

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, October to December 2016

- Parasitic pneumonia in calves
- Abomasitis in calves
- Actinobacillosis in a bull
- Copper toxicity in ram lambs
- Fasciolosis in ewes and lambs
- Larval paraphistomosis in shearlings
- Aspergillosis in a Gentoo penguin

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

CATTLE:

Respiratory diseases

Respiratory disease was identified in 96 cattle post mortem submissions between October and December 2016. The most common pathogens identified included *Mycoplasma bovis* (thirty two cases), *Dictyocaulus viviparus* (eighteen cases), *Mannheimia haemolytica* (sixteen cases), *Trueperella pyogenes* (twelve cases), *Pasteurella multocida* (twelve cases), respiratory syncytial virus (five cases) and *Histophilus somni* (five cases).

Parasitic pneumonia

Cases of parasitic pneumonia (husk) due to *D. viviparus* infection continued to be diagnosed until late on in the reporting period. Many cattle were exposed to infection during the pre-housing period either after the last treatment at pasture or after the period of persistence of long acting anthelmintic products had lapsed. The importance of treatment for lungworm at housing (or housing before the period of persistent activity has ended) was emphasised in these cases.

Aspiration pneumonia

Pneumonia due to aspiration was diagnosed in a five –year-old cow which had died following following a period of non specific malaise. On gross examination a large bolus of rumen contents was found in the trachea and similar material was evident in the bronchi. Aspiration pneumonia was confirmed on lung histology. Interestingly, culture supernatants of small intestinal contents were positive for *Clostridium botulinum* C/D toxin by ELISA. This is consistent with the presence in the small intestine of organisms capable of elaborating these toxins. Careful interpretation of such results is required but in this case it was considered possible that botulism was a predisposing cause of the aspiration pneumonia.

An unusual case involved a freshly calved adult cow which died suddenly. On gross examination the nasopharynx was found to be impacted by placental membranes which had blocked the airways.

Alimentary diseases

BVD/Mucosal disease

BVD / MD was diagnosed on full post mortem examination of two twelve-month-old cattle from a herd in which seven deaths had occurred in a week amongst the yearling group. There was severe enteritis and diarrhoea in one of the animals submitted for post mortem examination with the most severe lesions being present in the caecum and rectum with a fibrino-necrotic membrane present in the latter. On histological examination there was inflammatory infiltrate in the submucosa with fibrinoid necrosis of the arterioles and necrosis of the intestinal mucosa with haemorrhage, fibrin exudation and infiltration of neutrophils and lymphocytes. There was a fibrino-necrotic pseudo-membrane present.

BVDV nucleic acid was detected by RT-PCR in both cases to confirm the diagnosis. This case demonstrated the imperative need to remove persistently infected calves (PIs) from herds once these have been detected. This herd had been undergoing routine tissue tag testing as part of the Health and Welfare Northern Ireland BVD Eradication Scheme but PIs had not been removed but instead grown on in the hope of finishing them. Both of the yearlings examined had previously been shown to be positive for BVDV by RT-PCR tissue testing as neonatal calves.

Torsion of the reticulum, omasum and abomasum

Torsion of the reticulum, omasum and abomasum was diagnosed in a four-year-old Holstein-Friesian cow which had recently calved. It was noted that abomasal rotation and volvulus is a common clinical problem in high producing intensively managed dairy cows particularly around the time of parturition. Associated torsion of the omasum and reticulum is less common but is nevertheless seen with significant frequency.

Hardware injury

Foreign body reticulitis (hardware injury or wire) was diagnosed in a fourteen-month-old heifer submitted with a history of suspected pneumonia. On gross examination the wall of the reticulum was found to be perforated by a short length of thick wire, there was associated seepage of fore-stomach contents with peritonitis and early fibrous reaction or walling off. Although there had been no penetration of the liver there was severe inflammation of the closely associated diaphragmatic muscle with fibrin exudation into the abdominal and thoracic cavities. There was no pneumonia present and it was considered that the described dyspnoea may have been due to a guarding reaction to anterior abdominal pain.

Actinobacillosis

Actinobacillosis was diagnosed by examination of lung, liver and regional lymph nodes from a bull submitted for routine slaughter. Histologically, in the liver, multiple foci of the characteristic club colonies of *Actinobacillus lignieresii* surrounded by dense fibrous capsules were detected. Similar changes were present in the hepatic lymph node. *A. lignieresii* is the cause of wooden tongue in cattle but atypical cases do occur and the infection may become more generalised with involvement of the viscera.

Abomasitis in calves

Abomasitis in young calves due to either *Clostridium sordellii* infection or fungal rumenitis / abomasitis due to infection with *Candida* sp. were diagnosed in two separate herds during the reporting period. Whilst on one unit intercurrent infection with rotavirus was diagnosed it was considered that the root cause of the problems in both instances was poor feeding practice leading to ruminal drinking and abomasal acidosis with subsequent complications.

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 2016

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	260	69 (26.5%)
Rotavirus	257	93 (36.2%)
Coronavirus	258	16 (6.2%)
<i>Escherichia coli</i> K99	85	0 (0.0%)

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 2016

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	939	855	69	11	3	1	8.9%
Ovine	317	214	30	32	19	22	32.5%
Paramphistome							
Bovine	939	367	117	252	101	102	60.9%
Ovine	317	213	29	43	16	16	32.8%
Coccidia							
Bovine	1016	889	110	6	3	8	12.6%
Ovine	317	153	144	17	3	0	51.7%
Strongyle worm egg count							
	Total	<500 epg	≥500 epg				% Positive
Bovine	1001	965	36				3.6%
Ovine	310	206	104				33.5%

≥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 165 bovine faecal samples. Ten samples (6.1 per cent) contained acid-fast organisms typical of MAP. Of 5390 bovine blood samples that were tested for antibodies to MAP 394, (7.3 per cent) were positive.

Reproductive and mammary diseases

Abortion

Specimens from 89 bovine abortions and stillbirths were examined during the 4th quarter. Significant pathogens were detected in 39 cases (43.8 per cent). Of these, *Salmonella* Dublin (13 cases, 14.6 per cent) was the most commonly identified pathogen. Other pathogens identified included *T. pyogenes* (6 cases, 6.7 per cent), *Neospora caninum* (5 cases, 5.6 per cent), *E. coli* (4 cases, 4.5 per cent), BVDV (3 cases, 3.4 per cent), and *Bacillus licheniformis* (3 cases, 3.4 per cent).

Streptococcus pluranimalium was recovered in profuse pure growth from the foetal stomach contents (FSC) of a foetus aborted two months early. This organism is a cause of sporadic abortion in a range of species and there are no specific measures for its control.

Mycoplasma/ Ureaplasma abortion

Abortion due to Mycoplasma / Ureaplasma was suspected in a group of six adult cows, three of which had shown late abortion / stillbirth over the period of one week. Histological examination of foetal tissues showed marked bronchopneumonia with the presence of nodular peribronchial lymphoid hyperplasia. These changes are considered by some pathologists to be pathognomonic although this is not universally accepted. Mycoplasma / Ureaplasma are considered opportunist in many cases and may act as secondary pathogens. No other infectious causes of abortion were detected by routine testing in this case.

Summary of bovine abortion in Northern Ireland 2016

CHART 1 below gives a summary of the causes of bovine abortion diagnosed in Northern Ireland during the period January to December 2016.

Specimens from 430 bovine abortions and stillbirths were examined during 2016. Significant pathogens were detected in 190 cases (44.2 %). Of these, *S. Dublin* (33 cases, 7.7 %) and *T. pyogenes* (33 cases, 7.7 %) were the most commonly identified pathogens. Other pathogens identified included *N.caninum* (31 cases, 7.2 %), *B. licheniformis* (27 cases 6.4%), *E. coli* (16 cases, 3.7 %) and BVDV (16 cases, 3.7 %).

Bovine Abortions 2016

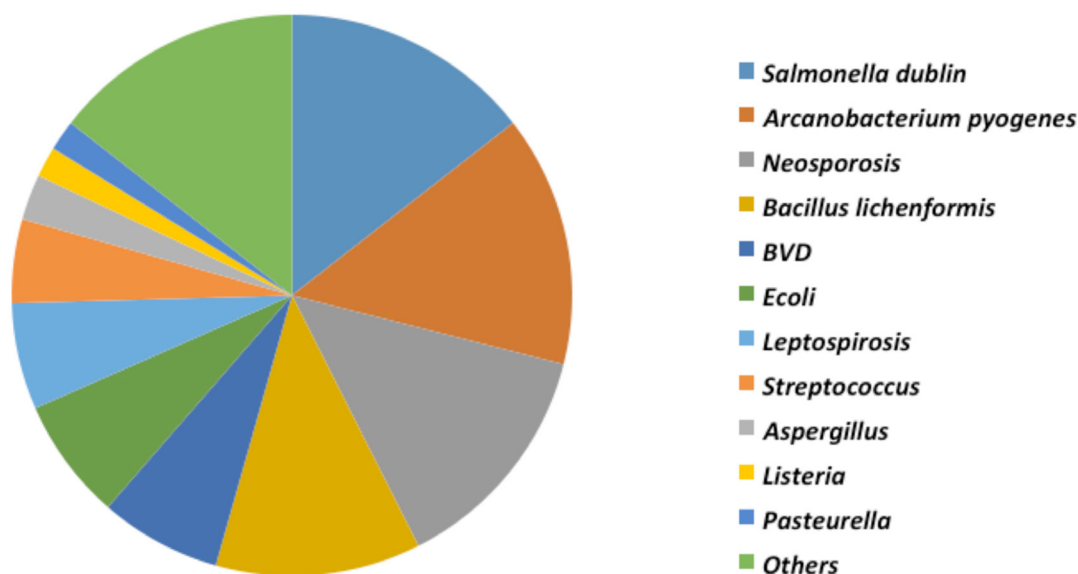


Chart 1

Summary of bovine abortions in Northern Ireland 2016

Mastitis

A total of 124 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Fourteen (11.3 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 9 samples. *E. coli* was the most frequently isolated organism and accounted for 26.6 per cent of isolates cultured. Other frequently identified organisms included *Streptococcus uberis* (19.4 per cent), *Staphylococcus aureus* (4.8 per cent) and *B. licheniformis* (4.8 per cent).

Neurological diseases

Clostridium botulinum type D toxin was detected in 4 cases during the 4th quarter of 2016. Brain abscessation and meningitis in calves

Navel ill, joint ill and purulent meningo- encephalitis were diagnosed in a two-week-old Friesian calf that was unable to rise. The limb joints and the atlanto-occipital joint contained fibrinopurulent fluid and there were numerous purulent foci throughout the brain parenchyma. The umbilicus was swollen and firm and there was foul smelling fluid in the remnants of the umbilical vein with abscessation of the liver. *Fusobacterium necrophorum* and *E. coli* were cultured from multiple tissues.

Colisepticaemia, joint ill and meningitis was diagnosed in a one-week-old calf which had presented with neurological signs. Inadequate uptake of colostral antibodies was demonstrated with a zinc sulphate turbidity test (ZST) result of only 9 units compared to the usually accepted low adequate level of 20 units.

Bleeding disorder in a calf

A bleeding disorder indistinguishable from bovine neonatal pancytopenia (BNP) was diagnosed in a two-week-old calf with necrotising enteritis and pancytopenic lesions of the bone marrow, which was hypocellular with loss of megakaryocytes. There were occasional small pockets of erythroid series cells present. BVDV antigen was not detected by immunofluorescence in lung, spleen or mesenteric lymph node and RT-PCR testing was negative for the presence of BVDV nucleic acid in the blood. In this case vaccination of the dam with the BVDV vaccine PregSure had not taken place. Similar cases have been reported in the UK and the cause(s) have not been confirmed to date.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 14 ovine post mortem submissions during this quarter. Jaagsiekte (seven cases), pasteurellosis (three cases) and laryngeal chondritis (two cases) were the most common diagnoses.

Alimentary diseases

Parasitic gastro enteritis

Cases of parasitic gastro-enteritis (PGE) including ostertagiosis and trichostrongylosis were diagnosed in first season lambs throughout the reporting period and it was noted that problems persisted until late in the year with cases still being diagnosed in December. In some instances, losses were high. Incorrect anthelmintic usage was a common feature in that flocks involved were not being routinely faecal egg count monitored and control programmes had been stopped too early in the season, allowing late infection to come through undetected. One flock had been routinely dosed with benzimidazole based products and a faecal egg count reduction test (FECRT) was advised in this case on the basis of recent survey work showing widespread resistance to this class of anthelmintic amongst the intestinal nematodes affecting sheep in Northern Ireland.

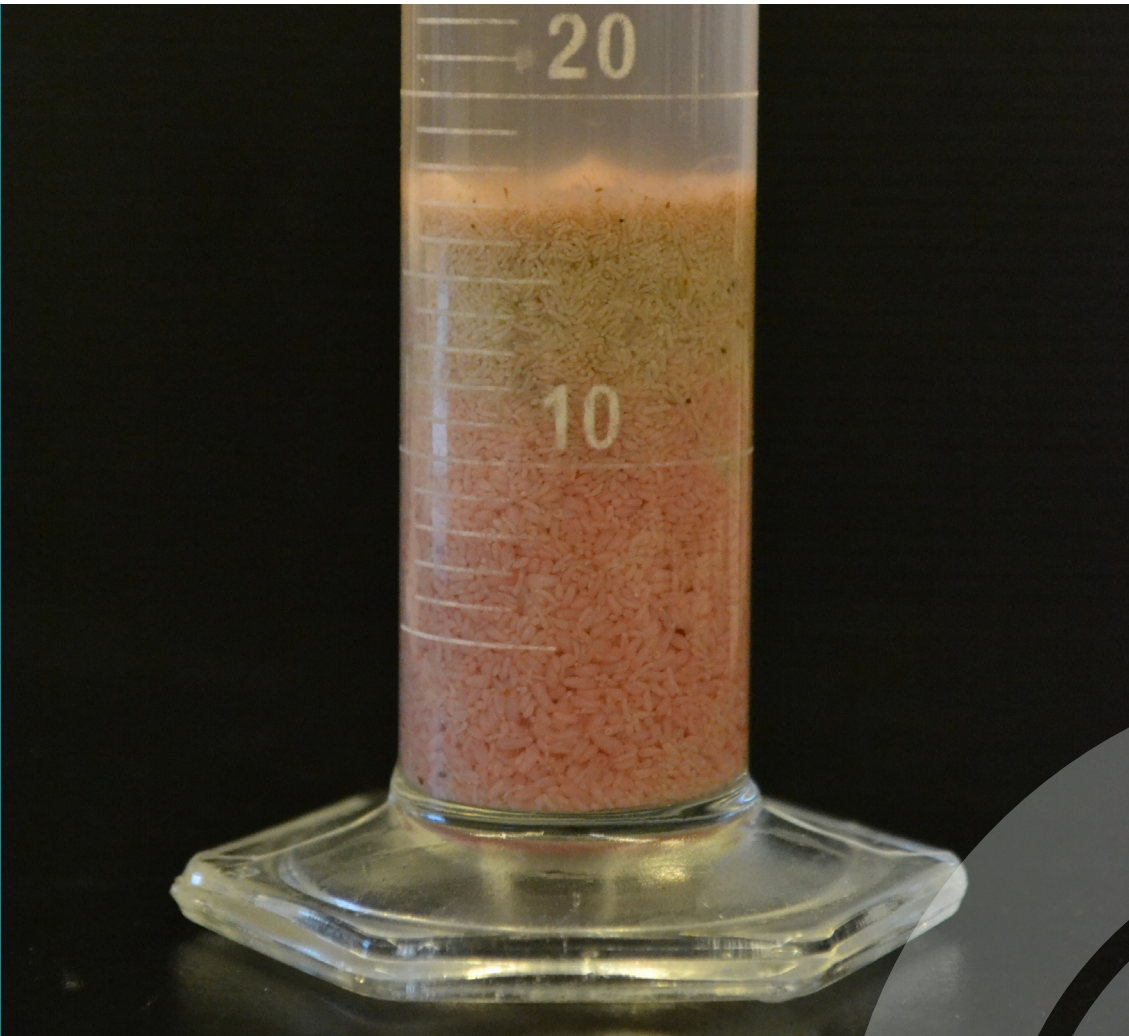
Fasciolosis

Fasciolosis (FIGURE 1 - next page) was a common diagnosis in adult sheep and lambs during the reporting period. This was expected on the basis of the AFBI Autumn and Winter Liver Fluke Forecast for Northern Ireland 2016-17 which warned of a high risk of fluke across the country during the period. In many instances flukicide programmes were inadequate with products effective against only adult or late immature stages being used too early in the season. Some flocks had intercurrent PGE problems and in one instance *Escherichia fergusonii* was recovered in septicaemic distribution from severely diarrhoeic lambs submitted in early November with trichostrongylosis and sub-acute fasciolosis. These lambs had been dosed in late September with an oxytetracycline-based product.

Larval paratuberculosis (FIGURE 2 - next page) was again diagnosed in sheep during the quarter. Affected sheep ranged from one to two years of age and presented either with profuse watery diarrhoea or sudden death. It was noted that in one case, very high numbers of immature stages (60,000) were present in the intestine without the presence of any adults in the rumen and correspondingly without the presence of eggs in the faeces.

**Figure 1**

Acute fasciolosis in a lamb, extensive haemorrhage and haematoma formation due to migration of immature liver flukes can clearly be seen

**Figure 2**

Immature stages of rumen fluke recovered from the intestine of a shearling

Copper poisoning

Copper poisoning was diagnosed in pedigree ram lambs in two separate flocks during the reporting period. Copper remains the most common cause of inorganic poisoning in sheep in Northern Ireland. Toxicity may occur following excessive intake due to: inappropriately formulated compound feed with too high a level of copper, excessive feeding of concentrate feed containing copper in correct amounts or excessive supplementation. Copper poisoning is slow to develop but sudden in onset. Measurement of serum creatinine, urea, GGT and GLDH levels whilst not specific for copper poisoning can be used to detect early signs of liver damage in groups of sheep suspected of being at risk from excessive copper intake.

Johne's disease

Four ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. No samples contained any acid-fast organisms typical of MAP. Six ovine bloods samples were tested for antibodies to MAP during this quarter; 2 samples (33.3 per cent) were positive.

Johne's disease was diagnosed in a two-year-old ewe, one of three to die from a group of thin ewes in a hill flock. On gross examination there was severe enteritis of the terminal ileum and proximal large bowel with blood stained fluid contents. The mucosa was thickened with pronounced rugae and there was a pale yellow pseudo-diphtheritic membrane present. Changes consistent with chronic fasciolosis were detected in the liver.

Histological examination of Ziehl-Neelsen stained sections confirmed the presence of acid fast organisms with the morphology of *Mycobacterium paratuberculosis* (MAP) in the macrophages which were infiltrating the intestinal mucosa (FIGURE 3) and the mesenteric lymph nodes.

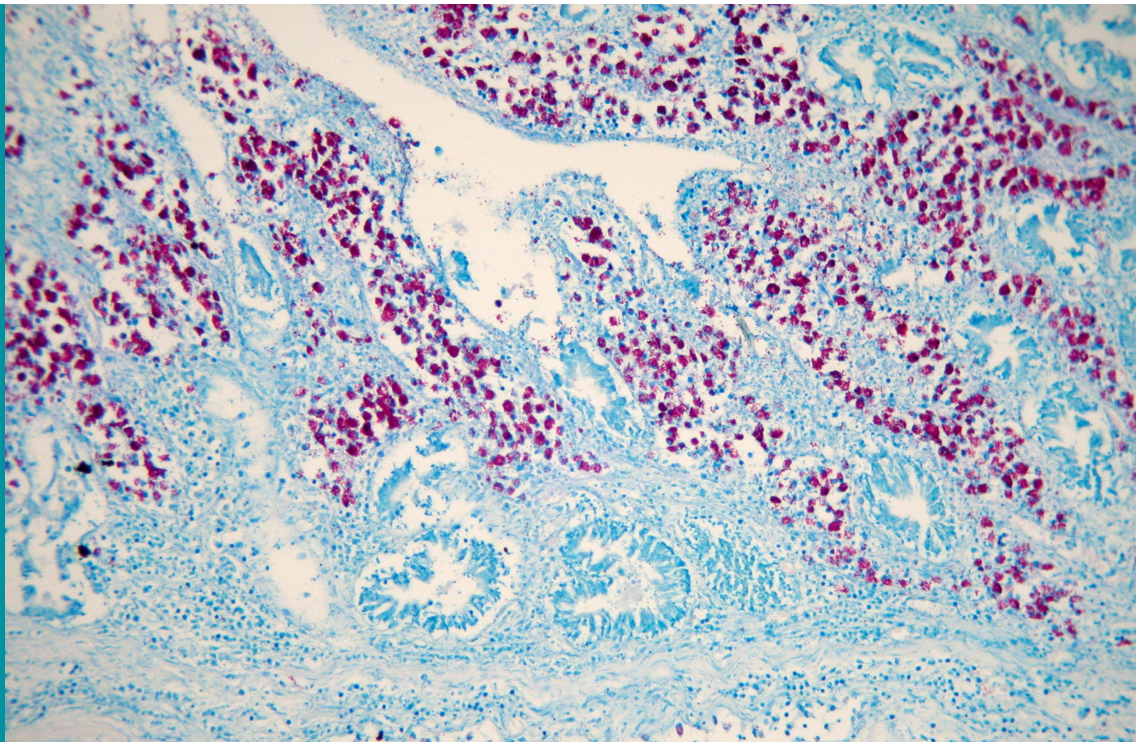


Figure 3

Ileum of a ewe with Johne's disease, Ziehl-Neelsen staining clearly shows the presence of acid fast organisms in macrophages within the mucosa

Johne's disease is a so-called 'iceberg' condition of sheep in that it is very likely to be much under-diagnosed in the UK flock due to inadequate numbers of thin cull ewes being submitted for post mortem examination. Routine post mortem screening of thin culls, serology and measurement of serum albumin levels in ill-thrifty sheep are all useful in detecting the presence of Johne's disease in a sheep flock

Reproductive diseases

Abortion

Specimens from 4 ovine abortions and stillbirths were examined during the 4th quarter of 2016. The pathogens identified were *Chlamydia abortus* (3 cases, 75.0 per cent) and *E. coli* (1 case, 25 per cent).

Ovine Abortion Data 2016

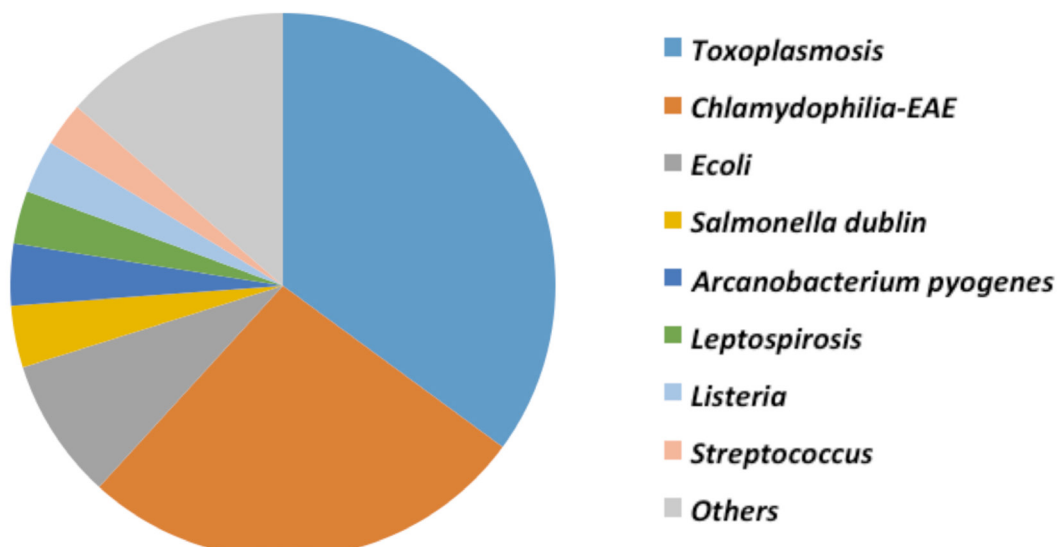


Chart 2

Summary of ovine abortions in Northern Ireland 2016

Chart 2 gives a summary of the causes of ovine abortion diagnosed in Northern Ireland during the period January to December 2016.

Specimens from 241 ovine abortions and stillbirths were examined during 2016. Significant pathogens were detected in 154 cases (63.9 %). Pathogens identified included *Toxoplasma gondii* (67 cases, 27.8 %), *C. abortus* (51 cases, 21.2 %), *E. coli* (16 cases, 6.6 %), *T. pyogenes* (7 cases, 2.9%), *Listeria* sp (6 cases, 2.5 %) and Leptospiral infection (6 cases, 2.5 %).

Skin diseases

No cases were examined for sheep scab during the 4th quarter of 2016

HORSES:

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

PIGS:

The post mortem diagnostic summary for pigs of less than one month of age during 2016 is given in CHART 3 below.

PIGS <1.0 MONTHS DIAGNOSTIC ANALYSIS 2016

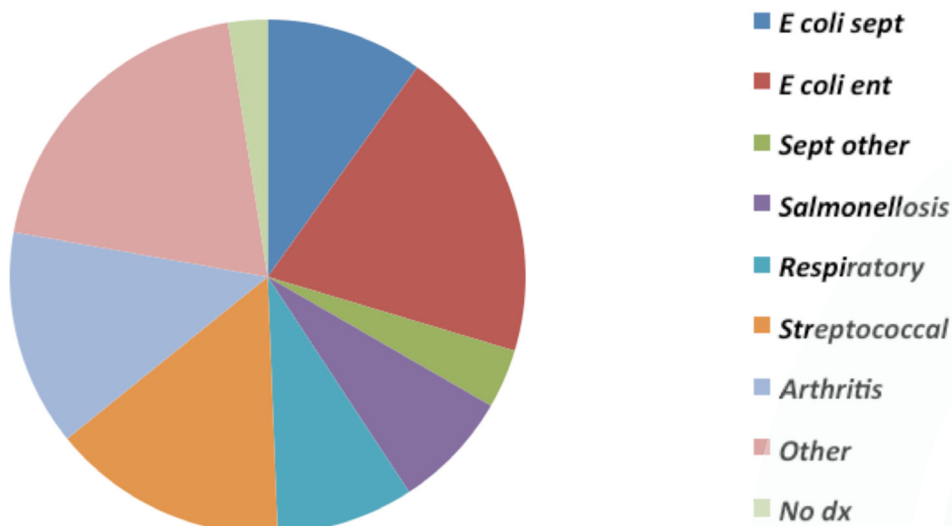


Chart 3

Summary of diagnostic analysis for pigs of less than one month of age for 2016

Colibacillosis including enteric infection and septicaemia (24 cases, 30%) was the most frequently diagnosed condition in young piglets during 2016, streptococcal infection including meningitis was also common (12 cases, 15%) as was salmonellosis (six cases, 8%) including infection with *Salmonella Typhimurium*.

The post mortem diagnostic summary for pigs of between one and five months of age during 2016 is given in CHART 4 below.

PIGS OF 1 to 5 MONTHS DIAGNOSTIC ANALYSIS 2016

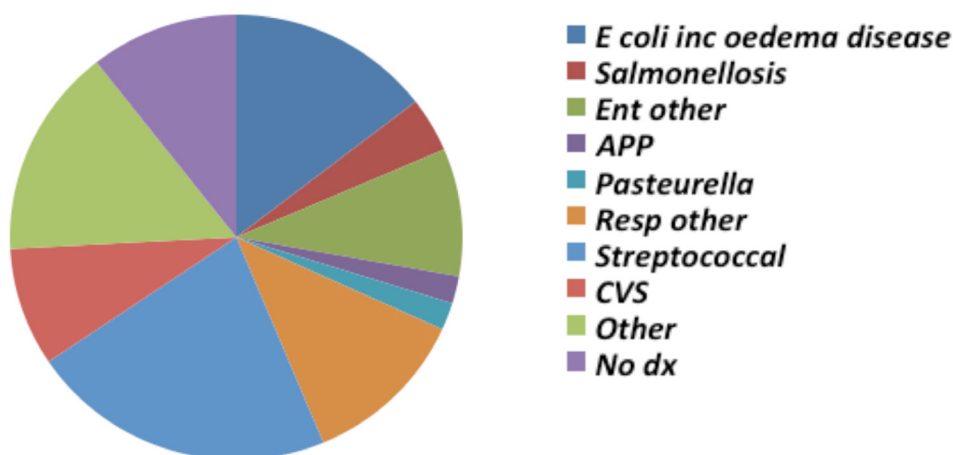


Chart 4

Summary of diagnostic analysis for pigs of one to five months of age for 2016

Streptococcal infection including *Streptococcus suis meningitis* (33 cases, 22%) was the most common condition diagnosed in pigs of between one and five months of age in Northern Ireland in 2016. *E. coli* infection including post weaning diarrhoea and oedema disease was also common (22 case, 15%), salmonellosis was less common (six cases, 4%) and infection with *Salmonella Choleraesuis* was rare (two cases)

BIRDS: Poultry

The diagnostic analysis for poultry post mortem submissions during the quarter is given in CHART 5 below. Liver diseases including bacterial hepatitis and hepatic necrosis (ten cases, 20.0 %), digestive disorders (four cases, 8.0 %) and musculoskeletal disorders including tendonitis and tendon rupture (four cases, 8.0%) predominated.

POULTRY SUBMISSION DIAGNOSTIC ANALYSIS Q4 2016

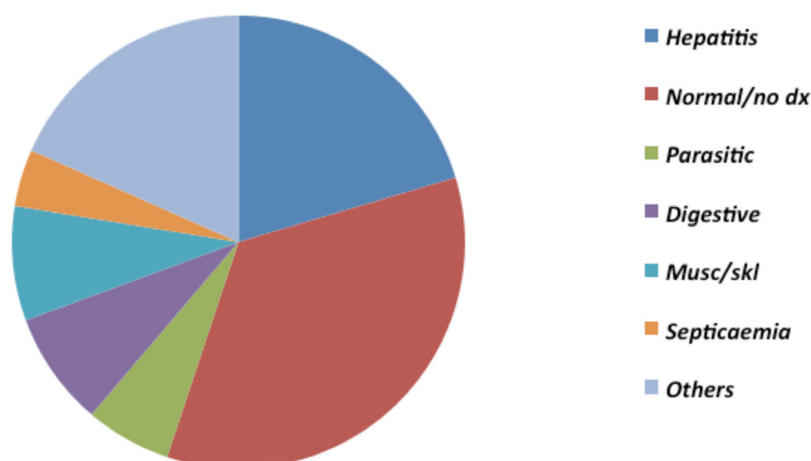


Chart 5

Poultry diagnostic submission analysis

Heterophilic uveitis was diagnosed on post mortem examination of group of eight-week-old pullets with suspected ammonia blindness. On histological examination there was significant heterophilic uveitis in the anterior chamber of all eyes examined. In addition to numerous heterophils, generally dispersed or organised in loose foci in the vicinity of blood capillaries, there were numerous lymphocytes in the interstitium. Occasional heterophils were seen throughout the stroma of the cornea.

The changes were not consistent with ammonia blindness and the bulbar conjunctiva was not involved. Infiltration by heterophils was considered to be the result of systemic bacterial infection and *Streptococcus* sp and coagulase negative *Staphylococcus* were recovered from cultures of the eye tissues and may have been acting as opportunistic pathogens in this case.

Intercurrent coccidiosis was present.

WILDLIFE and EXOTICS:

Systemic aspergillosis was diagnosed in a three-year-old Gentoo penguin (*Pygoscelis papua*) submitted from a zoological collection with a history of dyspnoea and poor response to anti-fungal therapy. On gross examination there was pneumonia and air sacculitis with thickening of the air sac membranes by granulation tissue with the presence of focal to coalescing, white, creamy plaques; there was involvement of the pericardium and abdominal air sacs. Histological examination confirmed the presence of fungal hyphae in the granulomatous lesions and moderate growths of *Aspergillus fumigatus* were recovered from lung and air sac cultures