Better Training for Safer Food Initiative

Outbreak investigation

Bryony Jones, Royal Veterinary College, University of London

SHEEP AND GOAT PLAGUE (PPR)

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Outline

- PPR clinical signs
- Differential diagnosis
- Case definition
- Outbreak investigation
  - history
  - clinical examination
  - rapid diagnostic tests
  - post mortem examination
  - back- and forward-tracing
- Contingency plan and preparedness
PPR clinical signs

- high mortality
- fever – depression
- ocular discharge – watery, becoming purulent, matting of eyelids, conjunctivitis
- nasal discharge – watering, becoming mucoid and purulent, blocked nostrils
- coughing, sneezing, broncho-pneumonia
- mouth lesions – ulcers, necrotic tissue, sores on lips, discharge around mouth
- sores and nodular lesions around muzzle
- diarrhoea – watery, dysentery, dehydration
- abortion

1-2 year old goat with mucoid nasal discharge and diarrhoea
Source: B Jones
Variation in PPR clinical signs

Variation in signs and severity by:

- Species
- Breed
- Age
- Co-infections

Syndromes – main presenting signs:

- High mortality
- Respiratory
- Diarrhoea
- Ocular/nasal discharge +/- mouth lesions
- All or some of the above

Frequency of clinical signs in a flock of sheep and goats, northern Tanzania

Source: B Jones
Case Definition – example from Ethiopia
Pneumo-enteritis syndrome

An outbreak is characterised as a number of cases in a flock (exceptionally a single animal) in which the following clinical signs are present:

- Bilateral, clear or purulent ocular and nasal discharges
- Fever, coughing and sneezing

AND one or more of the following:

- Conjunctivitis
- Difficulty breathing (dyspnoea)
- Erosions (ulcers) in the epithelium of the mouth +/- cheese-like coating on the epithelium
- Diarrhoea or dysentery
- Death

(Source: FAO/MoLF Ethiopia, 2016)
Differential diagnosis

- High mortality
  - pasteurellosis
  - Anthrax
  - poisoning
- Respiratory
  - bacterial or viral pneumonia
- Diarrhoea
  - helminthiasis
  - coccidiosis
  - clostridial infections
- Mouth lesions
  - FMD
  - bluetongue
  - orf

3 month old goat with ocular discharge, eyelids stuck together, nasal discharge, mouth lesions
Source: B Jones
Outbreak Investigation

The main activities are:

- history-taking
- clinical examination
- post mortem examination
- back- and forward tracing
- sample collection
- record-keeping

Adult sheep with profuse mucoid nasal discharge
Source: B Jones
History-taking

- when did the disease start?
- what clinical signs have been observed?
- what species, ages are affected?
  - how many are sick?
  - how many have died?
  - total flock size
- has any treatment been applied?
- what vaccinations has the flock received?
- production system
- wildlife species in the area?
  - any sick or dead wildlife?
Clinical examination

General examination of whole flock
- body condition
- main clinical signs
- species, ages affected
Clinical examinations – several sick animals with range of signs
- mild and severe
- early and later cases
Observe:
- body condition and behaviour
- eyes
- nose
- mouth – gums, tongue, hard palate
- breathing (respiratory rate)
- hindquarters – diarrhoea?
- body temperature
- feet (for differential diagnosis)

2 year old goat with pyrexia, ocular discharge, mucoid nasal discharge blocking nostrils, diarrhoea and straining
Source: B Jones
Post mortem examination

- External signs
  - Eyes
  - Nose
  - mouth
  - Diarrhoea
  - Feet
- Thoracic cavity
  - Lungs
  - Lymph nodes
- Abdominal cavity
  - Gastro-intestinal tract
  - Lymph nodes
- Mouth and pharynx

1 year old sheep; severe dyspnoea, purulent ocular and nasal discharge. Post mortem; congested and collapsed areas of lung, zebra striping of large intestine. Source: B Jones
Rapid diagnostic tests

PPR antigen tests that can be carried out on farm

BDSL lateral flow device

- Collect conjunctival swab from pyrexic animal with early clinical signs
- Less sensitive than PCR but highly specific

Idvet lateral flow device – in development

PPR lateral flow devices:
Top – negative
Centre – weak positive
Bottom – strong positive
Source: B Jones
Back- and Forward Tracing

Tracing window = date of onset of first case + maximum incubation period (21 days)

Collect data on:
- sheep and goat movements on and off farm
- all contact with other flocks
- people, vehicles, equipment, products

Movements on to the farm:
- bought – from where?
- moved from another location – where?
- other animals joining the flock?

Movements off the farm:
- sold – where?
- moved to another location – where?
- other animals leaving the flock?

Contact with other flocks:
- pasture, water points, shared fence, other?

Opportunities for contact with other flocks: watering points, livestock markets
Source: B Jones
Contingency Plan

1. Action to be taken on receiving a report of PPR-like disease

Reporting channels and chain of command?

- Who is likely to report?
- Where do they report?
- Who will take action?
- Who should be notified?
Contingency Plan

2. Preparedness for outbreak investigation

- Transport
- Communications – chain of command
- Team members
- Clinical, sampling and post mortem kit, cold chain
- Protocols for sample collection and submission
  - Type of samples
  - How to store and transport
  - Where to send samples
- PPE & disinfection
- Camera, GPS
- Record-keeping
Contingency Plan

3. Investigation indicates suspected PPR outbreak ........

- Notification of relevant authority - CVO
- Control measures – is necessary legislation in place?
  - quarantine farm
  - biosecurity measures
  - identify and follow up high risk contacts
    - neighbouring farms
    - forward and back-ward tracing
- Confirm or refute PPR diagnosis
  - Laboratory diagnostic tests
Contingency Plan
4. PPR is laboratory confirmed

- Exotic disease coordination group
  - national and local levels
  - communications – daily meetings and updates

- Control measures
  - quarantine infected premises (IP)
  - biosecurity measures – cleaning and disinfection
  - culling, carcass disposal and compensation
  - identify and follow up dangerous contact premises (DCP)
    - neighbouring farms, forward and back-ward tracing
    - investigation
  - vaccination?
Contingency Plan 5. PPR is laboratory confirmed (cont.)

- Define infected zone
  - at least 10 km radius from perimeter of IP – depends on production system, density of farms, fencing, wild animal range, physical barriers
  - Intense surveillance - domestic, wild animals
  - Strict movement control – animals, products, closure of markets

- Define surveillance zone
  - At least 10km from perimeter of infected zone
  - Surveillance - domestic, wild animals
  - Movement control – animals, products, markets

- Communications and awareness – vet personnel, farmers, general public

References

http://www.fao.org/docrep/004/X2096E/X2096E00.htm#TOC

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OPERA

Viale Parioli 96, 00197 Roma - Italy
Tel +39 06 96042652- / +39 06 8080111
Fax +39 06 89280678
info@opera-italy.it;  www.btsftraining.com;
www.opera-italy.it

Better Training for Safer Food
BTSF

European Commission
Consumers, Health and Food Executive Agency
DRB A3/042
L-2920 Luxembourg