

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, APRIL TO JUNE 2017

- Parasitic pneumonia in cows
- Leptospirosis in a calf
- *Pasteurella* mastitis in ewes
- Schmallenberg virus infection in bovine foetuses
- Congenital goitre in ovine foetuses
- *Actinobacillus pleuropneumoniae* pneumonia in growing pigs
- Circovirus and *Salmonella Typhimurium* infection in pigeons

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for April to June 2017

CATTLE:

Respiratory diseases

Respiratory disease was identified in 36 cattle post mortem submissions between April and June 2017. The most common pathogens identified included:

- *Mycoplasma bovis* (eleven cases),
- *Pasteurella multocida* (seven cases),
- *Trueperella pyogenes* (five cases),
- respiratory syncytial virus (three cases),
- *Mannheimia haemolytica* (two cases), and
- lungworm infection (two cases).

Parasitic pneumonia in adult dairy cows

Pneumonia due to *Dictyocaulus viviparus* infection was diagnosed in a group of adult dairy cows, it was noted that husk is frequently seen in adult stock as well as calves.

Alimentary diseases

Lymphosarcoma was diagnosed on post mortem examination of a two-year-old dairy heifer which had numerous large circular ulcers in the abomasal mucosa. Histological examination of the abomasum showed mucosal ulceration with fibrin exudation and neutrophilic infiltrate. Subjacent to ulcerated mucosa there was granulation tissue within the submucosa. There was an infiltrate of round cells with prominent nuclei and scant cytoplasm into the mucosa and there were large focal aggregates of similar round cells with large nuclei and scant cytoplasm in the submucosa. Mitotic figures were frequent. Serology for enzootic bovine leucosis (EBL) was negative.

Intestinal obstruction

A three-month-old heifer calf died due to adhesion of a loop of ileum in an umbilical hernia creating an intestinal obstruction. On gross examination there was a moderately large umbilical sac. The ileum was adhered within the hernial sac creating an intestinal blockage. The small intestine anterior to the obstructed ileum was dilated by watery cream content. Posterior to the adhered loop of ileum the remaining small intestine and large intestine contained scant content.

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in TABLE 1.

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, April to June 2017

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	210	77 (36.6%)
Rotavirus	213	44 (20.6%)
Coronavirus	212	21 (9.9%)
<i>Escherichia coli</i> K99	116	2 (1.7%)

Overall, *Cryptosporidium* species and Rotavirus were the most common pathogens identified.

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, April and June 2017

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	516	464	37	12	2	1	10.1%
Ovine	502	457	19	12	5	9	8.9%
Paramphistome							
Bovine	516	270	43	121	35	47	47.7%
Ovine	502	348	39	72	22	21	30.7%
Coccidia							
Bovine	604	435	125	12	6	26	27.9%
Ovine	560	141	260	74	39	46	74.8%
Strongyle worm egg count							
	Total	<500 epg	≥500 epg				% Positive
Bovine	606	593	23				3.8%
Ovine	560	482	78				13.9%

≥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 161 bovine faecal samples. 51 samples (31.6 per cent) contained acid-fast organisms typical of MAP. Of 3907 bovine blood samples that were tested for antibodies to MAP 322, (8.2 per cent) were positive.

Reproductive and mammary diseases

Abortion

Specimens from 57 bovine abortions and stillbirths were examined during the 1st quarter. Significant pathogens were detected in 20 cases (35.1 per cent). Of these *T. pyogenes* (5 cases, 8.8 per cent) and *Salmonella* Dublin (5 cases, 8.8 per cent) were the most commonly identified pathogens. Other pathogens identified included *Neospora caninum* (3 cases, 5.3 per cent) and *E. coli* (2 cases, 3.5 per cent).

Schmallenberg virus infection

Foetal abnormalities and abortion were diagnosed in individual animals in two herds during the reporting period. In one case testing for the presence of SBV nucleic acid by RT-PCR on tissues from the calf was negative but the calf was serologically positive by ELISA testing. The calf had not sucked so this was taken to indicate that in utero exposure to SBV had occurred and infection with SBV was diagnosed as the cause of the skull malformation, arthrogryposis and scoliosis seen in this case. In the other case the calf tested positive for the presence of SBV nucleic acid by RT-PCR and was also serologically positive by ELISA. In this case there was cerebellar hypoplasia, hydrocephalus, arthrogryposis and externalised viscera.

Other reproductive diseases

In mid-April, thyroid hyperplasia was diagnosed in a full term stillborn calf from a heifer which was being fed silage indoors. There had been two other stillbirths in the herd in the recent past. Enlargement of the thyroid was noted on gross examination and histologically multiple small, empty follicles were evident with little thyroglobulin present. Some follicles had papillary in-growths of the epithelium. The appearance was considered suggestive of thyroid hyperplasia and assessment of the iodine status of the herd was advised.

Mastitis

A total of 227 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 18 (7.9 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 32 samples. *E. coli* was the most frequently isolated organism and accounted for 26.4 per cent of isolates cultured. Other frequently identified organisms included, *Staphylococcus aureus* (14.1 per cent) and *Streptococcus uberis* (13.7 per cent).

Neurological diseases

Clostridium botulinum type D toxicosis was diagnosed in 4 individual cattle cases during the 2nd quarter of 2017.

Other diseases of cattle

Leptospirosis in a calf

A twelve-day-old calf was submitted with a history of jaundice, diarrhoea, and recumbency. On gross examination the sub-cutis and fat displayed an intense orange discolouration and the liver was congested and showed patches of yellowish discolouration. Histologically: in the liver there was congestion, generalised effacement of the sinusoidal pattern due to swelling and rounding of the hepatocytes with some hepatocytes displaying changes in the nuclei including karyolysis and karyorrhexis, suggestive of incipient apoptosis. In the kidney, the proximal convoluted tubules showed epithelial swelling with necrosis and sloughing of epithelial cells and eosinophilic hyaline material into the tubule lumens. In the distal convoluted tubules, in addition to epithelial disorganisation, there is orange-brown granular material present in the cytoplasm of the epithelial cells. There was a degree of interstitial oedema present. Both lung and kidney were strongly positive for the presence of leptospiral antigen by immunofluorescence and leptospirosis was diagnosed on the basis of the gross, histological and immunohistochemical findings.

Colisepticaemia was diagnosed in two ten-day-old calves which had died following malaise and blindness from around two days of age. On gross examination, there was navel ill, joint ill, polyserositis and meningitis in both calves and *E. coli* was recovered in septicaemic distribution in both cases. The blindness was attributed to fibrinous clots in the anterior chamber of the eyes. Blood from both calves showed very poor uptake of colostral antibody (ZST: < 2 units) and were negative for the presence of BVDV nucleic acid by RT-PCR.

Clostridium perfringens enterotoxaemia was diagnosed in a six-week-old calf which died suddenly and presented with pleural and pericardial effusion and pulmonary oedema with clostridial epsilon toxin detected.

Fasciolosis and vegetative endocarditis in a calf

Chronic fasciolosis was diagnosed in a five-month-old bullock which had been born indoors and housed on a straw and concentrates diet without access to fresh grass. At necropsy the liver was firm with fibrosed bile ducts, some containing clumps of liver and a high number of *Fasciola hepatica* eggs were detected in the caecal contents. There was a vegetative endocarditis present with necrotic vegetative masses on the cusps of the left atrio-ventricular valves and there was a large 10cm diameter necro-purulent mass distending the pulmonary artery and adhered to the wall of the vessel. There was associated renal infarction. It was noted that exposure to metacercariae of *F. hepatica* must have occurred through the forage.

Ruptured aneurysms in dairy cows

Ruptured arterial aneurysms were diagnosed in two dairy cows submitted during the reporting period. In one case the hepatic artery was involved and histological examination of the artery wall showed disruption and disorganisation of the smooth muscle in the deeper zone of the media with dissecting haemorrhage between the separated layers of tissue. In the other case, the aneurysm and rupture involved the cranial mesenteric artery.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 14 ovine post mortem submissions during this quarter. Jaagsiekte (five cases), *M. haemolytica* (two cases) and laryngeal chondritis (two cases) were the most common diagnoses. In one instance of diagnosis of Jaagsiekte it was noted that extensive and well developed lesions (FIGURE 1) were present in shearlings in the affected flock and it was noted that presence of lesions in young sheep is increasingly common.



Figure 1

Jaagsiekte:
Extensive
lesions in sheep
lung, the pale
grey coloured
solid tumour
tissue clearly
visible

Laryngeal chondritis

Bilateral laryngeal chondritis (FIGURE 2) with swelling and occlusion of the laryngeal inlet was the cause of death in a one-year-old Texel ewe.

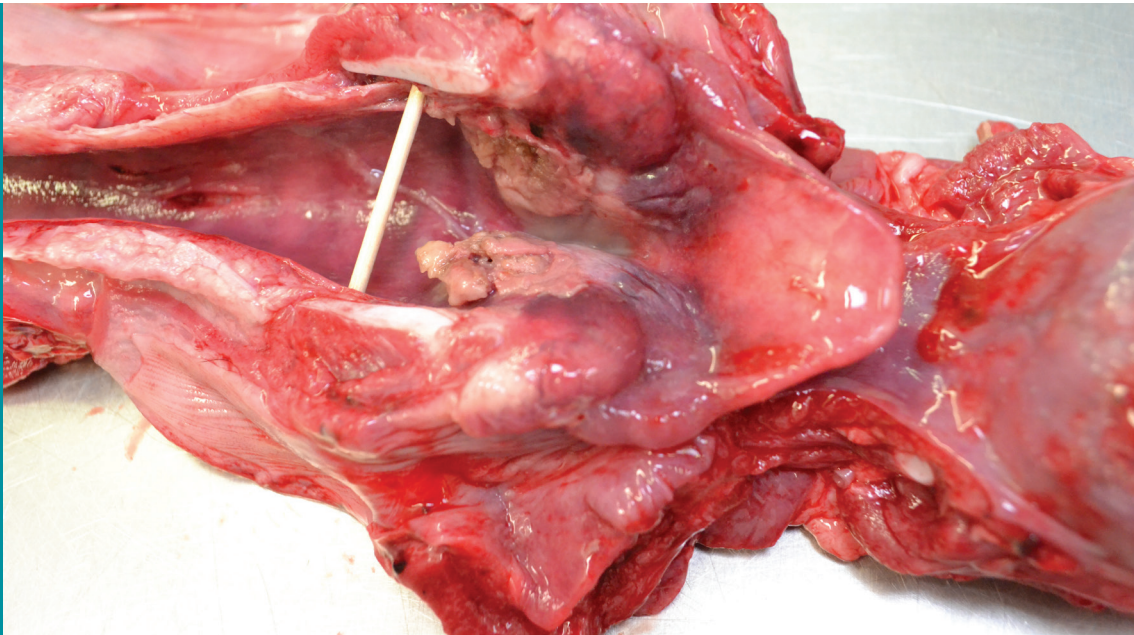


Figure 2

Laryngeal chondritis in a Texel shearling, pale necrotic cartilage is present and soft tissue swelling is marked

Alimentary diseases

Nematodirosis in early season lambs

During the first week of April, nematodirosis were diagnosed in a group of two-month-old lambs showing diarrhoea and ill thrift and in which four out of a group of sixty had died. It was noted that this was early in the season but that weather conditions had been favourable for the early hatch of *Nematodirus* sp eggs. Elevated strongyle egg counts (FEC: 1,200 epg) were also detected in the group.

Johne's disease

Three ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. One sample (33 per cent) contained acid-fast organisms typical of MAP. 4 ovine bloods samples were tested for antibodies to MAP during this quarter, all of which were negative.

Reproductive diseases

Abortion

Specimens from 24 ovine abortions and stillbirths were examined during the 1st quarter of 2017. The pathogens most commonly identified pathogens were *Chlamydophila abortus* (9 cases, 37.5 per cent), *Toxoplasma gondii* (6 cases, 25.0 per cent) and *E. coli* (3 cases, 12.5 per cent).

Congenital goitre

Congenital goitre was diagnosed in two ovine foeti in a flock with a history of weak-born alopecic lambs. Whilst the lambs submitted for post mortem examination had no obvious wool/hair abnormalities the thyroid glands were greatly enlarged (FIGURE 3) weighing 23 g and 28.5 g respectively, giving an elevated thyroid weight: body weight ratio. Histological examination of thyroid tissue showed the follicles to be variably sized with many follicles being well filled with colloid and others showing little or no fill. The follicles were lined by columnar epithelium with frequent papillary invaginations into the colloid and there was mild to moderate peripheral absorption of colloid. These changes were considered to be consistent with goitre.

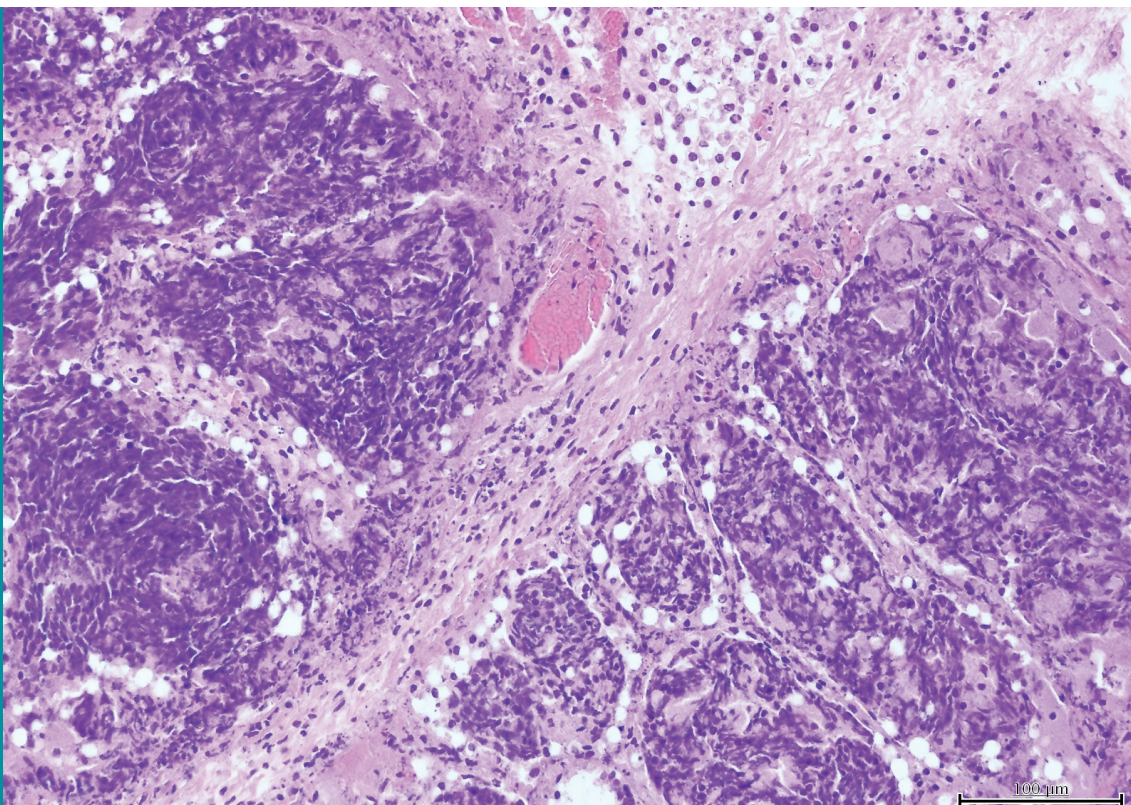
**Figure 3**

Goitre in an ovine foetus, the enlarged thyroid gland can clearly be seen

Mastitis

Cases of severe necrotising mastitis due to *M. haemolytica* infection (FIGURE 4) were diagnosed in ewes from two separate flocks during the reporting period. In one case the mammary gland abscessation was extensive and showed inward fistulation from the left udder half with fibrous adhesion of the caudal rumen and several intestinal lops to the peritoneum of the left paralumbar fossa, the adhered tissue encapsulated a large purulent focus.

M. haemolytica was recovered in septicaemic distribution and *Streptococcus uberis* was also recovered from the mammary gland and it was noted that the latter is a documented cause of mastitis in ewes as well as cows. In the other case, the mastitis was accompanied by septicaemic spread of *M. haemolytica* and the presence of acute necrotising pneumonia characterised histologically by multifocal aggregates of neutrophils and oat cells associated with necrosis, fibrin exudation, bacteria and thrombosis. Histological examination of the mammary tissue showed alveolar lumens filled with aggregates of oat cells and alveolar walls infiltrated by oat cells, neutrophils and fibrin exudate.

**Figure 4**

Pasteurella mastitis in a ewe, glandular alveolae are packed with aggregates of neutrophils with some showing degenerative changes and nuclear streaming

Neurological diseases

One case of listeriosis was confirmed by post mortem examination during the 2nd quarter of 2017. A three-year-old ewe died suddenly and was submitted for examination. At necropsy there was a large haemorrhage around the brainstem and cerebellum. The exact cause was not identified but *Bibersteinia trehalosi* was recovered in septicaemic distribution and it was considered that the brain haemorrhage may have resulted from septic embolism.

Skin diseases

No cases were examined for sheep scab during the 2nd quarter of 2017.

Other disease of sheep and small ruminants

Valvular endocarditis of the left atrio-ventricular valve was diagnosed on gross examination of a sixteen-month-old Belclare ewe which died suddenly after a period of vague malaise. Histological examination of the brain revealed subacute meningo-encephalitis with occasional micro-abscesses in the brainstem and cerebellum. *Streptococcus sinensis* was recovered in profuse pure growth from the heart valve lesion and scant growth of *B. trehalosi* was recovered in scant growth from the brain. Alpha-haemolytic *Streptococci* are associated with infective endocarditis in man but there is little or no literature on their importance in this condition in sheep.

Rickets in an alpaca

A seven-month-old Alpaca died following a history of inappetence, weight loss, pale mucous membranes, lameness and an arched back stance. The alpaca had previously been treated with Vitamin D paste and antibiotics.

On gross examination the animal had very little subcutaneous or visceral fat. There were multiple fractured ribs; both acute with associated haemorrhage and chronic healing fractures. The ribs were soft and malleable and the long bones were easily fractured with pressure. Histologically there was loss of the orderly pallisade arrangement of chondrocytes with extension of the disorderly cartilage into the marrow cavity of the bone. Pale trabeculae consisting of unmineralised osteoid and cartilaginous remnants were widespread within an enlarged osteochondral junction. There was very little evidence of mineralisation and widespread vascularisation of the unmineralised osteoid region.

The histological findings on examination of the chostochonral junctions were consistent with Rickets, confirmed by a bone weight as ash of 36% (below 45% suggests osteodystrophy) and was most likely caused by vitamin D deficiency.

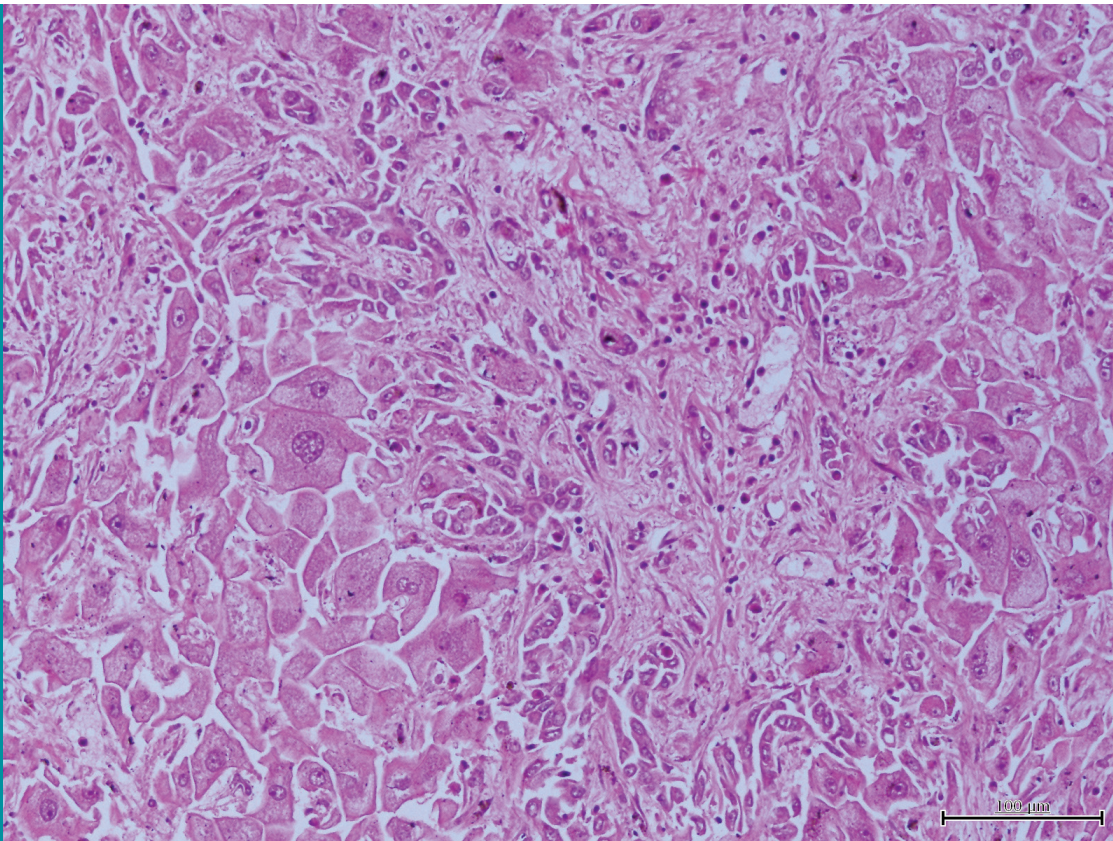
This condition is common in young growing camelids living outside of South America. Spring is a high risk time for young crias as the young spring grass has very low vitamin D2 concentrations as compared to older mature grass or hay and also as cloudy conditions will reduce exposure to sunlight.

HORSES:

Forty three swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all were negative. One swab was cultured from a horse with a history suggestive of strangles during this quarter, the swab was negative.

Pyrolizidine alkaloid toxicity

Pyrolizidine alkaloid toxicity, most likely due to ingestion of ragwort (*Senecio jacobaea*) was diagnosed on the basis of histological findings in a thirteen-year-old mare that had presented dull and stiff in the twelve hours preceding death. Histologically there was portal fibrosis, bile duct hypertrophy and megalocytosis (FIGURE 5). Due to a lack of information on the quality of the diet fed, it was cautioned that chronic hepatic toxicosis due to either alkylating agents such as aflatoxins may produce similar pathology and therefore could not be excluded as a possible cause.

**Figure 5**

Megalocytosis in the liver of a horse with suspected pyrrolizidine alkaloid toxicity

PIGS;***Pneumonia due to *Actinobacillus pleuropneumoniae****

Pneumonia due to *A. pleuropneumoniae* (APP) was diagnosed in two grower pigs that died suddenly in a herd in which eight pigs had died in twenty four hours. On gross examination there was antero-ventral purple consolidation affecting 55-60% of the lung volume. There were multiple large red black firm foci present in the lung parenchyma with a marked fibrinous pleurisy. On histology there were multiple foci of coagulative necrosis (with a lobular distribution), severe haemorrhage, fibrin exudation and an inflammatory infiltrate of neutrophils and oat cells. In affected areas there was thrombosis. Bronchioles contained inflammatory cells and fibrin. In adjacent lobules, alveolar septae were expanded by neutrophilic infiltrate. Interlobular septae were thickened by fibrin, oedema and neutrophilic infiltrate. There was fibrinous pleurisy with associated bacterial clumps and neutrophilic infiltrate. APP was cultured from the lung tissue.

BIRDS: Poultry

The diagnostic analysis for poultry post mortem submissions during the quarter is given in CHART 1 (page 9). Parasitic disease including coccidiosis and red poultry mite infection (six cases, 14.0 %), liver diseases including bacterial hepatitis and hepatic necrosis (five cases, 11.0 %), and musculo-skeletal disorders including tendonitis and tendon rupture (five cases, 13.0% %) predominated.

Two young (eight and sixteen- weeks- old) racing pigeons died following a short period of weight loss and regurgitation of crop contents. Grossly both carcasses were congested and had moderate pectoral muscle mass wastage. On histological examination of the bursae there was widespread lympho-depletion and frequent cystic areas within follicle centres. At the cortico-medullary junction were large numbers of macrophages containing large basophilic botryoid inclusions. *S. Typhimurium* was cultured from multiple organs in both birds.

The histological findings were consistent with pigeon circovirus. *S. Typhimurium* can cause disease in groups of pigeons and is likely to be exacerbated by the immunosuppressive effects of the pigeon circovirus in this case.

POULTRY SUBMISSION DIAGNOSTIC ANALYSIS Q 2 2017

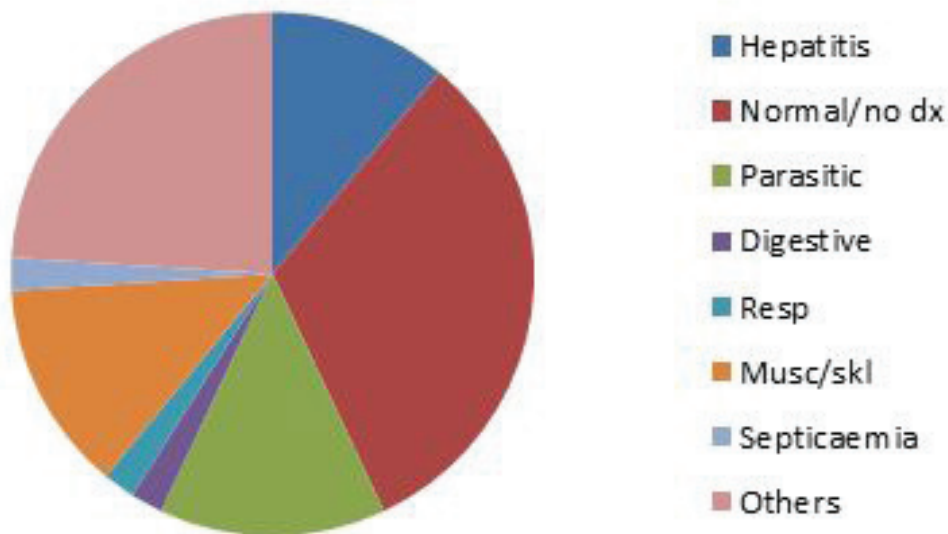


Chart 1

Poultry
Diagnostic
Submission
Analysis,
(Q2 2017)

Trichomonosis in pigeons

An adult crowned pigeon from a zoological collection was diagnosed with trichomonosis; two others in the group had been successfully treated for the condition previously. Grossly there were multiple pale, raised diphtheritic plaques in the oral cavity and oesophagus, and multifocal-to-coalescing pale solid caseous lesions in both lungs. The crop mucosa was eroded with pale material overlying the ulcerated areas. Histological examination of the oral mucosa identified large ulcerative lesions extending deep into sub-epithelial tissues, containing large amounts of fibrinopurulent exudate, haemorrhage and many granulocytes and macrophages. Focally there were large numbers of bacteria present. There was no histological evidence of avian tuberculosis, fungal organisms or pigeon herpes virus. A diagnosis of trichomonosis was made based on the gross and histological lesions. The causative organism is *Trichomonas gallinae*, which is a flagellated protozoan and these are best seen when wet smears are made from very fresh tissue.