

Highlights:

- Nutritional osteodystrophy in fattening bulls
- *Clostridium botulinum* type D toxicosis in cattle
- Parasitic gastroenteritis in sheep
- Avian influenza survey of wild birds
- *Reimerella anatipestifer* septicaemia in wild ducks
- Infectious laryngotracheitis

CATTLE

Respiratory diseases

Pneumonia was identified as the cause of death in 75 carcass submissions between October and December 2005. *Mannheimia haemolytica* (13 cases), *Mycoplasma bovis* (11 cases), *Dictyocaulus viviparus* (7 cases), *Histophilus somni* (6 cases), infectious bovine rhinotracheitis (IBR) virus (5 cases) and *Pasteurella multocida* (6 cases) were the most common pathogens isolated. In addition, bovine respiratory syncytial virus (RSV) was isolated from 4 cases, aspiration pneumonia was diagnosed in 3 cases and bovine parainfluenza-3 (PI3) and bovine viral diarrhoea (BVD) viruses were each isolated from one case.

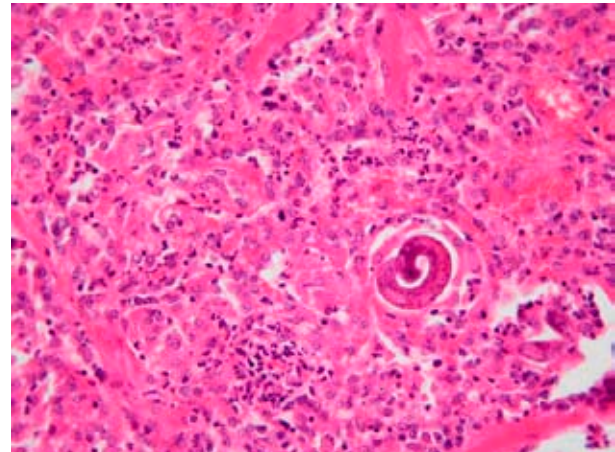


Fig 1. *Dictyocaulus viviparus* larva in calf lung

In one incident, nasal mucus and faeces were submitted from a recently housed 2-year-old heifer with acute respiratory disease. Although the clinical signs were suggestive of IBR, immunofluorescence tests for IBR virus were negative. Lungworm larvae were, however, identified in faeces suggesting parasitic pneumonia.

A six-month-old calf was submitted from a group of 20 in which one other had died from pneumonia. Postmortem examination revealed lungworm and secondary bacterial pneumonia associated with *Pasteurella multocida* infection. In addition, lesions of necrotising enteritis were present and the mesentery was oedematous. Large numbers of coccidial oocysts and significant numbers of strongyle eggs were found in the faeces. Tests for BVD virus were negative.

In another incident, bought-in calves had been losing weight and were off feed although not scouring. Eleven in a group of 26 had died within 10 days.

Histological examination of lung tissue revealed necrotising pneumonia with marked pleurisy and *Mannheimia haemolytica* was cultured from the lesions. However, *Salmonella* Dublin, which was isolated in a septicaemic pattern from multiple organs, was considered to be the most significant factor in the disease outbreak.

Two recently calved cows were submitted for postmortem examination from a 150-cow dairy herd. Lesions consistent with IBR were observed in both carcasses and immunofluorescence to IBR virus was detected in lung and trachea of one.

Alimentary diseases

BVD / mucosal disease

A total of 652 blood samples from 291 separate submissions were tested by virus isolation or antigen capture ELISA for BVD virus. Of these, a positive result was obtained from 65 samples (10%). In addition, 443 tissues and nasal mucus samples from 193 separate submissions were tested by immunofluorescence for the same virus, with 10 (2.3%) found positive.

Two cases of mucosal disease were confirmed at postmortem examination during this quarter. One case was a 10-month-old bullock that had been submitted with a history of enteritis that was unresponsive to treatment. Abomasitis, enteritis and fibrinous typhlitis were observed at postmortem examination and BVD viral antigen was detected in the spleen. The other case was a 26-month-old bullock, that developed acute enteritis in a closed dairy herd. Linear ulceration of the

oesophagus and extensive ulceration of the abomasum were observed. BVD virus was detected by immunofluorescence in the ulcerated abomasum and mesenteric lymph node.

Blood samples from two 12-month-old heifer calves with ill-thrift and scouring were submitted for BVD serology and virus isolation. BVD virus was isolated from the blood of both animals and serum antibody titres were detected. The veterinary practitioner was advised to resample in 3 weeks to determine whether seroconversion indicative of recent infection had occurred.

Neonatal enteritis

In the final quarter of 2005 faeces samples from 340 animals were tested for rotavirus and coronavirus. Rotavirus was detected by ELISA in 91 samples (27%). Positive coronavirus ELISA results were found in 13 (4%) samples. Of 136 samples tested for *E coli* K99 antigen, five samples (4%) were positive.

High levels of cryptosporidia were detected in 23 of 357 samples (6%), medium levels in 59 samples (16%) and low levels in 44 samples (12%).

Pseudomonas aeruginosa, which has been previously associated with enteritis in calves, was isolated at high levels from faeces of a neonatal calf that had enteritis. Rotavirus antigen was also detected.

Table 1: Endoparasitic infections in ruminants in Northern Ireland, October to December 2005

| | Number | | | Number of parasites | | | | Percentage positive |
|---------------------------------|--------|----------|-----------------|---------------------|----|-----|------|---------------------|
| | Total | Negative | With > 800 epg* | + | ++ | +++ | ++++ | |
| Liver fluke | | | | | | | | |
| Bovine | 425 | 377 | - | 40 | 7 | 0 | 1 | 11.3 |
| Ovine | 330 | 314 | - | 8 | 3 | 1 | 4 | 4.8 |
| Coccidia | | | | | | | | |
| Bovine | 540 | 392 | - | 118 | 15 | 9 | 6 | 27.4 |
| Ovine | 210 | 94 | - | 108 | 8 | 0 | 0 | 55.2 |
| Strongyle worm egg count | | | | | | | | |
| Bovine | 495 | 431 | 64 | | | | | 12.9 |
| Ovine | 189 | 142 | 47 | | | | | 24.9 |

Key > 800 eggs per gram of faeces (epg) was considered of likely clinical significance
 + Low, ++ Moderate, +++ High, ++++ Very high

Postnatal enteritis

Parasitic ova found in ruminant faeces samples submitted during the period are shown in Table 1.

Blood and faeces samples were received from a one-year-old calf in October. No clinical history was supplied but *Salmonella* Dublin was isolated from the faeces on secondary enrichment. A faecal egg count indicated 1000 strongyle eggs per gram and BVD virus was isolated from the serum sample.

A postmortem examination was carried out on two animals that had died in a bull beef unit in October and November. Lesions of rumenitis with devitalisation of the rumen wall, fibrinous peritoneal adhesions and septicaemia were

seen. Histological lesions included congestion, oedema and thrombosis of the rumenoreticulum and severe acute hepatitis. The gross appearance was indicative of excessive grain feeding. The herdowner was advised to introduce the grain ration more gradually in order to prevent the rumenal damage.

Postmortem examination of a cow submitted in September revealed small numbers of adult Paramphistomes (rumen fluke) feeding on the rumen mucosa near the junction with the reticulum (fig 2). Paramphistomes have similar life cycle to *Fasciola* except that development in the final host occurs entirely in the alimentary tract. After ingestion of encysted metacercariae, excystment occurs in the duodenum and young flukes attach and feed there for



Fig 2. Adult Paramphistomes (rumen fluke) on rumen mucosa

about six weeks before migrating forward to the forestomachs where they mature. Any pathogenic effect is associated with the intestinal phase of infection and the small numbers found in the rumen of this case were considered an incidental finding.

Johnes disease:

A total of 194 bovine faecal samples were received for examination by modified Ziehl-Neelsen staining. Typical acid-fast organisms, consistent with *Mycobacterium avium* subspecies *paratuberculosis* (MAP), were identified in 26 samples. A total of 1110 bovine sera, including samples from individual animals and herds, were received for testing for antibodies to MAP. Of these, 1004 sera were negative, 7 gave an inconclusive result and 99 were positive.

In one submission, two of 13 blood samples were seropositive to MAP. Both samples gave high positive results, suggesting they were in or moving towards the clinical phase of disease.

Nutritional and metabolic diseases

Four 6-month-old bulls were submitted for postmortem examination from a batch of 60 cattle, 11 of which were

recumbent. The diet consisted of silage and corn gluten, supplemented with 'dry cow' minerals. At postmortem examination, two of the bulls had femoral fractures and the other two animals had haemorrhage around the insertion of the Achilles tendon on the talus, with either rupture of the tendon or avulsion of the tip of talus from the hock. In two cases there was enlargement of the ribs at the costochondral junctions and in one bull the articular cartilage readily sheared from the underlying bone. Histologically there were areas of subchondral bone collapse and fibrosis. In rations for growing cattle the calcium:phosphorus ratio should be at least 1:1 with a slight excess of bioavailable calcium. The calcium:phosphorus ratio in corn gluten is 1:10 and when fed with silage calcium supplementation is required to bring the ratio of the total diet to >1:1 and prevent abnormal bone development and decreased bone strength. The 'dry cow' minerals being used as a supplement in this case contained a low concentration of calcium.

Blood samples were submitted from three downer cows that had calved 3-5 months previously in a dairy herd of 160 cows kept indoors. Low blood calcium concentrations (within clinical hypocalcaemia range) were detected in all 3 samples. The farmer not only zero-grazed but fed a home-mixed diet. Advice was given to check the mineral balance of the diet.

Low copper concentrations and erythrocyte glutathione peroxidase activity were detected in blood samples submitted in December from a heifer and a bullock from a suckler herd with a history of ill-thrift. Seroconversion to BVD virus was also detected.

Reproductive and mammary diseases

Abortion

Specimens from 112 bovine abortions were examined between October and December 2005. Pathogens associated with abortion were detected in 43 cases (38%). Of these, *Leptospira* Hardjo was the most commonly identified pathogen (28%). *Salmonella* Dublin was cultured from 10 cases (23%) while *Neospora* infection was diagnosed in 7 cases (16%). *Brucella abortus* biotype 1 was cultured from the abomasal contents of two fetuses submitted from one herd in November. This herd had been recently restocked after a previous outbreak of brucellosis. BVD virus was detected by immunofluorescence in liver, lung and kidney from one foetus submitted from another herd.

Mastitis

A total of 1046 bacterial isolates were obtained from milk samples submitted from acute and chronic cases of mastitis. Environmental pathogens, including coliforms (14.9%), *Streptococcus uberis* (11.1%) and yeasts (3.4%) accounted for 29.4% of the isolates. *Staphylococcus aureus* accounted for 10.2% of the isolates, with smaller numbers of *S. dysgalactiae* (1.6%) and *S. agalactiae* (2.6%). Less frequently isolated organisms included *Pasteurella spp.*, *P. aeruginosa* and *Corynebacterium bovis*. Sixty two samples (5.9%) that yielded multiple bacterial isolates were considered to be contaminated.

An investigation of subclinical mastitis in a 60-cow dairy herd with elevated bulk milk cell counts in the region of 900,000 cells per ml was carried out in December. Individual quarter samples were collected

from 20 cows with cell counts over 250,000 cells per ml. The main isolates were *S. aureus*, *S. agalactiae* with smaller numbers of *C. bovis* and coagulase-negative staphylococci. Consistently the highest cell counts were detected in the right forequarters. A milking machine problem was therefore suspected. *S. agalactiae* is an unusual isolate at VSD although an increasing incidence has been noted recently. As this organism is an obligate mammary gland pathogen, treatment of all cows with an appropriate antibiotic at drying off time was recommended along with culling of the *S. aureus*-infected cows.

Nervous diseases

Botulism

Samples were submitted for botulinum toxin testing from five herds. Type D toxin was identified in the gut contents from two animals from one herd, one submitted in October and one submitted in December. In one outbreak animals from three separate farms were affected. Signs included sudden onset of collapse, with progressive flaccid paralysis and tongue paralysis developing later. Botulinum toxin tests in this case were negative. Poultry litter had been spread on an adjacent farm.

Other diseases

Clostridial diseases

Six cases of black disease and eleven cases of blackleg were identified by postmortem examination of carcasses submitted during this quarter.

In one case blackleg was identified on postmortem examination of an unvaccinated 3-month-old calf.

Clostridium septicum antigen was detected by immunofluorescence in the affected muscles but, unusually, no *C. chauvoei* antigen was detected.

Chronic reticulitis

Postmortem examination of an 18-month-old beef heifer submitted in December revealed a congested carcass and a large mass approximately 9" x 9" of pale tissue enclosing numerous caseous abscesses attached to the serosal surface of the reticulum and omasum. On histological examination, this tissue was found to be fibrotic with occasional foci of rod-shaped bacteria present. The likely cause of death was septicaemia originating from the septic focus associated with the wall of the reticulum. The cause of this lesion may have been penetration of the wall of the reticulum by a foreign body.

SHEEP

Reproductive diseases

Specimens from 19 ovine abortions were examined during this period. Recognised pathogens were detected in eight (42%) cases. Of these, *Toxoplasma* was identified in three, *Campylobacter* spp. were cultured from two, *Leptospira* from two and chlamydial abortion agent identified in one case.

A three-year-old ewe that had been found dead was submitted for postmortem examination in December. Examination revealed a congested carcass and two fetuses of approximately one-month gestation in the uterus. *Listeria* spp. were isolated in a septicaemic pattern; no histological lesions were detected in the brain.

A 2-year-old ewe was found dead in November in a group of 30 Blackface ewes grazing hill pasture. At postmortem examination, purulent metritis and peritonitis with fibrinous adhesions to the serosal surface of the uterus were observed. *Arcanobacterium pyogenes* was isolated from the uterus and spleen.

Alimentary diseases

Parasitic gastroenteritis was diagnosed as the cause of death in 12 carcass submissions during the quarter. Many of these cases had very high worm burdens. In one case, two lambs submitted in October for postmortem examination had worm counts in excess of 100,000 in the small intestine. A mixture of *Trichostrongylus* and *Nematodirus* worms were detected. In another case, several sheep were submitted for postmortem examination in November from a group of 70 Wiltshire Horns that had not been doing well. High levels of *Teladorsagia* spp., *Trichostrongylus* spp., lungworm and liver fluke were present.

Two unthrifty lambs were submitted for postmortem examination in December. One lamb was emaciated. Low grade liver fluke infection and 4,500 *Nematodirus* worms were present. Lower numbers of *Trichostrongylus vitrinus* worms were also detected. Pneumonic pasteurellosis, associated with *Mannheimia haemolytica*, was seen in the second lamb.

Parasitic gastroenteritis was commonly diagnosed by faecal egg counts on ovine faeces samples submitted during the quarter. Of 189 samples examined, 47 (25%) had faecal egg counts greater than 800 eggs per gram. Some of these samples had faecal egg counts in excess of 6,000 eggs per gram, an unusual finding for this time of year.

Faeces samples from 11 lambs were submitted in November for faecal egg reduction testing for suspect ivermectin resistance. There was only a 60% reduction in the geometric means of the worm egg counts in 14-day post-dosing samples compared to pre-dosing samples. This finding suggests a reasonably high level of resistance to ivermectin in this flock.

A faeces sample was submitted in November from an 8-month-old lamb with a history of muscle wasting, scour and collapse. The animal had been treated for worms and fluke 4 weeks previously and had been housed for 2 weeks. Extremely high strongyle (24,200 eggs per gram faeces) and *Strongyloides* (361,800 eggs per gram faeces) worm egg counts were detected in the sample.

Respiratory diseases

Laryngeal chondritis was detected in two Texel-type sheep submitted for postmortem examination in December. Both animals had abscessation of the larynx, with oedema of the mucosa causing almost complete occlusion of the laryngeal lumen. This condition is particularly associated with short-necked breeds.

Two cases of sheep pulmonary adenomatosis (Jaagsiekte) were confirmed by the presence of typical histological lesions in lung tissue. One case was a two and a half-year-old ewe with a history of dyspnoea which was submitted in December. The other case was a two-year-old ewe, also submitted in December with a history of ill-thrift. Gross and histological lesions consistent with Jaagsiekte were observed.

Skin diseases

Wool samples from two lambs, presented for slaughter at a meat plant, were submitted in December for examination for sheep scab mites. Sheep scab mites (*Psoroptes ovis*) were confirmed in both samples.

PIGS

Alimentary diseases

Brachyspira hyodysenteriae was identified in faeces samples submitted in October from fattening pigs with diarrhoea.

Respiratory diseases

Three pigs, aged 100-150 days, were submitted in November from a 5,000-pig unit with a history of respiratory disease. Six others had died in recent months. *Pasteurella multocida* was isolated from all three and *Haemophilus parasuis* from one. Although there was little histological evidence of porcine circovirus type 2 (PCV2) infection, a low level of PCV2 antigen was detected by immunofluorescence in one carcass.

Other diseases

Porcine circovirus infection was confirmed in several submissions for postmortem examination. Lesions consistent with porcine dermatitis and nephropathy syndrome were observed in two of these cases.

BIRDS

Poultry

Ventriculitis associated with adenovirus-type inclusion bodies in gizzard epithelium was detected in a batch of poultry.

Immunofluorescence to infectious laryngotracheitis (ILT) virus was detected in tracheas from a batch of 6-day-old and 14-day-old birds. Histological lesions of lymphocytic tracheitis and loss of cilia were seen in the older batch but no tissues were available for histological examination from the younger birds.

Postmortem examination of 10 birds submitted with a recent history of respiratory disease and low mortality, revealed evidence of severe tracheitis in most birds with severe swelling of the head and wattles in several. Histopathological examination revealed severe tracheitis with multiple intracytoplasmic inclusion bodies and epithelial syncytia in the majority of birds. Immunofluorescence and reverse transcriptase-polymerase chain reaction (RT-PCR) tests for ILT virus were positive. Positive antibody titres to ILT virus were also detected in blood samples. Tests for avian influenza (AI) and Newcastle disease viruses were negative.

Five birds and seven cloacal swabs were submitted from a 250,000-bird site. Signs of respiratory infection were reported in one house of point-of-lay birds. Postmortem examination revealed evidence of mild tracheal congestion and exudate in the upper respiratory tract of two birds. Similar, but slightly more severe lesions, were present in one other bird. All birds had been eating well with full proventriculus and gizzard. Histological

examination revealed tracheitis in all birds and intracytoplasmic inclusion bodies, suggestive of ILT virus in all five birds. RT-PCR tests on tissue and faeces pools were positive for the virus. RT-PCR for avian influenza and immunofluorescence tests for AI and Newcastle disease viruses were negative. Further RT-PCR testing has revealed co-infection with wild type and vaccinal type ILT virus.

Twenty-four two-day-old broiler chicks were submitted for postmortem examination in November from a unit in which approximately 25% of 20,000 day-old commercial broiler chicks had died within a few days of having been placed in a new broiler house. Signs included prostration and high mortality within a few hours of placing in the house. Wood shavings had been placed in the house a week previously and the heating had been running since then. Wet viscera and conspicuously congested lungs that sank in fixative were seen on postmortem examination. Histopathology revealed severe acute pulmonary haemorrhage in most birds. The suggested cause was a gaseous toxin, possibly derived from building components in the new house. 'Teflon' poisoning has been described in cage birds and is characterised by acute pulmonary haemorrhage. This substance also occurs in plasticisers, which may have been of relevance in this new building. Mycotoxicosis was also considered, but thought to be a less likely possibility. Mortality ceased after a few days.

An 11-week-old turkey was submitted in November from a group of 12 birds in which eight had died during the previous three weeks. The birds had been dull, off food and had diarrhoea. At postmortem examination, multiple large pale foci were found in the liver, with similar lesions in the wall of the caeca and in the pericardium. Histological lesions consistent with chronic *Histomonas meleagridis* infection were observed in liver and pericardial tissue. The lack of suitable treatment options creates difficulties in treatment of this condition in turkeys.

WILDLIFE

Wild bird avian influenza survey

Wild bird surveillance was carried out in Northern Ireland, as part of the overall UK wild bird surveillance programme. Sampling of live-caught and shot wild birds was carried out between October and December 2005. Faecal samples were collected from the cloaca of live birds that were caught by staff of the Wildfowl and Wetlands Trust. Following capture, these birds were ringed, samples collected for AI virus screening and the birds released. Cloacal swabs from 291 live-caught birds were tested by RT-PCR for high pathogenicity AI virus subtypes H5 or H7, low pathogenicity AI virus subtypes H5 or H7, and other low pathogenicity AI virus subtypes. All samples were negative for AI viruses.

Faecal samples for AI virus examination were collected from the cloaca of birds shot by members of the British Association for Shooting and Conservation as part of legal wildfowling activities. A total of 50 samples were tested and all were negative for AI viruses.

Eight carcasses were submitted for investigation from a seagull mortality event in County Antrim. Seven were tested for high pathogenicity AI viruses (one carcass was too decomposed for examination) and all were negative. The cause of the deaths was not determined. The surveillance of wild bird mortality events for avian influenza virus continues.

Two teals (*Anas crecca*) and five wigeons (*Anas Penelope*) were submitted for AI investigation. Postmortem examination revealed that all birds had been shot. Although the cause of death was identified as gunshot wounds, samples were taken for examination as part of the wild bird survey. Tests for AI virus were negative.

A one-year-old White Headed duck (*Oxyura leucocephala*) was submitted in November from a wildlife reserve after having been found dead. The liver was enlarged and the lungs were heavy and oedematous. *Riemerella anatipestifer* was isolated in large numbers in a septicaemic pattern. There was no evidence of meningitis, in contrast to outbreaks in domestic ducks identified earlier in 2005. Tests for AI virus using RT-PCR were negative.

CAGE AND AVIARY BIRDS

Three African grey parrots were submitted in November with a history of sudden death. Gross lesions and histology consistent with sub-acute septicaemia were observed. *Salmonella typhimurium* was cultured in a septicaemic pattern from all three birds. Tests for psittacosis, AI virus and paramyxovirus-1 were negative. Appropriate public health advice was given.

HORSES

Clitoral swabs were received from 29 horses for culture for contagious equine metritis organisms prior to movement to stud. No CEM organisms were detected. A swab was submitted in December from an adult horse which had a history of flu-like symptoms two weeks previously. The swab had been taken from an open abscess which had appeared on the sub-mandibular region a few days before sampling and *Streptococcus equi* subsp. *equi* was cultured, confirming strangles. Twelve skin scrapings or hair samples were examined for external parasites with chorioptic mange mites being found in one sample. Three abortion investigations failed to identify a significant causative pathogen. A single case of sudden death which was examined postmortem was found to have intestinal displacement and obstruction with associated marked vascular compromise. Viscera submitted from three postmortem examinations in the field were used to diagnose two cases of *S. zooepidemicus* pneumonia and one case of *Strongyloides* species infection.

OTHER SPECIES

A swab was submitted from a previously feral cat that had a chronic nasal discharge following dog bite. Long-term antibiotic treatment with clindamycin had failed to clear the infection. *Aspergillus fumigatus*, *Bordetella bronchiseptica* and *Pasteurella multocida* were isolated from the swab. Unusually the *Pasteurella* was resistant to lincomycin (as was the *Bordetella* isolate). Clindamycin is a lincosamide and this may explain the lack of response to treatment. A.

fumigatus is an unusual isolate in cats, more commonly found in dogs, especially doliocephalic breeds. Treatment is difficult requiring prolonged, sometimes topical anti-fungal treatment.

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.