

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, January to March 2016

- Abomasitis in calves
- Aortic aneurysm in a dairy cow
- Abortion due to *Salmonella* Brandenburg in ewes
- *Streptococcus dysgalactia* polyarthritis in lambs

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for January to March 2016

CATTLE:

Respiratory diseases

Respiratory disease was identified in 71 cattle post mortem submissions between January and March 2016. The most common pathogens identified included *Mycoplasma bovis* (twenty eight cases) (FIGURE 1), *Mannheimia haemolytica* (twenty four cases), *Pasteurella multocida* (thirteen cases), and *Trueperella pyogenes* (seven cases).

In some cases *Myc. bovis* was recovered from lung cultures and the isolates were retained for use as autogenous vaccine antigen. Such vaccines are used in the cows to provide passive immunity to the calves via colostrum.

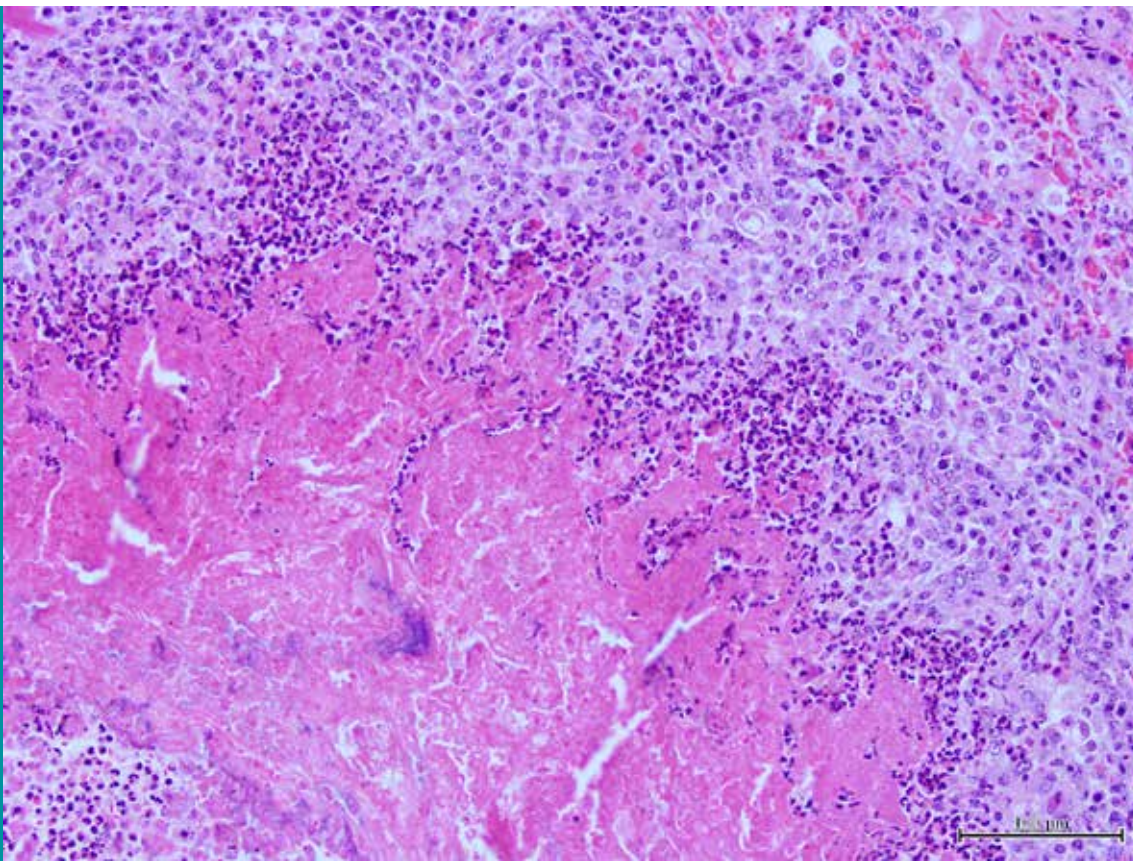


Figure 1

Mycoplasma bovis:
caseonecrotic
broncho-
pneumonia in a
calf

Alimentary diseases BVD / Mucosal disease

A six-month-old heifer calf was submitted after succumbing to chronic diarrhoea. This was the second death following similar clinical signs. There was severe ulcerative inflammation of the alimentary tract and the gross pathology was considered suggestive of BVD / mucosal disease (FIGURE 2). BVDV nucleic acid was detected by RT-PCR.



Figure 2

Severe ulcerative inflammation of the caecum of a calf due to BVDV infection

Abomasitis in calves

Fungal rumenitis (FIGURE 3) and abomasitis were seen in two one-week-old calves submitted from a unit with a history of diarrhoea and high neonatal calf mortality. The abomasum and developing rumen were distended with fine milk clots and a large volume of oral rehydration solution, the small and large bowel contained undigested milk. There was hyperaemia of the abomasal mucosa and a severe fungal rumenitis, omasitis and abomasitis. Low numbers of cryptosporidial oocysts were detected in the caecal contents and there was a low positive result on the rotavirus antigen ELISA test.

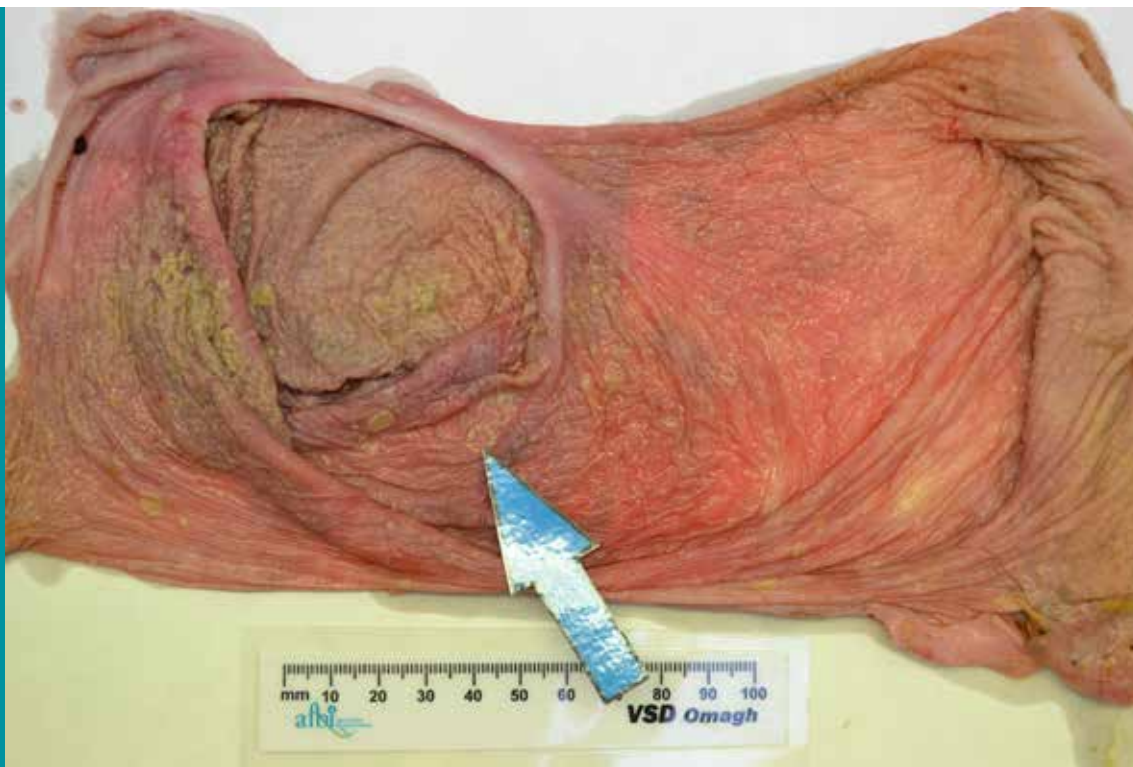


Figure 3

Fungal infection of the developing rumen of a young calf, similar lesions were present in the abomasums in this case

In a similar case severe multifocal necrotic mycotic abomasitis and enteritis (involving the caecal wall) was diagnosed in four 3 to 4- week- old suckler calves submitted with a history of bloating, diarrhoea and dehydration. Histologically numerous hyphae were penetrating the mucosa, lamina propria and sub-mucosa of the abomasums and caecum. *Candida* species yeasts were recovered from cultures.

Severe emphysematous abomasitis (FIGURE 4) and mesenteric torsion were seen in a two-week-old calf which had been grossly over-fed using a stomach tube. The history confirmed that up to 5l of colostrum / milk / colostrums supplement had been given by tube as a single feed.



Figure 4

Emphysematous abomasitis in a calf, no infectious agents were detected but there was a history of gross over-feeding with a stomach tube

There had been flooding of the developing rumen and abomasum with undigested milk and it was suggested that fermentation with bacterial multiplication was leading to acidosis and emphysematous abomasitis as well as leading to mesenteric torsion. Neither *Clostridium sordellii* nor *Sarcina ventriculi* could be detected in the lesions and advice on correct feeding practice was given.

Clostridial abomasitis was diagnosed in a two-day-old calf which died suddenly. On post mortem examination the abomasal mucosa was erythematous, thickened, eroded and emphysematous and it was overlain by adherent yellow inflammatory exudate. The intestinal mucosa was also thickened and reddened.

Histologically there was an intense neutrophilic infiltrate on the surface of the mucosa associated with numerous bacilli while in the submucosa there was emphysema and oedema with mild neutrophilic infiltrate. *Clostridium sordellii* was demonstrated on the abomasal mucosa by fluorescent antibody testing and it was considered that this was a case of clostridial abomasitis in a neonatal calf.

Intestinal obstruction in a calf

Obstruction of the ileocaecal junction by dry intestinal content was diagnosed in a one-week-old calf. The intestine proximal to the obstruction was distended by copious fluid contents.

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in TABLE 1. Overall, *Cryptosporidium* species and rotavirus were the most common pathogens identified.

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, January and March 2016

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	451	145 (32.2%)
Rotavirus	335	105 (31.3%)
Coronavirus	334	21 (6.3%)
<i>Escherichia coli</i> K99	199	3 (1.5%)

Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in TABLE 2.

TABLE 2: Endoparasitic infections in ruminants in Northern Ireland, January and March 2016

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	492	430	43	15	3	1	12.6%
Ovine	237	180	21	22	4	10	24.1%
Paramphistome							
Bovine	492	180	61	128	42	81	63.4%
Ovine	237	125	32	45	15	20	47.3%
Coccidia							
Bovine	597	538	46	8	2	4	10.0%
Ovine	276	136	86	18	15	21	50.7%
Strongyle worm egg count							
	Total	<500 epg	≥500 epg				% Positive
Bovine	597	586	11				1.8%
Ovine	276	226	50				18.1%

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance
+ Low, ++ Moderate, +++ High, ++++ Very high

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 153 bovine faecal samples. 3 samples (2.0 per cent) contained acid-fast organisms typical of MAP. Of 4909 bovine blood samples that were tested for antibodies to MAP 486 (9.9 per cent) were positive.

Johne's disease was diagnosed in a nine-year-old suckler cow which presented with diarrhoea and weight loss of two months duration. On gross post mortem examination the ileal mucosa appeared rugged and 'towelled'. Histological lesions typical of Johne's disease were present and there were numerous acid fast bacilli in Ziehl-Neelsen stained sections of intestine and mesenteric lymph node.

Perforated abomasal ulcer in a dairy cow

An eight-year-old dairy cow was submitted with a history of suspected abomasal ulceration. On gross post mortem examination there was a massive fibrinous peritonitis with sheets and clots of fibrin present in the abdominal cavity with a large volume of blood stained peritoneal fluid. There was a large (approx. 2.5cm in diameter) perforated abomasal ulcer present.

Reproductive and mammary diseases

Abortion

Specimens from 146 bovine abortions and stillbirths were examined during the 1st quarter. Significant pathogens were detected in 73 cases (50 per cent). Of these, *T. pyogenes* (19 cases, 13.0 per cent) was the most commonly identified pathogen. Other pathogens identified included *Bacillus licheniformis* (13 cases, 8.9 per cent), BVD (9 cases, 6.2 per cent), leptospiral infection (8 cases, 5.5 per cent), *Neospora caninum* (8 cases, 5.5 per cent), and *E. coli* (6 cases, 4.1 per cent).

Congenital abnormalities in calves

Thickening of the left atrial wall and absence of the inter-ventricular septum (i.e. single ventricle) were noted in neonatal calf which had lived for six hours.

Atresia jejuni (FIGURE 5) was diagnosed in three –day-old female calf that had failed to pass faeces. The intestine proximal to the atresia was dilated and fluid filled while distal to the atresia intestinal content was scant or absent.

A complex malformation was detected in a male calf which had been euthanised at 1 day old having been born alive but unable to stand and suck: cleft palate, lack of pigmentation of the eyes and right ear, malformed feet, lax tendons and short tail were seen. Tests for teratogenic viruses (BVDV, SBV, and BTV) were all negative.



Figure 5

Atresia jejuni in a calf, the dilation of the intestine proximal to the lesion can be seen

Mastitis

A total of 257 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 19 (7.4 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 27 samples. *E. coli* was the most frequently isolated organism and accounted for 20.6 per cent of isolates cultured. Other frequently identified organisms included *Streptococcus uberis* (19.1 per cent), *Staphylococcus aureus* (11.3 per cent), *Bacillus cereus* (4.3 per cent), *T. pyogenes* (4.3 per cent) and *Pseudomonas* species (3.9 per cent).

Neurological diseases

Clostridium botulinum type D toxicosis was diagnosed in 3 cases during the 1st quarter of 2016. Botulism is most usually associated with silage feeding indoors during the early part of the year.

A one-year-old heifer was submitted after an acute onset of recumbency with nystagmus. At necropsy, the carcass was toxic looking and oedematous. Grossly there was a focal pale area of myocardium surrounded by a red rim at the papillae of the left ventricle and in the brain there was a focal red area 1cm across at the base of the midbrain with purulent material adhered to it ventrally. Histological examination of the brain showed the blood vessels to contain fibrin thrombi whilst their walls were oedematous and distended with neutrophils. There were neutrophils and haemorrhage in the adjacent brain parenchyma. In the heart there were aggregations of neutrophils between muscle fibres. The coronary vessel walls were distended with neutrophils and there was necrosis of the adjacent myofibres. *Histophilus somni* was cultured from the brain and heart lesions and a diagnosis of thrombo-embolic meningo-encephalitis (TEME) was made.

Brain abscessation

Three cases of brain abscessation were considered noteworthy during the reporting period, all in heifers. In one case there was associated damage to the horn with possible tracking of infection with *T. pyogenes* being recovered from the lesion. In the other case coning of the cerebellum associated with pituitary abscessation was considered to be the cause of sudden death. In the third case micro-pyogranulomas were detected on histological examination of the brainstem and *Listeria monocytogenes* was cultured from the brain.

Other diseases of cattle

Ruptured aortic aneurysm in dairy cow

Ruptured aortic aneurysm and haemoabdomen was diagnosed on gross post mortem examination of an adult dairy cow which had died following a short episode of malaise and dyspnoea. Histological examination of the aortic wall showed a dissecting aneurysm with haemorrhage and disruption of the intima and media. There was vesiculation of the fibrous layer of the intima with marked hydropic change of fibrocytes. These changes were considered to be consistent with those listed in the literature describing this condition.

A lactating dairy cow was submitted with a history of sudden death. At necropsy there was a large degree of haemorrhage craniodorsal to the udder which extended through the subcutaneous tissue as far cranial as the sternum. The source of the haemorrhage was not determined however given the location, involvement of the subcutaneous milk vein was considered a possibility.

Phlegmon in a dairy heifer

Extensive phlegmon was diagnosed on gross examination of a fifteen-month-old heifer which had been euthanased on welfare grounds after failing to respond to antibiotics.

On the left hand side, there was extensive, necrotising, purulent fasciitis and myositis involving the muscles of the pelvic muscle mass and the upper limb. There was extensive fibrosis and multiple abscessation with tracking of pus between the facial planes. There was involvement of the peri-articular soft tissue of the hip, stifle and pedal joints but no abnormality of the articular surface, joint capsule or tendons was noted in any joint. There were no fractures and the hoof walls and sole were unremarkable. On the right side, there was marked subcutaneous oedema and congestion of the muscle mass, probably associated with recumbency.

P. multocida was recovered from cultures and immuno-staining detected *Myc. bovis* antigen in the inflamed soft tissue. *Myc. bovis* nucleic acid was detected by RT-PCR.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 18 ovine post mortem submissions during this quarter. Jaagsiekte (ten cases), *M. haemolytica* infection (six cases) and laryngeal chondritis (three cases) were the most frequently diagnosed conditions.

Alimentary diseases

Fasciolosis

The AFBI liver fluke disease forecast made in November 2015 predicted a high risk of fasciolosis over the winter period. Chronic liver fluke infection was diagnosed in ewes during the reporting period with substantial liver damage and abortion being present in some cases.

In one case the actual cause of death was 'choke' due to oesophageal impaction with sheep pellets but the liver fluke disease was considered too severe to be incidental.

It was noted that oesophageal obstruction with pellets or sugar beet (FIGURE 6) was relatively common in ewes during the period.



Figure 6

Oesophageal impaction in a ewe

Clostridial enterotoxaemia in intensively reared lambs

Clostridial enterotoxaemia (pulpy kidney disease) was diagnosed in a group of early finishing lambs on the basis of gross findings, histological evidence of micro-angiopathy in the brain and detection of *Clostridium perfringens* Type D epsilon toxin in the small intestine contents. It was noted that the ewes had been vaccinated with a polyvalent clostridial vaccine, the lambs were five-weeks -old and had been given the first injection of a primary course of clostridial disease vaccination. Under some circumstances, young lambs being fed high levels of concentrate show a shorter period of passive protection than is usual and this should be kept in mind when designing vaccination programmes for ewes and lambs in intensive systems. Full and proper vaccination of ewes and lambs is essential in these rearing systems.

Abomasitis in a lamb

Emphysematous abomasitis was diagnosed in a five-week-old lamb which had died after showing abdominal bloat. There was thickening and emphysema of the abomasal wall without marked mucosal hyperaemia. The other fore-stomachs were unremarkable on gross examination.

Histological examination showed the presence of tetrads of *S. ventriculi* organisms associated with the abomasal mucosa.

Forest Flame poisoning

Forest Flame (*Pieris* sp) poisoning was diagnosed in an eight-month-old hogget submitted with a history of sudden death. At post mortem examination fragments of Forest Flame and ivy (*Hedera* sp) were found amidst the rumen contents. It was noted that Forest Flame remains the most common form of plant poisoning of sheep in Northern Ireland.

Johne's disease

One ovine faecal sample was examined microscopically using Ziehl-Neelsen staining for MAP. This sample did not contain any acid-fast organisms typical of MAP. Four ovine bloods samples were tested for antibodies to MAP, one of which was positive.

Nutritional and metabolic disease

Pregnancy toxoemia in ewes

Two cases of pregnancy toxoemia (defined by fatty change of the liver on histology and elevated BHB levels in eye fluid) were considered noteworthy during the period, in one instance the affected ewes had inter-current parasitic gastro-enteritis (PGE) and in the other the actual cause of death had most likely been haemorrhage following fracture of the mandibular symphysis.

Reproductive diseases

Abortion

Specimens from 196 ovine abortions and stillbirths were examined during the 1st quarter of 2016. Significant pathogens were detected in 118 cases (60.2 per cent). Pathogens identified included *Toxoplasma* (49 cases, 25.0 per cent), *Chlamydia* (38 cases, 19.4 per cent), *E. coli* (13 cases, 6.6 per cent), *T. pyogenes* (7 cases, 3.6 per cent) and *Salmonella* Dublin (7 cases, 3.6 per cent)

Abortion in ewes due to *Salmonella* Brandenburg

Abortion in ewes due to *Salmonella* Brandenburg infection was diagnosed in a flock with sporadic abortions over a three week period. Profuse growths of the organism were recovered in septicaemic distribution from submitted foetuses. *S. brandenberg* is rarely seen as a cause of ovine abortion in the UK but has been associated with major outbreaks in New Zealand.

Enterococcus hirae was considered to be the possible cause of abortion in a small flock suffering an abortion storm. On histology there was placentitis and profuse pure growths of the organism were recovered from the foetal stomach contents.

Neonatal septicaemia and polyarthritis

Incidents of neonatal septicaemia due to *E. coli* and *L. monocytogenes* were diagnosed during the quarter. Gross examination of cases of listerial septicaemia showed the presence of military pale yellow foci of necrosis throughout the liver (FIGURE 7- next page). Interestingly in this case the ZST result was 36 units (adequate level: >10 units) indicating adequate uptake of maternally derived antibody.

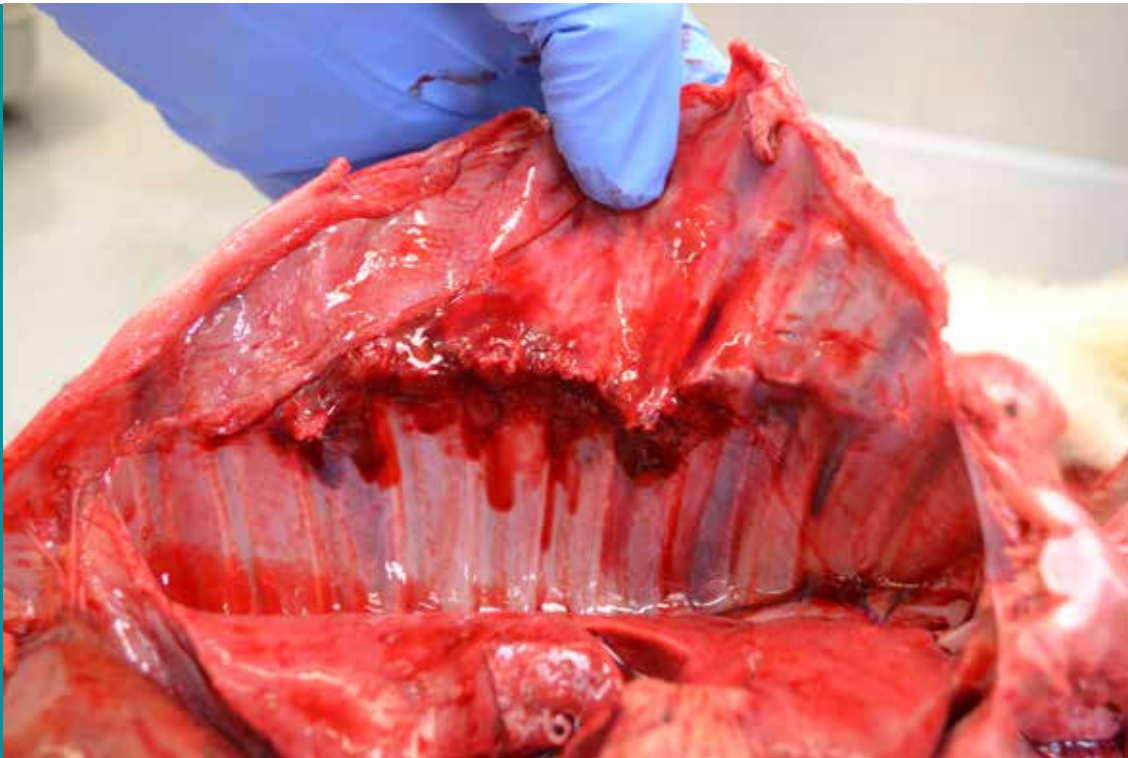
Streptococcal polyarthritis in lambs

Arthritis due to *Streptococcus dysgalactiae* was diagnosed in the limb and spinal joints of a two-week-old lamb submitted with a history of recumbency and paresis. The flock had been lambing indoors and experiencing problems with young lambs going lame and recumbent with failure to respond to antimicrobial treatment. Dystocia

Two large lambs which died within eighteen hours of birth were submitted from a flock with sporadic young lamb deaths over a period of a few weeks. Both lambs had severe rib fractures with associated bruising and intra-thoracic haemorrhage (FIGURE 8- next). The lambs had appeared normal after birth, it was however concluded that the injuries were the result of birth canal trauma.

**Figure 7**

Listerial septicaemia in a young lamb, the military foci of hepatic necrosis can clearly be seen

**Figure 8**

Rib fractures in a newborn lamb as a result of birth canal injury

Skin diseases

A one-year-old ram was submitted was in poor body condition and was suffering from severe dermatitis (FIGURE 9). Many *Psoroptes ovis* mites were detected in skin scrapes and wool plucks and a *Staphylococcus* species was recovered from skin cultures consistent with a diagnosis of sheep scab and intercurrent pyoderma. Ringworm spores were demonstrated in skin smears and ringworm was cultured from skin and wool. Orf virus was detected on electron microscopy. There was inter-current PGE. It was noted that the ram had been treated for sheep scab but only by showering with a product not licensed for use in a sheep shower. Advice was given as to the welfare of this flock and proper use of ectoparasiticides to treat and control sheep scab.

**Figure 9**

Sheep scab, ringworm and pyoderma in a ram

HORSES:

140 swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all of which were negative. Eight swabs were cultured from horses with a history suggestive of strangles during this quarter, all of which were negative.

PIGS;**Renal disease**

Pyelonephritis and ulcerative cystitis with bladder perforation and peritonitis was diagnosed in a gilt submitted from a unit showing a spate of sudden deaths.

Chronic fistulating pyogranulomatous lesions were seen in an aged Berkshire boar; There was a large, fibrous mass associated with the base of the tongue, this mass contained multiple abscesses and extended ventrally through the sub-cutaneous tissue to cause swelling beneath the lower jaw. The body of the tongue contained numerous small abscesses with fibrous capsules and there was an impacted sinus present on the dorsal surface of the tongue.

The lungs were congested and there were multiple multi-loculate abscesses present with green, sticky, plastic pus. On the caudal right side there was a large bi-loculate abscess associated with the visceral and parietal pleura. A smaller lesion was present in the rostral sternal region. There were widespread organising adhesions of the visceral and parietal pleura.

There was vegetative endocarditis of the left A/V valve with granular, necrotic tissue present. *T. pyogenes* was cultured from the sub-cutaneous lesions and it was postulated that vegetative endocarditis has resulted from systemic infection arising from the tongue and neck lesions with subsequent embolic infection of the lungs.

BIRDS: Poultry

The diagnostic analysis for poultry post mortem submissions during the quarter is given in CHART 1 (next page). Liver diseases including bacterial hepatitis, inclusion body hepatitis and fatty liver (twenty two cases, 24.2 %) and digestive disorders (twenty cases, 22.0 %) predominated.

POULTRY SUBMISSION DIAGNOSTIC ANALYSIS Q1 2016

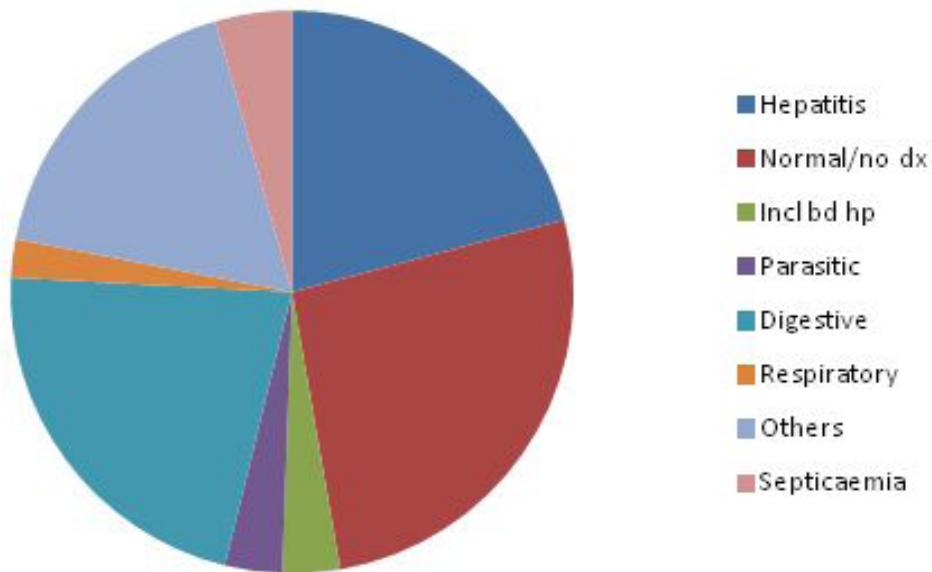


Chart 1

Diagnostic analysis of poultry submissions, January to March 2016.

WILDLIFE and EXOTICS:

A twenty-three-year-old Turaco was submitted with a history of having been attacked by another bird in the aviary. Gross examination showed limb haemorrhage and oedema but no fractures. There was myonecrosis of the breast muscles. On histology, the liver was found to have multifocal to confluent areas of brown granular pigmentation which was strongly positive by Perls Prussian Blue test for ferric iron. Each of the hepatocytes exhibited marked granular blue staining in the cytoplasm and a diagnosis of iron storage disease was made. This condition is known to affect older Turacos.

Severe generalised renal amyloidosis was diagnosed in a four-year-old warty pig which was submitted from a zoological collection.