

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, October to December 2015

- Pneumonia and encephalitis due to *Histophilus somni* in heifers
- Pneumonia due to *Bibersteinia trehalosi* in a cow
- Fasciolosis in ewes and lambs
- Dosing gun injuries in lambs
- Histomonosis in chickens

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for October to December 2015

CATTLE:

Respiratory diseases

Respiratory disease was identified in 106 cattle post mortem submissions between October and December 2015. The most common pathogens identified included *Mycoplasma bovis* (twenty five cases), *Mannheimia haemolytica* (seventeen cases), lungworm (eleven cases) *Pasteurella multocida* (eight cases) and *Trueperella pyogenes* (eight cases).

Parasitic pneumonia (husk) due to *Dictyocaulus viviparus* (Figure 1) was commonly diagnosed with a total of eleven cases being recorded during the reporting period. Affected animals ranged from six months to three years of age.

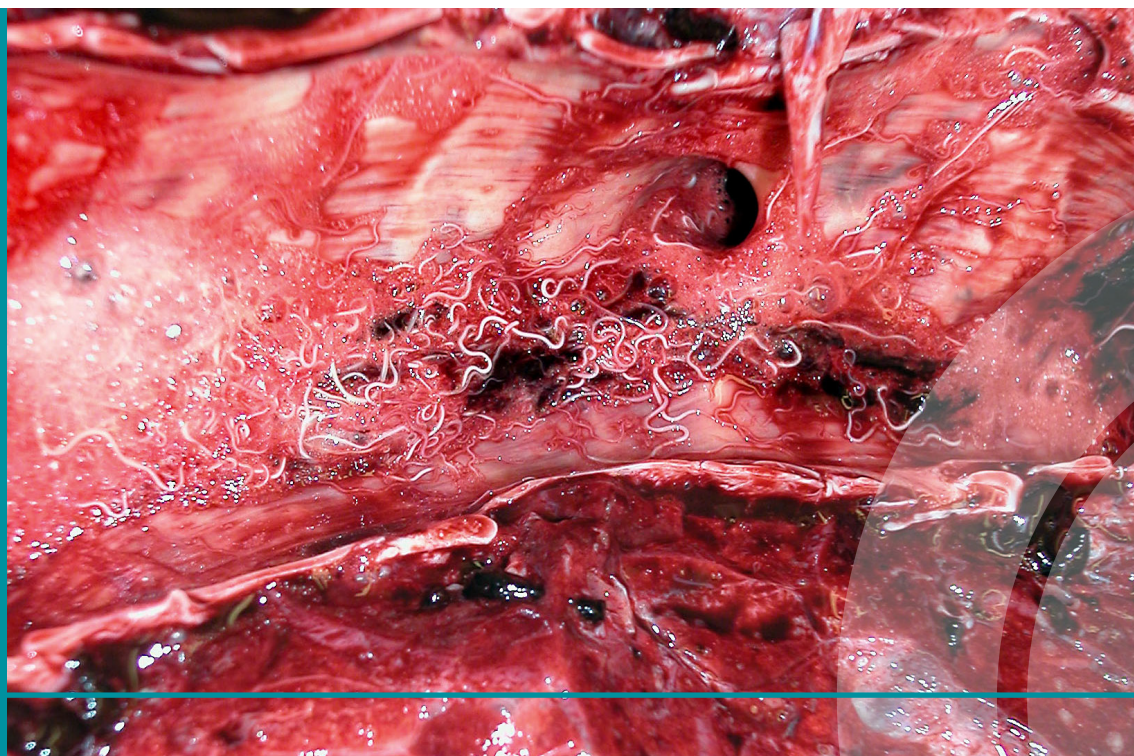


Figure 1

Adult lungworm
in the trachea of
a six month old
calf

Severe bronchopneumonia associated with *Bibersteinia trehalosi* infection was diagnosed in an adult dairy cow. Post mortem examination showed a fibrinous pericarditis and pleurisy with thoracic exudation and adhesions between the parietal and visceral pleura. There was massive consolidation of the right and left lung lobes with necrosis and micro-abscessation with around 75% of the lung field being affected. There was haemorrhage and fibrin exudation into the lower airways. *B. trehalosi* was cultured in profuse growth from lung tissue. No lungworms were detected on gross examination and immunofluorescence and PCR were negative for respiratory virus antigen and ovine herpes virus-2 nucleic acid respectively. *B. trehalosi* may be of increasing significance as a pathogen of bovine respiratory disease although the pathogenic factors are poorly understood. Pneumonia due to *Mycoplasma bovis* infection was diagnosed in a four-month-old heifer calf.

On gross examination there was severe consolidation of the apical, middle and cranioventral parts of the diaphragmatic lobes of the lung. The consolidated lung contained miliary pale yellow granulomata, 2-3 mm in diameter, sometimes merging to produce larger granulomas. There were numerous circular granulomata in the pleura (5-10 mm) each marked by a pale central necrotic focus circumscribed by fibrosis. There were severe adhesions between visceral and parietal pleura. Lymph tissue on the neck 4-5 cm proximal to the right shoulder was focally greatly enlarged containing a large pale necrotic focus (3-4 cm in length) and numerous smaller pale yellow necrotic foci. Histological examination of the lung showed numerous foci of caseous necrosis which were separated by a layer of necrotic neutrophils, macrophages and lymphocytes from peripheral fibrous capsules. There were necrotic foci within the lung parenchyma and within the pleura. Many alveoli were flooded with neutrophils and there was fibrin exudation. Bronchioles contained necrotic debris, neutrophils, macrophages and inflammatory cells. There was frequent bronchiolitis obliterans and peribronchiolar fibrosis. Histological examination of the neck tissue showed a large focal area of caseous necrosis containing an acidophilic coagulum, centrally with multilocular lacunae, separated by a layer of necrotic neutrophils, macrophages and lymphocytes from a fibrovascular capsule. There were frequent haemorrhages within the fibrovascular layer. Smaller foci of caseous necrosis bordered by degenerate neutrophils, macrophages and fibrosis were also present.

Histopathology of the pulmonary, pleural and soft tissue lesions of the neck were considered to be highly suggestive of infection by *Myc. bovis*. Reactivity for *Myc. bovis* was strongly positive on immunohistochemistry of pleural, lung and lymphoid lesions. Whilst gross pathology was concerning in that it was felt tuberculosis was a possibility histopathological findings were not supportive of a diagnosis of TB. Mycobacterial culture is ongoing. In this calf BVDV was detected by RT-PCR indicating either acute or persistent infection with BVDV. Immunosuppression due to BVDV may have contributed to the unusual presentation of *Myc. bovis* infection, in this case.

Alimentary diseases

Abomasal and intestinal perforations

Abomasal-omasal impaction, rupture and peritonitis was diagnosed in an adult suckler cow which had died after showing no response to antimicrobials and anti-inflammatories. There was omasal-abomasal impaction and the abomasum was distended with a large volume of dry digesta. The abomasal wall and serosa was congested and haemorrhagic and there was a perforation near the omasal-abomasal orifice. There was leakage of abomasal contents into the abdominal cavity and secondary peritonitis. It was noted that although abomasal-omasal impaction is uncommon it has been recorded in both suckler and dairy cows. Pregnant cows are most usually affected and the feeding of poor quality roughage with low energy levels has been associated with the condition.

Peritonitis and haemorrhage, associated with rupture of the small intestine with release of intestinal contents into the peritoneal cavity was diagnosed in a six-month-old calf which had been recently housed.

Idiopathic necrotic enteritis

A probable case of idiopathic necrotic enteritis was diagnosed in a two-month-old calf submitted with a history of malaise whilst at grass. On gross examination there was severe necrotising enteritis with mucosal ulceration and fibrin exudation. There was adhesion of the small intestine loops to the umbilical remnant at a single point.

Histologically there was acute enteritis with inflammatory infiltration of the mucosa by neutrophils and a fibrinous exudate containing cellular debris and clumps of basophilic bacteria was present. Herniation of the Peyer's patches into the mucosa was present in some of the sections viewed. Immunofluorescence was negative for BVDV antigen and there was no evidence of coccidial infection. Testing for the presence of *Clostridium perfringens* toxins (including alpha toxin) was negative. Idiopathic necrotic enteritis is generally diagnosed by ruling out other potential causes of necrotising enteritis.

Poisoning due to yew

Two cases of poisoning in cattle due to ingestion of yew (*Taxus* spp) were recorded during the reporting period. Both cases involved calves and access to yew had been either due to the presence of trees either overhanging fences or having been left on the pasture after being felled. The toxic agent in cases of yew poisoning is the alkaloid taxine which has cardiovascular and central nervous system effects causing cardiac arrest and respiratory centre depression.

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 2015

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	316	112 (35.4%)
Rotavirus	311	108 (34.7%)
Coronavirus	313	30 (9.6%)
<i>Escherichia coli</i> K99	201	8 (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 2015

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	867	806	53	8	0	0	7.0%
Ovine	171	138	45	11	4	3	17.5%
Paramphistome							
Bovine	867	393	134	221	66	53	48.6%
Ovine	172	124	18	24	4	2	26.7%
Coccidia							
Bovine	973	797	153	12	6	5	17.6%
Ovine	174	47	110	14	2	1	72.4%
Strongyle worm egg count							
	Total	<500 epg	≥500 epg				% Positive
Bovine	950	153	31				3.3%
Ovine	174	86	59				16.7%

≥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 118 bovine faecal samples. Thirteen samples (11%) contained acid-fast organisms typical of MAP.

Nutritional and metabolic disease Selenium and vitamin E deficiency

Cardiomyopathy and congestive heart failure was diagnosed in a ten-month-old calf which was submitted for examination after a prolonged history of dyspnoea and tachypnoea. At necropsy the heart was globular in shape with dilation of the right and left atria and ventricles. The great vessels, valves and septal walls were unremarkable. There was marked pulmonary congestion and oedema with a thoracic transudate present. The liver was congested and with a 'nutmeg' appearance to the cut surfaces with marked centrilobular congestion.

Histological examination of the heart showed shortening and rounding of myofibre bundles with oedema and the presence of scattered densely eosinophilic myofibrils. The liver showed sinusoidal engorgement, peri-acinar hepatocyte degeneration and necrosis with extensive fibrosis. These changes were considered to be consistent with congestive heart failure. Liver selenium levels were low (0.10 µg/g: normal range 0.25 to 0.75 µg/g). The level of vitamin E in the liver was 1.8 µg/g. This is below the 5.0 µg/g level generally accepted as the threshold, below which clinical signs of deficiency may occur in cattle. On the basis of this nutritional cardiomyopathy was considered to be more likely in this case than a congenital cardiomyopathy.

Reproductive and mammary diseases

Abortion

Specimens from 94 bovine abortions and stillbirths were examined during the reporting period. Significant pathogens were detected in 49 cases (52.1 %). Of these *Salmonella* Dublin (11 cases, 11.7 %) was the most commonly identified pathogen. Other pathogens identified included *T. pyogenes* (6 cases, 6.4 %), *Neospora caninum* (6 cases, 6.4 %), *Bacillus licheniformis* (4 cases, 4.3 %), leptospiral infection (4 cases, 4.3 %) and BVDV infection (4 cases, 4.3 %).

Salmonella Montevideo was considered to be the cause of abortion in twin bovine foeti. The organism was recovered in pure profuse growth from the foetal stomach contents of both foeti. It was noted that *S. Montevideo* is more commonly a cause of abortion in sheep.

CHART 1 below gives a summary of the causes of bovine abortion diagnosed in Northern Ireland during the period January to December 2015.

Bovine Abortion Pathogens 2015

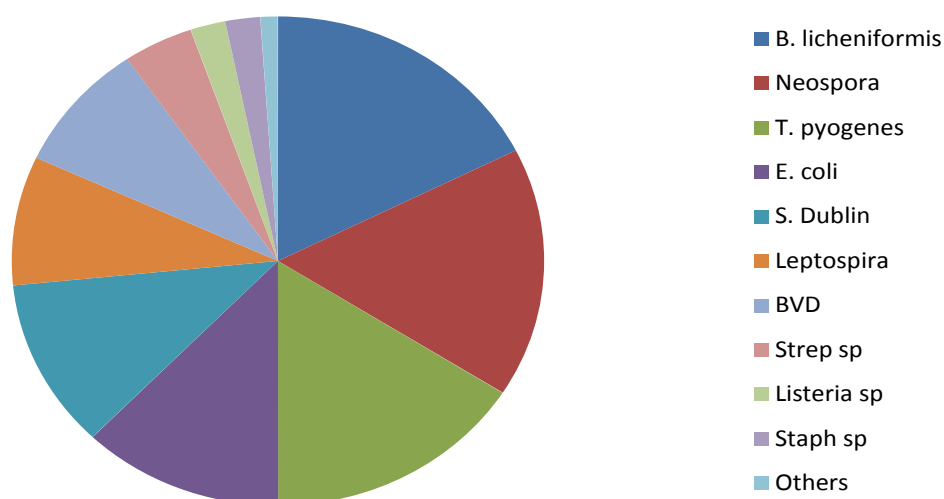


Chart 1

Summary of Bovine Abortions in Northern Ireland 2015

Specimens from 417 bovine abortions and stillbirths were examined during 2015. Significant pathogens were detected in 204 cases (49.0 %). Of these, *B. licheniformis* (33 cases, 7.9 %) was the most commonly identified pathogen. Other pathogens identified included *Neospora caninum* (31 cases, 7.4 %), *T. pyogenes* (30 cases, 7.2 %), *E. coli* (23 cases, 5.5 %), *Salmonella* Dublin (21 cases, 5.0 %) and BVDV (16 cases, 3.8 %).

Other reproductive diseases

Congenital hepatic fibrosis

Congenital hepatic fibrosis was diagnosed in a stillborn calf on the basis of histological examination of the liver. Histological examination showed linking of the centri-lobular and periportal areas by extensive raphes of connective tissue containing short cords or islets of vacuolated hepatocytes. There was mild, diffuse biliary hyperplasia present. Sections stained with monoclonal mouse anti-actin showed large numbers of myofibrils positive for alpha smooth muscle actin in the inner walls of the sinusoids, forming a part of the fibroplastic lesions considered typical of this condition.

Mastitis

A total of 314 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 51 (16.2 %) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured from a further 16 samples. *E. coli* was the most frequently isolated organism and accounted for 24.5 % of isolates cultured. Other frequently identified organisms included *Streptococcus uberis* (13.5 %), *Staphylococcus aureus* (6.6 %) and *Streptococcus dysgalactiae* (4.4 %).

Neurological diseases

Clostridium botulinum type D toxin was detected in 10 cases during the 4th quarter of 2015. These cases were all involved with either the spreading of broiler house litter on grazing land or feeding of silage.

Encephalitis due to *Histophilus somni*

Three cases of encephalitis due to *H. Somni* infection were diagnosed on different farms during the reporting period. Two of the cases were characterised by a rapid clinical course resulting in death whereas in the third case neurological signs were observed. The first case was in a fifteen-month-old heifer in which lesions of thrombotic meningio-encephalitis were detected on histological examination, with *H. somni* being cultured from the brain. *H. somni* is the cause of thrombotic meningioencephalitis and is a cause of pneumonia and cardiac necrosis and abscessation, which were all features of this case. The second and third cases were in feedlot animals, again characteristic lesions were present and *H. somni* was recovered from cultures of the brain.

Other diseases of cattle

Multicentric lymphosarcoma

Multicentric lymphosarcoma was diagnosed in a two- year- old dairy cow. Histological examination showed significant changes in the lungs, lymph nodes, bone marrow and alimentary tract. There were dense aggregates of neutrophils in many of the bronchioles and in clusters of alveoli, with flooding of alveoli by eosinophilic fluid and many alveolar walls were expanded by fibrin and there were foci of cellular dust from damaged cells. Neutrophils and macrophages were dispersed through the alveolar exudate. Interlobular septae were dilated by fibrin and some inflammatory cells.

In the lymph nodes there was diffuse effacement of node architecture by a sheet of infiltrating large lymphoid cells with large round, occasionally indented nuclei. Interspersed through the sheets were small clusters of small densely staining lymphocytes.

The sternal bone marrow was densely cellular with sheets of large round cells infiltrating the marrow. Interspersed through the sheets were megakaryocytes and remnants of erythroid and myeloid cell lines.

There was a low grade diffuse interstitial population of small lymphocytes in the mucosa and submucosa of the small and large intestine.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 11 ovine submissions during this quarter. Jaagsiekte (three cases), pneumonic pasteurellosis (two cases) and laryngeal chondritis (two cases) were the most common diagnoses.

Alimentary diseases

Plant poisoning

Six cases of poisoning due to ingestion of forest flame (*Pieris* spp) were diagnosed in sheep during the reporting period. Forest flame contains acetylandromedol toxin and is year-on-year the most frequent cause of plant intoxication in sheep in Northern Ireland. Other causes of phytotoxicity in sheep recorded during the quarter where ivy (*Hedera* spp) and rhododendron (*Rhododendron* spp).

Fasciolosis

Using a forecasting system based on climate data, AFBI predicted that the overall risk of liver fluke infection during the autumn and winter of 2015 would be high and that the risk would be likely to be highest in the West of the province where the incidence of liver fluke is normally higher. Nine cases of fasciolosis were seen during the period with acute and sub acute disease being seen in October and chronic disease in December. In one instance Black disease (*Clostridium novyi* type B) was associated with the liver fluke disease. Not all the ewes or lambs had been treated with flukicide but in cases where treatment had been given there was a period of around eight weeks on average between treatment and presentation. It was noted that re-infection is a frequent cause of perceived flukicide treatment failure.

Johne's disease

Two ovine faecal samples were examined microscopically using Ziehl – Neelsen staining for MAP. No samples contained acid fast organisms typical of MAP.

Reproductive diseases

Abortion

Specimens from 15 ovine abortions and stillbirth were examined during the quarter. Significant pathogens were detected in 7 cases (46.7 %). Pathogens identified included *E. coli* (2 cases, 13.3 %) and *Chlamydia abortus* (1 case, 6.7 %).

CHART 2 below gives a summary of the causes of ovine abortion diagnosed in Northern Ireland during the period January to December 2015.

Ovine Abortion Pathogens 2015

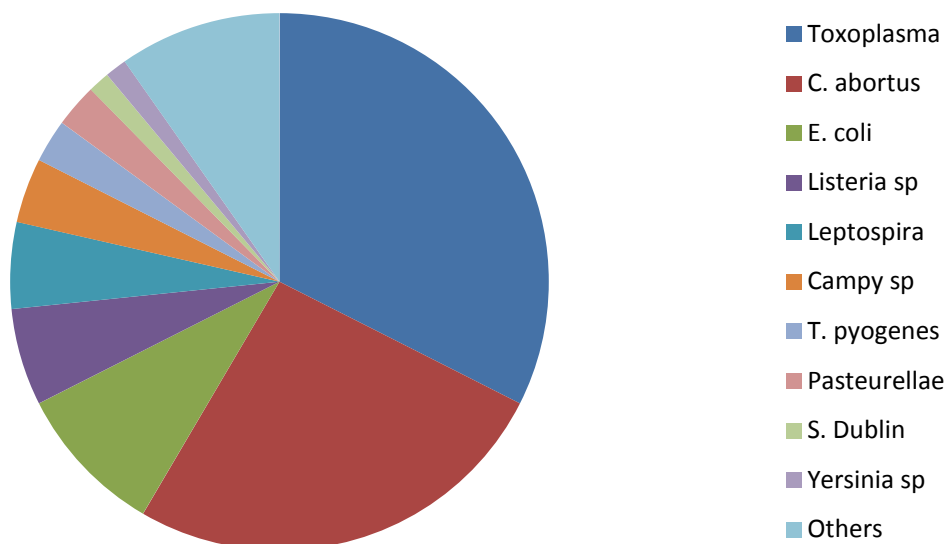


Chart 2

Summary of
Ovine Abortions
in Northern
Ireland 2015

Specimens from 246 ovine abortions and stillbirths were examined during 2015. Significant pathogens were detected in 158 cases (64.0 %). Pathogens identified included Toxoplasmosis (50 cases, 20.3 %), *Chlamydophilia abortus* (40 cases, 16.3 %), *E. coli* (14 cases, 5.7 %), *Listeria* sp (9 cases, 3.7 %), leptospiral infection (8 cases, 3.3 %) and *Campylobacter* sp (6 cases, 2.4 %).

Neurological diseases

No cases of listeriosis were confirmed by post mortem examination during the reporting period.

An eighteen-month-old ram was submitted with a history of nervous signs. At necropsy there was pulmonary abscessation with fibrinous pleurisy and a pituitary abscess was detected.

Skin diseases

Other diseases

Seven cases were examined for sheep scab during the quarter, none of which was positive.

An unusual presentation of systemic pasteurellosis due to *B. trehalosi* characterised by extensive necrosis of soft tissue associated with the left mandible was seen in a recently housed first season lamb in November. Within the necrotic tissue there was embedded plant material, therefore the necrotic mandibular soft tissue lesion may have resulted from embedding grass awns etc or local trauma. The rumen contained large amount of whole yellow maize. The pH of ruminal fluid was 5.5. Ruminal fluid pH of 5.5 or below is consistent with ruminal acidosis. *B. trehalosi* was cultured from multiple tissues.

Dosing gun injuries

Three instances of dosing gun injuries were seen in ewes and lambs during the reporting period. Traumatic pharyngitis, fracture of the hyoid bone, extensive soft tissue injury and cellulitis were found and in one case there was associated purulent meningitis. *Trueperella pyogenes* and *E. coli* are common isolates from these lesions.

HORSES:

31 swabs were examined for the presence of *Tayorella equigenitalis* during the quarter, all of which were negative.

BIRDS: Poultry

The diagnostic analysis for poultry post mortem submissions during the quarter is given in CHART 3 below. Liver diseases including bacterial hepatitis (sixteen cases, 22.9 %) inclusion body hepatitis (ten cases, 14.3 %) and fatty liver syndrome predominated.

POULTRY SUBMISSION DIAGNOSTIC ANALYSIS Q4 2015

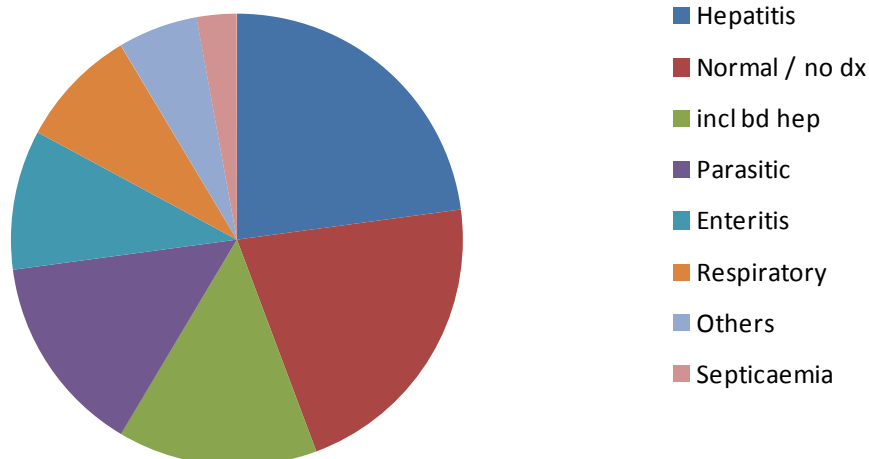


Chart 3

Diagnostic analysis of poultry submissions, October to December 2015.

Histomonosis was diagnosed on the basis of full post mortem examination of thirty-four-week-old chickens. Histological examination of the caecum showed necrotising typhlitis; the submucosa was oedematous and in the lumen of the caecum there was a core composed mainly of necrotic tissue, heterophils and fibrin. Numerous engorged macrophages were evident, and there was bacterial colonisation. In a Periodic-Acid -Schiff-stained section, occasional clusters of PAS-positive trophozoites were visible at the base of the mucosa and in the submucosa.

Erysipelas septicaemia was diagnosed in a group of 150 turkeys being finished for the Christmas market. The diagnosis was based on gross post mortem findings with histology and confirmed by the recovery of *Erysipelothrix rhusiopathiae* in septicaemic distribution.