **CLINICAL APPEARANCE:**

- BTV – Sheep
  - Elevated temperature 106 – 107<sup>0</sup> F
  - Excessive salivation and frothing at the mouth
  - Hyperemia and swelling of buccal and nasal mucosa
  - Erosions and ulcerations can be observed in the mouth
  - Tongue may be cyanotic and protrude from the mouth
- BTV – Cattle
  - Typically causes no clinical signs
  - Mild hyperemia in buccal cavity & around coronary band
  - Lameness and reproductive failure
- BTV – Goats
  - Typically causes no clinical signs
- EHD – Sheep
  - Does not appear to cause significant clinical disease
- EHD – Cattle
  - Rarely causes disease
  - Fever, erosive and ulcerative lesions of the mouth, throat
  - Stiffness, lameness

**DIFFERENTIAL DIAGNOSIS:** Vesicular stomatitis, foot and mouth disease, bovine viral diarrhea, malignant catarrhal fever, infectious bovine rhinotracheitis

**INCUBATION PERIOD:** 7 – 10 days

### **MORBIDITY & MORTALITY:**

Sheep (BT) – morbidity can reach 100%, mortality 0 – 50%

Cattle/Goats (BT, EHD) – usually subclinical. Morbidity can reach 5%

**BIOSECURITY LEVEL:** **Green**

## BLUETONGUE and EPIZOOTIC HEMORRHAGIC DISEASE



Bilateral nasal exudate



Multiple erosions



Ulcerations of teats



Hyperemic crusting of muzzle

## **BOVINE SPONGIFORM ENCEPHALOPATHY (MAD COW)**

**AGENT:** Prion protein

**SPECIES AFFECTED:** Cattle, goats

### **TRANSMISSION:**

- Ingestion of infected nervous tissue (i.e. feeding offal, meat and bone meal)
- Atypical form occurs spontaneously

### **CLINICAL APPEARANCE:**

- Clinical signs
  - Hyperesthesia, apprehension, nervousness, sometimes pruritis
  - Hind leg ataxia, pelvic swaying, hypermetria, tremors, and falling
  - Difficulty rising, abnormal posture
  - Weight loss, decreased rumination, decreased milk production
  - Recumbency, coma, and death
- Lesions
  - Emaciation and wasting
  - No other gross lesions

**DIFFERENTIAL DIAGNOSIS:** Nervous ketosis, hypomagnesemia, rabies, listeriosis, polioencephalomalacia, brain tumors, spinal cord trauma, lead poisoning

**BIOSECURITY LEVEL:** Yellow

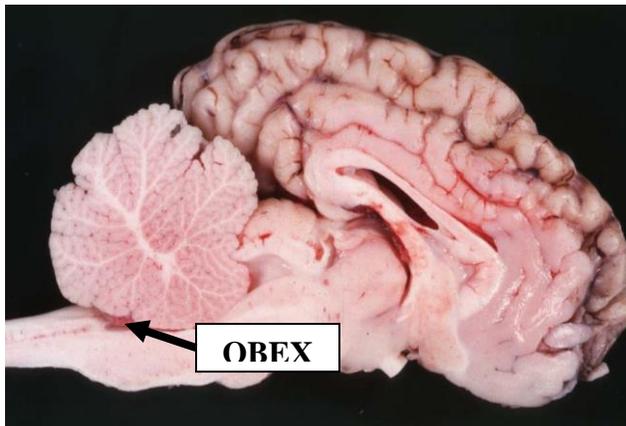
## BOVINE SPONGIFORM ENCEPHALOPATHY (MAD COW)



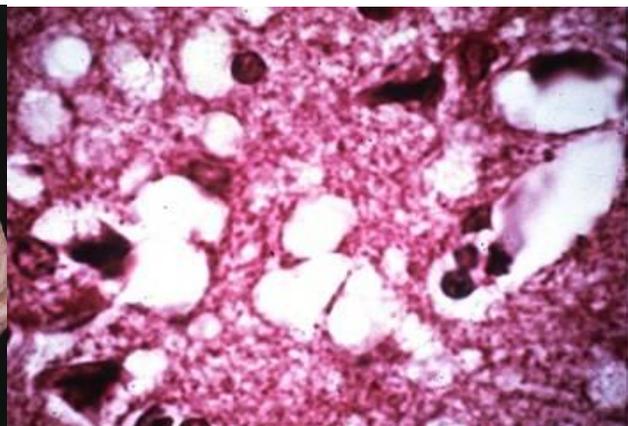
Cows with signs of BSE



Downer cow with BSE



Brain showing sampling location



Brain section with BSE lesions

## **BOVINE TUBERCULOSIS**

**AGENT:** *Mycobacterium bovis* (Gram positive, acid-fast bacteria)

**SPECIES AFFECTED:** All animals, especially cattle, **humans**

### **TRANSMISSION:**

- Inhalation of aerosol particles
- Ingestion of organism

### **CLINICAL APPEARANCE:**

- Clinical signs
  - Early infection is asymptomatic
  - Progressive emaciation, fever, weakness, inappetance
  - Moist cough that is worse in morning, when cold, or with exercise
  - Enlarged retropharyngeal lymph nodes
- Lesions
  - Tuberculosis granulomas where bacteria have localized
  - Granulomas most often in mediastinal, retropharyngeal, and portal lymph nodes
  - Granulomas may be in lung, spleen, liver, and abdominal wall
  - Granulomas are yellowish and caseous or calcified and are often encapsulated

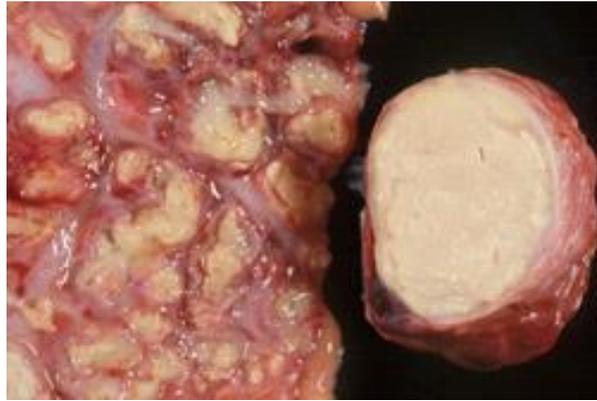
**DIFFERENTIAL DIAGNOSIS:** Contagious bovine pleuropneumonia, pasteurella pneumonia, inhalation pneumonia, traumatic reticulitis, chronic aberrant liver fluke infestation

**BIOSECURITY LEVEL:** **Yellow**

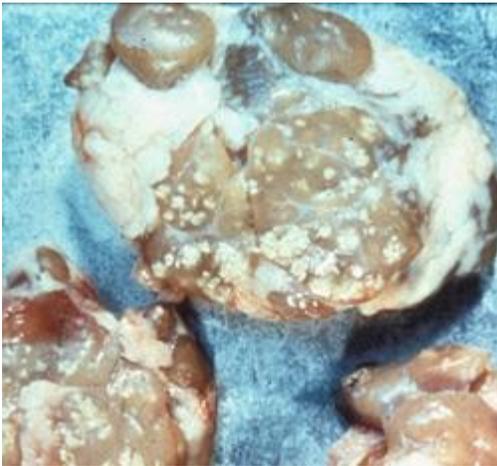
## BOVINE TUBERCULOSIS



Bovine lung



Elk lung and lymph node



Pig lymph node



Bovine uterus

## **BRUCELLOSIS**

**AGENT:** *Brucella* spp. (Gram negative, facultative intracellular rod)  
*Brucella abortus* has been eradicated from domesticated cattle in the US, but it persists in wildlife hosts in the Greater Yellowstone Area  
*Brucella suis* is present in the feral hog population in the US

**SPECIES AFFECTED:** All farm animals, **humans**

### **TRANSMISSION:**

- Contact with contaminated fetal materials and fluids
- Ingestion of organism
- Contact with fomites

### **CLINICAL APPEARANCE:**

- Clinical signs
  - Systemic signs not commonly seen
  - Abortion in the second half of gestation
  - Retained placenta in females, epididymitis / orchitis in males
  - Inflammation of supraspinous bursa (fistulous withers) in horse
- Lesions
  - Chronic placentitis with thickening of intercotyledonary region
  - Granulomatous inflammatory lesions of reproductive tract, mammary gland, supramammary lymph nodes, and joints

**DIFFERENTIAL DIAGNOSIS:** Trichomoniasis, vibriosis, leptospirosis, IBR, listeriosis, epizootic viral abortion, chlamydiosis

**BIOSECURITY LEVEL:** **Yellow**

## BRUCELLOSIS



Ram testicle



Swine testicle



Abortion in cattle



Abortion in sheep

## CLASSICAL SWINE FEVER (HOG CHOLERA)

**AGENT:** Classical swine fever virus, family *Flaviviridae*, genus *Pestivirus*  
A common and important disease in the US until eradicated in 1973.

**SPECIES AFFECTED:** Domestic and wild pigs

### TRANSMISSION:

- Pig is the only natural reservoir of the virus
- Ingestion of organism (i.e. uncooked garbage) – most common way to enter free countries
- Oral and oronasal routes via direct or indirect contact
- Direct contact between animals (secretions, excretions, semen and blood)
- Indirect contact through fomites
- Transplacental infection – may create unapparent carrier piglets

### CLINICAL APPEARANCE:

- Clinical signs vary by acute or chronic virulence of the virus
  - High fever (105 – 108<sup>0</sup> F) dullness, weakness, drowsiness, huddling, swollen lymph nodes, dyspnea, coughing
  - Anorexia, unsteady gait, conjunctivitis
  - Constipation followed by diarrhea, vomiting
  - Purplish ears and inner thighs several days after first signs
  - Abortions, stillbirths, fetal mummification
  - Stunted growth, alopecia, concurrent infections in chronic cases
- Lesions
  - Severe tonsillitis, splenic infarcts
  - Hemorrhagic lymph nodes (periphery) and renal cortex
  - Button ulcers of cecum and colon

**INCUBATION PERIOD:** 2 – 14 days, usually 3 – 4 days

**DIFFERENTIAL DIAGNOSIS:** African swine fever, porcine dermatitis and nephropathy syndrome, erysipelas, eperythrozoonosis, salmonellosis, actinobacillosis, Glasser's disease, thrombocytopenia purpura, warfarin poisoning

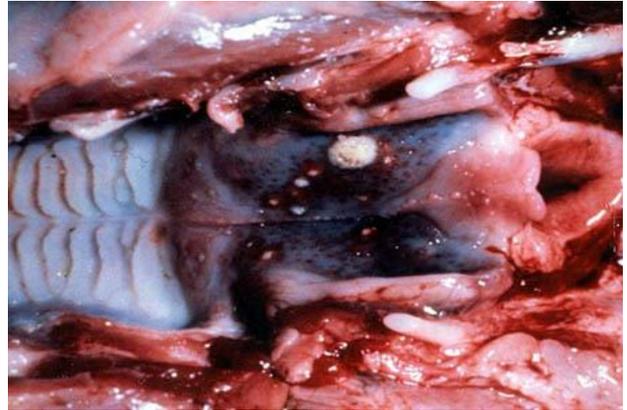
**MORBIDITY & MORTALITY:** High in acute cases

**BIOSECURITY LEVEL:** Yellow

## CLASSICAL SWINE FEVER



Pigs huddling with CSF



Multiple necrotic foci in tonsils



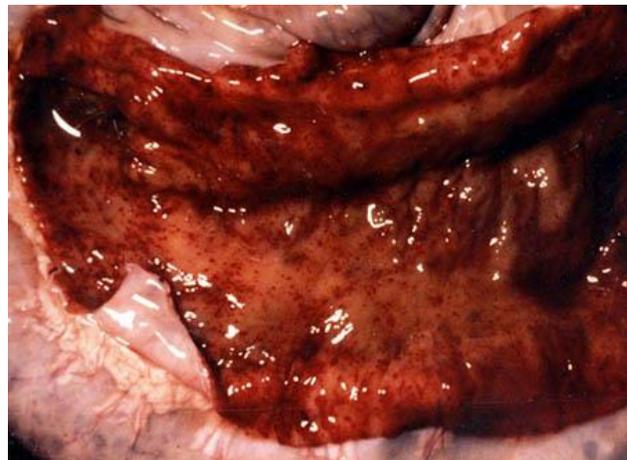
Hemorrhages in lymph nodes



Spleen with infarcts from CSF



Petechial hemorrhages of kidney



Hemorrhagic colitis of spiral colon

## CONTAGIOUS BOVINE PLEUROPNEUMONIA

**AGENT:** *Mycoplasma mycoides mycoides* (small colony type)

**SPECIES AFFECTED:** Cattle, especially European breeds, bison, yak

### TRANSMISSION:

- Inhalation of aerosol particles
- Direct contact with infected secretions
- Transplacental infection

### CLINICAL APPEARANCE:

- Clinical signs
  - Lethargy, anorexia, and fever initially
  - Progresses to cough, thoracic pain, dyspnea, and elbow abduction
  - Labored respirations
  - Infected calves commonly have polyarthritis + / - pneumonia
  - Chronically infected animals will cough with exercise
- Lesions
  - Thickening of lung tissues with extensive fibrin deposits
  - Large amounts of straw-colored fluid in thoracic cavity
  - Characteristic marbled appearance of affected lung lobe
  - May involve only one lung
  - Severe fibrinous pleuritis

**INCUBATION PERIOD:** 1-4 Months

**DIFFERENTIAL DIAGNOSIS:** Acute bovine pasteurellosis, traumatic pericarditis, bronchopneumonia from mixed infection, tuberculosis, actinobacillosis, hydatid cysts, East Coast fever

**MORBITIDY & MORTALITY:** 10 – 70% Mortality rate

**BIOSECURITY LEVEL:** Yellow

## CONTAGIOUS BOVINE PLEUROPNEUMONIA



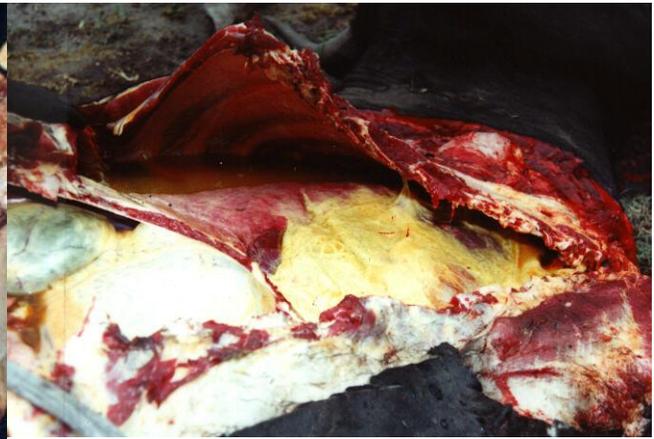
Extended head and neck



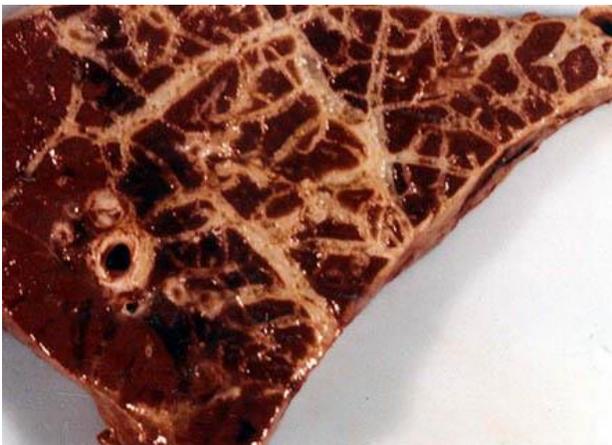
Cow with clinical CBPP



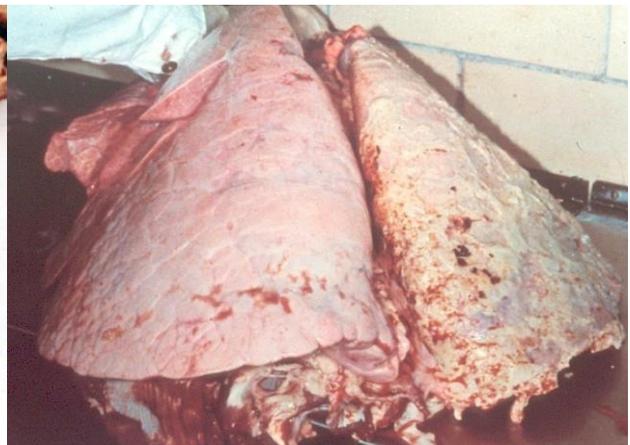
Thoracic wall with fibrin deposits



Severe fibrinous pleuritis



Classic interlobular "marbling"



CBPP with only one lung involved

## **CONTAGIOUS EQUINE METRITIS (CEM)**

**AGENT:** *Taylorella equigenitalis*

**SPECIES AFFECTED:** Horses, donkeys and mules

**TRANSMISSION:**

- Highly contagious
- Venereally transmitted
- Fomites – instruments, equipment, personnel

**CLINICAL APPEARANCE:**

- Mares
  - Copious mucopurulent vaginal discharge 10-14 days post breeding to an infected stallion that lasts several days
  - Short cycling of mares with return to estrus
  - Abortion or birth of carrier foal
  - Most infected mares do not conceive
- Stallions
  - Asymptomatic carrier

**INCUBATION PERIOD:** Inflammatory reaction begins within 24 hours of colonization; becomes clinical apparent 10-14 days after breeding

**MORBIDITY AND MORTALITY:** High morbidity, fatal infections not seen

**DIFFERENTIAL DIAGNOSIS:** Uterine infection, vaginitis

**BIOSECURITY LEVEL:** **Orange**

## CONTAGIOUS EQUINE METRITIS (CEM)



Mucopurulent vaginal discharge



Vaginal discharge on inside thighs



Mucopurulent discharge within uterine lumen during acute infection

## EQUINE PIROPLASMOSIS

**AGENT:** Protozoa: *Babesia caballi* or *Theileria equi*

**SPECIES AFFECTED:** Horses, mules, donkeys, and zebras

### TRANSMISSION:

- Vector borne by *Dermacentor*, *Hyalomma*, and *Rhipicephalus* ticks
- Contaminated needles and syringes
- Intrauterine infection of foals is fairly common
- Infected animals may remain carriers for long periods and can act as sources of infection for tick vectors

### CLINICAL APPEARANCE:

- Clinical signs
  - Signs are variable and often non-specific
  - Fever, inappetance, malaise, labored breathing, congested mucus membranes
  - Anemia, jaundice, hemoglobinuria, sweating, petechial hemorrhages on the conjunctiva, a swollen abdomen, and posterior weakness may be seen
  - In chronic cases, may have exercise intolerance, weight loss, and a palpably enlarged spleen
- Lesions
  - Animal is usually emaciated, jaundiced, and anemic
  - Enlarged, dark orange-brown liver
  - Enlarged spleen and pale, flabby kidneys
  - Petechial hemorrhages of kidneys and heart

**INCUBATION PERIOD:** *B. caballi* 10-30 days, *T. equi* 12-19 days

**DIFFERENTIAL DIAGNOSIS:** Immune-mediated hemolytic anemia, Surra, equine infectious anemia, dourine, African horse sickness, purpura hemorrhagica, various plant and chemical toxicities

**MORBITIDY & MORTALITY:** death rate can reach 10-50%

**BIOSECURITY LEVEL:** Yellow

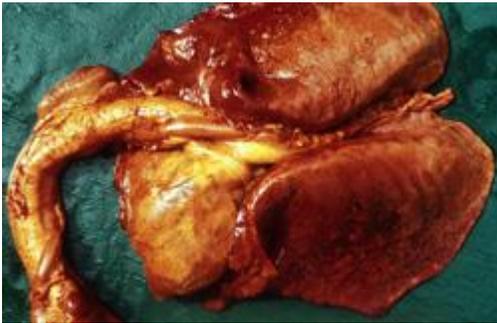
## EQUINE PIROPLASMOSIS



Kidney – congestion, icterus



Equine – icterus



Equine – congestion, icterus

## **EQUINE VIRAL ARTERITIS**

**AGENT:** EVA virus, family *Arteriviridae*, genus *Arterivirus*

**SPECIES AFFECTED:** Horses, ponies, and zebra

### **TRANSMISSION:**

- Inhalation of aerosol particles from acutely infected horses
- Venereal transmission from carrier stallions and infected semen
- Stallions appear to be the only carrier of the virus
- Indirect contact with fomites

### **CLINICAL APPEARANCE:**

- Clinical signs
  - Many infected horses are asymptomatic
  - Generally more severe in young, old, or debilitated animals
  - Fever, depression, anorexia, nasal discharge, respiratory distress
  - Edema of limbs (especially hind limb), prepuce, and scrotum
  - Lacrimation, conjunctivitis, photophobia, supraorbital edema
  - Urticaria localized to head or neck may be seen
  - Abortions
- Lesions
  - Edema, congestion, and hemorrhages of SQ tissues
  - Fluid accumulation in peritoneum, pleura, and pericardium
  - Edema and hemorrhages of lymph nodes and intestines
  - In foals, may see pulmonary edema, interstitial pneumonia, emphysema, splenic infarcts, and enteritis

**INCUBATION PERIOD:** 2 – 13 days

**DIFFERENTIAL DIAGNOSIS:** Equine influenza, equine herpes, equine infectious anemia, African horse sickness, purpura hemorrhagica

**MORBITIDY & MORTALITY:** Death is rare. MLV vaccine available

**BIOSECURITY LEVEL:** **Yellow**

## EQUINE VIRAL ARTERITIS



Equine scrotal edema

## EXOTIC NEWCASTLE DISEASE

**AGENT:** END virus, family *Paramyxoviridae*, genus *Rubulavirus*

**SPECIES AFFECTED:** All species of birds

### TRANSMISSION:

- Direct contact with feces or respiratory discharges
- Indirect contact with fomites

### CLINICAL APPEARANCE:

- Clinical signs
  - Sneezing, gasping, nasal discharge, coughing
  - Greenish, watery diarrhea;
  - Depression, tremors, droopy wings, circling, and complete paralysis
  - Partial to complete drop in egg production and thin-shelled eggs
  - Swelling of tissues around the eyes and in the neck;
  - Sudden death
  - Increased flock mortality
- Lesions
  - Hemorrhagic conjunctivitis, tracheitis, and lining of rectum
  - Hemorrhagic proventriculus and necrohemorrhagic enteritis
  - Additional lesions may include edema, hemorrhages, necrosis, or ulcerations of lymphoid tissue

**INCUBATION PERIOD:** Varies from 2-15 days depending on virulence and susceptibility; 4-6 days in chickens with the velogenic form

**DIFFERENTIAL DIAGNOSIS:** Fowl cholera, highly pathogenic avian influenza, laryngotracheitis, coryza, fowl pox, psittacosis, infectious bronchitis, mycoplasmosis, Pacheco's disease

**MORBIDITY & MORTALITY:** up to 100% depending on viral strain

**BIOSECURITY LEVEL:** Orange

## EXOTIC NEWCASTLE DISEASE



Edema, hemorrhage in eyelid



Petechiae on proventriculus



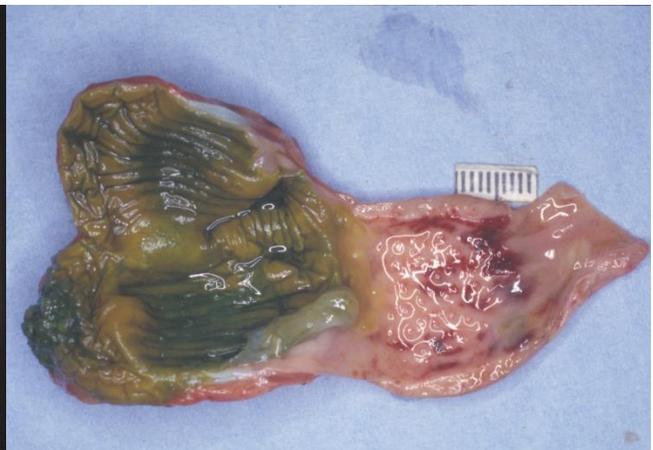
Lymphoid necrosis in intestine



Hemorrhage of cloaca and rectum



Conjunctivitis from END



Necrohemorrhagic enteritis

## FOOT AND MOUTH DISEASE

**AGENT:** FMD virus, family *Picornaviridae*, genus *Aphthovirus*

**SPECIES AFFECTED:** Cloven-hoofed domestic and wild animals

### TRANSMISSION:

- Highly contagious and infectious
- Ingestion of infected animal products (i.e. garbage (food) feeding)
- Inhalation of aerosol particles
- Direct contact with infected animal
- Indirect contact with fomites
- Artificial insemination with contaminated semen
- Contaminated biologicals, contaminated hormone preparations

### CLINICAL APPEARANCE:

- Clinical signs
  - Fever, vesicles, excessive salivation
  - Lameness can be severe, reluctant to move or rise
  - Vesicles effect mouth, nares, muzzle, feet, and teats
  - Oral lesions of tongue, dental pad, gums, soft palate
  - Hoof lesions of the coronary band and interdigital space
  - Signs or lesions are not pathognomotic for FMD alone
- Lesions
  - Lesions from small white area to fluid filled blister
  - Ruptured vesicles leave red eroded area covered with gray, fibrinous coating
  - Sloughing of tongue and / or hooves

**INCUBATION PERIOD:** 1-5 days

**DIFFERENTIAL DIAGNOSIS:** Vesicular stomatitis, swine vesicular disease, vesicular exanthema of swine, foot rot, chemical / thermal burns, rinderpest, IBR, BVD, malignant catarrhal fever, bluetongue, contagious ecthyma (Orf)

**MORBIDITY & MORTALITY:** Morbidity typically 100%, Mortality < 1% in adults, Mortality 10-20% in young animals

**BIOSECURITY LEVEL:** Red. Stay on site and contact state or federal animal health officials.

## FOOT AND MOUTH DISEASE



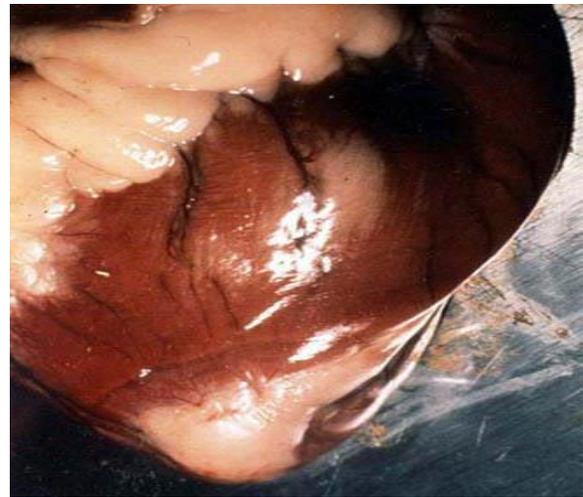
Cow tongue with FMD lesion



Pig with FMD vesicle on snout



Oral lesions in pig



Area of myocardial necrosis



Lesions of coronary band in pig



## GLANDERS

**AGENT:** *Burkholderia mallei* (Gram negative, aerobic rod)

**SPECIES AFFECTED:** Horses, mules, donkeys, **humans**

**TRANSMISSION:**

- Ingestion of infected material
- Direct contact with skin exudates or respiratory secretions
- Indirect contact with fomites
- Subclinically infected equids can shed and be a source of infection

**CLINICAL APPEARANCE:**

- Clinical signs
  - Three forms; nasal, cutaneous and pulmonary
  - High fever, cough, inspiratory dyspnea, thick nasal discharge
  - Deep, rapidly spreading ulcers that become star-shaped scars
  - Swollen, painful submaxillary lymph nodes and lymphatic vessels
  - In chronic cases, malaise, unthriftiness, weight loss, chronic purulent nasal discharge from one nostril, skin nodules
- Lesions
  - Ulcers, nodules, and stellate scars in nasal cavity, trachea, pharynx, larynx, skin, and SQ tissues
  - Catarrhal bronchopneumonia with enlarged bronchial lymph nodes
  - Miliary gray nodules of lung, liver, spleen, and kidneys
  - Swollen lymph nodes with focal abscesses and fibrosis

**INCUBATION PERIOD:** Weeks to months

**DIFFERENTIAL DIAGNOSIS:** Strangles, epizootic lymphangitis, ulcerative lymphangitis, melioidosis, dermatophilosis, sporotrichosis,

**MORBIDITY & MORTALITY:** Morbidity can be high; mortality varies among acute and chronic forms

**BIOSECURITY LEVEL:** Orange

## GLANDERS



Lesion on donkey's lip



Granulomatous pneumonia of donkey lung

## HEARTWATER

**AGENT:** Rickettsia; *Ehrlichia ruminantium* (formerly *Cowdria ruminantium*)

**SPECIES AFFECTED:** Cattle, sheep, goats, and buffalo

### TRANSMISSION:

- Acute noncontagious infectious disease of ruminants
- Vector borne by *Amblyomma spp.* ticks
- Tick carried by birds (cattle egret)
- May be transmitted from cow to calf in colostrum

### CLINICAL APPEARANCE:

- Clinical signs
  - Peracute form: fever, respiratory distress, hyperesthesia, lacrimation, severe diarrhea, terminal convulsions, sudden death
  - Acute form: sudden fever (up to 107<sup>0</sup> F), anorexia, listlessness, tachypnea initially, then nervous signs – chewing movements, protrusion of tongue, twitching of eyelids, circling, and hypermetria
  - Terminal stage shows opisthotonos, hyperesthesia, nystagmus, frothing of mouth, and galloping movements
- Lesions
  - Hydropericardium with straw-colored to reddish fluid
  - Ascites, mediastinal edema, hydrothorax, pulmonary edema
  - Petechial hemorrhages of thoracic organs
  - Splenomegaly, edematous lymph nodes, nephrosis, and hemorrhagic abomasitis may be seen

**INCUBATION PERIOD:** 14 – 28 days

**DIFFERENTIAL DIAGNOSIS:** Anthrax, rabies, tetanus, chlamydiosis, anaplasmosis, bacterial meningitis, piroplasmosis, cerebral trypanosomiasis, theileriosis, poisoning (lead, strychnine, organophosphates, arsenic)

**MORBIDITY & MORTALITY:** Mortality in cattle can reach 60%

**BIOSECURITY LEVEL:** Yellow

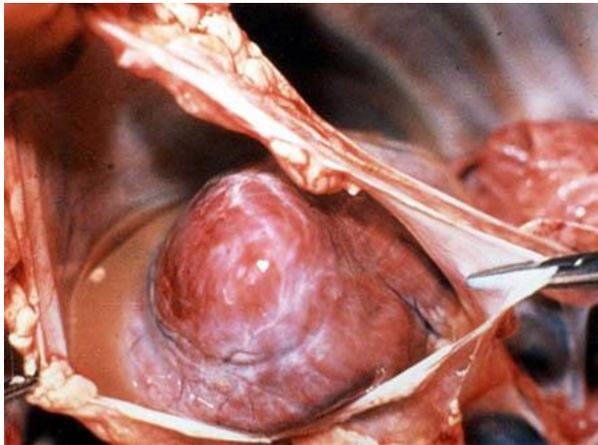
**HEARTWATER**



*Amblyomma variegatum* tick



Cow with CNS form of heartwater



Hydropericardium with Heartwater



Excessive thoracic fluid



Cattle egret



Deer with CNS form of Heartwater

## HIGHLY PATHOGENIC AVIAN INFLUENZA

**AGENT:** Type A influenza virus, hemagglutinin subtype H5 or H7

**SPECIES AFFECTED:** Birds, **humans**

### **TRANSMISSION:**

- Highly contagious in poultry
- Ingestion of feces from migratory waterfowl (low path strain)
- Low path strain can mutate to high path strain
- Fecal-oral in poultry
- Inhalation of aerosol particles
- Indirect contact via fomites

### **CLINICAL APPEARANCE:**

- Clinical signs
  - Marked depression with ruffled feathers, inappetance, excessive thirst, watery diarrhea (green changing to white)
  - Swollen combs, skin on head and wattles that may be cyanotic or bruised
  - Coughing, sneezing and sinusitis
  - Sudden death is frequently noted
  - Ecchymosis on shanks and feet
  - Congestion, swelling, or hemorrhages may occur on conjunctiva
  - Decreased egg production with misshapen eggs
- Lesions
  - Excessive fluid from nares and oral cavity
  - Subcutaneous edema of head neck, severely congested conjunctiva, small petechiae of abdominal fat and serosal surfaces
  - Hemorrhage of mucosa of trachea, proventriculus, gizzard, and intestine
  - Kidneys are severely congested and plugged with white urate

**INCUBATION PERIOD:** usually 3 – 7 days

**DIFFERENTIAL DIAGNOSIS:** Exotic Newcastle disease, infectious laryngotracheitis, acute bacterial diseases (fowl cholera, *E. coli*)

**MORBIDITY & MORTALITY:** Can be 100%

**BIOSECURITY LEVEL:** **Red. Stay on site and contact state or federal animal health officials.**

## HIGHLY PATHOGENIC AVIAN INFLUENZA



Congestion of wattles



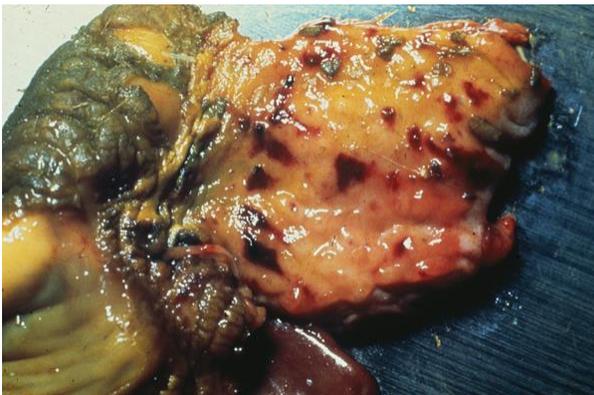
Cyanosis of comb (left), normal (right)



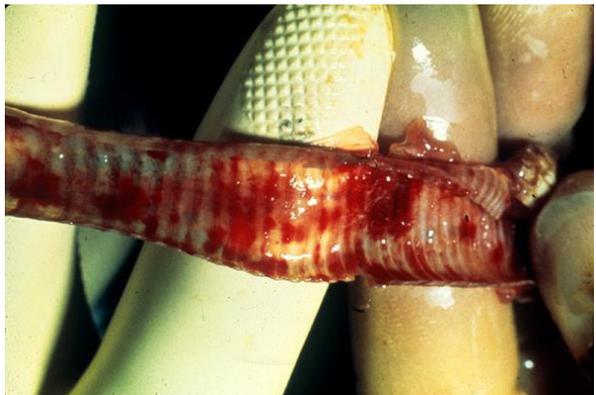
Congestion of hock and shanks



Opened edematous wattle



Visceral hemorrhages



Hemorrhages of trachea

## LUMPY SKIN DISEASE

**AGENT:** LSD virus, family *Poxviridae*, genus *Capripoxvirus*

**SPECIES AFFECTED:** Cattle and water buffalo

### TRANSMISSION:

- Vector borne by biting insects (mosquitoes and flies)
- Direct contact is a minor source of infection

### CLINICAL APPEARANCE:

- Clinical signs
  - Signs range from inapparent to severe
  - Skin nodules (1-5 cm) develop after an initial fever
  - Nodules become painful and necrotic before becoming scabs
  - Nodules may develop in GI tract, trachea, and lungs
  - Depression, anorexia, excessive salivation & emaciation noted
  - Lymph nodes may become 4-10 X normal size near lesions
  - Rhinitis, conjunctivitis, agalactia, lameness and edema of the brisket and legs may be noticed
- Lesions
  - Post mortem lesions can be extensive including nodules that penetrate SQ tissue and muscles with hemorrhage, edema, necrosis
  - Lesions may be found in oral and nasal cavities, pharynx, epiglottis, trachea, GI tract, lungs, testicles, and bladder
  - Pleuritis, edema, and focal lobular atelectasis in the lungs may occur with enlarged mediastinal lymph nodes

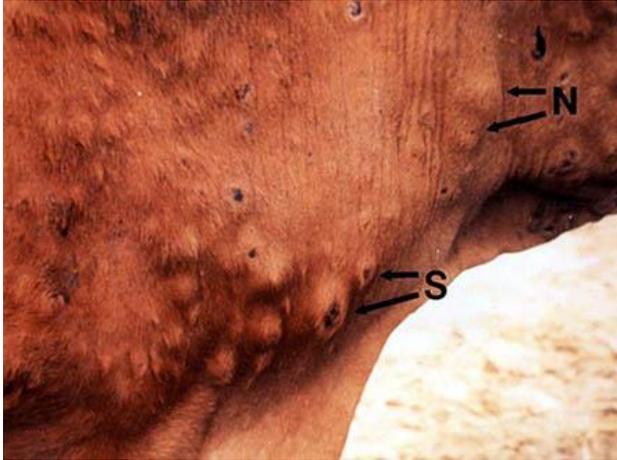
**INCUBATION PERIOD:** 4-28 days

**DIFFERENTIAL DIAGNOSIS:** Herpes-virus skin disease, pseudocowpox, bovine herpes mamillitis, dermatophilosis, ringworm, insect or tick bites, rinderpest, demodicosis, hypoderma bovis infection, photosensitization, urticaria, cutaneous tuberculosis, onchocercosis

**MORBIDITY & MORTALITY:** Morbidity 10-20%, Mortality often low (1 – 3%) but may reach 20-80%

**BIOSECURITY LEVEL:** **Yellow**

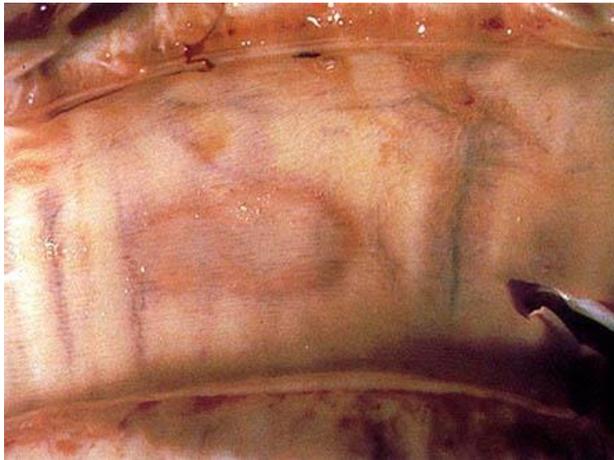
## LUMPY SKIN DISEASE



Calf with LSD nodules



Second calf with LSD



LSD (pox) lesion in trachea



Atelectasis and lobular edema

## PESTE DES PETITS RUMINANTS

**AGENT:** Small ruminant morbillivirus (SRM), family *Paramyxoviridae*, genus *Morbilivirus* –still commonly known as PPRV

**SPECIES AFFECTED:** Goats, sheep

### TRANSMISSION:

- Close contact with ocular, nasal, or oral secretions, or feces
- Inhalation of aerosol particles
- Indirect contact with fomites
- No known carrier state

### CLINICAL APPEARANCE:

- Clinical signs
  - Sudden fever (104-106<sup>0</sup> F), restlessness, inappetance
  - Serous nasal discharge that becomes mucopurulent
  - Hyperemic gums with erosive lesions that form scabs
  - Profuse, non-hemorrhagic diarrhea leading to severe dehydration
  - Bronchopneumonia with coughing is common late in the disease
- Lesions
  - Necrotic lesions in oral cavity and GI tract
  - Emaciation, conjunctivitis, and erosive stomatitis
  - Extensive necrosis of Peyer’s patches, “Zebra stripe” congestion of posterior colon, erosive lesions of vulva and vaginal wall
  - Bronchopneumonia with consolidation and atelectasis

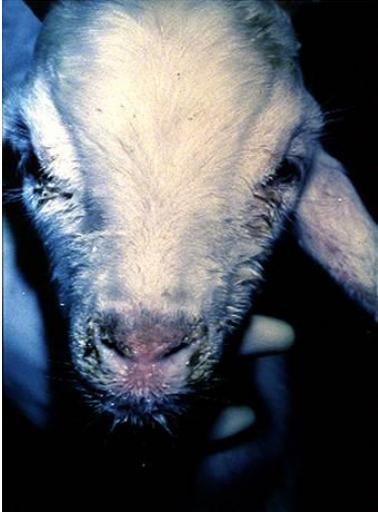
**INCUBATION PERIOD:** Typically 4 – 6 days but may be up to 10 days

**DIFFERENTIAL DIAGNOSIS:** Rinderpest, bluetongue, pasteurellosis, heartwater, contagious caprine pleuropneumonia, contagious ecthyma, FMD, coccidiosis, mineral poisoning

**MORBIDITY & MORTALITY:** Morbidity 90-100%, Mortality 50 – 100%

**BIOSECURITY LEVEL:** **Yellow**

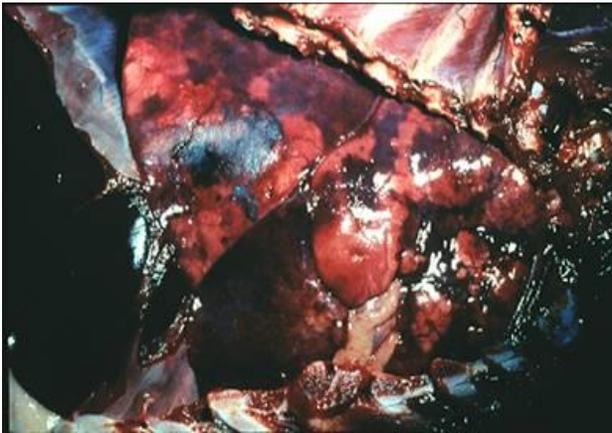
## PESTES DES PETITS RUMINANTS



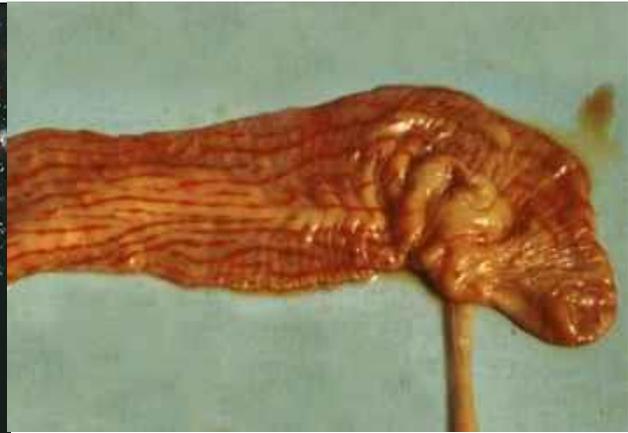
Goat with clinical signs



Oral lesions of infection with PPRV



Bronchopneumonia with PPRV



"Zebra striping" of colon with PPRV



Dry exudates on muzzle



Necrosis (white areas) in mouth

## **PORCINE EPIDEMIC DIARRHEA VIRUS (PED)**

**AGENT:** PED virus, family Coronaviridae, genus Alphacoronavirus

**SPECIES AFFECTED:** Swine

**TRANSMISSION:**

- Direct – Fecal/Oral route
- Indirect - Fomite

**CLINICAL APPEARANCE:**

- Clinical signs
  - Acute outbreak of severe diarrhea and vomiting
  - Dehydration
  - Anorexia
- Lesions
  - Small intestinal villous blunting
  - Thinning of the intestines, mostly limited to the small intestines
  - Presence of undigested milk in the stomach
  - Watery intestinal contents

**INCUBATION PERIOD:** 1-4 days

**DIFFERENTIAL DIAGNOSIS:** Transmissible Gastroenteritis (TGE)

**MORBIDITY & MORTALITY:** Morbidity: up to 100%

Mortality varying according to age:

- Suckling piglets: up to 100%
- Piglets older than 10 days: less than 10%
- Adult and fattening pigs: less than 5%

**BIOSECURITY LEVEL:** **Yellow**



## **RABBIT HEMORRHAGIC DISEASE**

**AGENT:** VHD virus, family *Caliciviridae*, genus *Lagovirus*

**SPECIES AFFECTED:** Wild and domesticated rabbits

**TRANSMISSION:**

- Direct contact with infected animals
- Fomites
- Mechanical transmission: Insects can transmit viral particles to conjunctiva

**CLINICAL APPEARANCE:**

- Clinical Signs
  - Rabbits < 8 weeks tend to be resistant
  - Peracute – fever & death within 12 – 36 hours of onset,
  - Acute – neurologic signs (opisthotonos, excitement, paddling, turn & flip quickly in cage), dyspnea, cyanosis, blood stained frothy nasal discharge
  - Chronic – thought to be asymptomatic
- Lesions
  - Hepatic necrosis & splenomegaly
  - Pale liver with reticular pattern of necrosis
  - DIC is common in terminal stage
  - Infarcts may be seen in most organs

**INCUBATION PERIOD:** 1 – 5 days

**DIFFERENTIAL DIAGNOSIS:** Pulmonary pasteurellosis, severe bacteremia or septicemia with secondary DIC, enterotoxemia due to *E. Coli* or *Clostridium perfringens* type E, heat exhaustion

**MORBIDITY & MORTALITY:** Depends on strain: Morbidity 30 – 100%, Mortality 40 – 100%

**BIOSECURITY LEVEL:** Red. Stay on site and contact state or federal animal health officials.

## RABBIT HEMORRHAGIC DISEASE

Dr. J.P. Teifke



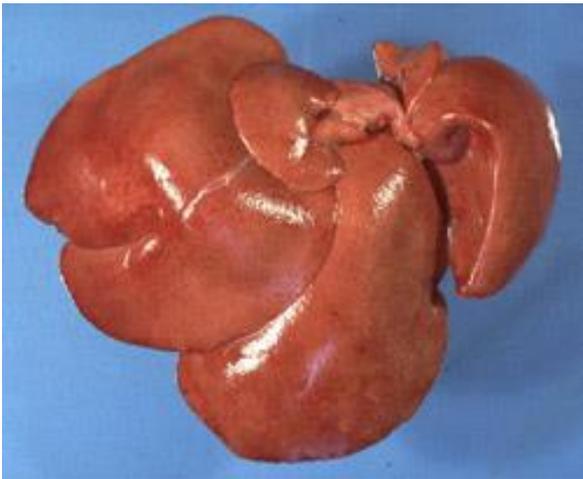
Severe Epistaxis

Dr. J.P. Teifke



Hepatic necrosis (reticular pattern)

Dr. J.P. Teifke



Swollen liver

Dr. J.P. Teifke



Trachea containing foam

## RIFT VALLEY FEVER

**AGENT:** RVF virus, family *Bunyaviridae*, genus *Phlebovirus*

**SPECIES AFFECTED:** Cattle, sheep, goats, buffalo and **humans**

**TRANSMISSION:**

- Vector borne by *Aedes* spp. Mosquitoes
- Wild ruminants serve as reservoir host in endemic areas

**CLINICAL APPEARANCE:**

- Clinical signs
  - Vary with age, species, and breed; most severe in young
  - In lambs: biphasic fever (104 – 107<sup>0</sup> F), anorexia, abdominal pain, dyspnea  
weakness, death in 24-36 hours
  - In sheep and goats: fever, mucopurulent nasal discharge, dyspnea, fetid hemorrhagic diarrhea, vomiting, jaundice, abortion, sudden death
  - In cattle: fever (104 – 106<sup>0</sup> F), anorexia, weakness, excessive salivation, fetid diarrhea, abortion, decreased milk production
- Lesions
  - Most consistent lesion is massive hepatic necrosis
  - In aborted fetuses, liver is very large, brown to red, soft and friable, with multiple gray to white necrotic foci usually present
  - Jaundice, widespread cutaneous hemorrhage, body cavity fluid
  - Wall of gallbladder is often edematous with hemorrhages
  - Widespread petechiation and ecchymosis

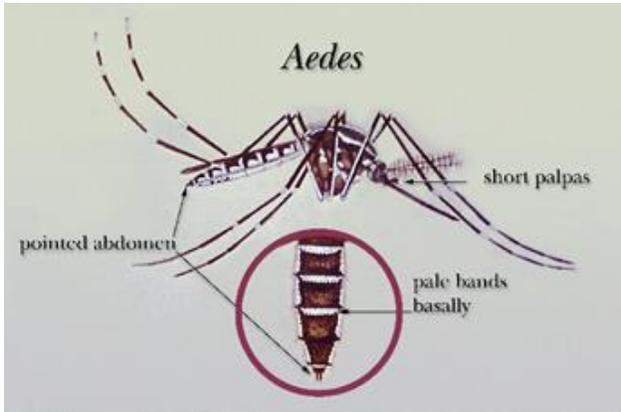
**INCUBATION PERIOD:** 12 Hours to 6 days

**DIFFERENTIAL DIAGNOSIS:** Bluetongue, enterotoxemia, brucellosis, vibriosis, trichomonosis, heartwater, ovine enzootic abortion, pestes des petits ruminants, rinderpest, toxic plants, bacterial septicemia

**MORBIDITY & MORTALITY:** Mortality in adult sheep 20-70%, adult cattle < 10%, mortality up to 70-100% in young lambs, calves and kids

**BIOSECURITY LEVEL:** **Yellow**

## RIFT VALLEY FEVER



*Aedes* spp. Mosquito



Aborted fetuses



Massive hepatic necrosis in lamb



Liver with hepatic necrosis

## **RINDERPEST**

**AGENT:** Rinderpest virus, family *Paramyxoviridae*, genus *Morbillivirus*

- Eradicated from the world in 2011- Virus held in laboratories

**SPECIES AFFECTED:** Cloven-hooved animals

**TRANSMISSION:**

- Direct contact with infected animals (nasal-ocular discharge, feces)
- Indirect contact with fomites

**CLINICAL APPEARANCE:**

- Clinical signs
  - Different forms depending on virus strain and host resistance
  - Peracute form: high fever (104 – 107<sup>0</sup> F), congested mucous membranes, death
  - Classic form: fever (104 – 106<sup>0</sup> F), depression, anorexia, tachypnea, leukopenia, congested mucous membranes, ocular & nasal discharge, oral erosions with salivation
  - After 2-3 days, develop profuse, watery or hemorrhagic diarrhea, tenesmus, dehydration, abdominal pain, weakness, recumbency
- Lesions
  - Small necrotic foci on gums, lips, palate, cheeks, base of tongue
  - Foci will slough leaving red erosions, can extend to GI and upper respiratory tract
  - “Zebra” striping in large intestines, enlarged GI lymph nodes with necrotic Peyer’s patches

**INCUBATION PERIOD:** 3 – 15 days, usually 4 – 5 days

**DIFFERENTIAL DIAGNOSIS:** BVD (mucosal disease), IBR, foot & mouth disease, vesicular stomatitis, malignant catarrhal fever, salmonellosis, necrobacillosis, paratuberculosis, arsenic poisoning, peste des petits ruminants

**MORBIDITY & MORTALITY:** Can approach 100%

**BIOSECURITY LEVEL:** **Yellow**

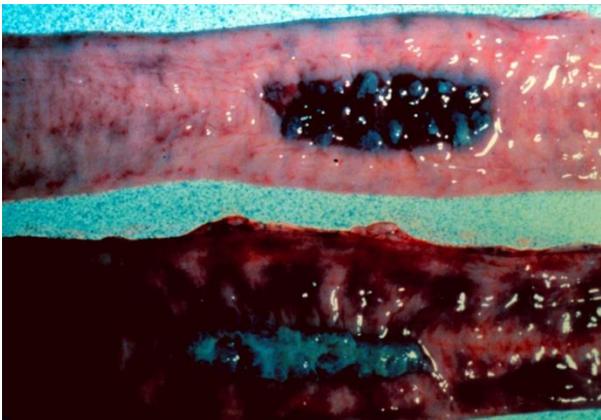
## RINDERPEST



Ocular discharge with Rinderpest



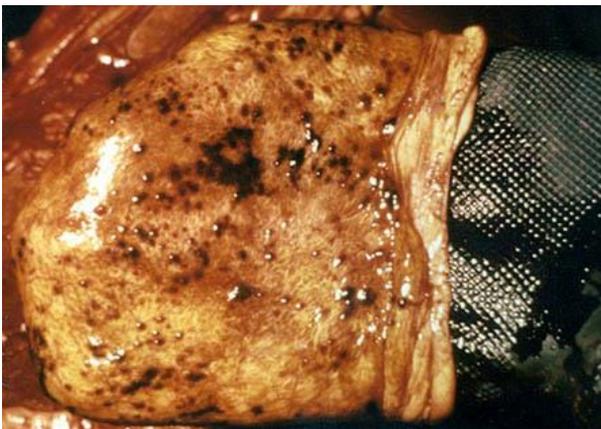
Oral erosions with clinical Rinderpest



Necrotic lesion over Peyer's patch



"Zebra striping" of colon



Hemorrhage of gall bladder



Conjunctivitis of early Rinderpest

## **SCRAPIE**

**AGENT:** Prion protein

**SPECIES AFFECTED:** Sheep and goats

**TRANSMISSION:**

- Ingestion of contaminated material

**CLINICAL APPEARANCE:**

- Clinical signs
  - Behavioral changes including isolation from flock, hyperexcitability, gait abnormalities, fixed stare, erect head, apprehension
  - Other signs include ataxia, incoordination, trembling, convulsions
  - Scratching and rubbing apparently to relieve pruritis (itching) beginning at tail head and progressing cranially
  - Weight loss with retention of appetite
  - Gait abnormalities including swaying of back end, hopping and high stepping of forelegs
- Lesions
  - No gross lesions except emaciation or wasting of carcass

**DIFFERENTIAL DIAGNOSIS:** Listeriosis, louping ill, ovine progressive pneumonia, caprine arthritis encephalitis, polioencephalomalacia, pruritic dermatitis from bacteria, fungi or ectoparasites, Aujeszky's disease, rabies

**BIOSECURITY LEVEL:** **Yellow**

## SCRAPIE



Alopecia secondary to rubbing

## SHEEP & GOAT POX

**AGENT:** Sheep pox virus, goat pox virus, family *Poxviridae*, genus *Capripoxvirus*

**SPECIES AFFECTED:** Sheep, goats

### TRANSMISSION:

- Inhalation of aerosol particles
- May enter body through abraded skin
- Spread by insects is possible

### CLINICAL APPEARANCE:

- Clinical signs
  - Fever, followed 2-5 days later by erythematous macules
  - Macules become 0.5-1.5 cm papules with gray center surrounded by hyperemia, then dark, hard, sharply demarcated scabs
  - Skin lesions in axilla, perineum, and groin
  - Systemic signs may include conjunctivitis, rhinitis, depression, blepharitis, lymphadenopathy, anorexia, dyspnea, nasal discharge
- Lesions
  - Skin usually contains macules and papules with areas of edema, hemorrhage, congestion, necrosis, and vasculitis
  - Lymph nodes can be enlarged up to 8X normal size
  - Lungs often contain discrete lesions or hard white nodules
  - Papules or ulcerated papules commonly in abomasal mucosa, rumen, large intestine, trachea, esophagus, tongue, and palate

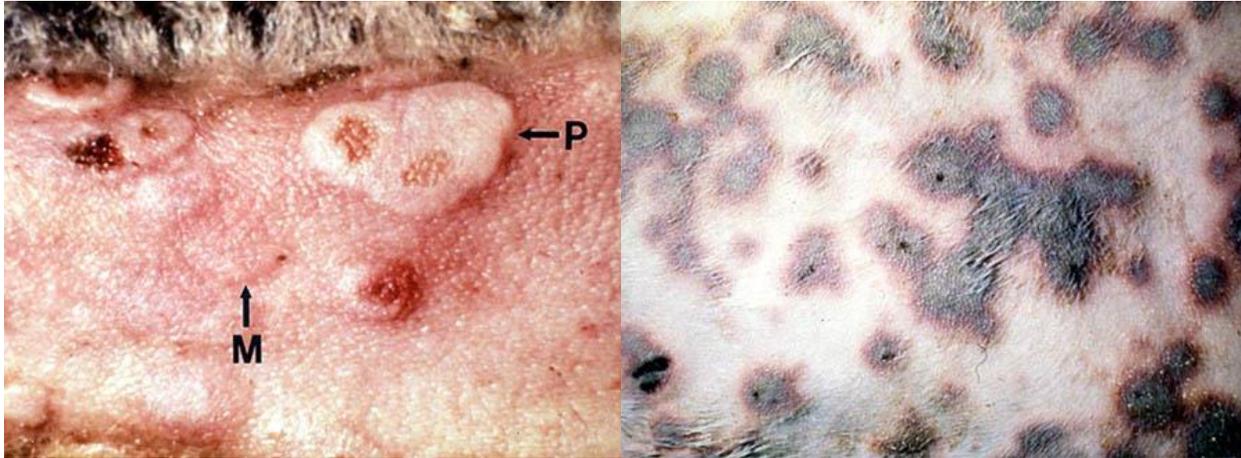
**INCUBATION PERIOD:** 4 – 13 days

**DIFFERENTIAL DIAGNOSIS:** Contagious ecthyma (orf), bluetongue, mycotic dermatitis, sheep scab, mange, photosensitization, peste des petits ruminants, parasitic pneumonia, caseous lymphadenitis

**MORBIDITY & MORTALITY:** Morbidity - up to 90%, Mortality – up to 100% in naïve animals

**BIOSECURITY LEVEL:** Yellow

## SHEEP & GOAT POX



Macule (M) & papule (P) of SGP

Necrotic lesions in skin of goat



Dried necrotic sheep pox lesions

Atelectatic area of lung with SGP



Skin lesions of sheep with SGP

Kid with SGP lesions of head

## SWINE VESICULAR DISEASE

**AGENT:** SVD virus, family *Picornaviridae*, genus *Enterovirus*

**SPECIES AFFECTED:** Pigs

### TRANSMISSION:

- Ingestion of contaminated meat scraps (i.e. food garbage)
- Direct contact with infected animals, feces or secretions
- Environmental contamination by infected animals

### CLINICAL APPEARANCE:

- Clinical signs
  - Fever, salivation, lameness
  - Vesicles and erosions of snout, mammary glands, coronary band, interdigital area, tongue and teats
  - On rare occasions, CNS signs may occur including shivering, unsteady gait, (chorea) rhythmic jerking
  - Recovery in 2-3 weeks typical
- Lesions
  - The only lesions are the vesicles that can be seen on live pigs

**INCUBATION PERIOD:** 2 – 7 days

**DIFFERENTIAL DIAGNOSIS:** Foot and mouth disease, vesicular stomatitis, vesicular exanthema of swine, chemical or thermal burns

**MORBIDITY & MORTALITY:** Morbidity can reach 100% Mortality very low

**BIOSECURITY LEVEL:** Red. Stay on site and contact state or federal animal health officials

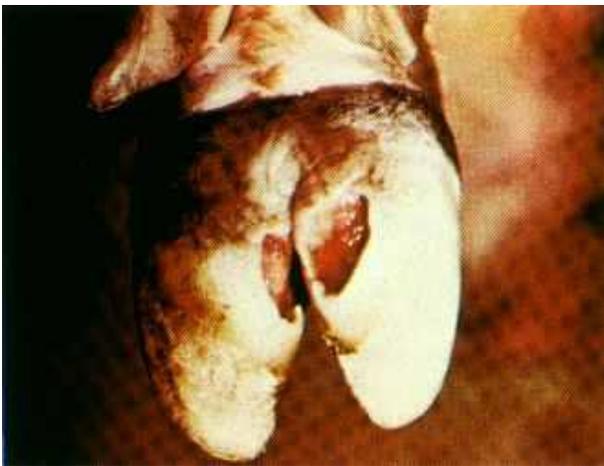
## SWINE VESICULAR DISEASE



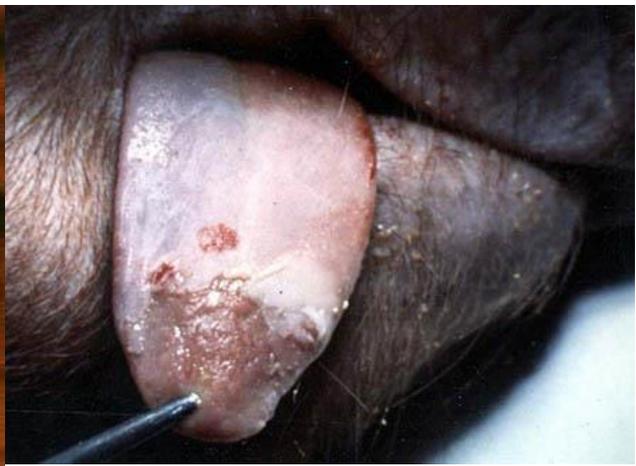
Ruptured vesicles on pig's foot



Vesicle on pig's snout



Ruptured vesicles on pig's heels



Erosions on pig's tongue



Pig sitting from sore feet



Erosions of coronary band

## VESICULAR STOMATITIS

**AGENT:** VSV virus, family *Rhabdoviridae*, genus *Vesiculovirus*

**SPECIES AFFECTED:** Horses, donkeys, mules, cattle, swine, very rarely sheep, goats, camelids, and **humans**

### TRANSMISSION:

- Vector borne by sand fly (*Lutzomyia*), black fly (*Simulidae*) and mosquito (*Aedes* spp.)
- Direct contact
- Indirect contact with fomites
- Inhalation of aerosol particles (humans)
- Not completely understood

### CLINICAL APPEARANCE:

- Clinical signs
  - Fever, vesicles of oral cavity and coronary band
  - Vesicles lead to drooling, chomping, mouth rubbing, lameness
  - Cattle and pigs have vesicles of oral cavity, mammary gland, coronary band, and interdigital spaces
  - Compared to other vesicular diseases, vesicles tend to be isolated to one area of body
- Lesions
  - Vesicles of oral cavity and coronary band
  - Absence of heart and lung lesions seen with FMD

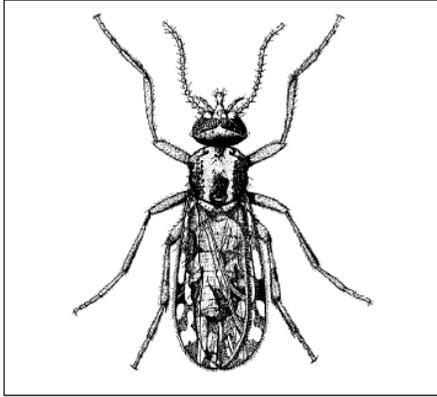
**INCUBATION PERIOD:** 1-8 days

**DIFFERENTIAL DIAGNOSIS:** Foot and mouth disease, foot rot, chemical or thermal burns, rinderpest, IBR, BVD, malignant catarrhal fever, bluetongue, swine vesicular disease, vesicular exanthema of swine

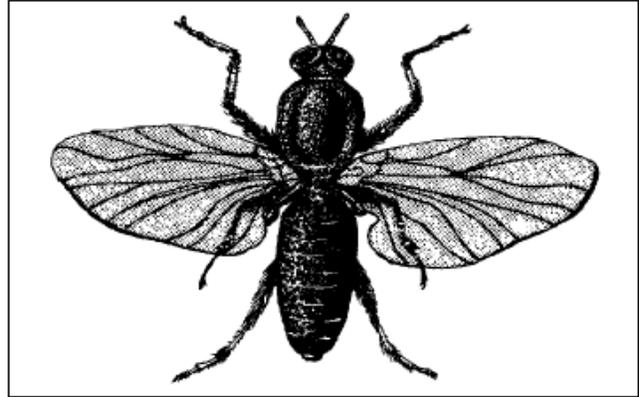
**MORBIDITY & MORTALITY:** Morbidity 5-70%, Mortality rare

**BIOSECURITY LEVEL:** **Red. Stay on site and contact state or federal animal health officials**

## VESICULAR STOMATITIS



Sand fly



Black fly



Oral lesions of VSV in horse



VS lesion on cow tongue



VS lesions on cow's teats



VS vesicle on pig's snout

## **FOR ADDITIONAL INFORMATION**

Iowa State University – Center for Food Security and Public Health

<http://www.cfsph.iastate.edu/>

United States Animal Health Association – Foreign Animal Diseases

<https://www.usaha.org/disease-information>

United States Department of Agriculture

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information>

OIE (World Organization of Animal Health)

<https://www.oie.int/animal-health-in-the-world/technical-disease-cards/>