Northern Ireland Disease Surveillance Report, October to December 2019

- Emphysematous abomasitis in calves
- Pneumonia due to *Mycoplasma bovis* in calves
- Yersiniosis in heifers
- Urolithiasis in lambs
- Dosing gun injury in lambs
- Acute fasciolosis in ewes

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for October to December 2019.

CATTLE:

Respiratory diseases

Respiratory disease was identified in 77 cattle post mortem submissions between October and December 2019. The most common pathogens identified included *Mycoplasma bovis* (twenty four cases), respiratory syncytial virus / bRSV (sixteen cases), *Pasteurella multocida* (thirteen cases), *Mannheimia haemolytica* (thirteen cases), lungworm (ten cases), infectious bovine rhinotracheitis / IBR (five cases) and *Trueperella pyogenes* (four cases).

Mycoplasma bovis infection

A one-month-old Friesian calf in poor condition died and was presented for post mortem examination. There was ringworm and severe pediculosis with very large numbers of the sucking louse, Linognathus species present. There was significant pneumonia. Gross and microscopic findings were highly suggestive of pneumonia due to *Myc. bovis*. On histological examination there were numerous broncho -centric foci of caseous necrosis circumscribed by degenerating leucocytes with ghosted nuclei, neutrophils, macrophages, lympho-plasmacytic cells and fibrosis. *Myc. bovis* nucleic acid was detected in the pneumonic lung by PCR. There was also evidence of aspiration pneumonia with plant debris and cellulose in many airways with associated inflammatory infiltrate.

There were caseous necrotic lesions in tympanic bullae. These lesions are frequently associated with *Myc. bovis* infections (FIGURE 1).

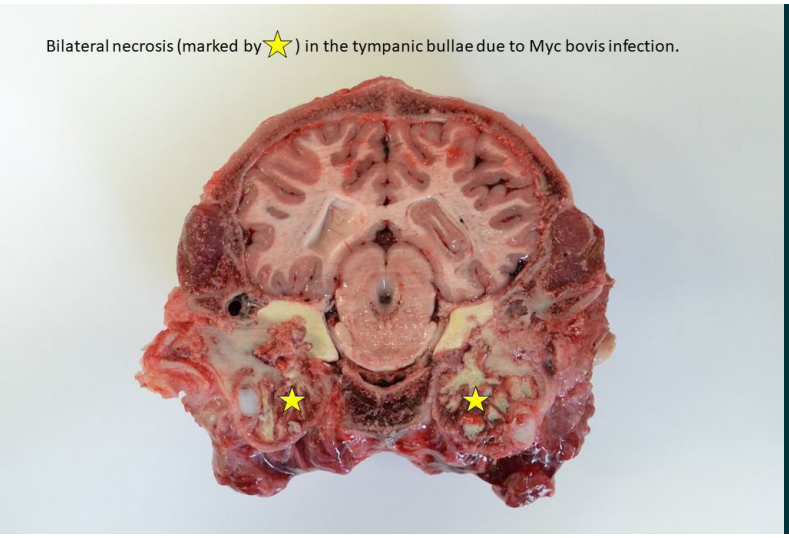

FIGURE 1: *Mycoplasma bovis* infection in a calf, note the caseo-necrotic lesions in the tympanic bullae.

Bovine respiratory disease (BRD) due to IBR, *Myc. bovis, M. haemolytica* and *T. pyogenes* was diagnosed in a beef heifer which died suddenly (FIGURE 2 over page).

There was severe catarrhal and haemorrhagic inflammation of the tracheal mucosa and severe antero-ventral pulmonary consolidation. IBRV nucleic acid was detected by PCR in the trachea. *T pyogenes, M. haemolytica* were cultured and *Myc. bovis* nucleic acid was detected by RT-PCR in the pneumonic lung.

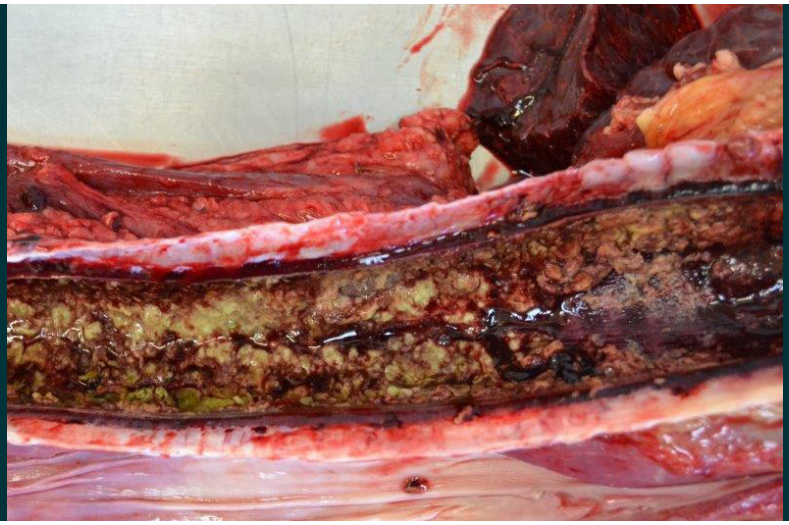

FIGURE 2: Severe tracheitis in a heifer due to IBR, *Mycoplasma bovis, Mannheimia haemolytica* and *Trueperella pyogenes* were all implicated in this case

Alimentary diseases

Emphysematous abomasitis in calves

Emphysematous abomasitis (FIGURE 3) was diagnosed in a two- week- old calf which had bloated and died; one other calf had been lost from the group of forty five. On gross examination there was emphysematous abomasits and gross distension of the developing rumen and abomasum with unclotted milk substitute with a strong acidic smell. Although there was evidence of cryptosporidial infection and rotavirus was detected in caecal contents the primary problem was considered to be over-feeding, subsequent acidosis with damage to the delicate abomasal mucosa and colonisation by gas producing *Sarcina ventriculi* bacteria.

FIGURE 3: Emphysematous abomasitis in a calf associated with over-feeding of milk substitute

Haemorrhagic enteropathy

A three-year-old Holstein Friesian dairy cow, calved approximately eight weeks, was euthanased due to recumbency and submitted for post mortem examination. There was a section of jejunum approximately 50cm long, dilated with a large blood clot filling the lumen and adherent to the mucosa, which had a roughened texture. The associated jejeunal wall was thickened and friable. The intestine proximal to the haemorrhage was dilated with fluid. The caecum and colon contained dark bloody material. Jejunal Haemorrhage Syndrome was diagnosed; this condition is usually seen as sporadic sudden deaths, or following a short period of recumbency in adult dairy cattle. The aetiology is poorly understood and no definitive cause has been identified.

Yersiniosis

Gross postmortem examination findings on a ten-month-old dairy heifer were suggestive of enteritis. There was reddening of small and large intestinal mucosa, contents were watery and the abomasal mucosa was reddened. Mesenteric lymph nodes were enlarged and prominent. Tests for BVDV, coccidia, paramphistome (rumen fluke) larvae and Salmonella culture were negative. Histologically there was a severe bacterial enterocolitis. The histological lesions were considered suggestive of yersiniosis. *Yersinia pseudotuberculosis* was isolated in profuse culture of large intestinal content. *Y. pseudotuberculosis* is a Gram negative coccobacillus and member of the Enterobacteriaceae. The organism can survive for long periods in cool wet conditions. It has been isolated from a wide variety of wild mammals, birds and domestic animals where it may form a reservoir of infection. Subclinical infection by Y. pseudotuberculosis in cattle is considered to be normal, and potentially common, although selective culture may be required to identify the organism in faeces samples due to overgrowth by commensal enteric bacteria. In suitable conditions, exposure to infection from the environment via the oral route or from subclinical infection leads to clinical disease. Such conditions may include poor nutrition, parasite infection, cold weather, transportation and weaning.

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 2019.

	NUMBER	
Pathogen	Tested	Positive (per cent)
Cryptosporidium species	193	72 (37.3%)
Rotavirus	199	64 (32.2%)
Coronavirus	201	5 (2.5%)
Escherichia coli K99	125	12 (9.6%)

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 2019.

		NO OF PARASITIC OVA					
	TOTAL	NEGATIVE	+	++	+++	++++	% POSITIVE
Liver fluke							
Bovine	742	703	35	4	0	0	5.1%
Ovine	169	148	9	9	1	2	12.4%
Paramphistome							
Bovine	747	343	128	168	41	67	54.1%
Ovine	169	133	21	12	2	1	21.3%
Coccidia							
Bovine	810	644	150	6	2	8	20.5%
Ovine	169	39	106	17	4	3	76.9%
Strongyle worm egg count	Total	<500 epg	≥500 epg				% Positive
Bovine	808	780	28				3.5%
Ovine	169	124	45				26.6%

≥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 on 430 bovine faecal samples by PCR. MAP nucleic acid was detected in 75 samples (17.4 per cent). Of 5208 bovine blood samples that were tested for antibodies to MAP, 322 (6.2 per cent) were positive.

Nutritional and metabolic disease

In early October a farm experienced the unexpected death overnight of four suckler cows; one was submitted for post mortem examination, during which the only notable findings were of petechial, ecchymotic and occasional suffusive haemorrhages on the pleura and serosal surfaces of the thoracic organs with pulmonary congestion. Testing showed a vitreous humour magnesium level of 0.52mmol/L, which was below the serum biochemistry reference range of 0.7-1.3mmol/L and was considered consistent with hypomagnesaemia in this case.

Reproductive and mammary diseases

Abortion

Specimens from 87 bovine abortions and stillbirths were examined during the 4th quarter. Significant pathogens were detected in 43 cases (49.4 per cent).

Of these, *Neospora caninum* (10 cases, 11.5 per cent) was the most common identified pathogen. Other pathogens identified included *Salmonella* Dublin (9 cases, 10.3 per cent), *T. pyogenes* (6 cases, 6.9 per cent) and *Bacillus licheniformis* (5 cases, 5.7 per cent).

In one instance a heifer was submitted for post mortem examination having died after aborting. On gross examination the uterus was found to be ruptured and there was severe fibrinous peritonitis. *Salmonella* Montevideo was recovered in pure culture from the uterine wall and it was considered likely that this organism had been the cause of the initial abortion.

Summary of bovine abortion in Northern Ireland 2019

Specimens from 374 bovine abortions and stillbirths were examined during 2019. Significant pathogens were detected in 153 cases (40.9 %). Of these, *B. licheniformis* (34 cases, 9.1 %) was the most commonly identified pathogen. Other pathogens identified included T. pyogenes (27 cases, 7.2 %), *N. caninum* (21 cases, 5.6 %), S. Dublin (17 cases, 4.5 %), *E.coli* (16 cases, 4.3 %), leptospiral abortion (10 cases, 2.7 %) and BVD (7 cases, 1.9 %).

Mastitis

A total of 442 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 46 (10.4 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 79 samples. *E.coli* was the most frequently isolated organism and accounted for 19.2 per cent of isolates cultured. Other frequently identified organisms included, *Streptococcus uberis* (13.8 per cent), *Staphylococcus aureus* (10.2 per cent) and *Streptococcus dysgalactiae* (4.5 per cent).

Neurological diseases

A six-month-old steer in good condition presented in lateral recumbency. At post mortem examination there were ecchymotic haemorrhages in skeletal musculature and there were grossly apparent haemorrhages in the cerebral cortex. Histologically there was a thrombotic vasculitis in brain, heart, lung and kidney. *Histophilus somni* was isolated in profuse culture from brain lesions.

Cerebrocortical necrosis (CCN)

A five-month-old calf which had presented with nervous signs was submitted for post mortem examination, the history indicated that this was the second calf lost from the group over a two week period. At necropsy auto-fluorescence of the cerebral cortex under UV light was noted and this was considered suggestive of cerebrocortical necrosis and histological findings in this calf were consistent with polioencephalomalacia (PEM). Also in this case there was thick fluid present in the right tympanic bulla and testing for Myc. bovis nucleic acid by PCR was positive indicating this was a relatively early lesion of otitis media due to Myc. bovis infection.

Urinary tract disease

Physical trauma to the urethra

A fourteen-month-old heifer was submitted with gross swelling of the anus and vulva, the animal was described as straining a lot as if calving. The mucous membranes were a toxic red colour. On gross examination there were two tears in the wall of the urethra and the associated soft tissue changes of cellulitis and oedema were consistent with chemical damage from leaking urine, which extended through the pelvic canal, and into the soft tissues around the kidneys and subcutaneously over the caudal aspect of the hindquarters and ventrally to the udder. Traumatic injury to the urethra either due to bulling or iatrogenic cause was suspected.

Pyelonephritis

Chronic bilateral pyelonephritis was diagnosed in a ten- year- old Aberdeen Angus cow following death after a short history of inappetance and blood in the urine. On examination renal pelves were dilated with thick purulent material with extensive papillary necrosis and ureters also contained thick purulent material. On histology the calyces contained large quantities of necrotic debris, degenerating leukocytes and bacteria. The vast majority of the renal medulla was replaced by fibrosis which extended into the cortices, there was widespread tubule-interstitial nephritis.

Cardio-vascular system disease

Congestive heart failure due to myocardial abscessation (FIGURE 4) was diagnosed as the cause of death in an adult dairy cow. *T. pyogenes* was recovered in profuse pure growth from the lesion. It was considered likely that the causation was blood borne infection from a remote site and an infected left hock joint was noted in this case.

FIGURE 4: Cardiac abscessation in a cow, it was considered possible that septic embolism from a hock lesion was the root cause in this case

Skin diseases

Abdominal haemorrhage due to a pelvic aneuryism was diagnosed as the cause of death in a heavily pregnant dry cow. On the ventral neck and shoulders there were many dermal nodules (3-4mm diameter) containing yellow inspissated material. Histologically there was a nodular granulomatous reaction in the dermis marked by degenerate and occasionally mineralised parasites, surrounded by macrophages and multinucleate giant cells, lymphocytes and plasma cells, peripherally well circumscribed by a thick fibrous capsule.

It was considered likely that the dermal lesions were due to demodecosis (FIGURE 5).

The main significance of bovine demodecosis is in the economic damage that may be caused to hides.

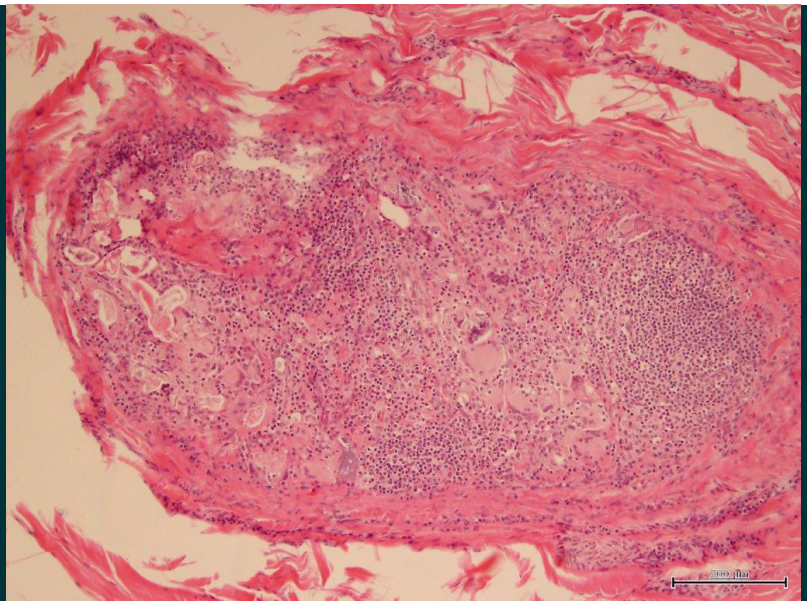

FIGURE 5: Parasitic intradermal granuloma associated with demodecosis in a cow

Other diseases of cattle

Sub-cutaneous abscessation in cows

A dairy herd experienced a number of cows with swellings along the lateral neck, which, when lanced exuded a large volume of floccular yellow pus. On gross examination multi –loccular abscesses with green liquid and floccular pus were present in the sub cutis and the musculature of the thoracic wall. There had been extensive fibrous walling off with encapsulation 7-10cm thick in places, there was no evidence of tracking from the pharynx/larynx or the buccal structures including teeth and tongue and there was no involvement of the limb joints. There was surrounding phlegmon with dark red muscle and fibrinous exudation between muscle bundles. A fibrous tract was detected through the chest wall at the point of the sternum. Further history obtained showed that intra muscular injections had been given to the cows in the herd several weeks ago. The thick fibrous walls of the lesions indicated chronicity and that the original insult was likely to have taken place several weeks ago, thus fitting this time frame. Poor hygiene and injection technique were considered to be the most likely cause of the problem and palliative treatment was advised.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 12 ovine post mortem case submissions during this quarter. *M. haemolytic* (five cases), Jaagsiekte (five cases) and laryngeal chondritis (two cases) were the most common diagnoses.

Jaagsiekte was diagnosed in an adult ewe which died suddenly, the third or three such deaths over a three week period. On gross examination the lungs were patchy purple pink coloured with focal pale areas (3.5cm) of tumour tissue in the left apical and diaphragmatic lung lobes.

Major branches of the pulmonary arteries in the right lung were plugged with firm pale substance associated with a severe vegetative valvular endocarditis of the right atrio-ventricular valve (FIGURE 6).

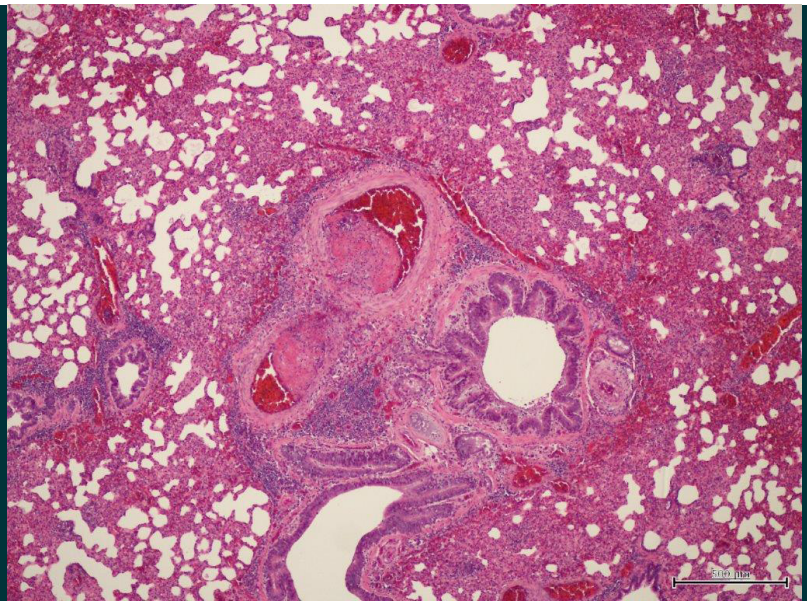

FIGURE 6: Jaagsiekte and embolic arteritis in a ewe;

Alimentary diseases

Acute fasciolosis

Cases of acute fasciolosis were recorded in ewes during October and November, this was to be expected on the basis of the AFBI Liver Fluke Forecast for autumn and winter 2019-2020 which predicted the overall risk of liver fluke disease in Northern Ireland during the period as high. In some instances a loss of condition was observed but in others there were no prodromal signs and the cases presented as sudden death. Some affected ewes had a history of flukicide treatment but frequently there is a lack of appreciation of the efficacy of different flukicides against immature and mature liver fluke leading to inappropriate product usage.

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out on 4 ovine faecal samples by PCR. No MAP nucleic acid was detected in any of the samples by PCR.

16 ovine bloods samples were tested for antibodies to MAP during this quarter, no samples were positive.

Reproductive diseases

Abortion

Specimens from 18 ovine abortions and stillbirths were examined during the 4th quarter of 2019. The pathogens identified were *Toxoplasma gondii* (4 cases, 22.2 per cent), *Chlamydophilia abortus* / EAE (3 cases, 16.7 per cent) and *T. pyogenes* (1 case, 5.6 per cent).

In one case of Toxoplasma abortion the lambs died in utero and the ewe became toxaemic and died, a case of so called 'rotten lamb' syndrome.

Summary of ovine abortion in Northern Ireland 2019

Specimens from 177 ovine abortions and stillbirths were examined during 2019. Significant pathogens were detected in 108 cases (61.2 %). Pathogens identified included *C. abortus* (44 cases, 24.9 %), *T. gondii* (42 cases, 23.7 %), *Campylobacter* sp(10 cases 5.6%), *Listeria monocytogenes* (6 cases, 3.4 %), *T. pyogenes* (4 cases, 2.3%), *Streptococcus* sp (4 cases, 2.3%) and E. coli (4 cases, 2.3 %).

Neurological diseases

Acute meningitis, meningeal oedema and petechiation, mild cerebral and cerebellar vasculitis was seen on brain histology in a two-year-old ewe which had shown neurological signs and then died. A moderate growth of alpha-haemolytic *Streptococci* was recovered from the lesion.

Urinary tract disease

Urolithiasis was diagnosed in a group of housed finishing wether lambs submitted with a history of dullness and sudden death. Typically, on gross examination copious free, urine smelling fluid was present in the abdominal cavity. The bladder was small and haemorrhagic with fibrinous material present on the serosa and tearing of the bladder wall. The kidneys were swollen and turgid with prominent ureters. Cream coloured crystals of up to 4 mm in diameter were found in the vermiform appendage of the penis or the renal pelvis.

Other diseases of sheep

Dosing gun injury

Dosing gun injury with associated brain abscessation was diagnosed in a lamb submitted for post mortem examination after appearing dull and showing neurological signs before dying despite treatment. There was a necrotic, purulent retropharyngeal lesion which extended dorsally towards the atlanto-occipital joint. Histopathology of the hind brain showed a focal area of bacteria surrounded by neutrophils and enclosed within a fibrosis capsule. The meninges contained fibrin and bacteria.

HORSES:

2 swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all of which were negative. 3 swabs were cultured from equines with a history suggestive of strangles during this quarter, 1 was positive.

A mare aborted at 7-8 months of gestation. On gross examination the foetus was un-haired with a swollen abdomen. The umbilical cord was greater than 1 meter in length and was congested with multiple twists along the length, with several twists incorporating foetal membrane. Umbilical cord torsion was diagnosed. The marked length of the umbilical cord for this foetus was considered a likely predisposing factor in the development of the torsion.

Haemopericardium in a yearling

Haemopericardium causing cardiac tamponade was diagnosed in a yearling gelding. The pericardium was distended with clotted blood coming from a small 1.0 cm tear in the pulmonary artery.

BIRDS: Poultry

Visceral gout and *Bordetella* sp infection was diagnosed in ducks. Histological examination of the kidneys showed numerous gout trophi present throughout the cortex and medulla; chronic interstitial nephritis with inflammatory and mineralised debris present in many collecting tubules was noted.

WILDLIFE and EXOTICS:

A Mediterranean Tortoise (*Testudo* sp.) aged over 20 years from a zoological collection presented for post mortem examination with suspected respiratory disease. Gross findings included large amounts of frothy fluid in the airways and thick mucus in the oropharynx and nasal cavity. There were several large round worms in the stomach and intestine. The histological changes within the upper respiratory mucosa of multifocal hyperplasia with sub-epithelial lymphoid accumulations with focally extensive heterophilic infiltrates were suggestive of mycoplasmosis with secondary bacterial infection. Bacterial culture isolated *Pasteurella testudinis* from multiple organs including the lungs; *P. testudinis* is associated with respiratory disease in tortoises, particularly precipitated by stress of captivity, or secondary to infection with *Mycoplasma* spp.