

# Wild Animal Disease

# Disease of Wild Ruminants I

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# Contagious Ecthyma

- Contagious ecthyma occurs in sheep, goats, alpacas, camels, and other wild ruminants. Rare cases have been reported in dogs that ate infected carcasses.
- Commonly affected species;
  - Mountain Goat (*Oreamnos americanus*)
  - Bighorn Sheep (*Ovis canadensis*)

**Parapox virus**

# Contagious Ecthyma

- This disease has also been observed in other ungulates including alpacas, reindeer (*Rangifer tarandus*), Japanese serows (*Capricornis crispus*), musk oxen (*Ovibos moschatus*), bighorn sheep (*Ovis canadensis*), Sichuan takin (*Budorcas taxicolor tibetana*), deer, pronghorn (*Antilocapra americana*) and wapiti/ elk (*Cervus canadensis*), and it is suspected to occur in some wild chamois (*Rupicapra rupicapra*).

# Contagious Ecthyma

- Signs are seen in 2 to 3 days after sheep and goats are exposed to the virus.
- The first signs are small raised bumps (papules), sores, and blisters found on the lips, nose, ears, and/or eyelids.
- Nursing lambs can transmit the virus to their dam, resulting in lesions on the teats and udder.
- Because these lesions can be painful, they can result in loss of appetite, weight loss, or even starvation.
- Excess salivation can occur.

# Contagious Ecthyma

- Initially, orf appears as **papules, pustules and vesicles**, typically found on and around the muzzle, mouth and nose, and sometimes on the ears, eyelids, feet, perineal region or other sites.
- Lesions may also occur inside the mouth, particularly in young lambs and reindeer.
- Contagious ecthyma in humans is called orf (ore-F).

# Lumpy Skin Disease



- LSDV is highly host specific and causes diseases only in cattle (*Bos indicus* and *B. taurus*) and water buffalo (*Bubalus bubalis*).
- There is evidence from a study in Ethiopia of **differential breed susceptibility to LSD**, with **Holstein Friesian or crossbred cattle** exhibiting higher **morbidity and mortality** due to LSD when compared with **local zebu cattle**.
- The virus appears to be highly host specific.
- Only, bovines and zebras develop clinical signs specific of the disease.
- LSDV is not zoonotic.

# Lumpy Skin Disease

- Clinical signs:
  - Lacrimation and nasal discharge – usually observed first.
  - Subscapular and prefemoral lymph nodes become enlarged and are easily palpable.
  - High fever ( $>40.50\text{C}$ ) may persist for approximately a week.
  - Sharp drop in milk yield.



# Lumpy Skin Disease

- Appearance of highly characteristic, nodular skin lesions of 10-50 mm in diameter:
  - The number of lesions varies from a few in mild cases, to multiple lesions in severely infected animals.

# Lumpy Skin Disease

- Predilection sites are the skin of the head, neck, perineum, genitalia, udder and limbs.

# Lumpy Skin Disease

- Deep nodules involve all layers of the skin, subcutaneous tissue and sometimes even the underlying muscles.
- Necrotic plaques in the mucous membranes of the oral and nasal cavities cause purulent or mucopurulent nasal discharge and excessive salivation, containing high concentrations of virus.

# Lumpy Skin Disease

- Typically, the centre of the lesion ulcerates and a scab forms on top.
- Skin nodules may persist for several months.

# Lumpy Skin Disease

- Sometimes, painful ulcerative lesions develop in the cornea of one or both eyes, leading to blindness in worst cases.

# Lumpy Skin Disease

- Skin lesions in the legs and on top of the joints may lead to deep subcutaneous infections complicated by secondary bacterial infections and lameness.
- Pneumonia caused by the virus itself or secondary bacterial infections, and mastitis are common complications.
- Subclinical infections are common in the field.

# Lumpy Skin Disease

- When an animal with multiple skin lesions is sent to a slaughterhouse, subcutaneous lesions are clearly visible after the animal is skinned.
- In a postmortem examination, pox lesions can be found throughout the entire digestive and respiratory tracts and on the surface of almost any internal organ

# Foot and Mouth Disease

- FMD may cause serious disease in wild animals.
- 50% of a population of *Gazella gazella*-**Mountain gazelle** died in Israel.
- Ten percent of *Odocoileus hemionus* - **Mule deer** in California were found to have FMD lesions in the last outbreak in the USA.



# Foot and Mouth Disease

- In Britain, **hedgehogs** (*Erinaceus europaeus*) have been found with serious and fatal disease while **deer** on and near infected location have been seen *lame and with typical FMD lesions*. However, various species also may develop only mild clinical signs, or seroconvert without obvious illness developing.

# Foot and Mouth Disease

- Wild birds, rodents, and invertebrates such as flies and ticks may all carry virus from one place to another.
- Rats may play a larger role in spread of the disease as they can become infected naturally and shed virus in their faeces and urine for some time; dust contaminated with infected rat urine or faeces might result in infection by inhalation.

# Foot and Mouth Disease

## Carrier States:

- **Domestic cattle** up to 3.5 years after infection
- **Domestic Water buffalo** up to 1-2 years
- **Domestic goats and sheep** up to 9 months
- **African buffalo** up to 5 years
- **Sable antelope** up to 28 days
- **Eland** up to 32 days
- **Wildebeest** up to 45 days
- **Kudu** up to 160 days
- **Fallow deer** up to 77 days
- **Sika deer** up to 77 days
- **White-tailed deer** up to 77 days

Sable antelope

Eland

Kudu

Wildebeest

# Foot and Mouth Disease

- Asia;
  - Mithun (*Bos frontalis*), Yak (*Bos grunniens*), and Gaur (*Bos gaurus*) Severe disease – associated w/ livestock infections
  - Asian elephants Moderately severe disease
  - Water Buffalo (*Bubalus bubalis*) domestic animals – sometimes feral
- Middle East No evidence for the maintenance of FMDV in wildlife in the Middle East
  - Dromedary camels (*Camelus dromedaries*) domestic animals - All serotypes but resistant to disease and do not appear to play a role in transmission to other livestock
  - Captive Arabian Oryx (*Oryx leucoryx*) – high mortality
  - Mountain Gazelle (*Gazella gazelle*) – high mortality
- Europe
  - Reindeer (*Rangifer tarandus*)
  - Roe deer (*Capreolus capreolus*)
  - Wild boar (*Sus scrofa*)

# Foot and Mouth Disease

- **Pathogenesis:**
- Acquisition of infection is normally **oral**, usually occurs by **inhalation** and the initial site of virus replication is thought to be the **respiratory bronchioles** of the lung.
- However, an earlier study showed initial replication occurred in the **mucosa** and possibly the **lymphoid tissues of the pharynx**, particularly in the tonsillar region of the soft palate.
- The virus then spreads **via the bloodstream to Langerhans cells** (macrophage-like dendritic cells) in, and **all epithelial cells** in contact with an infected Langerhans cell **become infected**.

- The signs of FMD in wildlife are generally similar to those in domestic animals.
- In FMD, vesicles (blisters, or aphthae) develop at multiple sites, generally on the feet and in the mouth.

- **Grossly:**
- In ruminants, oral lesions can be severe.
- In impala, as in small domestic ruminants, mouth lesions are usually most severe on the **dental pad**, but may occur elsewhere, especially on **the tongue**; foot lesions begin as a **coronitis**.

# Foot and Mouth Disease

- Young animals of any species may die acutely of myocarditis, which appears grossly as whitened streaklike areas in the myocardium.



# Foot and Mouth Disease

- **Histopathologically,**
- **Vesicles begin** as clusters of hypereosinophilic degenerating keratinocytes in the stratum spinosum.
- **Intercellular edema fluid accumulates**, forming a vesicle which soon ruptures, leaving an eroded surface.
- **Myocardial lesions** consist of multifocal myocardial degeneration and necrosis with a predominantly lymphocytic cellular response.