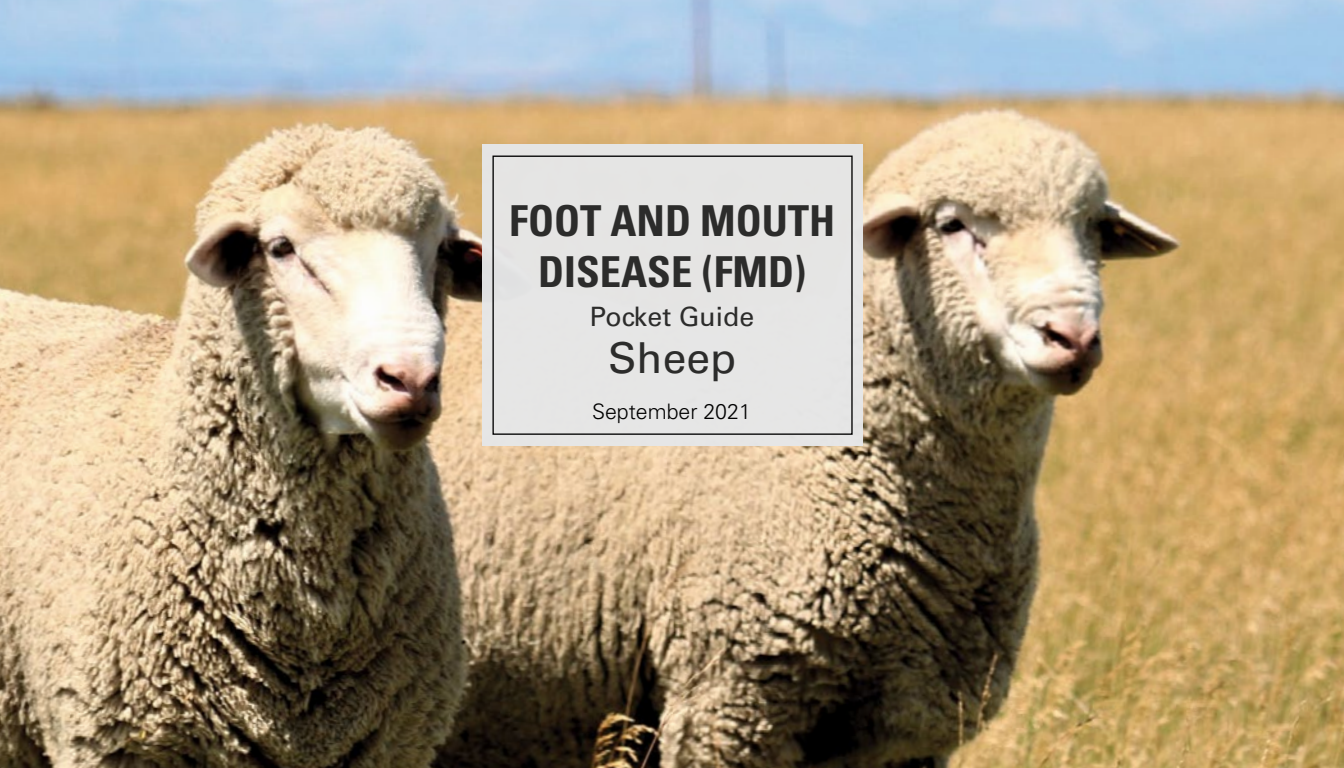


A photograph of two sheep with thick, light-brown wool standing in a golden-yellow field under a clear blue sky. The sheep on the left is looking towards the camera, while the one on the right is looking slightly to the side. A white rectangular box with a thin black border is centered over the image, containing text.

FOOT AND MOUTH DISEASE (FMD)

Pocket Guide
Sheep

September 2021

Acknowledgements

This Pocket Guide was developed to enhance foot-and-mouth disease (FMD) surveillance in sheep. The cooperative effort included contributions from the United States Department of Agriculture (USDA), American Sheep Industry (ASI) Association, and the Center for Food Security and Public Health at Iowa State University College of Veterinary Medicine.



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Cover photos courtesy of American Sheep Industry Association (English Cover), and MacCauley Suffolks, Atlgem, PA (Spanish Cover)

Introduction

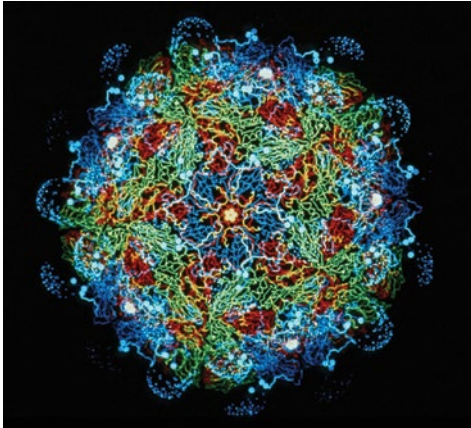


Illustration credit: Dr. Fred Brown

The sheep illustrated in this guide (approximately five months old) were infected with foot-and-mouth disease virus (FMDV) by contact with a pig experimentally inoculated with FMDV type O. The sheep were housed in the same room as the infected pig, another pig, and two calves. The first day of contact for the sheep was considered to be the day when FMD vesicles appeared on the inoculated pig. Note that FMDV infected animals may shed virus before the appearance of clinical signs. Also, sheep can be carriers of FMDV for up to a year after infection, while not showing signs of the disease.

With the exception of the images depicting fever and lameness, the images in this guide were taken in a laboratory setting over a period of several years. Lesion ages in this guide are approximate. These do not reflect field conditions; lesions may look different in sheep on farms.

Clinical Signs

FMD is a highly contagious viral disease that affects cloven-hoofed (two-toed) animals (sheep, cattle, pigs, goats, some wildlife). The onset and severity of clinical signs vary between animals and different strains of FMDV. Sheep might show no signs or only mild signs of being infected with FMD or may have severe disease like that seen in cattle or pigs. Fever and the pain from blisters on the feet and mouth can lead to depression, off-feed, lameness, and reluctance to move or rise. Sheep with FMD may show one or more of these signs:

- Fever greater than 104°F (>40°C)
- Mild to severe lameness in one or more feet
- Blisters on feet or in the mouth
- Decreased or no milk production
- Abortion, stillbirth
- Rams reluctant to mate
- Sudden death in young lambs

Early recognition of FMD signs and prompt reporting are **critical** to containing this highly contagious disease.

Fever



Approximately 90% of sheep will have a fever of greater than 104°F (> 40°C), 2–3 days following exposure.

*Photo credit: Andrew Kingsbury,
Iowa State University*

Lameness

Lameness is usually the first outwardly visible sign of FMD in sheep due to lesions around the coronary band and interdigital cleft.

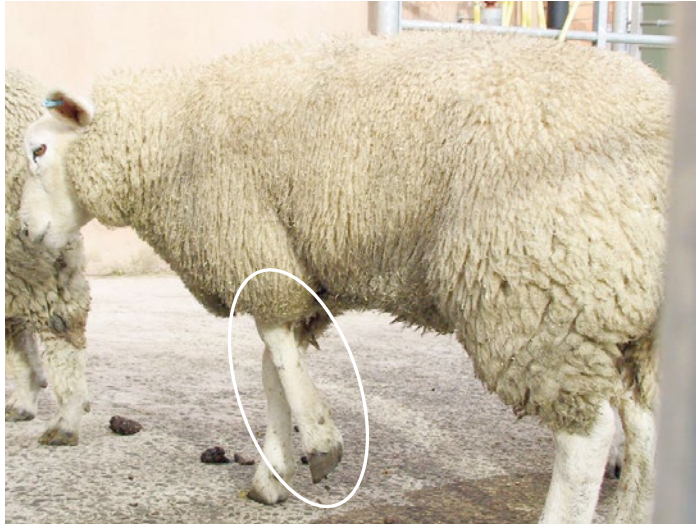


*Photo credit: National Animal
Disease Information Service
(NADIS), Phil Scot,
<https://www.nadis.org.uk/disease-a-z/cattle/foot-and-mouth-disease>*

Mouth



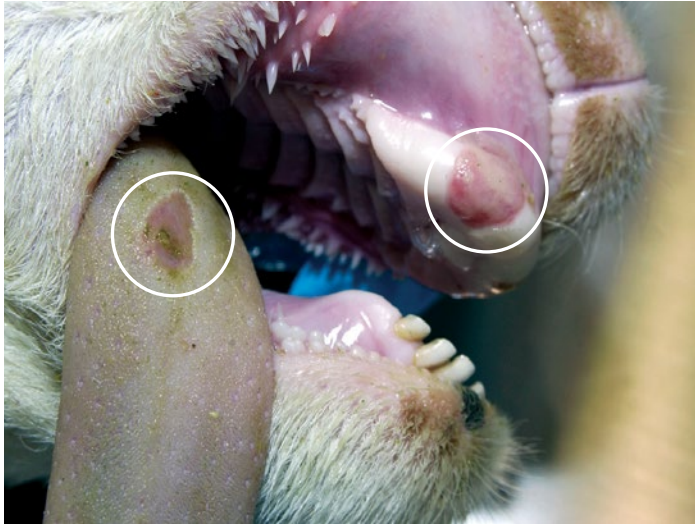
Focal erosion/ulceration of the mucosa of the lip.

Age of lesion 1 – 2 days.

Mouth

Focal erosion of the dental pad with fibrin deposition and focal erosion of the tongue.

Age of lesions 3 – 5 days.



Dental Pad



Blanching of the dental pad.

Age of lesion 1 – 2 days.

Dental Pad

Circular erosion of the dental pad.

Age of lesion 1 – 2 days.



Dental Pad



Erosion of the dental pad. Hyperemia of the oral mucosa.

Age of lesion 1 – 2 days.

Dental Pad

Erosion of the dental pad.

Age of lesion 1 – 2 days.



Dental Pad



Focal erosion on the dental pad, rough swollen edges of the lesion.

Age of lesion 3 – 4 days.

Dental Pad

Blanching and extensive erosion/ulceration of the dental pad with fibrin deposition around the borders.

Age of lesion 3 – 5 days.



Dental Pad



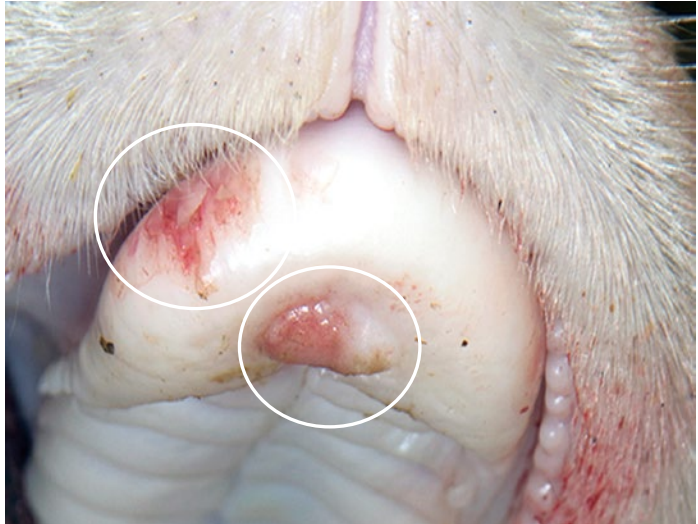
Focal erosion of the dental pad covered with fibrinous material.

Age of lesion 3 – 5 days.

Dental Pad

Healing erosions on the
dental pad and hard palate.

Age of lesion 5 – 7 days.



Dental Pad



Multifocal healing erosions
on the dental pad.

Age of lesion 5 – 7 days.

Nasal Mucosa

Focal erosion of the nasal mucosa.

Age of lesion 1 – 2 days.



Nasal Mucosa



Vesicle in the nasal mucosa.

Age of lesion 1 – 2 days.

Coronary Band

Blanching of the coronary band.

Age of lesion 1 – 2 days.



Coronary Band



Ruptured vesicle at the coronary band.

Age of lesion 1 – 2 days.

Coronary Band

Erosion of the coronary band with fibrin deposition.

Age of lesion 3 – 5 days.



Coronary Band



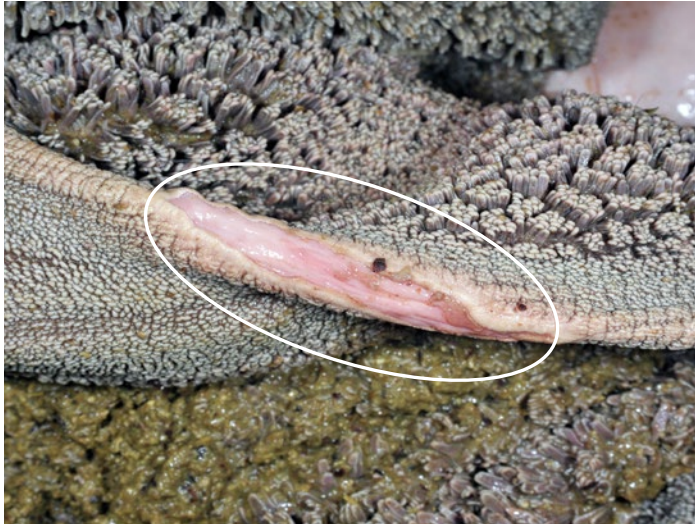
Blanching of the coronary band.

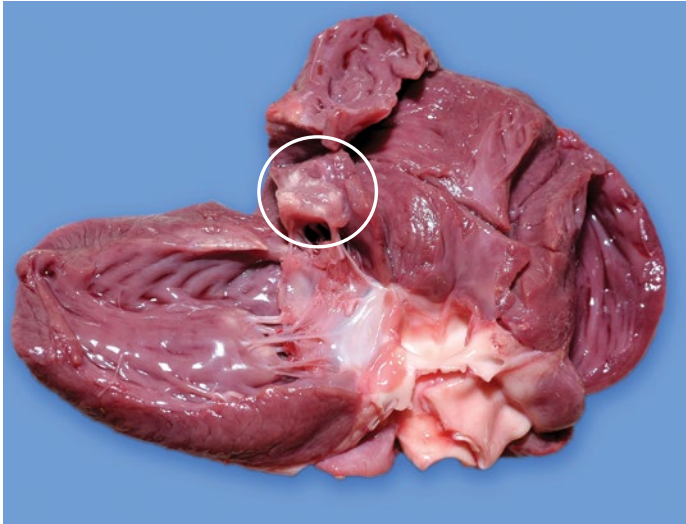
Age of lesion unknown.

Rumen

Erosions along the ruminal pillars are sometimes observed on necropsy.

Age of lesion unknown.





Myocarditis/myocardial degeneration and necrosis in a young lamb typically leads to sudden death.

Pale areas in the interventricular septum.

Age of lesion unknown.

Procedures to follow if you suspect a Foreign Animal Disease ____

1. Make “the Call.”

Call the USDA APHIS Area Veterinarian-in-Charge (AVIC) for your state or your State Animal Health Official (SAHO). Obtain contact information for your AVIC or SAHO by calling (866) 536-7593. You can also call the USDA Emergency number (800) 940-6524 (24 hours) for assistance.

2. Discuss How to Proceed.

The AVIC or SAHO will let you know approximately when the Foreign Animal Disease Diagnostician (FADD) will conduct a site visit. You should discuss precautions to take regarding people movement and contact with animals while waiting for the FADD to arrive. They will also want to gather information from those involved with the operation. Discuss the next steps to follow with the AVIC or the SAHO you have contacted.

Information will be kept confidential during the investigation.

Items to be discussed over the phone or when the FADD arrives may include:

- When did you notice the first blisters/lesions and where (feet, mouth)?
- When were animals last transported from the operation and what was their destination?
- When were these animals delivered to the operation and where did they come from?
- Do you or your employees care for other livestock?
- How many employees work at this location?
- Do the employees have livestock at home?
- Is equipment shared between operations or with neighbors?
- When was feed last delivered to the operation?
- Have there been any foreign visitors to the operation?
- Have any employees recently visited a foreign country?

3. Assisting the FADD

When the FADD arrives, the veterinarian, producer, and FADD will work together. Many questions will need to be answered during the investigation. Everyone will be kept informed of the procedures for sample testing and the time-frame involved.

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**AMERICAN
SHEEP
INDUSTRY**



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