

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, October to December 2014

- Abomasal bloat in calves
- Viral pneumonia due to bRSV in calves
- Selenium and vitamin E deficiency in calves
- *Clostridium sordellii* abomasitis in lambs
- Parasitism and pasteurellosis in lambs
- Jaagsiekte in ewes

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for the period October to December 2014

CATTLE:

Respiratory diseases

Respiratory disease was identified in 87 cattle post mortem submissions between October and December 2014. The most common pathogens identified included *Mannheimia haemolytica* (twenty two cases), *Mycoplasma bovis* (twenty cases), lungworm (ten cases), *Pasteurella multocida* (seven cases) and *Trueperella pyogenes* (seven cases).

Pneumonia due to bovine respiratory syncytial virus (bRSV) infection was diagnosed on the basis of full post mortem examination and histology in a group of three-month-old calves with clinical respiratory disease. Histological examination showed degeneration and necrosis of the bronchiolar epithelium with frequent syncytia formation. Neutrophils and degenerate epithelial cells were frequently present in bronchiolar lumens. Moderate numbers of macrophages and modest numbers of neutrophils infiltrated the alveolar airspaces and there was mild thickening of alveolar septae and mild alveolar type II pneumocyte hyperplasia. Positive staining for bRSV antigen was detected by immuno-histochemistry.

Alimentary diseases

BVD / Mucosal disease

Of 2860 blood samples that were tested for bovine viral diarrhoea virus (BVDV) by virus isolation or antigen capture ELISA 259 (9.1 per cent) were positive. In addition, 6 of 247 (2.4 per cent) submitted tissues and nasal mucus samples were positive by immunofluorescence. Three cases of mucosal disease were confirmed at post mortem examination during this period.

Abomasal ulceration and bloat was diagnosed in a group of one to two-week-old dairy calves being reared indoors on an automatic feeding system. Gram's stained histological sections of the abomasum showed the presence of distinctive clusters of *Sarcina ventriculi*.

This organism is sometimes associated with abomasal bloating in calves (Figure 1). In these cases the most likely origin of the condition is the dietary causation of acidic conditions which allow the proliferation of *S. ventriculi* with subsequent gas production. The gross lesions may resemble those of *Clostridium sordellii* abomasitis but in this case both fluorescent antibody testing and culture were negative for the presence of this organism.

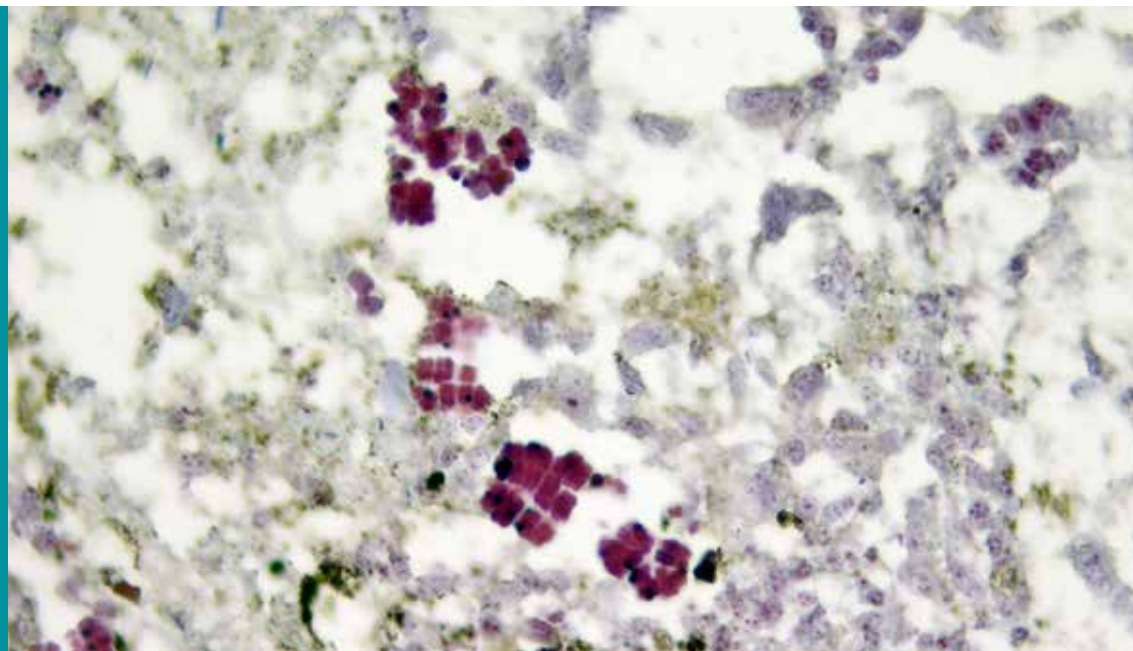


Figure 1

Characteristic clusters of *S. ventriculi* organisms in the abomasum of a calf with abomasal ulceration and bloat.

Alimentary obstruction

Two unusual cases of alimentary obstruction were seen during the reporting period. A six-year-old cow at grass was diagnosed with oesophageal obstruction ('choke') due to a tennis ball becoming lodged in the oesophagus with associated epithelial necrosis.

A phyto – trichobezoar was found to be lodged in the proximal duodenum of a three-year-old cow presented with a history of bloating which had not been relieved by abdominal surgery. Gross examination showed focal mucosal necrosis and peritonitis to be associated with the obstruction. There was fluid distension of the alimentary tract proximal to the obstruction, and distally the gut lumen contained only mucoid material.

A four-year-old bull with a history of weight loss and lethargy over a two week period was submitted for post mortem examination after euthanasia on welfare grounds. Gross examination showed a severe fibrinous peritonitis (Figure 2) and fibrinous pericarditis and pleurisy. Traumatic reticulitis or 'wire' was considered to be a possible initiating cause. However the lesion was so extensive that no foreign body could be found. *Trueperella pyogenes* was recovered from peritoneal swabs.



Figure 2

Severe peritonitis in a bull, possibly the result of hardware injury or 'wire'.

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, October to December 2014

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	332	114 (34.3%)
Rotavirus	329	103 (31.3%)
Coronavirus	317	26 (8.2%)
<i>Escherichia coli</i> K99	99	4 (4.0%)

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, October to December 2014.

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	871	763	92	13	3	0	12.4%
Ovine	288	254	19	9	4	2	11.8%
Paramphistome							
Bovine	868	389	157	211	70	41	55.2%
Ovine	287	173	58	45	8	3	39.7%
Coccidia							
Bovine	944	794	128	14	4	4	15.9%
Ovine	288	149	119	16	4	0	48.3%
Strongyle worm egg count	Total	<500 epg	≥500 epg			% Positive	
Bovine	937	895	42			4.5%	
Ovine	290	233	57			19.7%	

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

Ill-thrift in a group of 20 recently housed calves was investigated during late October. Gross post mortem examination of one six-month-old calf which had died showed the presence of 2,100 *Nematodirus* sp in the small intestine and a faecal egg count for *Nematodirus* sp of 300 e.p.g. Nematodirosis was diagnosed as the main cause of the problem with the infection having been acquired prior to housing.

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 179 bovine faecal samples. 1 samples (0.5 per cent) contained acid-fast organisms typical of MAP. Of 8391 bovine blood samples that were tested for antibodies to MAP 594 (7.1 per cent) were positive.

Nutritional and metabolic disease

Urolithiosis was diagnosed in a one-year-old Holstein – Friesian bull being reared indoors on concentrates. On gross examination there were ecchymotic haemorrhages throughout the carcass and the bladder was distended with urine. Numerous hard white calculi and associated grit were present at the neck of the bladder, in both renal pelvises and in the ureters (Figure 3). The urethra was obstructed by three calculi of up to 2 cm in length and the urethral mucosa and wall proximal to the calculi was haemorrhagic.

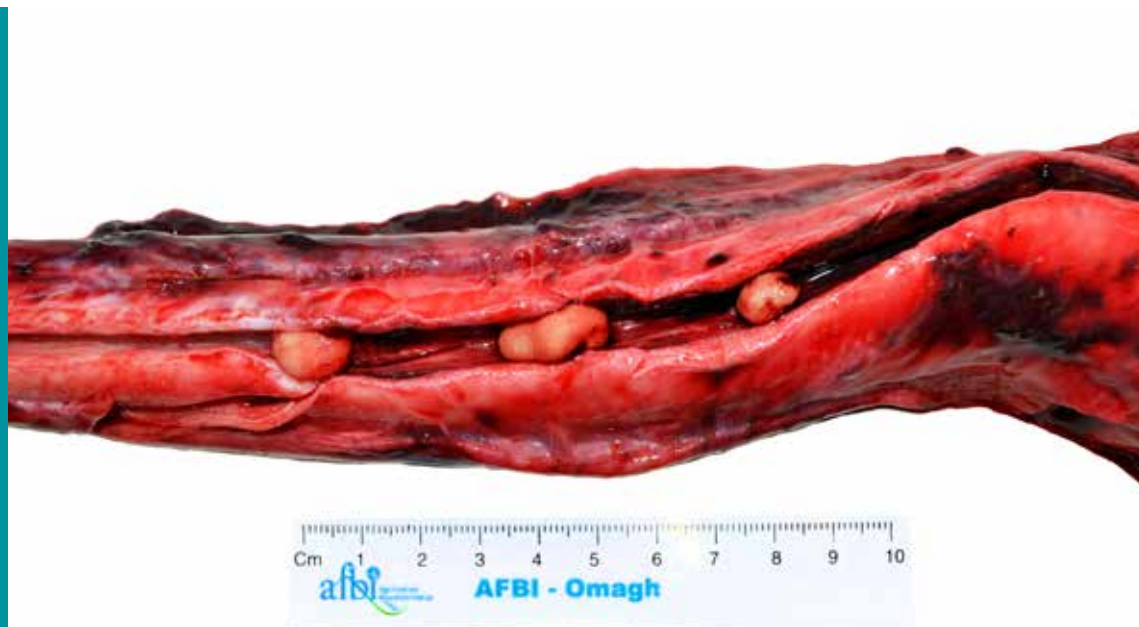


Figure 3

Urolithiosis in a bull being reared indoors on concentrates, calculi can clearly be seen in the urethra.

Nutritional cardiomyopathy was diagnosed in a ten-day-old black and white heifer calf found dead. Grossly there was pallor of the myocardium. Histologically there was multifocal to coalescing mineralisation of affected muscles (Figure 4). The liver selenium level was 0.16 µg/g (normal range: > 0.25 µg/g).

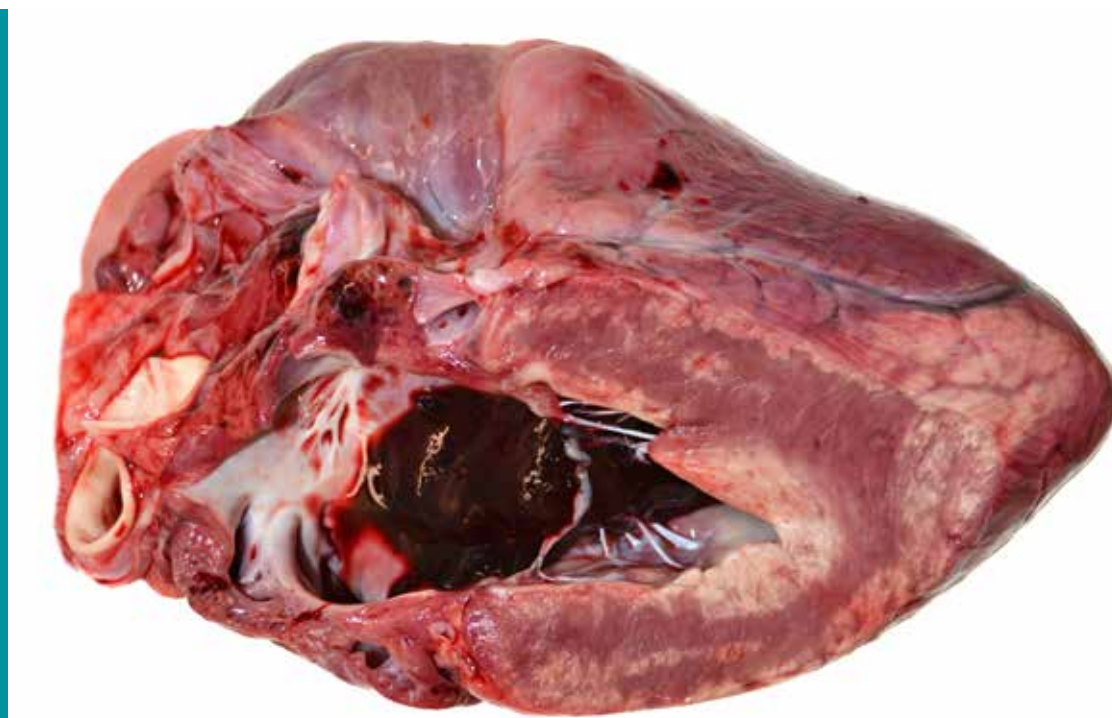


Figure 4

Mineralisation of muscle in a case of nutritional cardiomyopathy.

Reproductive and mammary diseases

Abortion

Specimens from 120 bovine abortions and stillbirths were examined during the 4th quarter. Significant pathogens were detected in 62 cases (51.7 per cent). Of these, *Salmonella* Dublin (16 cases, 13.3 per cent) was the most commonly identified pathogen. Other pathogens identified included: *T. pyogenes* (10 cases, 8.3 per cent), leptospiral infection (10 cases, 8.3 per cent), *E.coli* (7 cases, 5.8 per cent), *Neospora caninum* (6 cases, 5.0 per cent), BVD (5 cases, 4.2 per cent) and *Bacillus licheniformis* (5 cases, 4.2 per cent).

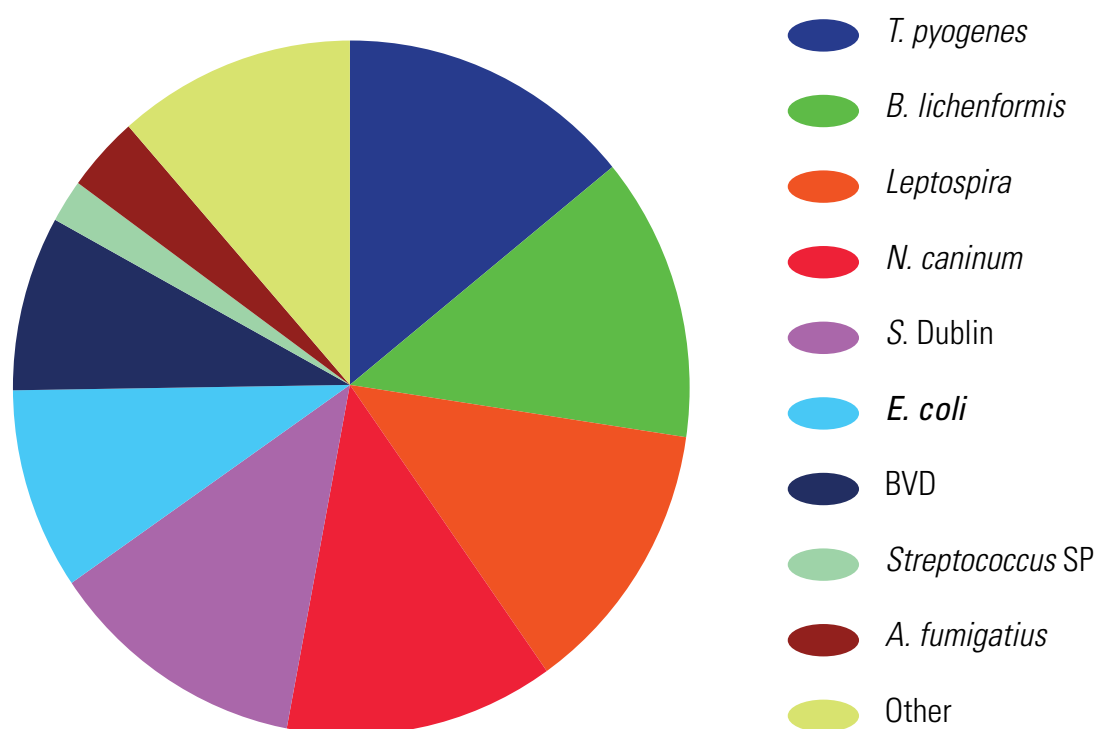


Chart 1

Summary of the causes of bovine abortion diagnosed in Northern Ireland during the period January to December 2014.

Specimens from 470 bovine abortions and stillbirths were examined during 2014. Significant pathogens were detected in 208 cases (44.3 per cent). Of these, *T. pyogenes* (33 cases, 7.0 per cent) was the most commonly identified pathogen. Other pathogens identified included *B. licheniformis* (31 cases, 6.6 per cent), leptospiral infection (30 cases, 6.4 per cent), *Neospora caninum* (30 cases, 6.4 per cent), *Salmonella* Dublin (29 cases, 6.2 per cent), *E.coli* (22 cases, 4.7 per cent) and BVD (19 cases, 4.0 per cent).

Based on 208 bovine abortion cases in which significant pathogens were detected during the period January to December 2014

Mastitis

A total of 285 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 30 (10.5 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 110 samples. *E.coli* was the most frequently isolated organism and accounted for 20.7 per cent of isolates cultured.

Other frequently identified organisms included *Streptococcus uberis* (15.1 per cent), *Staphylococcus aureus* (8.8 per cent), *Streptococcus dysgalactiae* (7.0 per cent), coagulase negative *Staphylococcus* species (5.6 per cent), *B. licheniformis* (4.9 per cent) and *Aerococcus* species (3.5 per cent).

Other reproductive diseases

Mastitis, arthritis and pneumonia due to *My. bovis* infection were diagnosed in a four-year-old Holstein-Friesian cow). On gross examination the left carpus was swollen and contained fibrino-purulent exudate and there was thick purulent secretion in multiple quarters of the udder. There was antero-ventral consolidation of the lung with multiple foci of necrosis and marked interlobular emphysema.

Many *Dictyocaulus viviparus* lungworms were also seen in the bronchi. Histological lesions suggestive of *My. bovis* infection were present in the lung and mammary tissue (Figure 5): Multifocally lactiferous and lobar ducts contained expanding necrotic cores, rich in degenerating and necrotic leucocytes, with a peripheral zone of degenerating neutrophils. The ductular epithelium was frequently desquamated or hypertrophic with large numbers of infiltrating lymphoid cells, plasma cells and macrophages. Alveolar epithelial cells contained large fat vacuoles. Alveoli contained varying quantities of exudate which was frequently rich in neutrophils and contained many fat droplets. Inter alveolar connective tissue contained lymphoplasmacytic cells and occasional neutrophils.

My. bovis antigen was detected by antigen capture ELISA in lung, mammary and joint exudates.

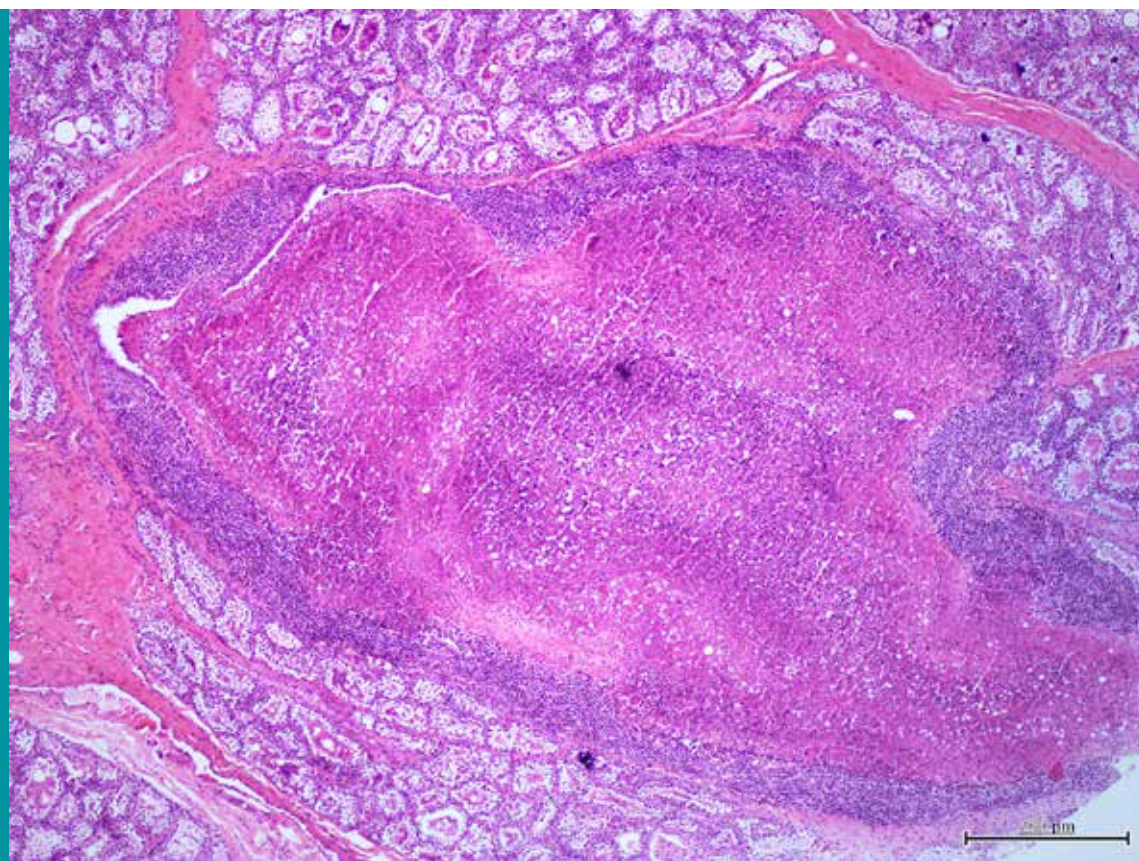


Figure 5

Mycoplasma bovis mastitis in a cow, a necrotic core with a peripheral zone of degenerating neutrophils can clearly be seen.

Neurological diseases

Clostridium botulinum type D toxin was diagnosed in 9 cases during the 4th quarter of 2014. These cases were all involved with either the spreading of broiler house litter on grazing land or feeding of silage.

A seven-month-old heifer was presented after being recumbent for 24 hours. Areas of haemorrhage were detected in the brain and heart on gross examination and histology confirmed lesions of thrombotic meningoencephalitis, *Histophilus somni* was recovered from brain cultures.

A three-year-old dairy cow was submitted with a history of progressive paralysis leading to recumbency. The most significant findings at gross post mortem examination were bronze discolouration and marked enlargement of the liver with peri-biliary fibrosis. Histological examination showed massive fatty infiltration with widespread large intra-cytoplasmic vacuolation of hepatocytes, marginalisation of nuclei and some pyknosis or karyolysis. Islets of less severely affected hepatocytes were seen, these cells showed multiple small cytoplasmic vacuoles and less marked nuclear degeneration. These changes were considered to be typical of fatty liver syndrome. Histological examination of brain sections showed intra-myelin oedema in the cerebral white matter consistent with hepatic encephalopathy.

Other diseases of cattle

Clostridial myositis in a neonatal calf

Positive immunofluorescence for *Clostridium chauvoei* was detected in dark coloured emphysematous lesions found throughout the skeletal muscles of a one-week-old calf. The calf also had navel-ill and joint-ill. It is very unusual to find blackleg lesions in a calf of this age.

Cardio-vascular disease

A six-year-old dairy cow was submitted with a history of sudden death. At necropsy there was copious free blood stained fluid and large blood clots in the abdominal cavity associated with a very large serosal haemorrhage over the caudal wall of the omasum with degeneration of the adjacent omasal wall. There was an aneurysm in one of the arteries leading from the aorta just before it coursed over the omasal wall with a 3 cm long tear in the media and a 3 mm long perforation through the artery wall. A diagnosis of death due to catastrophic intra-abdominal haemorrhage following rupture of a celiac artery aneurysm was made.

Vegetative endocarditis and renal infarction were diagnosed in a ten-week-old calf which died suddenly at grass. Whilst no significant organisms were recovered from routine cultures it was considered that previous neonatal bacterial infection was the root cause of the problem.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 21 ovine post mortem submissions during this quarter. Jaagsiekte (nine cases), *M. haemolytica* (seven cases), pneumonic pasteurellosis (three cases), lungworm (one case) and *P. multocida* (one case) were the most common diagnoses.

Jaagsiekte (ovine pulmonary adenomatosis / OPA) and secondary pasteurellosis were diagnosed in a two-year-old ewe which was presented as emaciated and weak. Gross and histological findings were consistent with OPA (Figure 6) and secondary bacterial infection and *Bibersteinia trehalosi* was cultured from lung tissue.



Figure 6

Jaagsiekte in a ewe, areas of pale coloured tumour tissue are visible.

Alimentary diseases

Positive fluorescence for *Cl. sordellii* was detected in a six-month-old lamb submitted as a sudden death. There was a circular necrotic lesion 2 cm in diameter on the abomasal mucosa at the pylorus and the adjacent mucosa was thickened and bright red in colour.

Johne's disease

5 ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. No samples contained acid-fast organisms typical of MAP. Of 287 ovine blood samples that were tested for antibodies to MAP 3 (1.1 per cent) were positive.

Parasitic disease

Nematodirosis and trichostrongylosis were commonly diagnosed in first season lambs during the last quarter of the year. Histories indicated that whilst in many case lambs had been treated with anthelmintic, these treatments had been undertaken in early autumn and re-infection had occurred. In one instance patent fasciolosis and trichostrongylosis lead to the deaths of four out of eighty store lambs within a period of a few days.

A group of 27 eight-month-old ewe lambs with pneumonic pasteurellosis caused by *M. haemolytica* serotype A2 showed significant intercurrent parasitism as a likely pre-disposing cause. One lamb submitted for post mortem examination had 10,600 *Trichostrongylus vitrinus* worms in the small intestine and a strongyle sp faecal egg count of 2,400 e.p.g.

Reproductive diseases

Abortion

Specimens from 7 ovine abortions and stillbirths were examined during the 4th quarter. Significant pathogens were detected in 3 cases (42.9 per cent). Pathogens identified included *S. Dublin* (2 cases, 28.6 per cent) and toxoplasmosis (1 case, 14.3 per cent).

CHART 2 below gives a summary of the causes of ovine abortion diagnosed in Northern Ireland during the period January to December 2014.

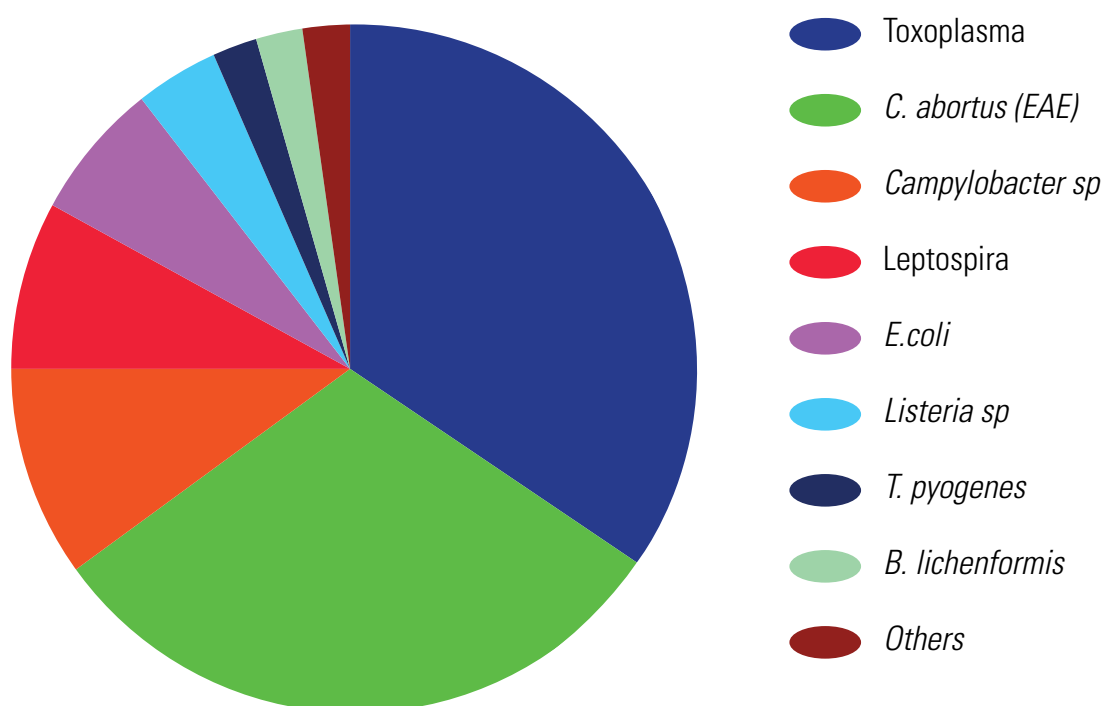


Chart 2

Summary of
Ovine Abortions
in Northern
Ireland 2014

Specimens from 265 ovine abortions and stillbirths were examined during 2014. Significant pathogens were detected in 159 cases (60.0 per cent). Pathogens identified included Toxoplasmosis (63 cases, 23.8 per cent), *Chlamydophila abortus* (56 cases, 21.1 per cent), *Campylobacter* sp (18 cases, 6.8 per cent), leptospiral infection (15 cases, 5.7 per cent), *E. coli* (12 cases, 4.5 per cent) and *Listeria* sp (7 cases, 2.6 per cent).

Based on 159 ovine abortion cases in which significant pathogens were detected during the period January to December 2014

Neurological diseases

No cases of listeriosis were confirmed by post mortem examination during the 4th quarter of 2014

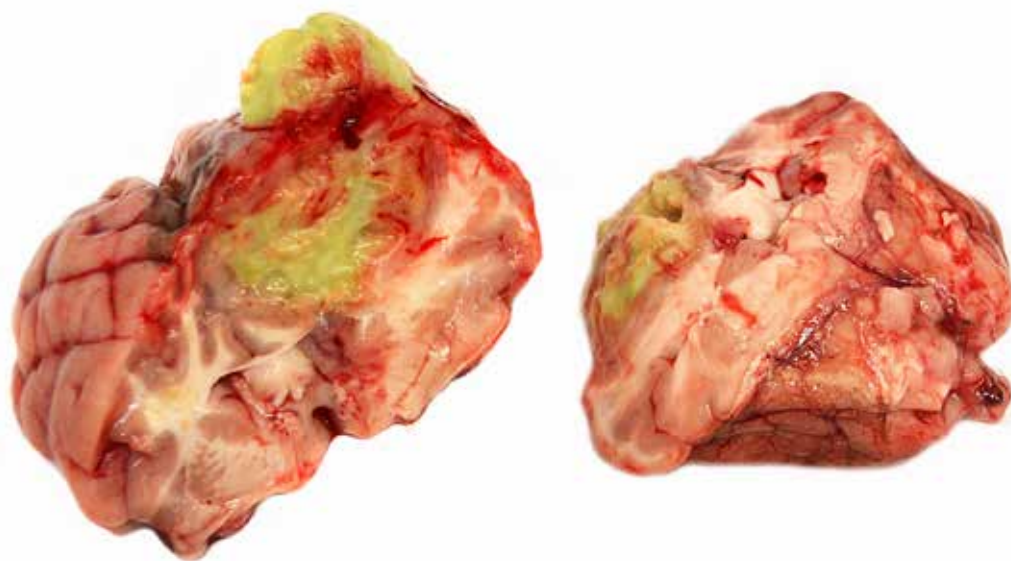
A ram lamb in good body condition was presented after showing neurological signs. On gross examination a large abscess was detected in the right frontal cortex of the brain (Figure 7). There was also abscessation of the left caudal lung lobe. *T. pyogenes* was recovered in moderate growth from the brain abscess, the significance of the *Streptococcus bovis* recovered in widespread distribution in this case was considered doubtful.

Skin diseases

No cases were examined for sheep scab during the 4th quarter of 2014.

Figure 7

Brain abscessation in a lamb, *T. pyogenes* was recovered



HORSES:

17 swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all of which were negative. 4 swabs were cultured from horses with a history suggestive of strangles during this quarter, all of which were negative.

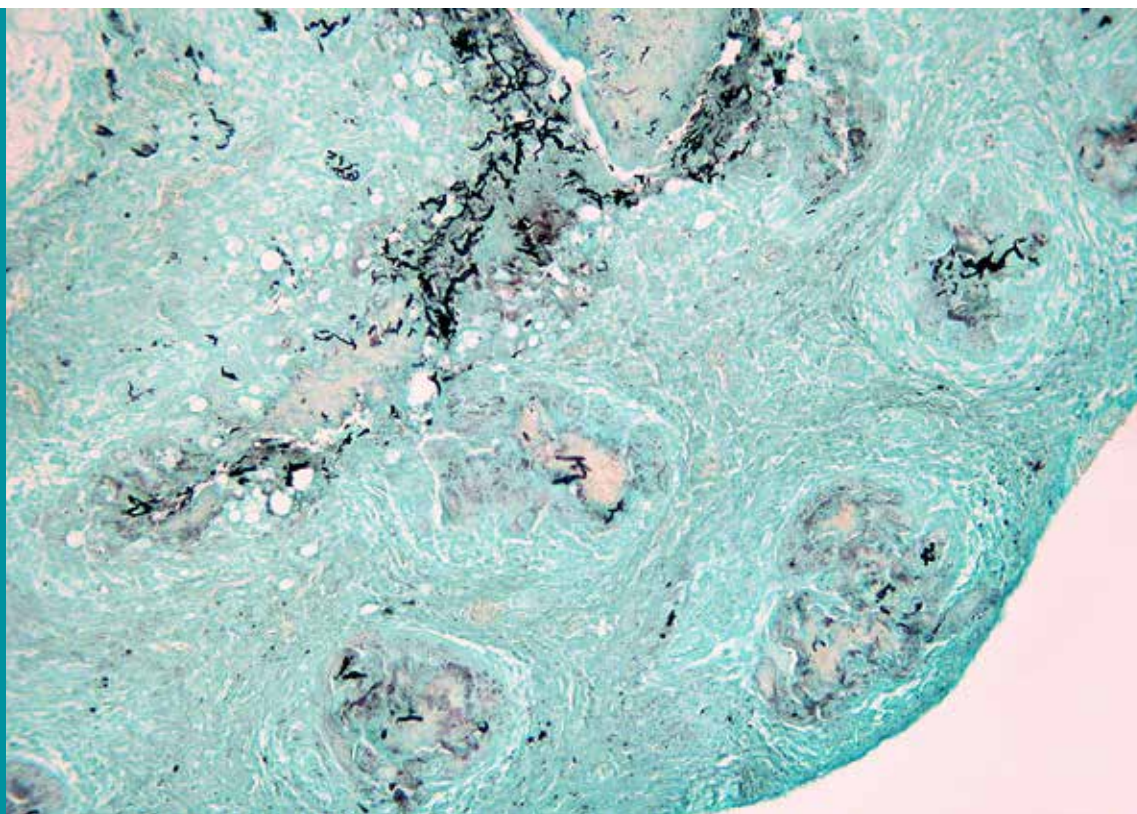
Hyperlipaemia

Hyperlipaemia and fatty infiltration of the liver was diagnosed in a donkey with intercurrent *Fasciola hepatica* and *Salmonella Typhimurium* infections. The hepatic lipidosis was considered to be associated with an inappetence and fat mobilisation although the pathogenesis if this condition is not well understood in equines.

BIRDS: Poultry

Marek's disease was diagnosed as the cause of lympho-proliferative disease in a flock of eight-week-old turkeys which presented with lameness. A feature of this case was a secondary *E. coli* septicaemia and osteomyelitis.

Fungal pneumonia was diagnosed in a group of chickens. Histological examination of lung tissue showed multiple pyogranulomas. The presence of fungal hyphae was confirmed in pyogranulomatous lesions using PAS and Grocott staining (Figure 8 - next page)

**Figure 8**

Fungal pyogranuloma in chicken lung, sections stained by Grocott method.