

Disease Surveillance and Investigation Branch

Northern Ireland Disease Surveillance Report, 1st April to 30th June 2010

- Primary squamous cell carcinoma of the bovine eye
- Intracranial sporadic lymphosarcoma in an 11-month-old heifer
- *Maedi* in imported sheep
- *Enterococcus hirae* infection in chickens
- Yersiniosis in wild and aviary birds

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for 1st April to 30th June 2010.

CATTLE:

Respiratory diseases

Respiratory disease was identified in 75 cattle postmortem submissions between April and June 2010. The most common pathogens identified included: *Pasteurella multocida* (fifteen cases), *Mycoplasma bovis* (twelve cases), *Mannheimia haemolytica* (ten cases), *Arcanobacterium pyogenes* (ten cases), infectious bovine rhinotracheitis virus (IBRV) (four cases), parainfluenza 3 virus (PI3V) (three cases) and *Histophilus somni* (two cases).

Parasitic pneumonia was diagnosed in a seven-year-old cow that was showing clinical signs of dyspnoea and emphysema. At necropsy, lungworm (*Dictyocaulus viviparus*) were detected on the tongue as well as in the major airways. There was subcutaneous, intra-abdominal, mediastinal and pulmonary emphysema. *D. viviparus* larvae were detected in faeces samples from two of five other coughing cows. Calves in the batch were unaffected.

Alimentary diseases

BVD / Mucosal disease

Of 2278 blood samples that were tested for bovine viral diarrhoea virus (BVDV) by virus isolation or antigen capture ELISA 146 (6.4 per cent) were positive.

In addition, 20 of 426 (4.7 per cent) submitted tissues and nasal mucus samples were positive by immunofluorescence.

Twelve cases of mucosal disease were confirmed at postmortem examination during this period. In five instances, blood samples were submitted for pooled PCR analysis and one or more of the pools found to be positive. In each case, subsequent testing of positive pools by individual ELISA showed at least one antigen positive animal to be present.

In one instance eleven individual blood samples were submitted following a positive BVD-PCR on bulk tank milk. All but one were seropositive; the seronegative sample being virus positive.

Mucosal disease was diagnosed in a two-year-old bullock with a history of pneumonia and being stuck in a ditch. Gross postmortem findings were non-specific but included lingual ulceration. BVDV antigen was demonstrated by immunofluorescence in the spleen and abomasum.

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.

Pathogen	Number	
	Tested	Positive (%)
<i>Cryptosporidium</i> species	3028	1260 (41.6%)
Rotavirus	2919	798 (27.3%)
Coronavirus	2909	178 (6.1%)
<i>Escherichia coli</i> K99	1115	22 (2.0%)

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, April to June 2010.

Two two-week-old calves from amongst a group of twenty that were diarrhoeic and

inappetent were submitted for postmortem examination. At necropsy both had distended rumens with rancid milk contents and severe white, crumbly necrotising rumenitis. Profuse growths of *Candida albicans* were recovered from cultures in both cases. Fungal hyphae were evident on histological examination in one case. Large numbers of *Cryptosporidia* species were detected in the faeces of one calf. It was suggested that cryptosporidiosis was the primary cause of the diarrhoea with rumen overfill and antibiotic treatment predisposing to the rumenitis.

Abomasal impaction was diagnosed in a two-year-old heifer submitted for necropsy in late March with a history of poor appetite, weakness and death. Gross postmortem examination revealed a large quantity of sand and stones causing impaction of the pyloric region of the abomasum. The rumen contents were dehydrated and a large number of stones were also present among the forage ingesta present in the rumen.

A twelve-year-old cow was submitted with a history of dysentery whilst at grass. At necropsy there was a large abscess in the abomasal wall and a bleeding ulcer was present in the abomasal mucosa. The carcass was bled out

due to haemorrhage into the gastrointestinal tract.

A seventeen-month-old heifer, one of a group of twenty-two was submitted with a history of ataxia and death at grass. At necropsy there was haemorrhagic ulceration of the abomasum and omasum with bleeding out of the carcass. An eight-year-old cow was submitted with a history of sudden onset of lethargy and knuckling. There had been no response to routine therapy and poisoning or intestinal torsion was suspected. At necropsy there was entrapment and strangulation of the small intestine by fibrous adhesions between the rumen and the body wall.

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 310 bovine faecal samples. 4 samples (1.3 per cent) contained acid-fast organisms typical of MAP. Of 2102 bovine blood samples that were tested for antibodies to MAP 214 (10.2 per cent) were positive.

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 to June 2010

	No of parasitic ova						% positive
	Total	Negative	+	++	+++	++++	
Liver fluke							
Bovine	666	564	71	23	6	2	15.3%
Ovine	210	195	5	4	3	3	7.1%
Paramphistome							
Bovine	577	370	100	79	16	12	35.9%
Ovine	183	158	21	3	1	0	13.7%
Coccidia							
Bovine	903	691	137	30	18	27	23.5%
Ovine	295	105	121	29	23	17	64.4%
Strongyle worm egg count							
		<500 epg	≥500 epg				
Bovine	744	171	43				5.8%
Ovine	279	57	62				22.2%

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

Nutritional and metabolic disease

A ten-year-old cow was submitted with a history of recent onset of aggressive behaviour. Histologically there was bridging fibrosis and megalocytosis of the liver and grossly visceral oedema secondary to portal hypertension was seen. The cow and her cohorts had been fed round bale silage containing ragwort six months previously.

Ragwort poisoning was also diagnosed in another (five-year-old) cow from this farm which died ten days later. Again there was a history of recent onset aggressive behaviour. Histological findings were similar in the two cases. As the toxic principle (the alkaloid retorsine) remains active in ensiled plants, the farmer was advised to physically remove the ragwort from the field prior to making further silage or hay. Spot spraying could have been another option if several weeks were allowed to elapse between spraying and cutting to allow the plants to die and rot.

Reproductive and mammary diseases

Abortion

Specimens from 87 bovine abortions and stillbirths were examined during the quarter. Significant pathogens were detected in 41 cases (47.1 per cent). Of these, *Leptospira* Hardjo (13 cases, 14.9 per cent) was the most commonly identified pathogen. Other pathogens identified included *Escherichia coli* (10 cases, 11.5 per cent), *Arcanobacterium pyogenes* (6 cases, 6.9 per cent), *Bacillus licheniformis* (5 cases, 5.7 per cent), BVDV (4 cases, 4.6 per cent) and *Neospora caninum* (3 cases, 3.4 per cent),

Mastitis

A total of 1089 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Seventy eight (7.2 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further

141 samples. *E. coli* was the most frequently isolated organism and accounted for 22.6 per cent of isolates cultured. Other frequently identified organisms included, *Streptococcus uberis*, (14.6 per cent), *Staphylococcus aureus* (12.2 per cent), other *Staphylococcus species* (10.1 per cent), other *Streptococcus species* (7.9 per cent), *Enterococcus species* (4.9 per cent), *Pseudomonas species* (3.4 per cent), *Streptococcus dysgalactiae* (3.6 per cent), *Corynebacterium bovis* (3.2 per cent) and *Bacillus licheniformis* (2.5 per cent).

Neurological diseases

An 11-month-old heifer was presented with a history of sudden collapse, opisthotonus, lateral recumbency and a sub-normal rectal temperature. There had been no response to supportive therapy. At necropsy a pituitary abscess (basilar empyaema) was present. A similar case was described in a 12-month-old bullock. This animal presented with stiffness, salivation and death. At the time of submission botulism was suspected. At necropsy, basilar empyaema was diagnosed (Figure 1).

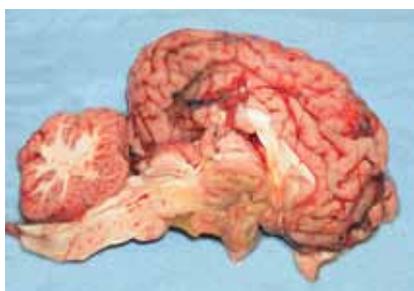


Figure 1: Basilar empyaema in a 12-month-old steer

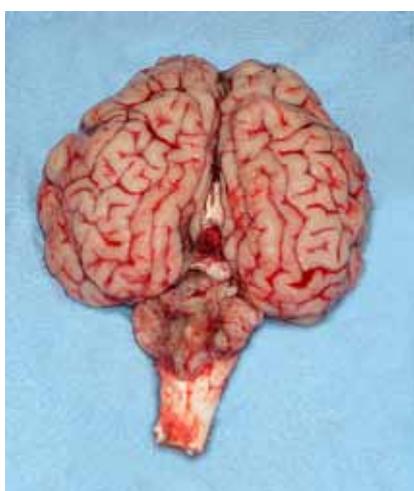


Figure 2: Cerebellar hypoplasia in a ten-day-old calf

In this case the pituitary abscess had extended locally to the ventral mid-brain. No other abscesses, which may have served as the original source of the infection were detected in the carcass.

A ten-day-old calf which had been ataxic since birth was submitted. At necropsy cerebellar hypoplasia (Figure 2) and omphalitis were detected. On histological examination loss of the external granular layer and Purkinje cells was seen. There was reduced cell density in the internal granular layer. Tests for BVDV were negative.

Listerial encephalitis and abomasal ulceration were diagnosed in a two-year-old bull on the basis of gross postmortem examination and histology. The animal presented with head pressing, circling and aggression and showed

no response to corticosteroid and antibiotic therapy. In the brain there was severe focal encephalomalacia with macrophage activity, microabscessation and lymphoid perivascular cuffing. These lesions were considered indicative of listerial encephalitis. *Listeria monocytogenes* was not recovered from brain cultures.

Botulism toxicosis was diagnosed in two cows from a herd in which there had been a suspected botulism outbreak. In total 27 cows became recumbent and either died or were euthanased on humane grounds. Among the other major clinical signs noted were a 33% reduction in dietary intake and a 20% reduction in average milk yield. The cows were on a diet of grass silage, brewer's grains, bread and in-parlour concentrate. Necropsy findings were non-specific or incidental. Vitreous humour magnesium and calcium levels were within normal limits. Botulinum toxin type C/D was detected in the faeces and small intestine contents of one of the cows submitted. The source of the botulinum toxin was not determined in this case. The cows and heifers had been vaccinated twelve months previously with a *Clostridium botulinum* toxoid.

Other Diseases

Myopathy was diagnosed in a 12-month-old heifer which died suddenly having previously been seen foaming at the mouth. At necropsy the muscles of the diaphragm were swollen, wet and streaked with haemorrhages and there were cardiac haemorrhages. Histologically in the diaphragmatic muscles there was an acute multifocal, monophasic degenerative myopathy.

A six-and-a-half-year-old cow was presented with a history of sudden death. At necropsy a superficial haemorrhage was found on the left ventricular wall, with blood clots in the pericardial sac. A large abscess, 7 cm diameter, was present in the left atrial wall. On incision this was found to contain foul-smelling pus from which *Arcanobacterium pyogenes* was recovered. A diagnosis of cardiac abscessation was made.

Corneal squamous cell carcinoma was diagnosed in an eight-year-old cow presented at an abattoir. Gross examination of the eye showed a long, thin exophytic growth from the

mid cornea (around 15 cm in length), composed of dense yellow tissue (Figure 3).



Figure 3: Corneal squamous cell carcinoma in an eight-year-old cow

On histological examination the mass was composed of cells showing ordered progression from columnar basal cells to flattened eosinophilic squamous cells. The underlying cornea was thickened, pigmented, vascularised and had multi-focal lymphoplasmacytic infiltrates. Primary squamous cell carcinomas of the cornea are rare in bovines, they more commonly arise from secondary invasion by conjunctival tumours.

A two-week-old calf was submitted with a history of stiff gait from birth and development of diarrhoea at ten days of age. The calf became recumbent with loss of feeling or power in the hind limbs and died. At necropsy there was omphalitis, with thrombosis of the umbilical arteries which extended into and occluding the lumen of the aorta and the iliac arteries. The muscles of the hind quarters were pale with associated subcutaneous oedema. A diagnosis of navel ill and aortic thrombosis was made.

Two cases of malignant catarrhal fever (MCF) were diagnosed during the reporting period. The first case was in an 18-month-old bullock and the second in a ten-month-old heifer. Both animals presented as sudden deaths. In the case of the heifer there was a history of grazing with sheep. Full gross necropsy and histological examination was carried out in each case and the diagnosis was confirmed serologically.

Owners were advised of the variability of the incubation period for MCF and that further cases may occur in the affected groups.

Malignant oedema was diagnosed in a one-year-old bull that was submitted for necropsy in May five days after bloodless castration by burdizzo. The creation of an anaerobic focus by burdizzo castration is likely to have predisposed this animal to infection. Positive fluorescence for *Clostridium sordellii* was detected in testicular smears supporting the diagnosis of malignant oedema.

Bovine neonatal pancytopenia

There were five instances of bovine neonatal pancytopenia recorded during the reporting period. In one case two calves were submitted from the same herd. In all cases the calves were between one and four weeks of age and presented either as sudden deaths or following a short period of treatment for general malaise. Gross necropsy findings were consistent and included multifocal echymotic haemorrhages in multiple organs, the musculature and connective tissue. One case had bled profusely from an ear tag wound. *Mannheimia varigena*, and *E. coli* were identified as potential secondary infectious agents in some cases. All cases tested negative for the presence of BVDV.

Bovine lymphoma

Two interesting cases of sporadic lymphosarcoma were recorded during the reporting period. A case of atypical sporadic lymphosarcoma was diagnosed in an 11-month-old dairy heifer submitted with neurological signs. There was a large locally invasive mass immediately ventral to the pre-sphenoid bone and further masses within the cranial vault (Figure 4) and supra-orbital sinuses.



Figure 4: Atypical intracranial sporadic lymphosarcoma in an 11-month-old heifer

Histological examination showed a locally invasive lymphoma with an intermediate to high mitotic index. There were no visceral tumours detected at necropsy. The neurological signs were the result of the space occupying mass in the cranial fossa. Immunocytochemistry demonstrated that the tumour was of T cell lineage (CD3).

A second case occurred in an eighteen-month-old heifer that was submitted with a history of dullness and inappetence. An intra-abdominal lymphosarcoma was detected on necropsy.

SMALL RUMINANTS (SHEEP):

Respiratory diseases

Respiratory disease was identified in 27 ovine postmortem submissions during this quarter. *Mannheimia haemolytica* (eleven cases), bronchopneumonia (six cases), fibrinous pleurisy (three cases), jaagsiekte (two cases) and *Pasteurella multocida* (two cases) were the most common diagnoses.

A six-week-old lamb died suddenly, there having been a few other deaths from amongst a group of twenty. At necropsy with histological examination, the lamb had an interstitial pneumonia with hyaline membrane formation, thickened alveolar walls and there were neutrophils and macrophages in the alveolae. Bacterial cultures were sterile and tests were negative for PI3V. The cause(s) of the lesions were not established.

Maedi was diagnosed on the basis of serology and histology, in a group of imported sheep. Full tracing was undertaken and precautions taken to prevent any spread of the disease.

Alimentary Disease

Emphysematous, haemorrhagic abomasitis due to *Mannheimia haemolytica* was diagnosed in a three-week-old lamb. During the same week several other similar cases of abomasitis were also detected.

Acute fascioliasis was diagnosed in a two-year-old ewe submitted for necropsy in May. This was the third death in this flock inside a week. Abomasal emptying defect was diagnosed in a four-year-old pedigree Suffolk ram, submitted with a history of chronic right sided abdominal distension.

Johne's disease

Eighteen ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. One sample (5.5 per cent) contained acid-fast organisms typical of MAP. Twelve ovine blood samples were tested for antibodies to MAP, 2 (16.7 per cent) of which were positive.

Reproductive diseases

Specimens from 14 ovine abortions and stillbirths were examined during the 2nd quarter. Significant pathogens were detected in 11 cases (78.6 per cent). Of these, *Toxoplasma* was the most commonly identified pathogen and was detected in 9 cases (64.3 per cent). Other pathogens identified included, *Leptospira* (2 cases, 14.3 per cent) and *Listeria* (1 case, 7.1 per cent).

Other diseases

Septicaemic pasteurellosis due to *Bibersteinia trehalosi* was diagnosed in 14-month-old hoggets. The sheep were reported to be vaccinated but details of the programme were not available.

Other diseases diagnosed in flocks during the reporting period included caseous lymphadenitis (*Corynebacterium pseudotuberculosis* infection) and corneal 'melting ulcers' due to highly resistant *Pseudomonas aeruginosa*.

GOATS:

A one-day-old pygmy goat was submitted with a history of euthanasia following inability to stand. At necropsy the cerebellum was found to consist of only a small nubble of tissue. Histological examination confirmed profound hypoplasia and dysplasia of all layers of the cerebellum. No evidence of Border Disease virus presence was seen by immunocytochemistry.

Coccidiosis was diagnosed in a 12-week-old goatling, one of triplets. The history indicated diarrhoea since four weeks of age, weight loss and weakness. At necropsy there were multifocal to coalescing white nodules seen in the small intestine wall. Histology confirmed the severe military invasion of the crypt epithelium by various stage coccidial organisms. Large numbers of coccidial oocysts were seen in faecal preparations.

PIGS

Alimentary disease

Torsion of the left lateral lobe of the liver (Figure 5) was diagnosed at necropsy of an 11-month-old sow, the third sudden death in the herd within four days.

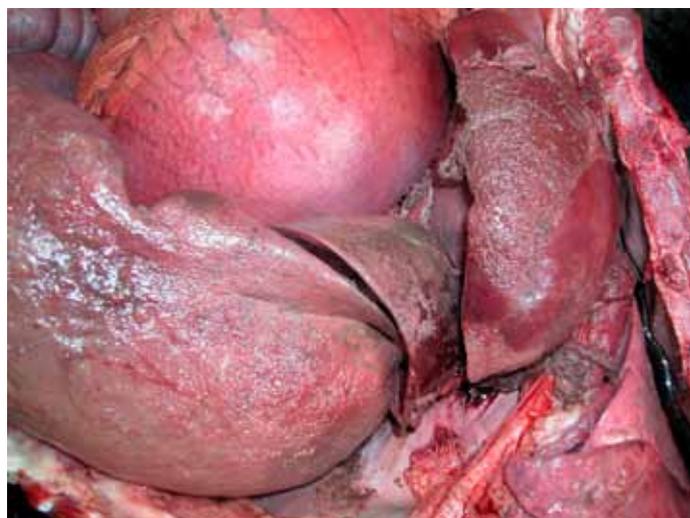


Figure 5: Torsion of the left lateral lobe of the liver in an 11-month-old sow

Other diseases

Streptococcus suis was isolated in septicaemic distribution from a four-month-old growing pig which was one of several to die per week over a period of time. Suppurative meningoencephalitis was detected histologically. Low levels of PCV2 antigen were detected in cryostat sections of lymph node. An abattoir submission of a porcine liver was examined histologically. An aggressive and invasive polymorphic predominantly large cell lymphosarcoma with a high mitotic index was identified.

BIRDS: POULTRY

Three instances of *Enterococcus hirae* infection were diagnosed during the reporting period. Common clinical features were neurological signs in young chicks with birds showing torticollis and prostration. Gross postmortem examination was unremarkable. Histology showed extensive foci of leucoencephalomalacia without an associated inflammatory response in the cerebrum and brain stem. *Enterococcus* species were isolated in septicaemic distribution.

Marek's disease and coccidiosis were diagnosed in a flock of 19-week-old birds coming into lay. The history indicated that birds were going light and dying. At necropsy,

enlarged livers, enlarged mottled spleens, pale nodules in the intestine wall and enlarged kidneys with pale nodules were evident. There was also ulceration of the proventricular mucosa and the koilin layer of the gizzard. Histologically, in the livers there were extensive focal to confluent lesions containing neoplastic pleomorphic lymphoid cells with a high level of mitoses and the presence of large Marek's-type cells. In the spleens there was generalised infiltration by neoplastic cells with a high mitotic index and Marek's-type cells. There were comparable lesions in the kidneys, intestine and proventriculus. Large numbers of coccidial oocysts were seen in intestinal contents.

Pulmonary hypertension syndrome was diagnosed in eight-week-old broilers from a small flock with increased mortality.

BIRDS: OTHER

Three cases of yersiniasis were diagnosed during the reporting period. The birds concerned were a part of two different zoological collections. Advice was given on possible control strategies.

Salmonella Typhimurium infection was diagnosed in three-month-old pigeons with a history of dullness and malaise. At necropsy, carcasses were severely congested with excess fluid in the body cavities. The livers were enlarged and friable. Histologically there was hepatoparenchymal necrosis and interstitial nephritis. *Salmonella* Typhimurium was isolated in moderate to large numbers and in septicaemic distribution.

A 28-year-old pelican was examined after being found dead. Necropsy showed massive haemorrhage from a kidney and a right wing disjuncted with ankylosis. Histological examination showed severe sub-acute to chronic pyogranulomatous nephritis. Ziehl-Neelsen stained sections were negative for the presence of acid fast organisms.

HORSES

An 11-year-old horse with a history of pyrexia, conjunctivitis and a sub-cutaneous lump in the right neck region, suddenly developed neurological signs and was euthanased on humane grounds. At necropsy there were multiple lymphatic nodules in the connective tissue of the sub cutis of the neck and chest wall. The cerebrum and cerebellum were considered to be of unusually firm consistency. Histological examination showed diffuse foci of lymphocytic cuffing in the cerebrum and cerebellum. The histology of the sub-cutaneous nodules was suggestive of multicentric lymphosarcoma. The horse was negative on serology for equine viral arteritis (EVA). It was concluded that the nervous signs were due an encephalitis, possibly the result of herpes virus infection. In this case the lymphosarcoma was considered to be a parallel and unconnected condition.

Two cases of *Strongyloides westeri* were recorded in foals of four-to-six-weeks of age. Small intestine burdens ranged from 21,300 to 38,200 worms. Concurrent conditions were colonic impaction and omphalitis.

This summary has been compiled by the Veterinary Sciences Division of the Agri-Food and Biosciences Institute (AFBI*) of Northern Ireland and is based on diagnostic submissions to AFBI's veterinary laboratories at Stormont, Belfast, and Omagh, Co Tyrone.

<http://www.afbini.gov.uk/index/services/diagnostic/adds.htm>

*AFBI was created on 1st April 2006 as the amalgamation of DARD Science Service and the Agricultural Research Institute of Northern Ireland. AFBI operates a farm animal disease diagnostic service on behalf of the Department of Agriculture and Rural Development for Northern Ireland.