OVERVIEW
A total of 375 bovine foetuses were examined in the RVLS during February as calving activity approached its peak nationally. Hereditary and developmental abnormalities were identified in 12 carcasses. The cases were distributed among all the RVLS with the majority of cases being recorded by Limerick RVL where scoliosis of the spine and atresia ilei were recorded, as well as three further cases in which Schmallenberg virus was implicated. Placentitis was identified in three cases submitted to Athlone RVL. The submission and examination of foetal membranes can be very informative in such cases and increase the probability of a conclusive diagnosis in an abortion or stillbirth case. Less frequent diagnoses in bovine abortions such as Q fever and Chlamyphila abortus can be made based on foetal membrane histopathology.

There were nine cases during February where a diagnosis of dystocia was made based on gross findings and a further 14 cases where anoxia, hypoxia or asphyxiation was identified as the cause of death. The majority of these cases were associated with prolonged calving. Of those cases in which an infectious cause was identified, Trueperella pyogenes (20 cases) was the most frequently identified pathogen followed by Bacillus licheniformis (12 cases) and Neospora caninum (12 cases). Both Trueperella pyogenes and Bacillus licheniformis are opportunistic pathogens and tend to be associated with sporadic cases of abortion. Diagnoses of neosporosis normally prompt a recommendation from the RVL that female offspring of positive animals are not maintained for breeding purposes as this can perpetuate the infection in the herd. Other pathogens of interest that were identified among abortion cases during February included nine cases of listerial abortion and six cases of Salmonella Dublin abortion.

In addition to the cases of hereditary and developmental abnormalities identified in aborted and stillborn calves, there were a further 13 cases recorded in neonatal calves. Six of these cases were associated with atresia of sections of the intestine. Sligo RVL diagnosed two cases of atrial septal defects and a case of patent ductus arteriosus, while Athlone RVL recorded a diagnosis of renal dysplasia in a calf.

Among the post-natal bovine carcasses submitted for examination during February (214 in total), enteritis was the most commonly recorded diagnosis (30 cases) followed by pneumonia (25 cases). The high relative prevalence of enteritis cases is a reflection of the increased submission of neonatal calves at this time of year among which enteritis is, perennially, the most frequent cause of death. The calf faecal package test is a range of tests that are routinely performed in the RVLS on samples from calves under one month of age to screen them for the most frequently diagnosed causes of neonatal enteritis. Table 1 shows the results of these tests during February on 448 faecal samples from both clinically ill animals, as well as those sampled during necropsy:

Table 1: Table displaying a breakdown of the agents detected in examination of calf scour samples submitted to the Veterinary Laboratory Service in February 2014.

<table>
<thead>
<tr>
<th>Agent</th>
<th>No. positive</th>
<th>No. tested</th>
<th>Percentage positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotavirus</td>
<td>161</td>
<td>448</td>
<td>35.9%</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>108</td>
<td>448</td>
<td>24.1%</td>
</tr>
<tr>
<td>Salmonella spp.</td>
<td>10</td>
<td>448</td>
<td>2.2%</td>
</tr>
<tr>
<td>Coronavirus</td>
<td>1</td>
<td>448</td>
<td>0.2%</td>
</tr>
<tr>
<td>Escherichia coli K99</td>
<td>3</td>
<td>323</td>
<td>0.9%</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>42</td>
<td>420</td>
<td>10%</td>
</tr>
</tbody>
</table>

Mannheimia haemolytica was the most frequently recorded pathogen from necropsies in which pneumonia was diagnosed accounting for five cases. IBR (three cases) and Mycoplasma bovis (two cases) were also recorded. Nine cases of abomasal ulceration and perforation were also diagnosed during February. All cases were diagnosed in calves less than two months of age, except for a case in Kilkenny RVL in a six-year-old cow and a case in a weaning in Limerick RVL. BVD virus was detected in the Limerick case.

Bovine neonatal pancytopaenia is still recorded occasionally in the RVLS with Cork, Kilkenny and Sligo all recording a single case during February.

Sheep:
A total of 125 ovine foetuses were examined across the RVLS during February. Twenty-nine cases of Toxoplasma gondii abortion were recorded with a further 16 cases of Chlamyphila abortus abortion also recorded. Campylobacter fetus was diagnosed as the cause of abortion in two cases while Bacillus licheniformis and Trueperella pyogenes accounted for small numbers of sporadic abortions. Of ovine carcases examined during February (n= 104), enteritis was the most frequently recorded cause of death accounting for 14 cases. Four of these cases were associated with Salmonella Dublin infection – three of the cases on a single farm in Kilkenny and the other case in a week-old lamb in Athlone. Giardia sp. was identified in three cases although the significance of a finding of Giardia sp. in cases of neonatal enteritis is still subject to much debate.

As would be expected at this time of year peripartum conditions such as metritis (five cases – two in Athlone RVL and one in Kilkenny RVL), vaginal prolapse (one case in Sligo RVL) and uterine prolapsed (one case in Sligo RVL) were also recorded. Owing to the nature of these conditions, diagnosis tends to rely on clinical rather than post-mortem observations which give rise to the relatively infrequent recording of these conditions in the RVLS.
NORTH EAST REGION

CATTLE

Fibrinonecrotic oesophagitis

A two to three day-old Charolais-cross calf was presented to Dublin RVL with a history of being weak since it was born. At necropsy, there was a 0.5cm diameter rupture on the right side of the pharynx, adjacent to the opening of the oesophagus, with a severe fibrinonecrotising reaction (Figure 1) tracking down to the level of the apex of the heart. There was a large pocket of milk at the distal end of this tract. The presumptive cause was poor stomach tubing technique.

Figure 1: Photograph illustrating extensive fibrinonecrotising peri-oesophagitis in a calf with a ruptured pharynx. Photo: Máire McElroy.

OLDER CATTLE

Embolic pneumonia

One lung and a large portion of the liver from a cow that died suddenly were submitted to Dublin RVL. On gross examination, there were multifocal thick-walled abscesses 1-4cm in diameter in the liver. Multifocally and randomly in the lung there were 1-2cm areas of necrosis, some with a very thin capsule (<1mm). Histopathologically there was extensive, acute, severe, multifocal random necrosis associated with vascular thrombosis and myriad intralesional bacteria. The pattern of the lung lesions was indicative of embolic spread and was consistent with spread from a hepatic abscess that may have eroded a vessel wall.

SHEEP

Older sheep

Copper poisoning

A 2.5-year-old Texel ewe was presented with a history of having been found dead. At necropsy there was marked jaundice, a friable orange liver, bilateral gunmetal grey kidneys and red urine in the bladder. Liver and kidney copper concentrations were elevated at 6.35 and 0.35mmol/kg respectively (reference ranges 0.06 - 2.5mmol/kg for liver and 0.06 - 0.18mmol/kg for kidney). On histopathology of the kidney, there was a marked haemoglobinuric nephrosis. A diagnosis of acute haemolytic crisis as a result of chronic copper poisoning was made. Chronic copper poisoning occurs when the liver capacity for copper storage has been exceeded, releasing copper into the circulation and causing acute haemolysis. It may be associated with excess dietary intake of copper. Breeds of sheep vary widely in their ability to absorb copper and some, such as the Texel, can accumulate potentially toxic levels on diets below toxic levels for other breeds such as Mountain Blackface, which have a higher tolerance for copper.

OTHER SPECIES

Renal amyloidosis

A diagnosis of renal amyloidosis was made in a young adult male swan that was found dead in a public park (Figure 2). A swan from the same brood had been diagnosed with hepatic amyloidosis previously. Amyloidosis encompasses a group of diseases characterised by the abnormal accumulation of amyloid proteins. In birds, most amyloidosis cases consist of reactive systemic amyloidosis and increased production of serum amyloid A protein (SAA), a normal acute-phase reactant protein involved in the transport of cholesterol and prevention of tissue damage. Under certain conditions, such as chronic inflammatory diseases, SAA is incompletely degraded and accumulates in the form of insoluble proteins within a variety of organs interfering with normal function. Ducks, geese and swans have an increased susceptibility to amyloid deposition, and potential risk factors include chronic infection, enteric parasitism, aging, and social stresses.

Figure 2: Photomicrograph illustrating two glomeruli (green arrows) with extensive deposits of amyloid effacing normal architecture. Photo Maire McElroy.

MID WEST REGION

CATTLE

Chronic nephritis

A six-week-old calf was examined by Limerick. The animal had developed scour within a few days of birth, was treated and appeared to recover. However, the calf relapsed and failed to thrive despite further treatment. Eventually the calf weakened and died. At necropsy both kidneys were enlarged, pale and hardened. On
CURRENT FINDINGS

**Histopathology lesions of chronic tubule-interstitial nephritis were seen.** *Escherichia coli* infection is implicated as a possible cause in calves.

**Multifactorial pneumonia**

A seven-week-old Friesian calf with a history of pneumonia was submitted to Limerick RVL following its death. It had been purchased along with other calves four weeks previously. Shortly after purchase, the calves had been given a preliminary dose of vaccine to protect against Parainfluenza-3 virus, Bovine Respiratory Syncytial virus and *Mannheimia haemolytica*. At necropsy there was consolidation involving the cranial and middle lung lobes. There was also mild tracheitis. *Salmonella Dublin* was isolated from the lung and liver and a PCR test was positive for *Mycoplasma bovis*. *Mycoplasma bovis* was also detected in a three-month-old Friesian bull calf submitted to Limerick with a history of sudden death. Animals in the group had shown signs of pneumonia and there had been vaccination against infectious bovine rhinotracheitis (IBR). The animal had severe diffuse fibrinous pleuropneumonia, with abscessation of the lungs.

**OTHER SPECIES**

Gun shot injury in a large bird of prey

A juvenile White-tailed Sea Eagle (*Haliaeetus albicilla*) found dead near the shore of Lough Derg was submitted to Limerick along with the attached x-ray (Figure 3). This was one of the first two birds to hatch and fledge successfully in Ireland, under the Government-funded sea eagle reintroduction programme, and had received a great deal of media attention in 2013. The X-ray revealed a large number of shot-gun pellets throughout the carcass, as well as callus formation around a fractured leg and wing. The bird was in an emaciated condition. Toxicology testing carried out in the State Laboratory was negative. It was concluded that the bird had been shot at close range, but survived and lived for some weeks before eventually starving to death, as it would have been impaired in hunting and feeding by the broken leg. White-tailed Sea Eagles are protected birds and an investigation into the incident is being carried out by the National Parks and Wildlife Service (NPWS) and An Garda Síochána.

**Parasitism and rodenticide poisoning**

An adult buzzard (*Buteo buteo*) found in a distressed and weakened state, was submitted to an animal sanctuary where it died a short time later. The bird was submitted to Limerick RVL by the NPWS. The bird was underweight and had a very heavy intestinal parasitic burden consisting of tapeworms and roundworms. Toxicology testing carried out on a sample of kidney by the State Laboratory was positive for the rodenticides difenacoum and bromadiolone.

**FURTHER OBSERVATIONS**

Colisepticaemia was diagnosed by Limerick in a four-day-old calf with a history of weakness and drooling for a few hours before death. A zinc sulphate turbidity test carried out on a sample of heart blood gave a reading of four units, suggesting poor absorption of colostral antibodies. A four-week-old Friesian heifer calf submitted to Limerick RVL with a history of staggering and weakness was found to have an abomasal torsion.

**SOUTH EAST REGION**

**CATTLE**

Congenital Polycephalic calf

A full-term calf was submitted to Kilkenny RVL. The calf had two normally proportioned heads (Figure 4), each with normal palate and brain; two separate necks joined by skin at their lower ends; a single vertebral column posterior to the mid thoracic area; two hearts (one larger than the other) and a single liver that was enlarged and golden. There was a diaphragmatic hernia and the stomach was in the thorax. The right hind limb was ankylosed and hyper-extended. Tests for SBV antibody and antigen were negative. This abnormality is likely to have arisen as an accident of development resulting in incomplete separation of identical twins.

Figure 3: Radiograph of a juvenile White-tailed Sea Eagle (*Haliaeetus albicilla*) showing injuries associated with a shotgun discharge at close range. Radiograph courtesy of Treaty Veterinary Clinic.

Figure 4: Photograph of a polycephalic calf seen in Kilkenny RVL. Photo: Donal Toolan.

Calves

Inhalation pneumonia

Extensive pneumonia was diagnosed in a one-day-old calf that had been born smaller than normal. ZST was very low (five units) and *Escherichia coli* was isolated from liver and lung. Foreign material (staining deeply eosinophilic) was...
widespread in alveoli (Figure 5). It was suspected that an intra-uterine septicaemia may have caused the low birth weight of the calf and that lack of colostrum and aspiration of milk aggravated the problem.

**CURRENT FINDINGS**

**Enteritis and Mesenteric Torsion**

A one-month-old calf with a history of passing red fluid from its anus had a torsion of a segment of jejunum. Further examination showed a diphtheritic enteritis in the affected bowel. There were fibrin strands on the serosa of the abdominal organs. No significant isolates were made but it was suspected that the enteritis may have been associated with salmonellosis. The enteritis may have predisposed to the torsion and this led to peritonitis.

**SHEEP**

**Lambs**

Enzootic abortion of ewes (EAE)

EAE was diagnosed in lambs aborted two weeks before term on the basis of patchy gross intercotyledonary placentitis and histologically a suppurative placentitis with vasculitis. Immunohistochemistry was positive for Chlamydia, confirming the diagnosis.

**FURTHER OBSERVATIONS**

*Escherichia coli* K99 was diagnosed in a four-day-old calf with diarrhoea, the first death among 17 calves.

A cow with a solid mass on the side of the face and a left sided exophthalmos was examined. Section of the mass showed very hard bony tissue in the nasal passages of the left side of the skull. Histological examination showed the mass was an osteoma.

Two pregnant ewes that had been recumbent for several days without any obvious nervous signs were euthanased. No gross lesions were seen but listerial encephalitis was found in both animals on histological examination.

**OLDER ANIMALS**

**Acute Fasciolosis**

Acute fasciolosis was diagnosed in an 11-month-old hogget by Sligo RVL. There was gross distortion of the liver and ascites was evident. The flockowner noted that there were five or six comrades not thriving, in spite of concentrate feeding and silage feeding. The prevalence of fluke infestation at necropsy in Sligo RVL is significantly down compared to last year, coinciding with the reduced rainfall over last summer and autumn. However, cases such as this one are a timely reminder for flockowners that liver fluke is a constant threat.

**Sligo RVL diagnosed an atrial septal defect in a two-week-old embryo-transfer Charolais calf. There was hepatic fibrosis and pulmonary atelectasis. Pleural fluid was seropositive for Schmallenberg virus antibodies and BVD virus was known to be circulating in the herd.**

**Calves**

**Dystocia**

Sligo diagnosed dystocia in a full-term Charolais bull calf, that had two broken ribs and bruising around the hips. The calf died a few minutes after calving, having got caught at the hips.

**Abomasal Ulceration**

Acute fibrinous peritonitis, subsequent to perforation of the abomasum, was diagnosed in two calves presented to Sligo. One calf had been dull for a few days, while there was no history of illness in the second. The aetiology of the condition is unclear, with stress, copper deficiency and NSAID treatment implicated as risk factors.

**Older Cattle**

**Traumatic Reticulopericarditis**

Sligo RVL found three pieces of metal (similar in gauge to a clothes hanger) approximately 4-5cm in length in a seven-year-old Friesian cow with reticuloperitonitis. The owner had reported the animal as being dull, but continuing to eat. There was diffuse peritonitis with blood tinged abdominal fluid. There was an adhesion of the reticulum to the diaphragm with localised oedema and inflammation. Concurrent heavy trichostrongyle and rumen fluke burdens were also identified.

**SHEEP**

**Lambs**

Purulent polyarthritis, omphalophlebitis, peritonitis and hepatic ascites were seen in three 10-day-old lambs submitted to Sligo RVL. *Trueperella pyogenes* and *Streptococcus* were isolated from the lesions. The owner reported that the animal had displayed some difficulty in standing, stiffness and head problems ante mortem. The referring practitioner indicated that the lambs were indoors and well bedded. A concentrated iodine solution was applied to the navels. It was suspected that the iodine solution may have been too concentrated and had actually irritated the navel, and predisposed to infection.

**NORTHWEST REGION**

**CATTLE**

**Congenital**

Atrial septal defect

Sligo RVL diagnosed an atrial septal defect in a two-week-old embryo-transfer Charolais calf. There was hepatic

**Figure 5: Photomicrograph of alveoli filled with a deeply eosinophilic staining material with surrounding inflammatory reaction taken from the lungs of a one-day-old calf. Photo: Dónal Toolan.**

**NORTHWEST REGION**

**CATTLE**

**Congenital**

Atrial septal defect

Sligo RVL diagnosed an atrial septal defect in a two-week-old embryo-transfer Charolais calf. There was hepatic fibrosis and pulmonary atelectasis. Pleural fluid was seropositive for Schmallenberg virus antibodies and BVD virus was known to be circulating in the herd.
FURTHER OBSERVATIONS

Several calves were presented to Sligo during February with enteritis and associated hypogammaglobulinaemia. These calves were dehydrated to varying extents. More often than not, no significant pathogen was detected in the faeces of these calves.

Sligo diagnosed rumenal acidosis in a four-year-old ewe, with a history of sudden death. This was the second ewe in the group to die. There was multifocal ulceration of the abomasum. Rumen contents were yellow, watery and porridge-like. The pH of rumen contents was 3.9, indicating acidosis.

SOUTH WEST REGION

CATTLE

Calves
Five different cases of bovine neonatal pancytopenia were diagnosed in Cork RVL. The age profile, around two weeks of age, and gross lesions were similar in theses calves; the lesions consisted of acute anaemia, multiple mucosal and subserosal petechial and ecchymotic hemorrhages (Figure 6), bloody, tarry faeces with absence of diarrhoea and casts of blood and debris in the intestinal lumen. Those gross lesions, along with a marked trilineage aplasia/hypoplasia of the bone marrow (Figure 7) and absence of other significant aetiological agent, prompted a diagnosis of bovine neonatal pancytopenia.

Sheep

Lambs
Intussusception
A three-month-old lamb found dead displayed an intussusception (acute intestinal obstruction) of approx. 8cm in the small intestine (ileum) with associated segmental necrosis, congestion and infarcted mucosa. The proximal section of small intestine was distended with a large amount of watery/light intestinal contents; the intestinal wall was very thin (poor mucosal lining). The large intestine contained scant intestinal contents with tarry appearance. A heavy infection of coccidial oocysts was detected in the intestinal contents. Intussusception was likely consequent to the hyperperistalsis induced by the coccidial infection.

Clostridial enterotoxaemia
A one-month-old lamb, found dead and submitted for examination to Cork RVL showed a hyperemic and congested intestinal tract with distinct dark red and watery intestinal contents. Clostridial enterotoxaemia was suspected on gross examination; subsequently an ELISA test of the intestinal contents produced a positive result for two Clostridium perfringens toxins, alpha and epsilon, suggesting type D enterotoxaemia.

Older sheep
Encephalitis
Bacterial encephalitis was diagnosed in a seven-year-old ram. A grape-size abscess was detected in the cerebrum. One of the horns was cracked and apparently a neoplasm had previously been removed by the practitioner from the base of the horn. There was also marked sinusitis in the frontal sinus and was assumed to be the route of entrance for Truperella pyogenes, which was isolated in the brain.

FURTHER OBSERVATIONS

Arthrogryposis, torticollis and hydranencephaly syndrome were diagnosed in several foetal submissions. These congenital malformations were thought to be caused by the SBV, though the virus was not detected by PCR in brain tissue.
CURRENT FINDINGS

MIDLANDS REGION

CATTLE

Calves
Pharyngitis and oesophagitis
A 10-day-old calf was submitted for necropsy that had a clinical history of pharyngitis respiratory signs and anorexia. Pharyngitis, oesophagitis, reticulitis, focal rumenitis, tracheitis in the upper portion of the trachea and diffuse pneumonia were the pathological changes found. PCR for BHV-1 virus was positive. Histopathological examination showed interstitial pneumonia, multifocal necrotic hepatitis. The latter is typical of IBR viral infection in very young cattle.

Older cattle
Cattle scab (Psoroptic mange)
Psoroptic mange was diagnosed in skin scrapings taken from beef cattle ready for slaughter. These cattle showed hair loss, with lesions along shoulder area, the back and tail head. Treatment with an avermectin was recommended.

In cattle, infestations with Psoroptes ovis are responsible for a severe dermatitis. The disease is very common in some breeds of beef cattle (such as Belgian Blue) whereas dairy cattle such as Friesian Holstein are considered more resistant. It is usually considered that there is only one species, with separate strains adapted to sheep and cattle. The transmission of Psoroptes ovis isolated from sheep to cattle and vice versa is difficult to perform and variably successful. In cattle, lesions that are extensive, characterised by a marked hyperkeratosis and harbouring heavy parasite burdens, are common. Unlike in sheep, the mites are not restricted to the periphery of the lesion and secondary bacterial infection is common. Successful treatment of cattle scab can be achieved using avermectins and/or anti-acaricidal topical treatments. However, depending on the product used, the treatment regime varies depending on whether the preparation used is injectable or a pour-on. Similarly, there can be variation between different types of avermectin and more than one treatment may be required to eradicate the mite.

SHEEP

Lambs
Hepatic abscessation secondary to navel infection was in two three-to-four week-old lambs with a history of having been found dead. There had been a problem in the flock with lambs scouring.

Older sheep
Parasitism
Parasitic gastro-enteritis and coccidiosis were diagnosed in a hogget that had been pining for four months. A strongyle egg count of 5000epg was detected, in addition to a heavy burden of coccidial oocysts in a faecal sample. In addition, there was a large peri-vaginal abscess in this animal, the source of which was not clear. Parasitic pneumonia was diagnosed in a 12-year-old goat. This animal also had significant hepatic fibrosis due to liver fluke as well as multiple micro-abscesses in the kidneys.

FURTHER OBSERVATIONS

Cerebellar hypoplasia and hydrocephalus were seen in a three-week-old calf with a history of “not being right since birth”, recumbency licking and opisthotonus. PCR for Schmallenberg virus was negative and the animal was BVD ear-notch negative.

A two-day-old calf that was underweight and lethargic prior to death was necropsied. Enteritis, peritonitis and jaundice were present. Salmonella Dublin was isolated from multiple tissues.

Peritonitis, secondary to perforated abomasal ulcers, was found in three calves from different farms aged one, three and five weeks. All three calves had died suddenly. A bleeding abomasal ulcer was identified as the cause of death in a five-week-old lamb with a history of having a slight scour and dying.

Malignant Catarhal Fever was diagnosed in a nine-month-old weanling that had become blind prior to death. Histopathological examination showed a non-suppurative encephalomyelitis.

Listeriosis was diagnosed on histopathology of the brain of a two-year-old ewe that had a history of becoming recumbent six weeks before lambing and dying following treatment with Magnesium.