SPECIFIC DISEASES OF CATTLE

Diseases caused by viruses

Foot and mouth disease (FMD, Aphthous fever)

FMD is an acute viral and extremely contagious disease of cloven footed animals such as cattle, sheep, goats, pigs and antelope. It is manifested by vesicles and erosions in the muzzle, nares, mouth, feet, teats, udder and pillar of the rumen. There are three main strains of viruses causing FMD, namely A, O and C. Three additional strains, SAT 1, SAT 2 and SAT 3 have been isolated from Africa and a further strain ASIA-1 from Asia and the Far East.

Transmission: Direct and indirect contact with infected animals and their secretions including saliva, blood, urine, faeces, milk and semen, aerosol droplet dispersion, infected animal by-products, swill containing scraps of meat or other animal tissue and fomites and vaccines.

Antemortem findings:

Before vesicle formation:

1. Incubation is 1 - 5 days or longer
2. Morbidity: Nearly 100 %
3. Mortality: variable depending on the strain of virus and its virulence and susceptibility of host; 50 % in young animals, 5 % in adults
4. Fever up to 41.7°C
5. Dullness
6. Lack of appetite
7. Drastic drop in milk production.
8. Uneasiness and muscle tremors

Vesicle formation:

9. Smacking and quivering of lips
10. Extensive salivation (Fig. 45) and drooling
11. Shaking of feet and lameness

The vesicles and later erosions are commonly found on the muzzle, tongue (Fig. 46), oral cavity, teat and on the skin between and above the hoofs of the feet. In more chronic cases in cattle the hoof become loose and the animal may walk with characteristic “clicking” sound (Slippering).

Some strains of FMD, particularly in swine, sheep and goats cause erosions instead of vesicles.

Postmortem findings :

1. Necrosis of heart muscle(tiger heart), usually only in young acutely infected animals.

2. Ulcerative lesions on tongue, palate, gums, pillars of the rumen and feet.

Remarks : Latent infections with Salmonella organisms were reported in animals affected with FMD.

Differential diagnosis in bovine and ovine species : Vesicular stomatitis, allergic stomatitis, feedlot glossitis, photosensitization, bluetongue, rinderpest, infectious bovine rhinotracheitis, malignant catarrhal fever, bovine papular stomatitis, bovine viral diarrhoea, pseudocowpox, ovine pox, contagious ecthyma, footrot, mycotoxicosis and increased salt in concentrate.

Fig. 45: Excessive salivation in a cow affected with FMD.

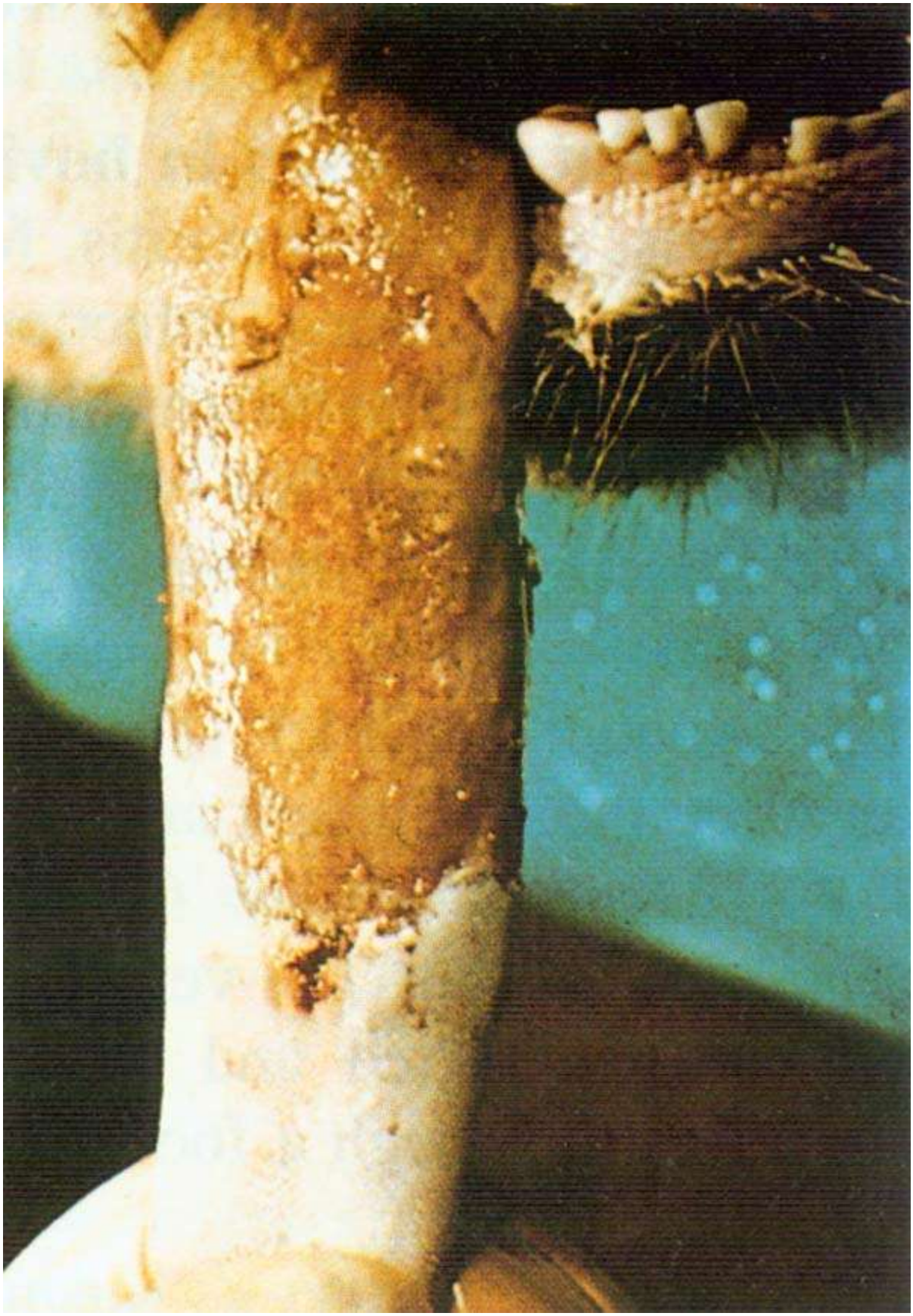

Fig 46: FMD. Extensive areas of eroded epithelium on a bovine tongue.

Rinderpest (RP)

Rinderpest is an acute, highly contagious, fatal viral disease of *cattle, buffalo* and *wild ruminants* manifested by inflammation, haemorrhage, erosions of the digestive tract, wasting and often bloody diarrhoea. Some swine species are also susceptible. Man is not susceptible to RP virus.

Transmission : Direct contact with infected animals or their excretions and secretions and fomites. The virus appears in the blood and in secretions before the onset of clinical signs and this may cause infection in abattoirs and stockyards.

Antemortem findings :

1. Incubation: 3 – 10 days or longer
2. Morbidity: Up to 100 % in a susceptible herd
3. Mortality: 50 % and may reach 90 – 95 %
4. High fever (41–42°C)
5. Nasal discharge and excessive salivation
6. Punched out erosions in the mouth (Fig. 47)
7. Loss of appetite and depression
8. Abdominal pain (grunting, arched back)
9. Constipation followed by bloody diarrhoea and straining
10. Dehydration and rough hair coat
11. Marked debility
12. Abortion
13. The classical "milk fever position" in cattle

Postmortem findings :

1. Punched out erosions in the oesophagus
2. Edema or emphysema of the lungs
3. Haemorrhage in the spleen, gallbladder and urinary bladder
4. Haemorrhagic or ulcerative lesions in the omasum
5. Congested abomasum filled with bloody fluid. Ulcers may also be observed.
6. Severe congestion and haemorrhage in the intestine and enlarged and necrotic Peyer's patches (Fig. 48)
7. Last portion of the large intestine and rectum are haemorrhagic showing "tiger stripping" of longitudinal folds
8. Enlarged and edematous lymph nodes
9. Emaciated carcass.

Remarks : Rinderpest virus is sensitive to environmental changes and is destroyed by heat, drying and great number of disinfectants.

Differential diagnosis : Bovine viral diarrhoea, malignant catarrhal fever, infectious bovine rhinotracheitis, bluetongue, coccidiosis, foot and mouth disease, vesicular and necrotic stomatitis and bovine papular stomatitis. Vesicular diseases do not have accompanying haemorrhage and blisters should be differentiated from erosions (ulcers) seen at RP.

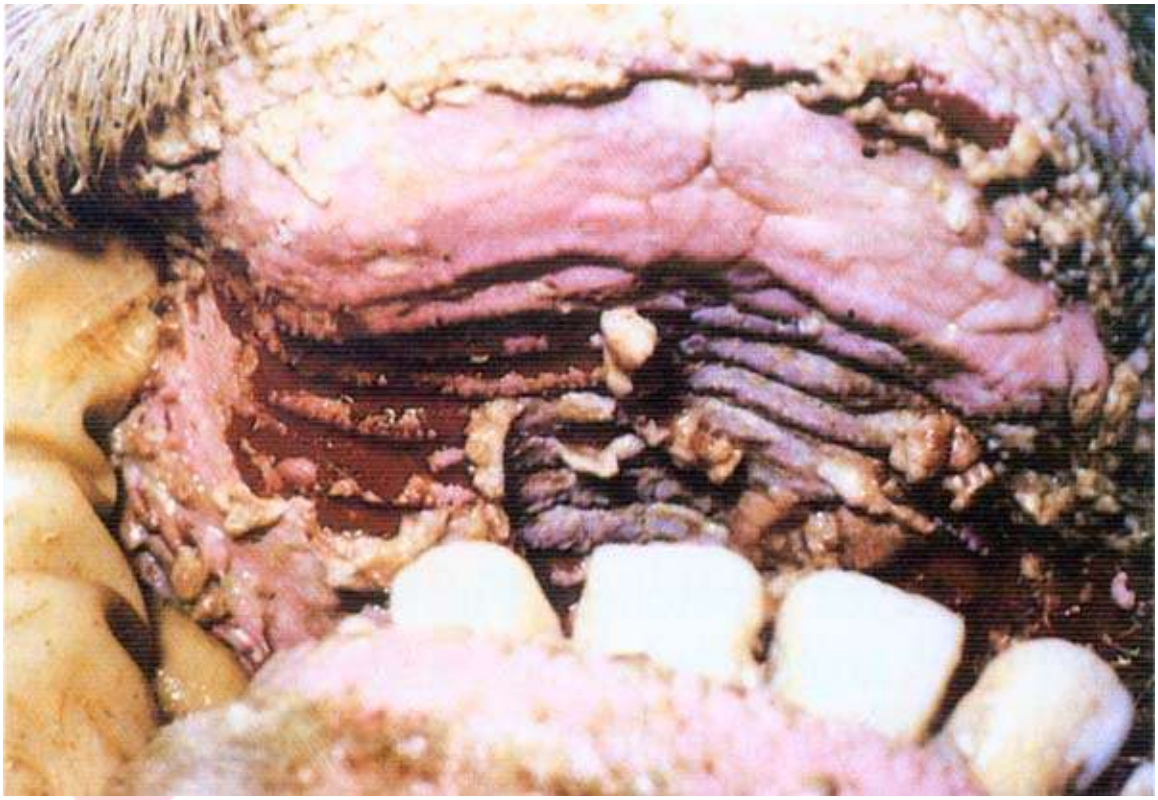

Fig. 47: Rinderpest Erosions on the dental pad and the hard palate which resemble FMD.

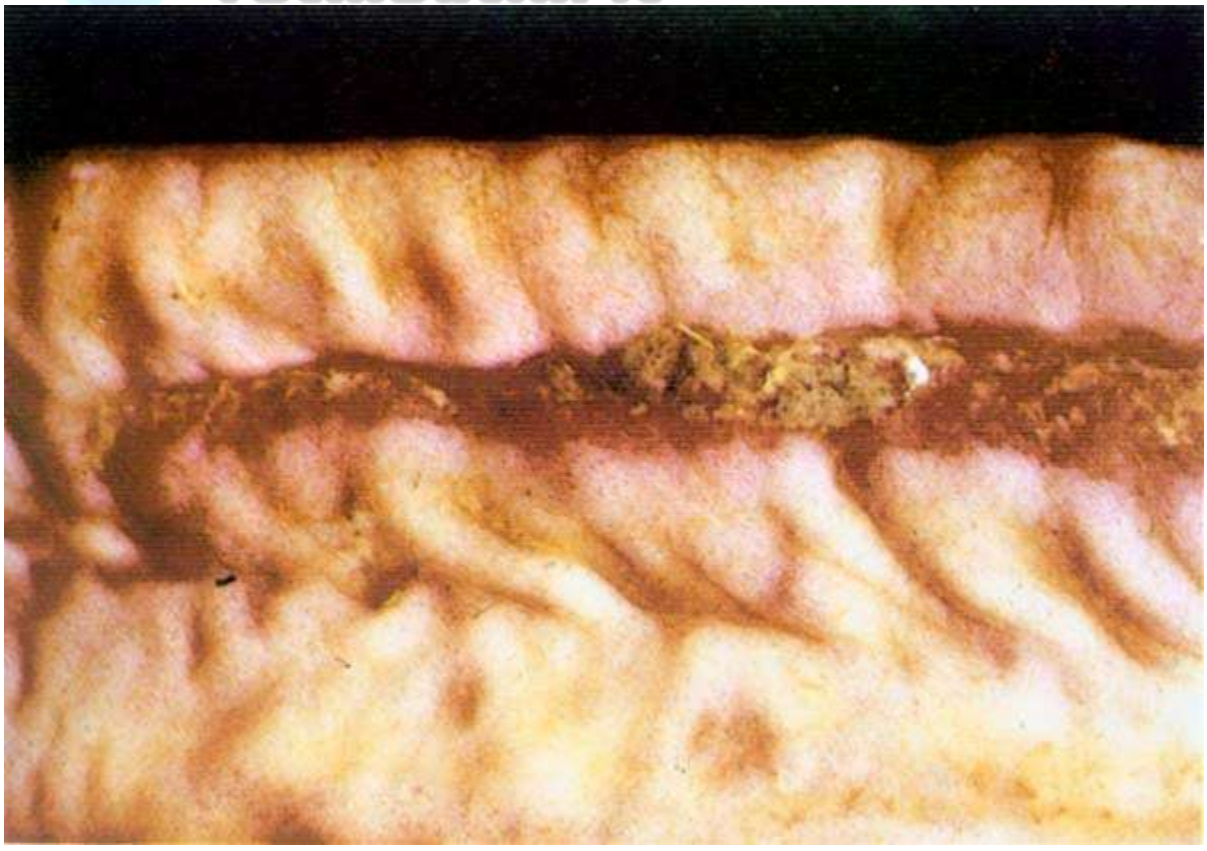

Fig. 48: The mucosal surface of Peyer's Patches showing necrosis and congestion.

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Malignant catarrhal fever (MCF)

An acute viral disease of *cattle, deer, bison* and *buffalo* characterized by inflammation of mucous membranes of the nose, eyes, corneal opacity, profuse nasal discharge and enlargement of lymph nodes. MCF is arbitrarily divided into peracute, intestinal, head-eye and mild forms according to antemortem findings. It is not communicable to man.

Transmission: Close contact between cattle and wildebeest (gnu, antelope), by common use of drinking troughs or by direct contact between cattle and newborn wildebeest and placenta of parturient dams. In American or European MCF, cattle are infected from sheep.

Antemortem findings :

1. Incubation: 9 – 44 days
2. Morbidity is low and mortality is high
3. Increased temperature
4. Bilateral ocular and nasal discharges
5. Dyspnea and cyanosis
6. Loss of appetite
7. Encrustation of muzzle and eczema of the perineum, scrotum and udder
8. Erosions on the lips, tongue, gums, soft and hard palate
9. Swollen reddened eyelids, corneal opacity and conjunctivitis (Fig. 50)
10. Photophobia associated with corneal opacity and blindness
11. Reluctance to swallow because of oesophageal erosions and drooling
12. Enlarged body lymph nodes
13. Rarely, uncoordinated movements and shivering

Postmortem findings :

1. Lesions are not present in acute cases
2. Crater like erosions of the nose, mouth, conjunctiva, oesophagus and gastrointestinal tract
3. Lungs may be congested, swollen or emphysematous
4. White areas in the kidneys
5. Swollen and reddened abomasal folds
6. Intestinal edema and petechial haemorrhage
7. “Tiger striping” in the distal colon (Fig. 51)
8. Enlarged and reddened lymph nodes
9. Dehydrated and emaciated carcass

Differential diagnosis : Bluetongue, rinderpest, bovine viral diarrhoea/mucosal disease, foot and mouth disease, vesicular stomatitis

Fig. 50: Malignant catarrhal fever Early stages of corneal opacity, conjunctivitis and the reddening of the eye lids.

Fig. 51: Malignant catarrhal fever. “Tiger striping” in the distal colon.

Rabies

This is an acute infectious viral disease of the central nervous system in mammals.

Transmission : It is usually transmitted through the saliva by a bite from a rabid animal, commonly the dog or jackal. Man is infected the same way.

Antemortem findings :

Furious form

1. Incubation from 2 weeks to 6 months or longer
2. Restlessness
3. Aggressive, may attack other animals
4. Sexual excitement
5. Bellowing
6. Paralysis and death

Paralytic form

7. Sagging and swaying of the hind quarters
8. Drooling and salivation
9. The tail is held to one side
10. Tenesmus or paralysis of the anus
11. Paralysis
12. The animal falls to the ground
13. Death after 48 hours of decubitus

Postmortem findings: Possible inflammation of gastrointestinal mucosa

Lumpy skin disease

Acute pox viral disease of *cattle* manifested with sudden appearance of nodules on the skin.

Transmission : Insect vectors by direct and indirect transmission. Seasonal and geographic distribution.

Antemortem findings :

1. Incubation: 4 – 14 days
2. Fluctuating fever
3. Diarrhoea
4. Nasal discharge and salivation
5. The first lesion appear in the perineum
6. Various sized cutaneous nodules (Fig. 52) may occur throughout the body
7. Skin lesions may show scab formation
8. Swelling of superficial lymph nodes and limbs, and lameness
9. Infertility and abortion
10. Secondary infection may lead to joint and tendon inflammation

Postmortem findings :

1. Ulcerative lesions in the mucosa of the respiratory and digestive tract
2. Reddish, haemorrhagic to whitish lesions in the lungs
3. Edema (interlobular) and nodules in the lungs (Fig. 53)
4. Heart lesion (endocardium)
5. Thrombosis of skin vessels followed by cutaneous infarction and sloughing..

Differential diagnosis : Allergies, screw-worm myiasis, urticaria, dermatophilosis (streptothricosis), bovine herpes dermophatic infection, cattle grubs, vesicular disease, bovine ephemeral fever, photosensitization, besnoitiosis (elephant skin disease), sweating weakness of calves, bovine farcy and skin form of sporadic bovine lymphomatosis

Fig. 52: Lumpy skin disease. Various sized cutancous nodules in a severe case of lumpy skin disease.

Fig. 53: Cut surface of the nodules in the parenchyma of the lung and interlobular edema.

Bovine viral diarrhoea (BVD)

This is an infectious viral disease of *cattle* manifested by an active erosive stomatitis, gastroenteritis and diarrhoea.

Transmission: Direct contact with clinically sick or carrier animals, indirect contact with feedstuffs or fomites contaminated with urine, nasal and oral secretions or faeces and contact with aborted fetuses. Transmission through aerosol droplet dispersion or by insect vector may also be a possibility. Virus may persist in recovered and chronically ill cattle which are considered a potential source of infection.

Antemortem findings :

1. Incubation: 1 – 3 days
2. Fever
3. Congestion and erosions in the mucous membranes of the oral cavity
4. Depression and anorexia
5. Cough, polypnea and salivation
6. Dehydration and debilitation
7. Foul-smelling diarrhoea
8. Cessation of rumination
9. Reduced milk supply
10. Abortion in pregnant cows
11. Laminitis

12. Congenital anomalies of the brain (cerebellar ataxia) and arthritis in young calves

Postmortem findings :

1. Shallow erosions present on the entrance of the nostrils, mouth, pharynx, larynx, oesophagus, rumen (Fig. 58), omasum, abomasum (Fig. 59), caecum and less frequently in Peyer's patches in the small intestine.
2. Erythema of the mucosa with submucosal haemorrhage in the abomasum, small intestine, caecum and colon. Stripped appearance on the caecal and colon mucosa is similar to that seen in rinderpest.
3. Cerebral hypoplasia and cataracts in calves.

Differential diagnosis : Malignant catarrhal fever, rinderpest, blue tongue and vesicular diseases. The latter produce vesicles which are not present in BVD. Diseases with no oral lesion nor diarrhoea include salmonellosis, Johne's disease and parasitism.

Fig. 58: BVD. Congestion and erosions in the ruminal mucosa.

Fig. 59: BVD. Inflammation of the abomasum (abomasitis, gastritis).

Diseases caused by Rickettsia and Mycoplasma spp.

Contagious bovine pleuropneumonia

This is an acute, subacute or chronic highly infectious disease of cattle caused by *Mycoplasma mycoides var, mycoides*.

Transmission : Aerosol and droplet infection from the infected animals. The recovered animal called "lungers" act as carriers and shedders, especially under stress.

Antemortem findings :

1. Incubation: acute 10 – 14 days, chronic 3 – 6 months
2. Morbidity: 90 % in susceptible cattle
3. Mortality: 10 – 50 %
4. Fever
5. Depression
6. Lack of appetite and loss of weight
7. Coughing on exercise
8. Shallow rapid respiration, grunting and gurgling
9. Extended neck, lowered head and open mouth
10. Arched back and outward rotated elbow
11. Arthritis in young animals

Postmortem findings :

1. Fibrinous inflammation of the pleura (pleuritis)
2. Straw coloured fluid in the thorax (Fig. 64)
3. Lobar pneumonia with red hepatization, marbled appearance of lung lobules (Fig. 65) due to thickening of interlobular septae and interlobular pulmonary edema
4. Enlarged mediastinal lymph nodes
5. Walled-off sequestra formation in chronic cases
6. Haemorrhage in the heart
7. Arthritis and tenosynovitis

Differential diagnosis : Shipping fever (Pasteurellosis). East coast fever, foreign body pneumonia, IBR, tuberculosis, chlamidial infections and lungworms

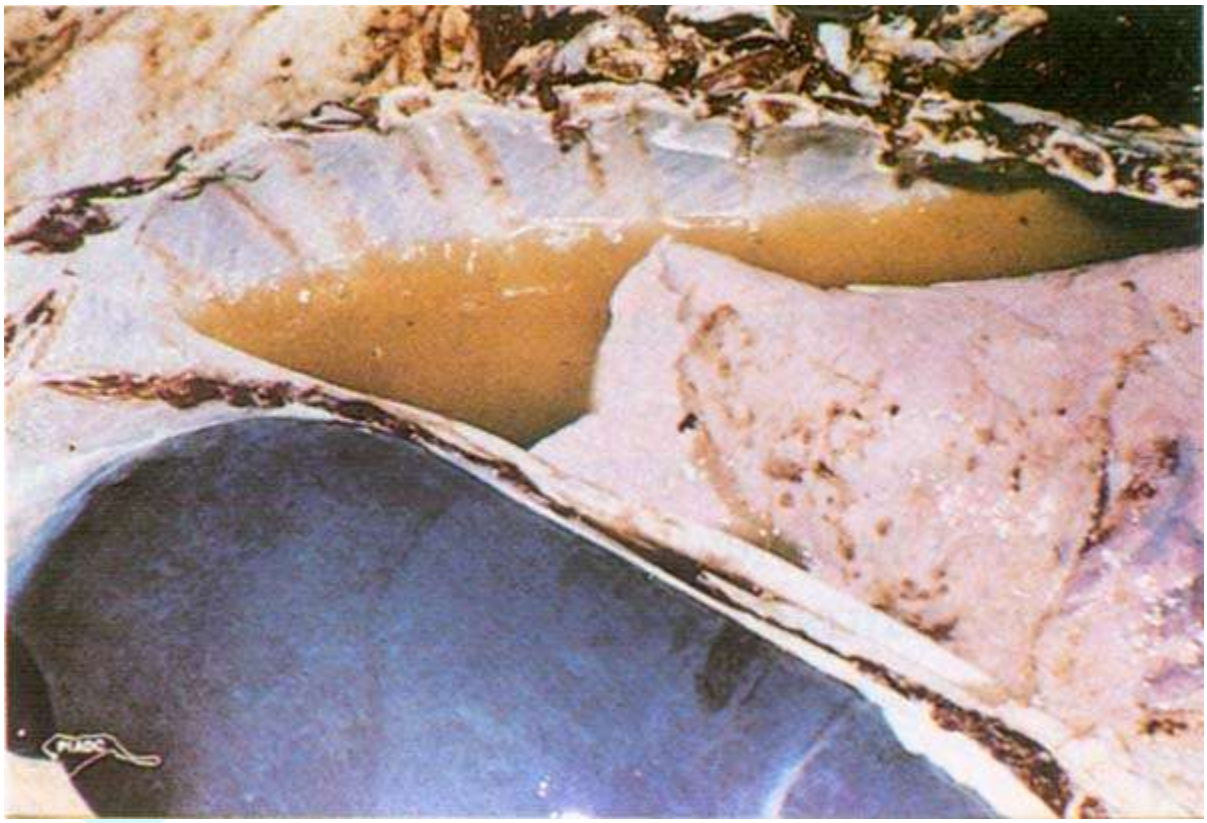

Fig. 64: Contagious bovine pleuropneumonia. Straw coloured fluid in the thorax and partial lung hepatization.

Fig. 65: Contagious bovine pleuropneumonia. Lobar pneumonia with red hepatization and marbled appearnce of lung lobules.

Diseases caused by bacteria

Tuberculosis

Tuberculosis is a chronic disease of many animal species and poultry caused by bacteria of the genus *Mycobacterium*. It is characterized by development of tubercles in the organs of most species. Bovine tuberculosis is caused by *Mycobacterium bovis*. It is a significant zoonotic disease.

Transmission : An infected animal is the main source of transmission. The organisms are excreted in the exhaled air and in all secretions and excretions. Inhalation is the chief mode of entry and for calves infected milk is an important source of infection. When infection has occurred tuberculosis may spread: a) by primary complex (lesion at point of entry and the local lymph node) and b) by dissemination from primary complex.

Antemortem findings:

1. Low grade fever
2. Chronic intermittent hacking cough and associated pneumonia
3. Difficult breathing
4. Weakness and loss of appetite
5. Emaciation
6. Swelling superficial body lymph nodes

Postmortem findings:

1. Tuberculous granuloma in the lymph nodes of the head, lungs (Fig. 68), intestine and carcass. These have usually a well defined capsule enclosing a caseous mass with a calcified centre. They are usually yellow in colour in cattle, white in buffaloes and greyish white in other animals.
2. Active lesions may have a reddened periphery and caseous mass in the centre of a lymph node.
3. Inactive lesions may be calcified and encapsulated
4. Nodules on the pleura and peritoneum
5. Lesions in the lungs (Fig. 69), liver, spleen, kidney
6. Bronchopneumonia
7. Firmer and enlarged udder, particularly rear quarters
8. Lesions in the meninges, bone marrow and joints

The diagnosis may be confirmed by making a smear of the lesion and with Ziehl-Neelsen. The TB bacterium is a very small red staining bacillus.

Fig. 68: Tuberculous granuloma in the mediastinal lymph nodes. M. bovis was isolated.

Fig. 69: Lesion of tuberculosis in the lungs.

Discussion : Mycobacteria invade cattle by respiratory (90 – 95 %) and oral routes (5–10 %). Congenital infection in the bovine fetus occurs from an infected dam. Tuberculosis lesions can be classified as *acute miliary, nodular lesions* and *chronic organ* tuberculosis. Young calves are infected by ingestion of contaminated milk. The incidence of human tuberculosis caused by Mycobacterium bovis has markedly dropped with the pasteurization of milk. It also has dropped in areas where programs of tuberculosis eradication are in place. Man is susceptible to the *bovine type*. In cattle, lesions of tuberculosis caused by the *avian type* are commonly found in the mesenteric lymph nodes. Tuberculosis in small ruminants is rare. In pigs the disease may be caused by the *bovine and avian types*. Superinfection is specific in cattle.

Differential diagnosis : Lung and lymph node abscess, pleurisy. pericarditis, chronic contagious pleuropneumonia, actinobacillosis, mycotic and parasitic lesions, tumours, caseous lymphadenitis Johne's disease, adrenal gland tumour and lymphomatosis

Leptospirosis

Leptospirosis is an important and relatively common disease of domestic and wild animals and humans. In cattle, it is manifested by interstitial nephritis, anaemia and mastitis and abortion in most species. *Leptospira spp*. are the causative agents.

Transmission : Animals contract the disease by eating and drinking leptospira-contaminated urine, water, or by direct contact of broken skin or mucous membranes with mud, vegetation or aborted fetuses of infected or carrier animals. Recovered

animals and animals with unapparent (subclinical) leptospirosis frequently excrete billions of leptospiras in their urine for several months or years.

Antemortem findings :

Acute and subacute forms

1. Transient fever
2. Loss of appetite
3. Lactating cows may stop milking
4. Mastitis
5. Milk may be yellow, clotted and frequently blood stained

Severely affected animals

6. Jaundice and anaemia
7. Pneumonia
8. Abortion with frequent retention of the placenta (afterbirth)

Severe illness in young calves may be associated with yellowish discoloration of mucous membranes and reddish-brown urine before death. The chronic form has mild clinical signs and only abortion may be observed. If meningitis occurs, the animal may show incoordination, salivation and muscular rigidity.

Postmortem findings :

1. Anaemia and jaundice
2. Subserosal and submucosal haemormage
3. Ulcers and haemorrhages in the abomasal mucosa
4. Rarely pulmonary edema or emphysema
5. Interstitial nephritis (Fig. 71)
6. Septicaemia

Fig. 71 : Leptospirosis. Interstitial nephritis in a bovine.

.**Differential diagnosis** : Acute and subacute forms to be differentiated from babesiosis, anaplasmosis, rape and kale poisoning, bacillary haemoglobinuria, post parturient haemoglobinuria and acute haemolytic anaemia in calves. The presence of blood in the milk is a characteristic clinical sign which will differentiate leptospirosis from other infectious diseases.

Discussion : Leptospirosis is a zoonosis and is also an occupational hazard for farmers, veterinarians and butchers.

Human infection may occur by contamination with infected urine and urine contents. The bacteria may be also found in milk in acute cases, however, it does not survive for long period of time in milk. Pasteurization will also kill leptospiras. They can survive for months in moist and humid environments, particularly in swamps, ponds and streams or poorly drained pastures.

Haemorrhagic septicemia

Haemorrhagic septicemia is a systemic disease of cattle, buffalo, pigs, yaks and camels. It is caused by *Pasteurella multocida* type B of Carter. Outbreaks of this disease are associated with environmental stresses such as wet chilly weather and overworked, exhausted animals. It is specific type of pasteurellosis distinct from of other forms of pasteurella infections.

Transmission: By ingestion of contaminated feedstuff.

Antemortem findings:

1. Disease more severe in buffalo than in cattle
2. High fever up to 42°C
3. Salivation and difficulties in swallowing
4. Cough, and difficult breathing and associated pneumonia in later stages
5. Edematous swelling of throat, dewlap, brisket and peritoneum
6. Diarrhoea

Postmortem findings:

1. Subcutaneous swellings characterized with yellowish gelatinous fluid especially around the throat region, brisket and perineum
2. Enlarged haemorrhagic lymph nodes
3. Haemorrhage in the organs
4. Pneumonia (Fig. 74)
5. Rarely haemorrhagic gastroenteritis
6. Petechial haemorrhage in the serous membranes which are extensive in some cases .

Differential diagnosis: Anthrax, blackleg, acute leptospirosis, rinderpest, other pasteurellosis, snake bite and lighting stroke.

Fig. 74: Haemorrhagic septicemia Fibrinous bronchopneumoni

Calf diphtheria

Calf diphtheria is an acute oral infection of calves less than 3 months old. It is caused by *Fusobacterium (Sphaerophorus) necrophorum*. This agent also causes liver abscesses and "foot rot" in cattle.

Transmission: Fusobacterium necrophorum is an inhabitant of cattle's digestive tract and the environment. Under unhygienic conditions, infection may be spread on feeding troughs and dirty milk pails. Some of the contributory factors for occurrence of this disease include abrasions in the oral mucosa, animals suffering from poor nutrition and other (intercurrent) disease present in young calves.

Antemortem findings:

1. High temperature
2. Coughing
3. Loss of appetite and depression
4. Difficult breathing, chewing and swallowing
5. Swollen pharyngeal region
6. Deep ulcers on the tongue, palate, and inside of cheeks
7. Pneumonia

Postmortem findings:

1. Inflammation and ulceration with large masses of yellow-grey material in the mouth, tongue, pharynx and larynx
2. Often aspiration pneumonia

Differential diagnosis: Vesicular diseases, neoplasms and abscesses

Actinobacillosis

Actinobacillosis is a chronic disease of cattle caused by *Actinobacillus lignieresi*. It is manifested by inflammation of the tongue and less frequently lymph nodes of the head and of even the viscera and carcass.

Antemortem findings:

1. Loss of appetite
2. Salivation and chewing
3. Swollen tongue
4. Mouth erosions
5. Enlarged parotid and retropharyngeal lymph nodes

Postmortem findings:

1. Enlarged tongue showing tough fibrous consistency. ("wooden tongue")(Fig. 75)
2. A cluster of small yellowish nodules and erosions of tongue mucosa
3. Granulomatous lesions in the lymph nodes (Fig. 76)
4. Marked thickening of the lower part of oesophagus and stomach wall
5. Raised plaques and erosions in the mucosa of rumen and reticulum
6. Liver and diaphragm lesions due to contact spread from reticulum

Typical actinobacillosis lesions in the lymph nodes and organs consist of greenish-yellow thick creamy pus with “sulphur granules”. These are bacterial colonies surrounded by club like structures

Differential diagnosis: Neoplasms, tuberculosis, abscesses in the lymph nodes, foreign body, salivary cysts, fungal granulomas, chronic pneumonia and parasites

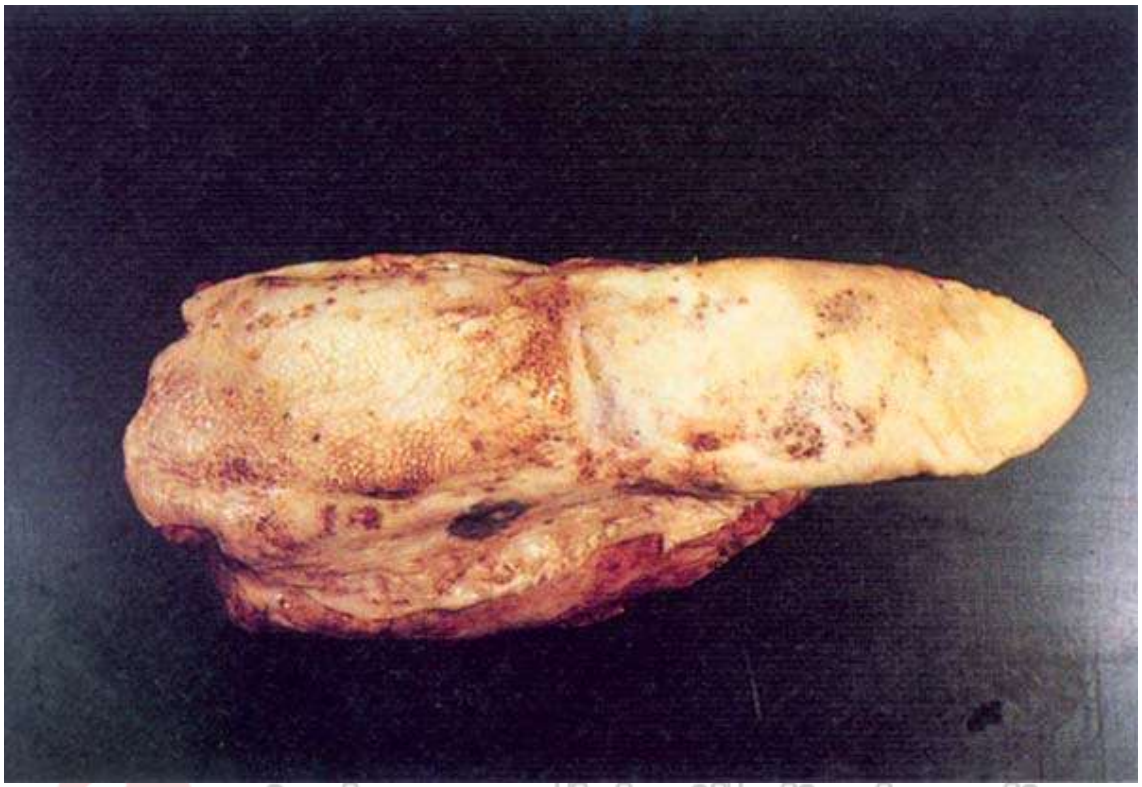

Fig. 75: Actinobacillosis. Actinobacillosis of the tongue. The tongue is enlarged, firm and contains numerous granulomatous lesions. It is called “wooden tongue” because of its firmness due to diffuse proliferation of fibrous tissue.

Fig. 76: Actinobacillosis. Multifocal, well demarcated yellow lesions in the retropharyngeal lymph node of a bovine animal.

Actinomycosis ("Lumpy Jaw")

Actinomycosis is a chronic granulomatous disease of cattle and pigs and rarely in sheep and horses. It is caused by *Actinomyces bovis* which is an obligatory parasite in the mucous membrane of the mouth and pharynx. Infection occurs following injury with a sharp object or hard feed pieces to the oral mucosa.

Antemortem findings:

1. Painful swelling of the maxilla and mandible (lumpy jaw); rarely in feet.
2. Suppurative tracts in the granulation tissue breaking towards oral cavity or skin
3. Ulceration of cheeks and gums and wart like granulations outward on head
4. Difficult breathing and salivation
5. Loss of weight
6. Diarrhoea and bloat

Postmortem findings:

1. Lesions in the mandible (Lumpy jaw) or maxilla (Fig. 77)
2. Granulomatous lesions in lower part oesophagus or anterior part of the reticulum
3. Local peritonitis
4. Mild abomasitis and enteritis

Differential diagnosis: Tooth infection, impacted food, bone injury, neoplasms and osteomyelitis due to other causes

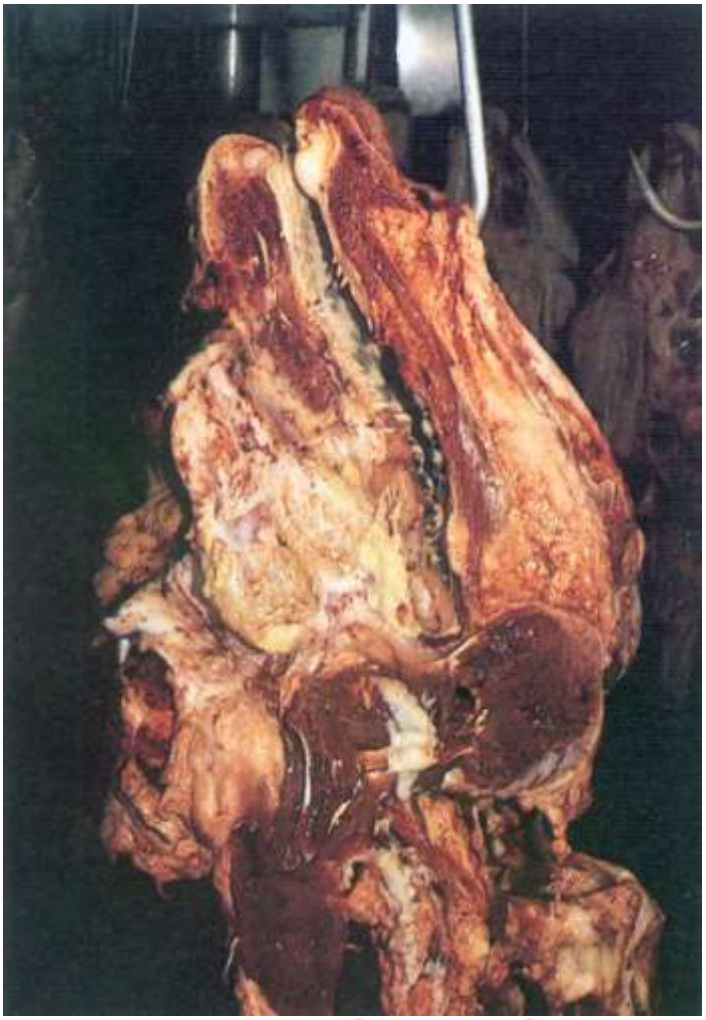

Fig. 77: Actinomycosis. Diffuse granulomas in maxilla and formation of green yellow pus. “Sulphur granules” are found in the pus.

Colibacillosis (White scours)

It is one of the most common serious enteric diseases of the young animals (calves and lambs) characterized by high morbidity and mortality (100 %) The principles signs are diarrhea (loss of fluid) resulting in dehydration and acute enteritis.

Etiology Bacteria E coli (rod shape Gram negative produce potent enterotoxin.

Lesion varying depending serotype

Enterotoxigenic Colibacillosis

This form of colibacillosis is characterized by varying degree of diarrhea .li occur in all species especially in the very young less than one year old.Specific serotypes causes this form and they have two way virulence factors

1. Fimbrial antigens enable them to attach to and colonize the villi of small intestine of neonatal calves in the first days of life(pilus) attachment antigens that allow them to attach to the enterocyte
2. The ability to produce enterotoxin that after fluid absorption and excretion in the small intestine.

The cardinal sings is diarrhea

Parasitic diseases

Diseases caused by protozoa

Trypanosomiasis

This is a protozoan disease of animals and humans caused by parasites of the genus Trypanosoma, which are found in blood plasma, various body tissues and fluids.

Transmission : Trypanosoma are transmitted primarily by the Glossina spp., tsetse fly, Stomoxys, tabanid and reduviid bugs, and by venereal contact. Trypanosoma species in the insect vector undergo one or two cycles of development.

Antemortem findings :

3. Intermittent fever
4. Anaemia
5. Weight loss and weakness
6. Edema, particularly observed in the face and legs
7. Enlarged body lymph nodes
8. Haemorrhage
9. Opacity of the cornea, keratitis and photophobia

Chronic form of trypanosomiasis is sometimes manifested by progressive weakness, despite absent parasitemia, and death.

Postmortem findings :

1. Enlarged lymph nodes
2. The enlargement of spleen, liver and kidney may also occur.
3. Edematous and emaciated carcass
4. Mild icterus

Differential diagnosis : Helminthiasis, malnutrition and other chronic wasting diseases, equine infectious anaemia, heartwater, babesiosis and anaplasmosis

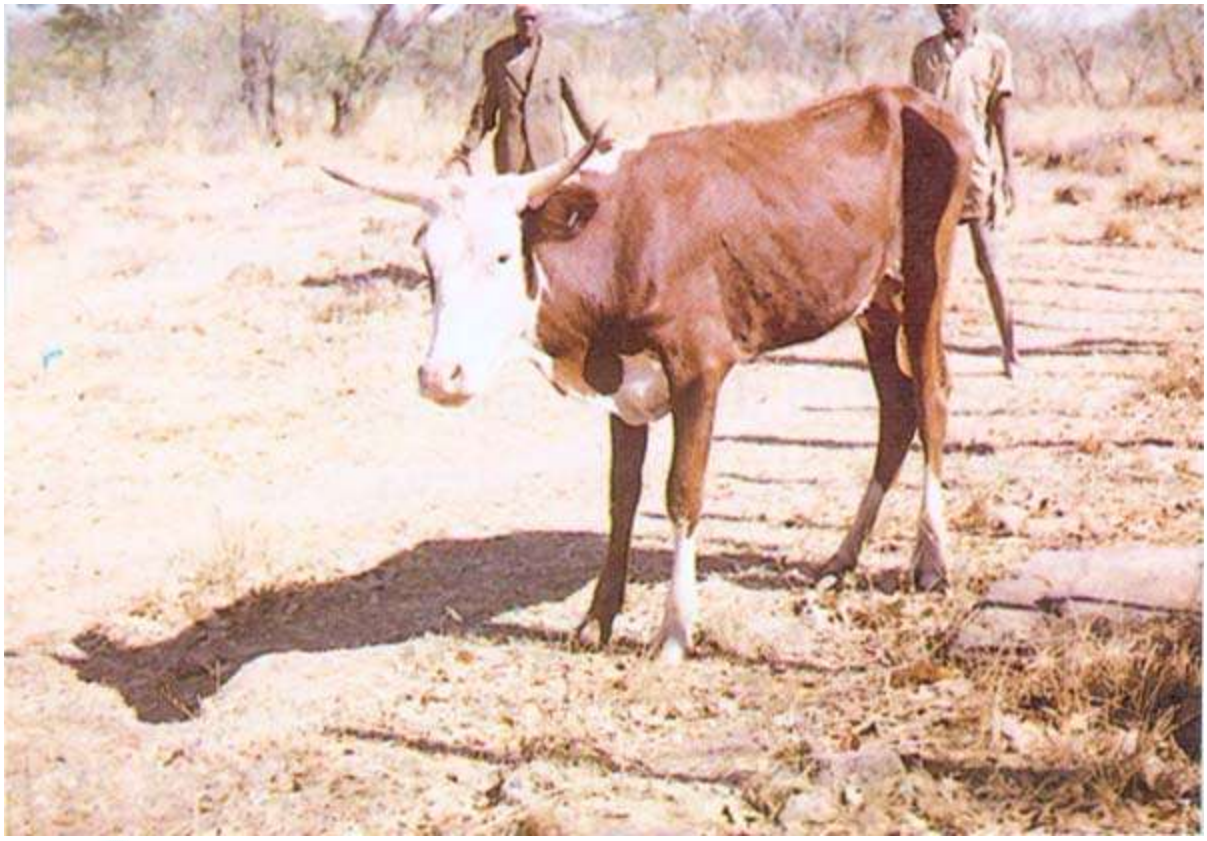

Fig. 95: Trypanosomiasis. This animal shows icteric mucous membranes, weakness in leg muscles and emaciation.

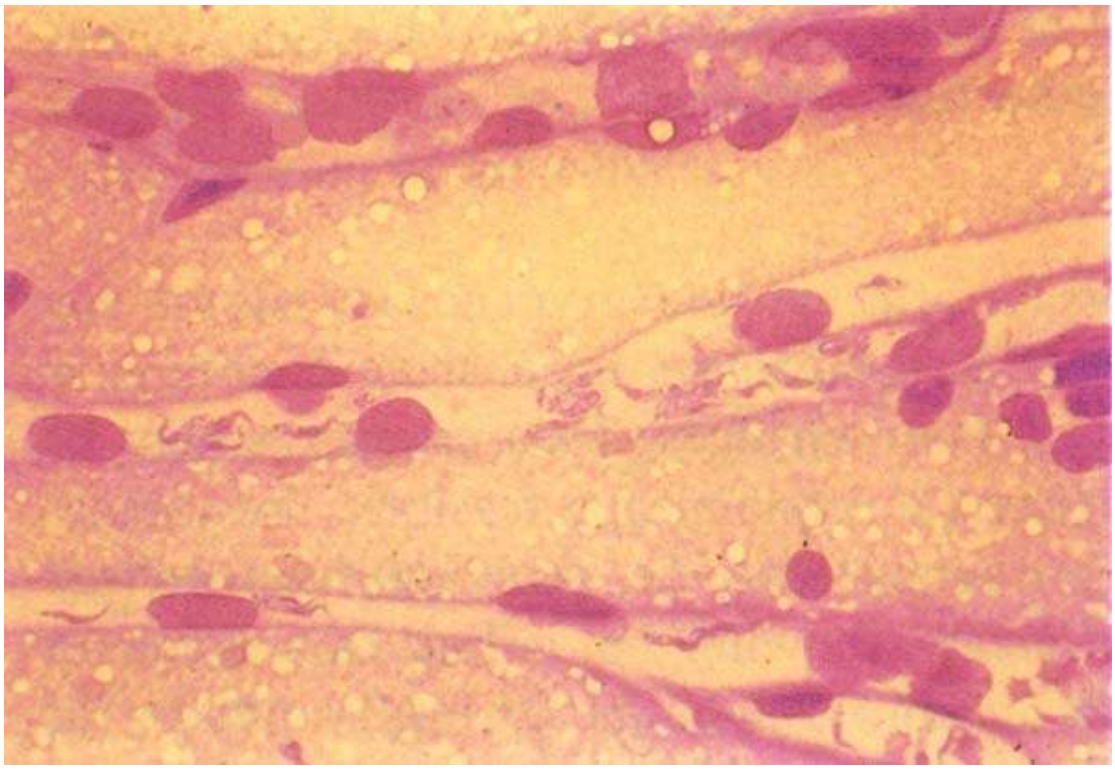

Fig. 96: An impression smear of the trypanosomes and the RBC in the capillaries.

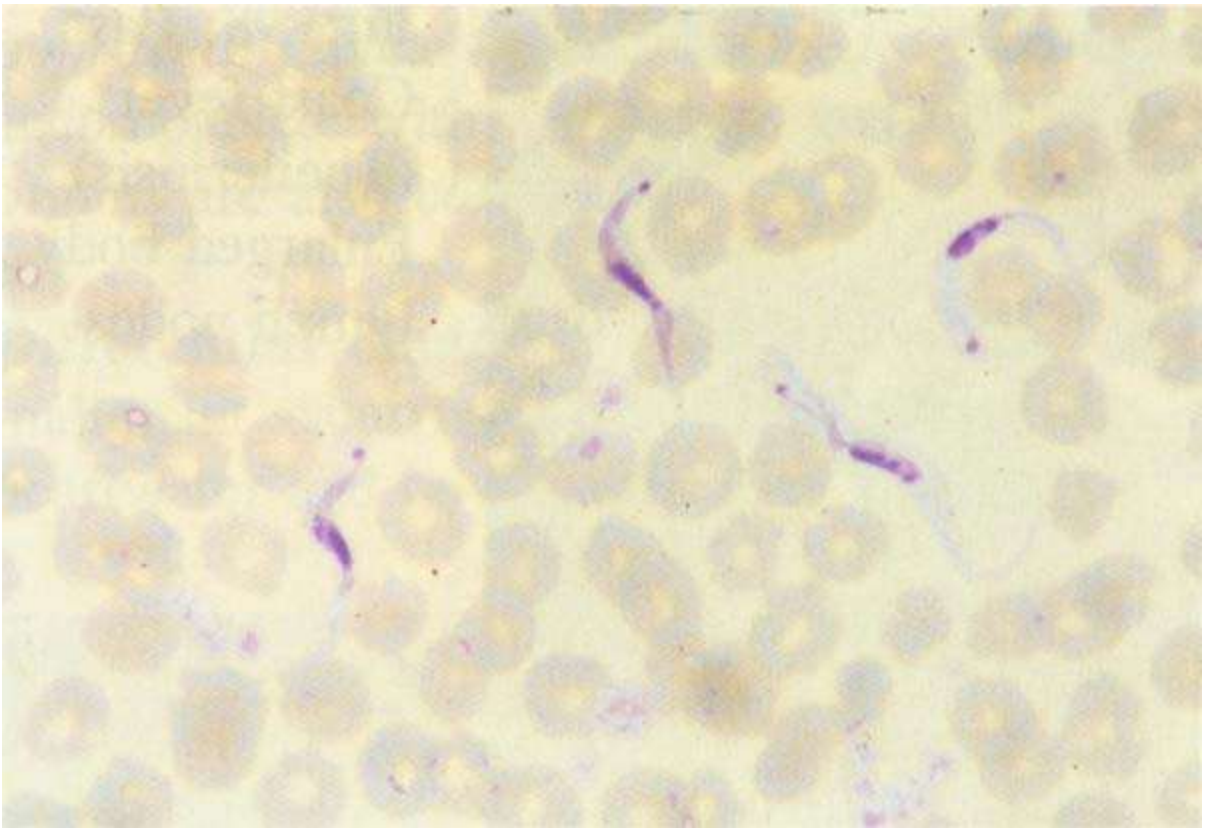

Fig. 97: Trypanosoma vivax in blood smear.

Theileriosis (East cost fever)

East coast fever is a subacute haemoprotozoan disease of cattle caused by *Theileria parva*. Theileriosis is characterized by fever, enlarged lymph nodes, dyspnea and death. In chronic cases loss of condition, emaciation, diarrhoea, blindness, etc. can be seen.

Transmission : Vectors are ixodid ticks of the species *Rhipicephalus*.

Antemortem findings :

1. Mortality up to 90 %
2. High temperature (up to 41 °C)
3. Difficult breathing and coughing
4. Nasal discharge, salivation and watery eyes
5. Swelling of the lymph nodes draining the area where the infected tick fed (Fig. 98)
6. Cerebral signs manifested by circling to one side, convulsions and death

Fig.98: East Coast fever (Theileriosis). Enlarged body lymph nodes.

Postmortem findings:

1. Froth in nostrils and bronchi associated with pulmonary edema and emphysema
2. Swollen, edematous lungs (Fig. 99) and interstitial pneumonia
3. Enlarged and haemorrhagic lymph nodes and splenic lymphoid hypertrophy (Fig. 100)
4. Enlarged and mottled liver
5. Infarcts, thrombosis and lymphoid hypertrophy in spleen (Fig. 100)
6. White spots of lymphoid aggregates in a kidneys
7. Brownish coloration of fat
8. Haemorrhagic and rarely ulcerative enteritis

Confirmation of diagnosis is only made through detection of parasites in a Giemsa stained lymph node biopsy smear and/or blood smear..

Differential diagnosis: Haemorrhagic septicemia, babesiosis, malignant catarrhal fever, trypanosomiasis, Rift Valley fever, heartwater and bovine leucosis

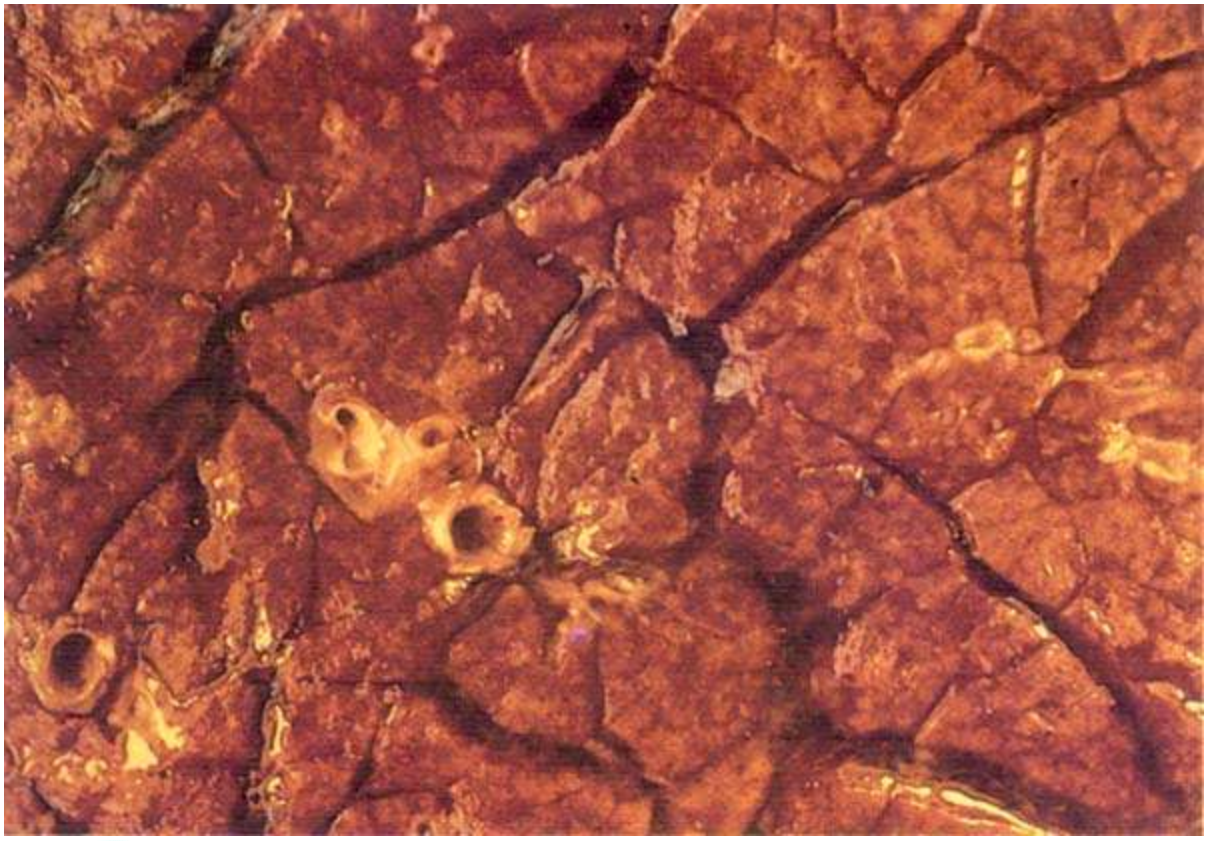

Fig.99: Theileriosis. Swollen edematous lungs and interstitial pneumonia.

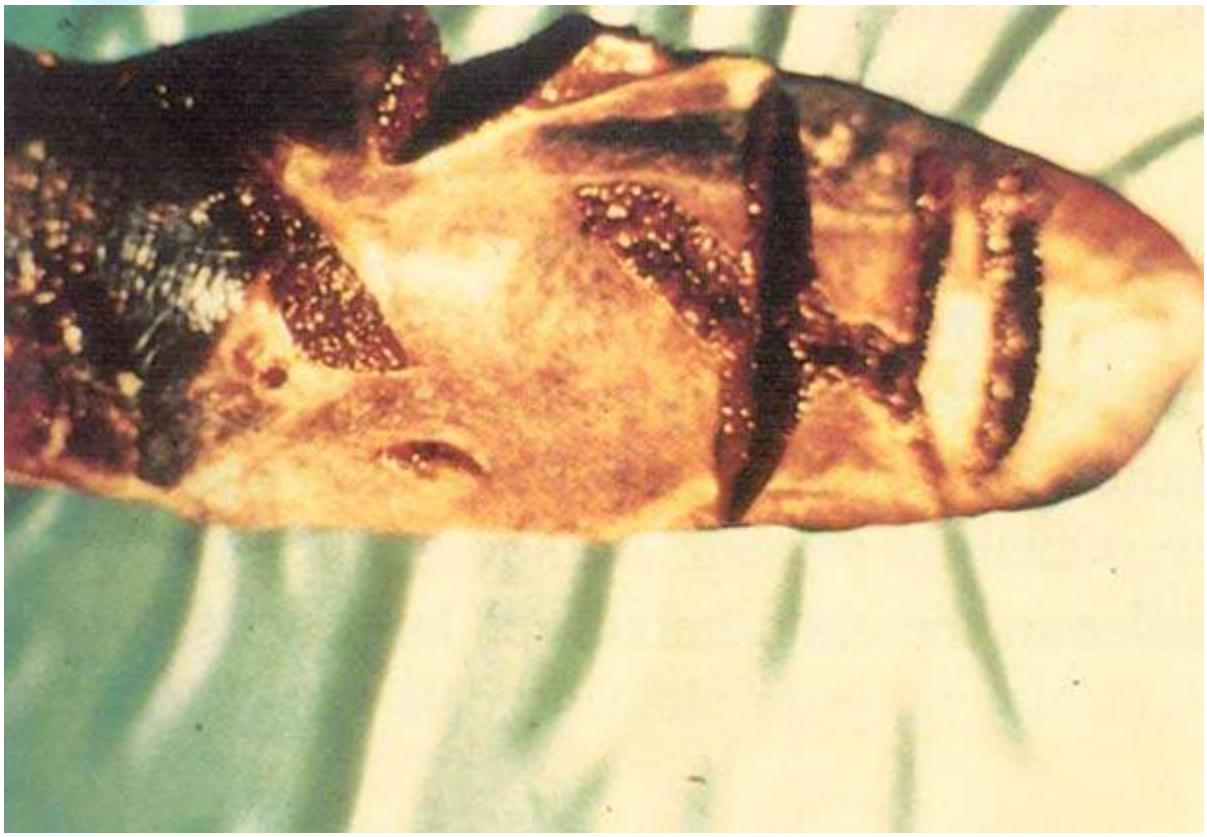

Fig.100: Theileriosis. Infarcts, thrombosis and lymphoid hyperplasia in spleen..

Anaplasmosis (gallsickness)

Anaplasmosis is a rickettsial disease characterized by severe debility, emaciation, anaemia and jaundice and is caused by Anaplasma spp.. They are obligate intracellular parasites.*Anaplasma marginale* is the causative agent in cattle and wild ruminants.

Transmission: Boophilus species of ticks transmit anaplasmosis. Mosquitoes and the horsefly are mechanical transmitters. Transmission is also possible through injection needles.

Antemortem findings:

Acute infection with *A. marginale*

1. High fever
2. Jaundice and anaemia demonstrated by pale mucous membranes
3. Frequent urination and constipation Chronic infection
4. Emaciation

Postmortem findings :

1. Enlarged and congested spleen (splenomegaly) showing soft pulp
2. Distended gall bladder with dark tarry bile
3. Thin, watery blood, which clots poorly
4. Enlarged, icteric liver, deep orange in colour and distended bile ducts (Fig. 102)
5. Lemon yellow carcass and connective tissue of the sclera of the eye, tendons, pleura, peritoneum, and attachments of diaphragm.

Diagnosis can only be confirmed by detecting parasites in a blood smear stained with Giemsa.

Differential diagnosis : Icterus and anaemia of different causes, anthrax, leptospirosis, emaciation caused by parasitism and malignant lymphoma, babesiosis.

Remarks : The access of biting insects to contaminated fresh blood should be prevented. Blood from suspicious carcasses should not be salvaged.

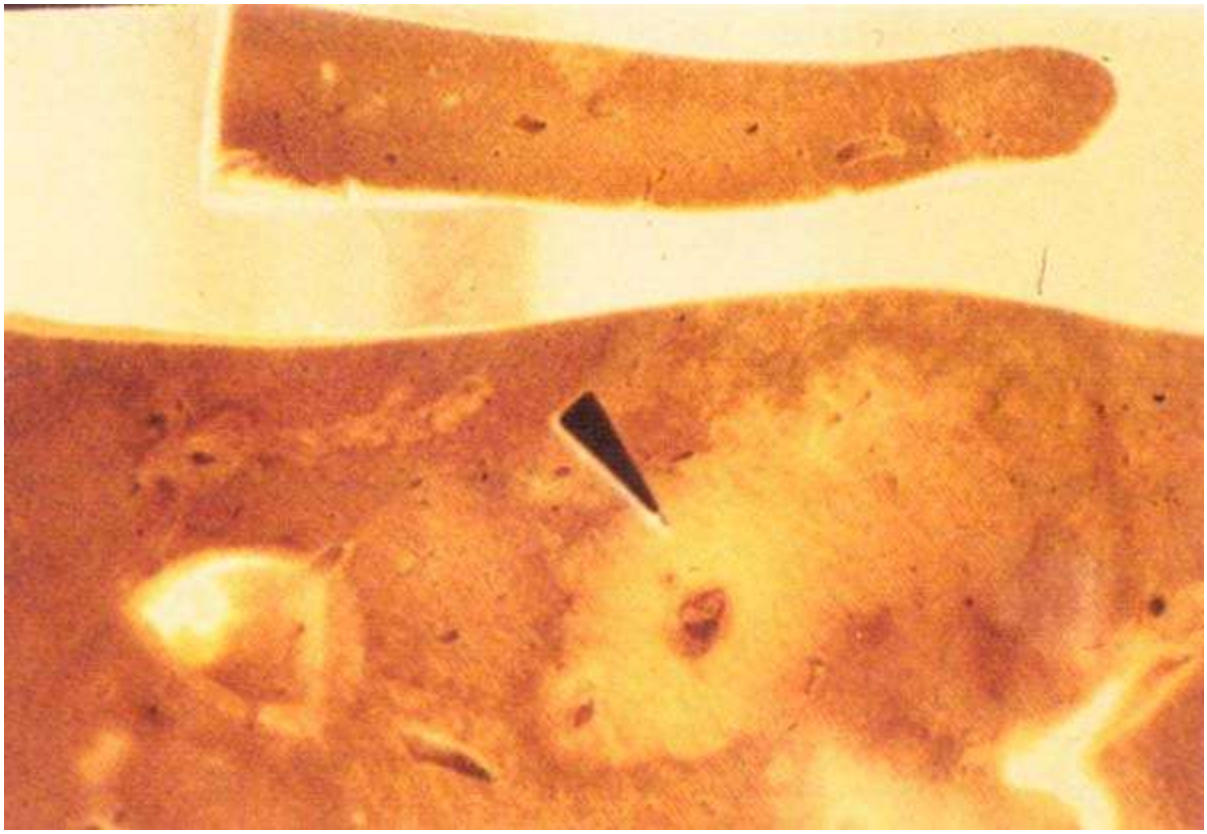

Fig. 102: Anaplasmosis. Ox liver affected with disease showing distended bile ducts.

Babesiosis (Piroplasmosis, Texas fever, Red water fever, Tick fever)

Babesiosis of cattle, horses, sheep and swine is a febrile, tick borne disease caused by various species of the protozoan genus *Babesia*.

Transmission : Different species of ticks in the family Ixodidae serve as vectors in different locations. The Babesia parasites can be transmitted transstadially and transovarially within a tick species.

Antemortem findings :

1. Incubation 7–10 days
2. Mortality up to 50 % or over depending on age, breed, etc.
3. High fever (41.5° C)
4. Dark reddish brown urine in the terminal stage
5. Reddened and injected mucous membranes at the early stages and later, anaemic mucous membranes
6. Clinical signs may resemble rabies in cerebral form of babesiosis.

Postmortem findings :

1. Edema and congested lungs
2. Enlarged and yellow liver and distended gall bladder with thick dark green bile.
3. Enlarged spleen
4. Anaemia and pale muscles

5. Jaundice particularly noted in the connective tissue
6. Edematous and haemorrhagic lymph nodes
7. Yellowish-orange colour of musculature (mild cases)
8. Occasionally dark kidneys with no other findings
9. Pink haemorrhage of a bovine brain (Fig. 103)

Diagnosis can only be confirmed by identification of parasite in the peripheral blood smear stained with Giemsa (Fig. 104)..

Differential diagnosis : Anaplasmosis, trypanosomiasis, theileriosis, leptospirosis and bacillary haemoglobinuria.

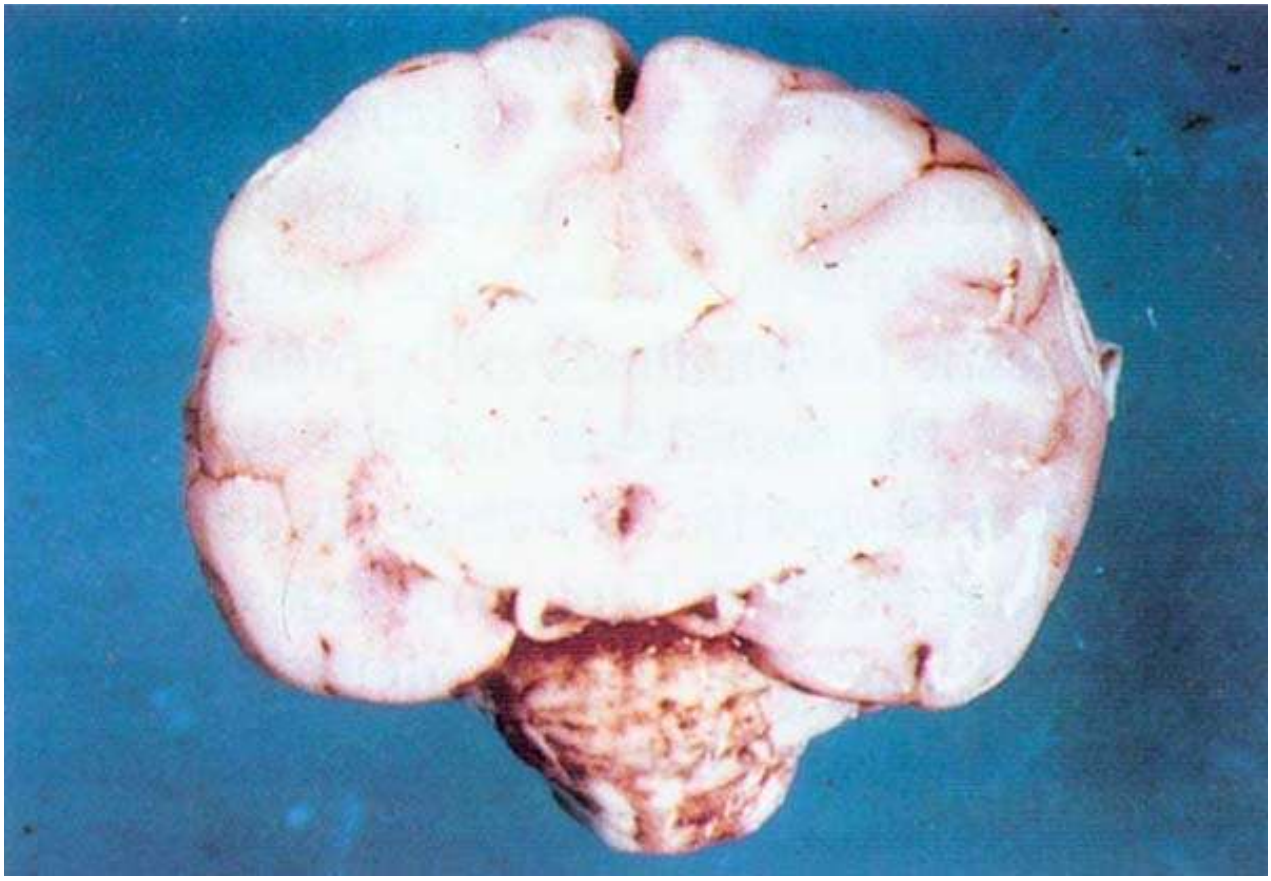

Fig. 103: Pink haemorrhage. Cerebral form of babesiosis caused by B. bovis. It is characterized by formation of thrombi and emboli in brain capillaries.

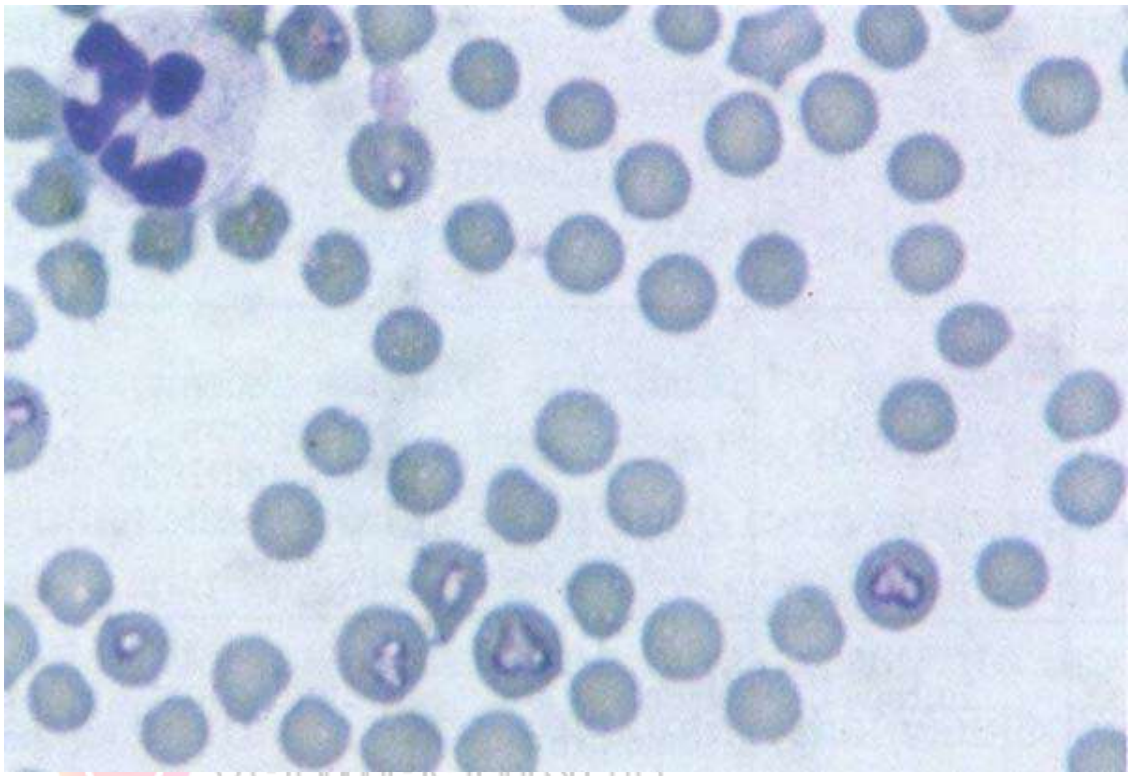

Fig. 104: Babesia bigemina in American bison blood.

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