

# 7\_CLOSTRIDIOSIS

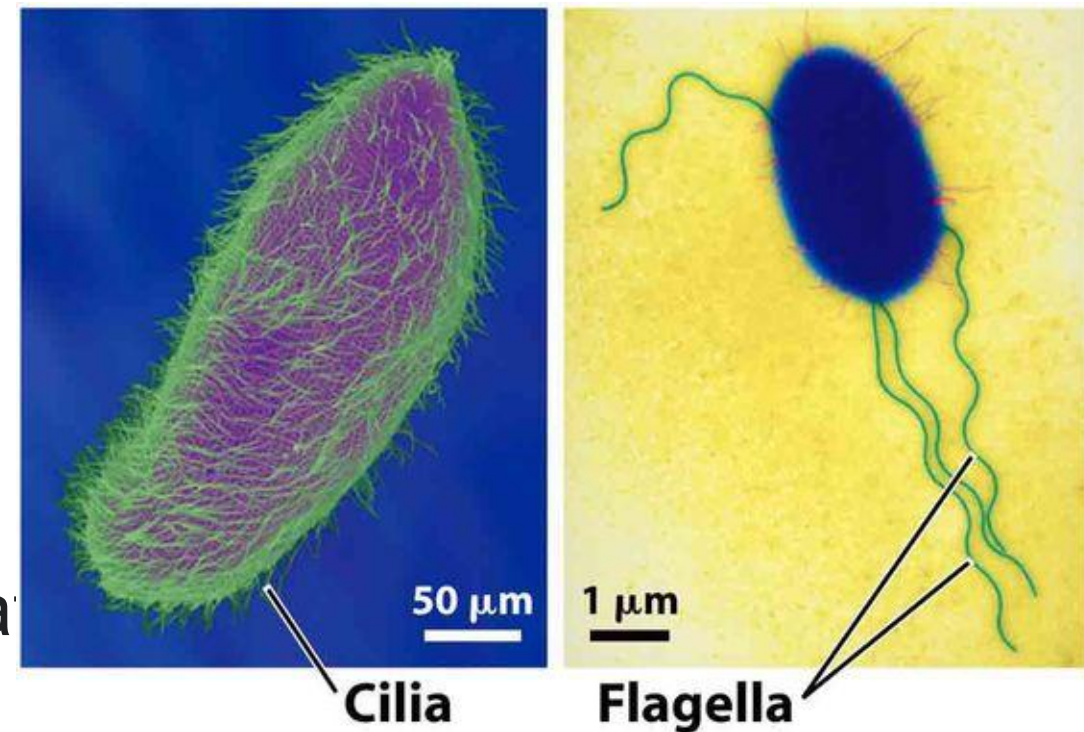


DAHMANI Ali & METREF Kireddine  
Ahmed  
Maitres de conférences  
Cours de Ruminant pour 4<sup>eme</sup> année  
Année 2025-2026  
ISV de Blida

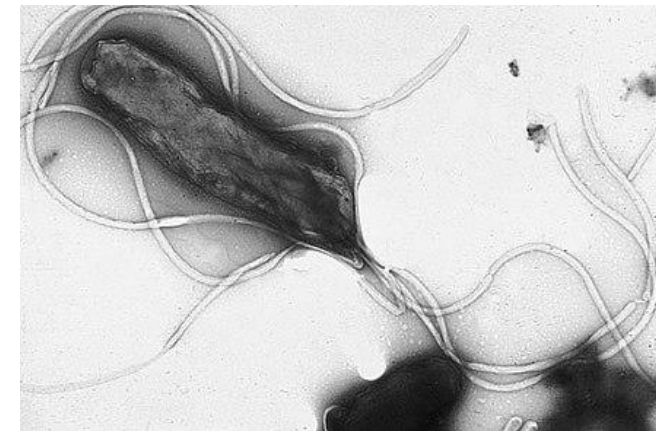
# 7\_CLOSTRIDIOSIS

- Introduction
- Clostridia: germs of capital importance in farm animals.
- cause many diseases as primary agents,
- They produce exotoxins on which their pathogenicity depends.
- These toxins can be ingested preformed in the food
- Pathogenic clostridia are ubiquitous, especially on humus-rich soils.
- as well as in the intestinal contents of non-diseased animals

- Clostridium is a genus of bacteria
- Gram-positive bacilli
- strictly anaerobic and spore-forming,
- mobility by peritrichal flagella.
- It includes pathogens such as those that cause botulism or tetanus.
- Phylogeny:
- Family Clostridiaceae
- Order Clostridiales,
- Class Clostridia,



[Cette photo](#) par Auteur inconnu est soumise à la licence [CC BY-SA](#)



[Cette photo](#) par Auteur inconnu est soumise à la licence [CC BY-NC-ND](#)

## 7\_1 : MALIGNANT EDEMA or SYMPTOMATIC ANTHRAX

- These are infectious complications of wound contamination by clostridia.
- These wounds can be accidental (brush injuries), surgical (tail docking) (farrowing)
- The toxin is developed in the tissues when they are infected.
- Aetiology:
- Several pathogens can be involved, sometimes in combination: Clostridium septicum, Clostridium chauvoei, Clostridium novyi, Clostridium sordellii and Clostridium perfringens.

# **Symptoms**

**In cattle:**

**Marked lameness. Significant swelling of the upper part of the affected limb.**

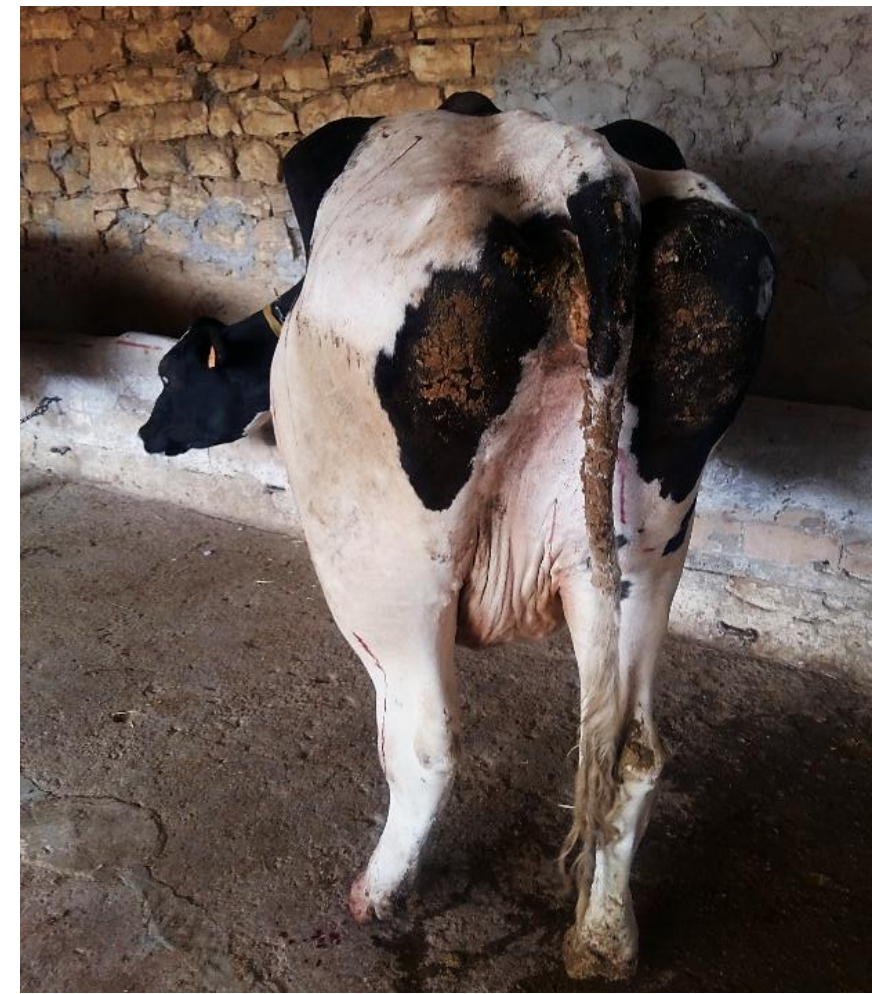
**Despondency. Anorexia. Hyperthermia (41°C). Rapid pulse,**

**Swelling at the base of the tongue, in the heart muscle**

**Death without agitation within 12 to 36 hours after the 1st symptoms.**

**Animals perish without symptoms,**

- Signs develop 1 to 4 days after contamination of the wound.
- Locally, a painful oedema appears, sometimes crackling to the touch,
- extends partly downhill.
- At the incision, a bloody exudate flows.
- This swelling is localized according to the place of entry of the bacteria
- the whole head,
- neck muscles,
- at the level of the perineum,
- on a limb, ect.....



*Œdème entre la hanche et la croupe et au niveau des muscles fessiers, le sang coule des points d'injections. La vache a présenté des boiteries et une difficulté à se déplacer*

# In sheep

Limp: 1 or ++ immobilized limb(s) or and be only moderate in others.

Subcutaneous edema is not common. We can hear the crackling after death. Change in skin color may be visible, but necrosis and skin gangrene do not occur. Necropsy table is identical to cattle. However, muscle damage is more localized and deeper

- **Subcutaneous edema is less marked, gas exists in the affected muscles but in smaller quantities than in cattle**
- **Sick animals are prostrate with hyperthermia (41/42°C).**
- **Death is common within 1 to 8 days.**
- **General antibiotic treatment and local disinfection are recommended at the beginning of the course,**
- **but do not always save the animal.**

# 7\_2 : BOTULISM

## Etiologie

**Infectious agent: Clostridium botulinum, obligate anaerobic, sporul, Gram+**

**The very potent toxic action is linked to the formation of neurotoxins,  
the most violent toxins; 0.01mg kills a human.**

**Types A, B, E and F are mainly found in humans,  
and types C and D are associated with botulism in birds and mammals;  
type E is found mainly in fish and fish products.**

**C. botulinum spores are very resistant to heat, freezing and desiccation and survive for a very long time in soils (neutral or alkaline pH).**

**The toxin is destroyed by boiling for 10 minutes.**

## Circumstances of intoxication

This toxin is found in decomposing animal tissues.

The risk to ruminants may arise during pica (ingestion of a corpse),

when there is a dead body in the silage and concentrate (wheat bran)

or when drinking water contaminated with the toxin.



**mice trapped with glue in the concentrate food depot (photos Dahmani A.)**



## Symptoms

In cattle:

progressive flaccid paralysis of the muscles of the musculoskeletal system,

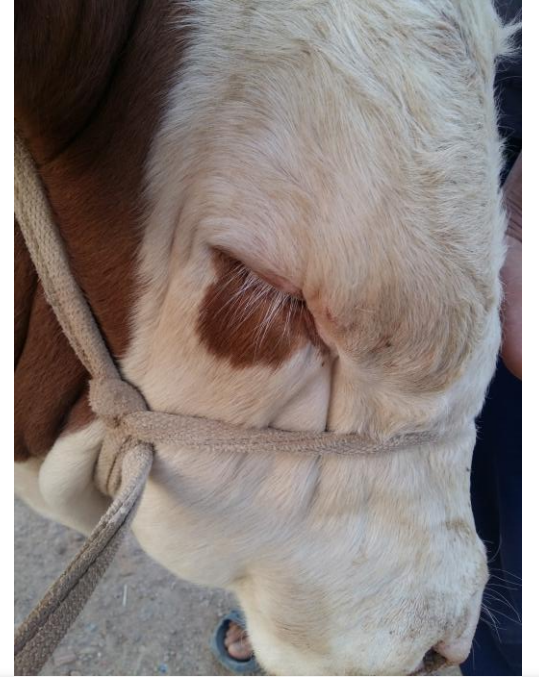
it begins with the muscles of the hind limbs,

then the chewing muscles

Difficulty swallowing

In case of attempts to drink, the liquids are regurgitated.

In the event of a forced beverage, the animal risks going down the wrong path

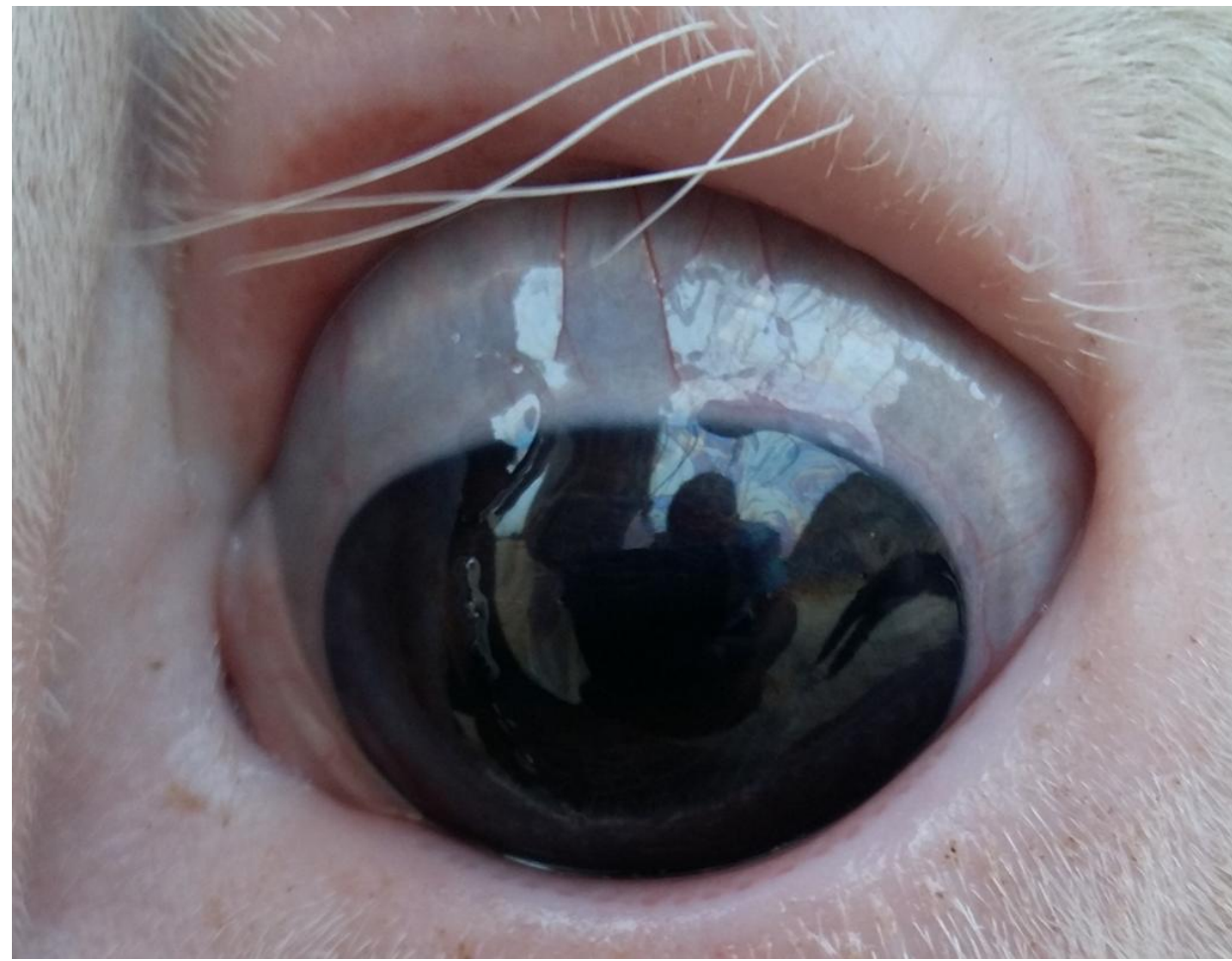


*ptosis of the eyelids the animal seems drowsy, the saliva is not swallowed ( photos (Dahmani A.)*



We can see:

- Ptosis of the eyelid
- Mydriasis, and the
- Blurred vision in animals.

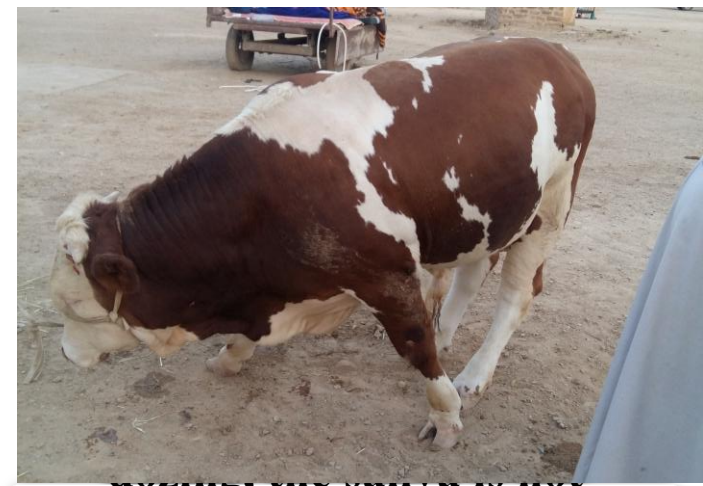


*Mydriasis is observed, the vision becomes blurred in the animal (Photos Dahmani A).*

The tongue may remain protruding and let the saliva  
weld.

Animals have difficulty moving  
stand still, they stumble when moving, then get on their  
knees,

Then slump to the ground, in sternal position, then in  
Sterno-abdominal position, then in abdominal position  
(on the side)



**swallowed, the animal dies  
without agitation (photos  
Dahmani A.)**



At the end of its evolution, the animal remains lying down

in sternal position,

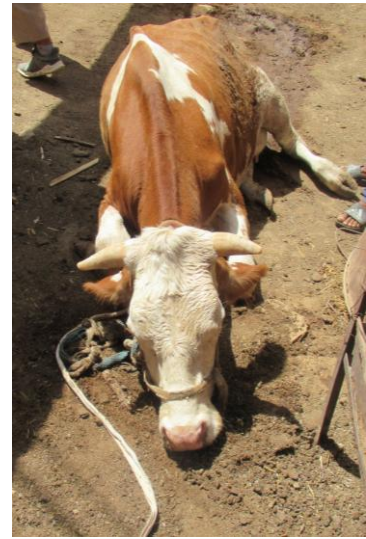
in the frog position,

then in the sternolateral position, the head in the self-  
auscultation position

at the end of the phase, in a lateral position with the head  
extended forward,

and then later in a lateral position for a long time.

The mortality rate is high, the animal dies without agitation



*the animal seems to be dozing, the saliva is not  
swallowed, the animal dies without agitation  
(photos Dahmani A.)*



# In sheep

- **The sheep does not present the paralysis typical of other animal species.**
- **There is a stiff gait,**
- **The head can be carried to one side or swung up and down while walking.**
- **The side of the tail can be seen.**
- **Salivation and a serous nasal discharge are also common.**
- **At the end of the phase, abdominal breathing, paralysis of the limbs is observed, followed by rapid death.**



( photographies Dahmani A.)

## 7\_3: TETANUS

- Manifests as spastic paralysis.
- This paralysis results from the spread in the body of the toxin produced by *Clostridium tetani*.
- The spore of *Clostridium tetani* develops in tissues where the absence of oxygen is marked following a tail dock, a lambing wound.
- The toxin inhibits the functioning of neurons
- The muscles are constantly stimulated.



( photos Dahmani A.)

Signs are contractures with:

a stiffness of the neck,  
rigidity of the ears

Tetany of the masseter muscles,

Difficulty gripping food  
and chewing,

very marked stiffness of the limbs.

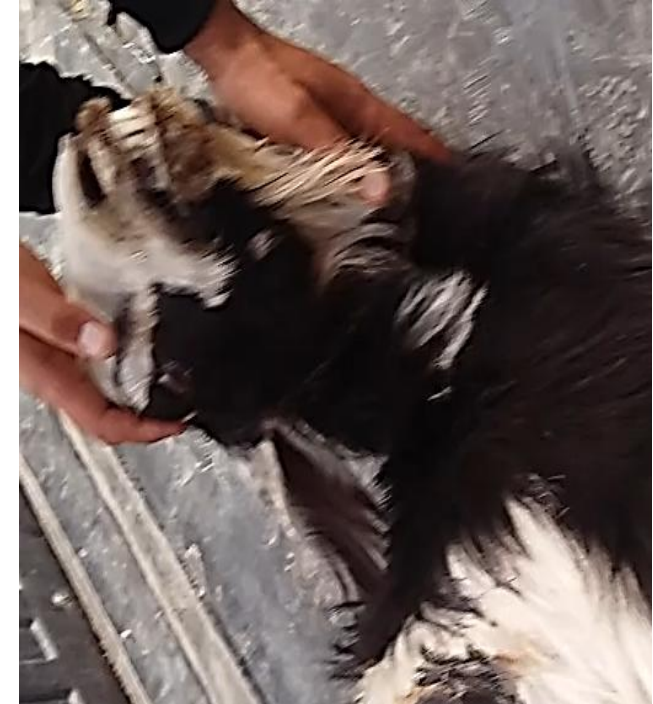
There is an opisthotonos (head thrown back, limbs extended).

A characteristic position known as a "sawhorse".

Any stimulation triggers contractions.



( photos Dahmani A.)



# **7\_4 : LES ENTEROTOXEMIES FRANK**

- 1. DYSENTERY OF THE LAMB,**
- 2. NECROTIZING HAEMORRHAGIC ENTERITIS IN LAMBS,**
- 3. PUSCIOUS KIDNEY,**
- 4. GASTROXEMIA,**
- 5. NECROTIZING INFECTIOUS HEPATITIS**
- 6. BACILLARY HEMOGLOBINURIA**

- Enterotoxemia is an acute to superacute illness,
- they are defined as intoxications with an intestinal starting point,
- this intoxication is the consequence of the abnormal proliferation of bacteria of the genus *Clostridium* in the intestine.
- Due to the resorption into the bloodstream of bacterial toxins produced in the intestine.

# Etiologies

- Bacteria responsible for enterotoxemia: Clostridium group. Strict Anaerobes, Gram+,
- Sporulation allows them to survive in the environment for a long time.
- They result from the damage to different tissues by toxins produced by clostridia in large quantities in the digestive tract and passed into the bloodstream.

- The main culprit is *Clostridium perfringens* type A, B, C or D,
- Type A: gas gangrene and puerperal septicemia.
- Type B: dysentery in lambs less than 15 days of age
- Type C: necrotizing and hemorrhagic enteritis in young lambs less than 5 days of age
- Type D: is that of the pulpy kidney disease.

- The virulence of Clostridium is linked to the production of exotoxins noted:
  - Alpha, Beta, Epsilon, Delta
  - for the most important, and the combination of which allows the classification into
  - 5 types of Clostridium perfringens

1-Alpha toxin:

is strongly hemolytic, not very lethal but quite necrotizing. It is hyperthermic and increases intestinal permeability

2-Beta toxin:

is highly lethal and necrotizing. It causes a hemorrhagic inflammation of the intestinal mucosa, which is destroyed and allows toxins to pass into the bloodstream.

3-Epsilon toxin:

made up of a pro-toxin which, under the effect of trypsin, becomes highly lethal and necrotizing. Its secretion requires a protein-rich environment.

4-Toxin iota:

is responsible for haemorrhagic and necrotising diarrhoea in calves, which is rapidly fatal.

- These bacteria are present (in small numbers) permanently in the intestine.
- Clinical signs occur as a result of an imbalance in the gut microbial flora



Agneau en chevalet de scie, présentant des spumes au niveau de la bouches et narines ( photos Dahmani A.)

Various "stressful" factors can cause this imbalance:

sudden variation in diet in quantity or quality

Abundant and rich milk (good milkmaid with only one lamb)

New concentrate or fodder, in large quantities

Massive ingestion of rapidly fermentable carbohydrates,

Lush grass (rich in nitrogen),

Consumption of frozen weed,

Significant digestive parasitism.

# 1-Dysentery of lamb

This form is observed mainly in lambs aged 1 to 15 days.

It can be high-pitched, lightning or

Evolve towards death in a few days after:

anorexia,

abdominal pain and

yellowish diarrhea

quickly becoming blood-stained.



( photos Dahmani A.)

Type B: "dysentery of lamb

The lesions present:

hemorrhagic inflammation of the  
small intestine

with necrotic areas or  
hemorrhagic halos.

The colon is very inflamed.



## TYPE C: NECROTIZING HEMORRHAGIC ENTERITIS IN LAMBS

- This condition is found in lambs aged 0 to 15 days (1 to 3 days),
- It is characterized by:
  - necrosis of the mucosa of the small intestine (ileum and jejunum)
  - with sometimes hemorrhagic intestinal contents.
  - The abomasum can also be affected.

- Clostridium perfringens type C is responsible for the haemorrhagic form of diarrhoea in lambs aged 0-15 days. The disease is the result of the production of a Beta toxin causing necrosis and hemorrhage of the small intestine. The lamb often dies before the appearance of clinical signs.

## **TYPE D: KIDNEY DISEASE PULPOSUS**

- Clostridiosis can be encountered at any age,
- They are common in lambs under 2 weeks of age when lactating
- or in sheep for fattening.
- This disease is characterized by a sudden evolution (sudden death) in the most beautiful animals of the herd.
- In the less brutal forms, nervous symptoms are observed (drunken gait, convulsions, opistotonos, walking in a circle,...),

## PULPABLE KIDNEY

- acute pulmonary edema (white foam in the nostrils)
- sometimes diarrhea can be observed with a most often fatal course within 24 to 48 hours.
- Necrosis of liver cells will result in hyperglycemia, and consequently glucosuria.

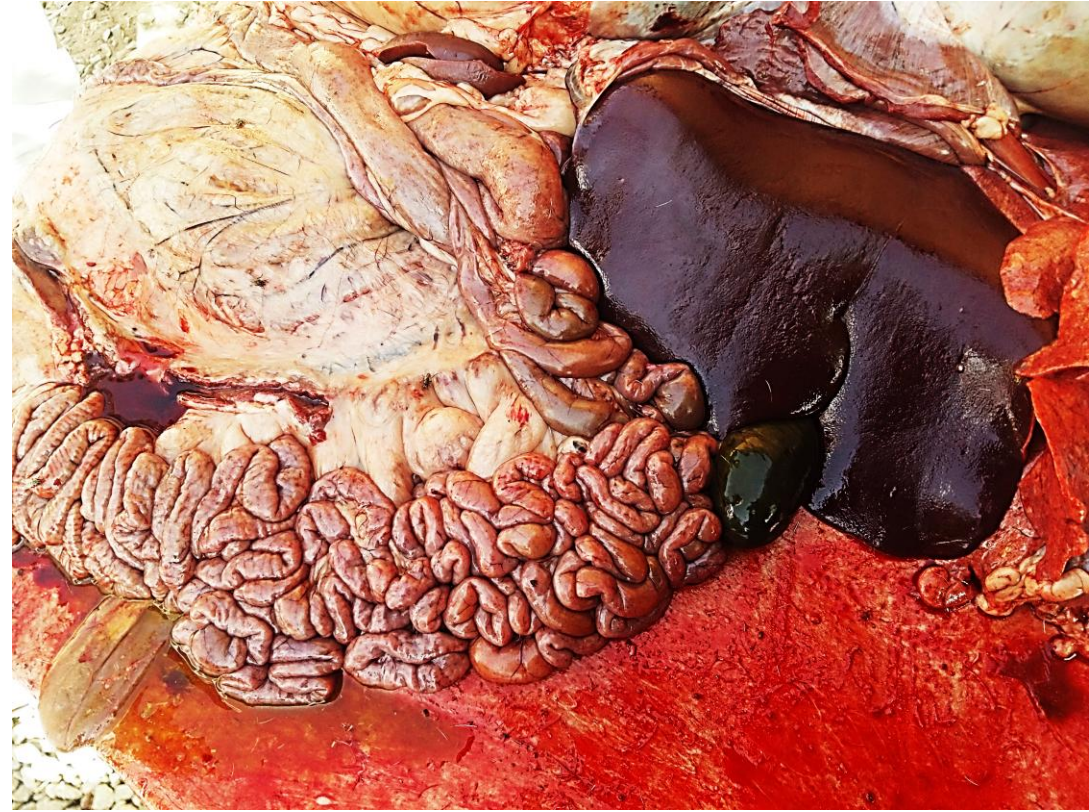


*Presence of foam and blood in the mouth and nostrils; with a sudden death (photo Dahmani A.)*

- colic
- rapid breathing through the mouth,
- tremors,
- seizures
- and other nervous signs.

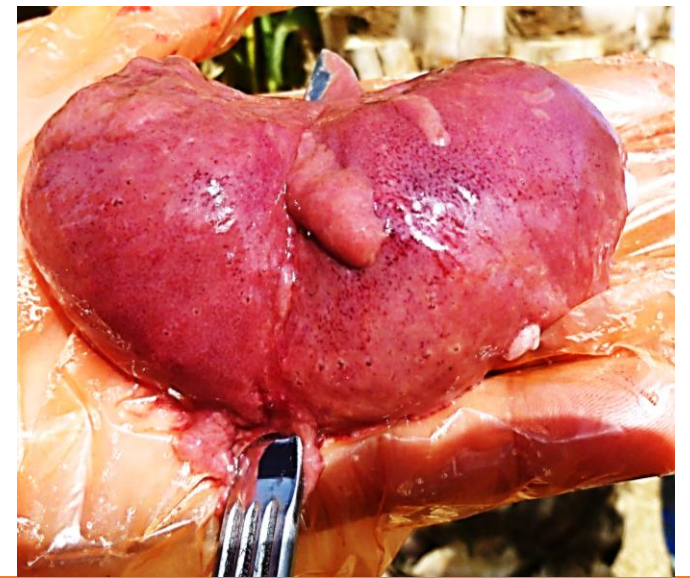
# At the autopsy

- Animals that have died of enterotoxaemia are in an excellent state of maintenance
- with stomachs full of food
- (undigested milk in abomasum in lambs).
- In the lightning forms, we observe:



*intestins congestionnés, foie congestionné avec une vésicule biliaire volumineuse ( photo Dahmani A.)*

- softening of the kidneys,
- a discolored and brittle liver,
- congestive or even hemorrhagic areas (intestine, heart, muscles)
- and lesions of oedema and cerebral degeneration on histological examination



*Softened kidneys, discolored and friable liver with large gallbladder (photos Dahmani A.)*



heavy congestion of:  
intestines  
lungs and  
friable liver.

Petechiae on the serosae  
Hydro peritoneum  
Hydropericardium  
(rather yellowish liquid)  
Petechiae on the myocardium



*petechiae on the serous rumen of the abomasum and intestines, congested liver with a voluminous gallbladder (photo Dahmani A.)*



- PULPABLE KIDNEYS :
- 1° kidney: with capsule
- 2nd kidney: uncapped



- *Softened kidneys, discolored and friable liver with large gallbladder (photos Dahmani A.)*

# PULPEUX KIDNEYS: decapsulated sheep kidneys from a case of enterotoxemia in a lamb



- *Reins ramolli, ( photos Dahmani A.)*



**Left; PETECHIAE ON THE MYOCARDIUM**

( photos Dahmani A.)



**Right; CONGESTED LUNGS**

( photos Dahmani A.)



Abomasum with petechiae on the serosa, (photos Dahmani A.)

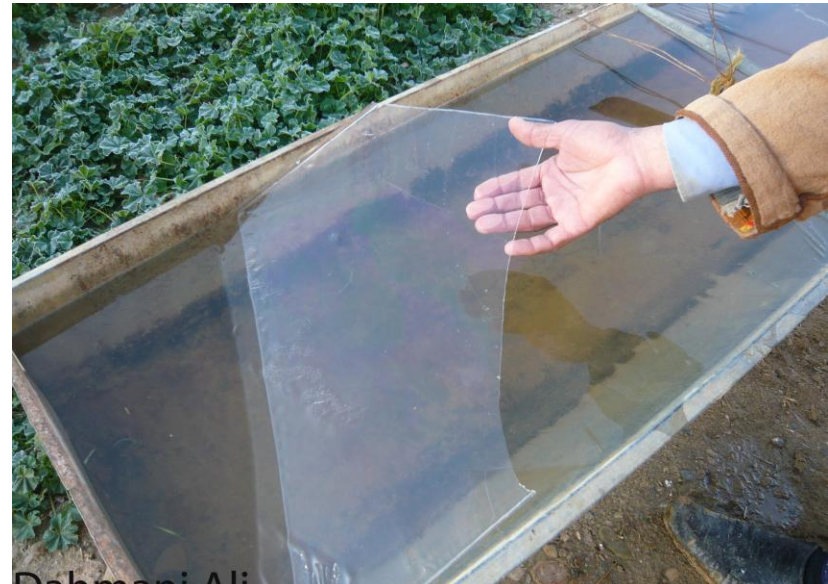
# Gastroxemias

- Gastroxemias (*Clostridium septicum*) appear following the consumption of frozen grass by animals aged 6 to 18 months,



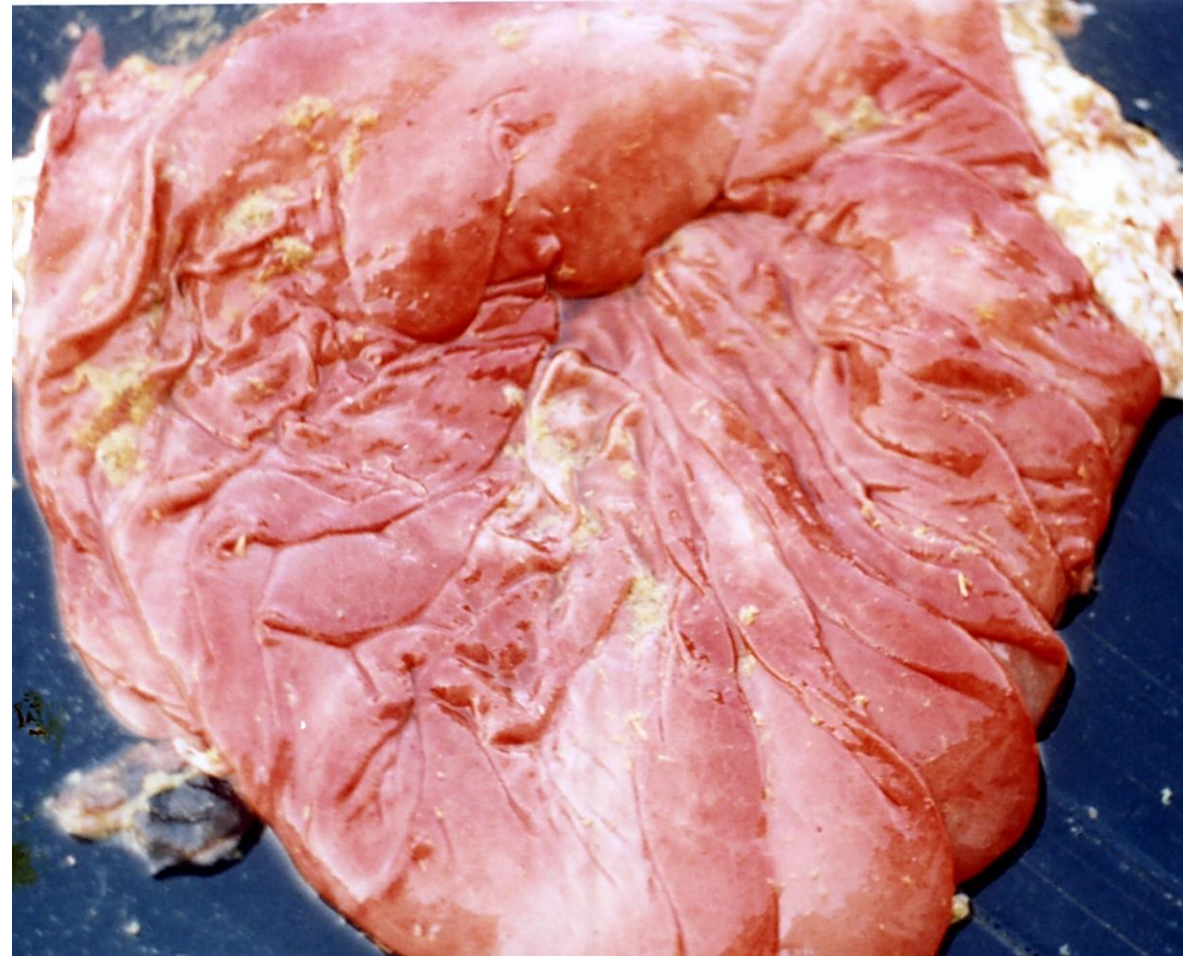
Dahmani Ali

*in the 2 watering troughs, the water froze (photos Dahmani A.)*



Dahmani Ali

- causes necrosis
- of the abomasum.
- Animals may show severe abdominal pain



*Oedema of the abomasum in a sheep that consumed a grass in very cold weather (spring frost) (photos Dahmani A.)*

# NECROTIZING INFECTIOUS HEPATITIS

- Is due to (*Clostridium oedematiens* or *novyi*)
- Found in animals over one year old
- following a massive infestation by flukes,
- Clostridia develop along migration pathways in the liver
- The liver has numerous necrotic lesions,
- The carcass of affected animals has a haemorrhagic appearance.

# BACILLARY HEMOGLOBINURIA

- (*Clostridium haemolyticum*) is also favoured by hepatic parasitism;
- Symptoms manifest as anemia and then
- jaundice
- the appearance of reddish-brown urine (hemoglobinuria)

- The diagnosis of these "enterotoxemias" is made by autopsy:
- So by observing the lesions.
- To confirm the role of clostridia, the laboratory should be used to
- Identify bacteria
- and counting them



Symptoms manifest as anemia and then hemoglobinuria jaundice (Photos Dahmani Ali)



# Differential diagnosis

- ✓ Acute copper poisoning
- ✓ leptospirosis.
- ✓ Babesiosis
- ✓ Poisoning by certain toxic plants
- ✓ *Tribulus terrestris*
- ✓ Coumarin plants (great eagle fern, annual mercurial,

# PREVENTION

- **Given the formidable effectiveness of clostridial toxins**
- **the speed of evolution of symptoms, lethality (100%)**
- **= on the other hand, treatments are always illusory.**
- **= Withdrawal of the food in question does not give an immediate result.**

- Vaccination against enterotoxemia is systematically carried out on lambs and is adopted throughout the year.
- For the people of Antenais, vaccination is practiced before changes in diet (change from green to dry (stubble) and vice versa).
- 
- Recalcitrant breeders are penalized by sudden mortalities among the best of their animals.

- It is recommended that pregnant ewes be vaccinated 30 to 45 days before lambing, to confer colostrum antibodies to lambs that are likely to be protected from 1 to 2 months
- Then vaccinate and revaccinate the lambs 1 month apart, then every 6 to 8 months

Thank you