BOVINE ABORTION
There were 693 cases of bovine abortion presented to the RVLs in January. See Table 1 for some of the more common causes of abortion recorded. The majority of the Schmallenberg abortions diagnosed occurred in the catchment areas of Kilkenny and Cork RVLs. All RVLs recorded listerial abortion during January with the majority of cases recorded by Kilkenny (14 cases) and Limerick (eight cases). This is a reflection of the quality of forage fed to animals this winter and confirms the fears stated last summer that owing to the very wet summer that a significant quantity of clay was ensiled with the forage during harvesting.

Table 1: Confirmed causes of abortion in cases submitted to the Veterinary Laboratory Service in January 2013.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trueperella pyogenes</td>
<td>74</td>
</tr>
<tr>
<td>Bacillus licheniformis</td>
<td>42</td>
</tr>
<tr>
<td>Schmallenberg virus</td>
<td>28</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>27</td>
</tr>
<tr>
<td>Salmonella dublin</td>
<td>9</td>
</tr>
<tr>
<td>BVD virus</td>
<td>2</td>
</tr>
<tr>
<td>Neospora caninum</td>
<td>6</td>
</tr>
</tbody>
</table>

PNEUMONIA
Thirty-eight diagnoses of pneumonia were recorded during January. Athlone diagnosed RSV in three five-month-old calves from the same farm and respiratory syncytial virus (RSV) was also diagnosed by Athlone in an 11-month-old heifer. Infectious bovine rhinotracheitis (IBR) was diagnosed in two two-week-old-week-old calves from the same farm. Pasteurella multocida was isolated from four cases where pneumonia was diagnosed as the cause of death. Two of these were in five-month-old calves presented to Kilkenny while Athlone diagnosed P. multocida pneumonia in a five-month-old calf. Cork also diagnosed a case of pneumonia, from which P. multocida was isolated, in an 11-week-old calf.

ENTERITIS
There were 25 diagnoses of enteritis across the RVLs during January. Nineteen of these were in calves less than one month of age. The other six diagnoses were recorded in weanlings. Two of the weanlings were positive for BVD virus on PCR test. Of the calves, Cryptosporidium was identified in seven animals; rotavirus was identified in six and Escherichia coli K99 was identified in one.

SOUTH EAST
Bovine abortion stillbirths & neonatal conditions
Schmallenberg Virus

Several calves with congenital deformities including combinations of arthrogryposis (Fig. 1), torticollis, scoliosis, brachygnathia inferior (shortened lower jaw), doming of skull, hydranencephaly, cerebellar aplasia, hypoplasia of entire brain or spinal cord were seen in Kilkenny.

Atresia jejuni
A number of calves were submitted to Kilkenny during the month of January with a history of alimentary obstruction, enlarged abdomens or dystocia. Gross examination revealed atresia jejuni in all cases (Fig. 2). This is the most common type of atresia seen by John Mee in Teagasc who is researching this condition with the collaboration of the RVLs. Type 1 atresia, where there is patent...
Calves Enteritis

A one-month-old calf was presented to Kilkenny regional lab with a history of scouring for the previous week progressing to weakness and recumbency. Gross post mortem revealed dehydratation, cranio-ventral pulmonary consolidation, abomasal ulcers and the mucosa of the large intestine was congested and hyperaemic. There were white specks visible in the caecum. Laboratory findings revealed coccidial oocysts on faecal examination. BRSV was detected by PCR from a lung swab. Histopathology revealed pneumonia with features of bacterial and viral involvement. An enteritis was observed at histopathology, with coccidia visible (Fig 3).

Older bovines Lymphoma

A 21-month-old thin bullock with a history of weight loss and diarrhoea was submitted to Kilkenny as a suspect case of mucosal disease. There was generalised enlargement of lymph nodes (Fig. 4) and many firm areas in the thymus, which had not regressed. Lymphoma was diagnosed on histology.

Black Disease

The carcass of a nine-month-old yearling was presented with a history of sudden death. Gross post mortem revealed sub-cutaneous oedema, and the heart wall muscles appeared thickened on the right and left sides. There were petechial haemorrhages proximal to the atrio-ventricular valves in the myocardium. The mesenteric lymph nodes appeared oedematous. The surface of the reticulum was reddened but there was no evidence of trauma, and there were ulcers in the abomasum. There was one discreet pale area in the liver. Laboratory findings revealed that lead levels were within the normal range. Histopathological analysis revealed an area of necrosis in the liver suggestive of black disease. There were lesions of chronic fasciolosis also evident. The recommendation was to review clostridial vaccination in this herd. Liver damage caused by migrating immature liver fluke can predispose to this disease.

Ovine Abortion

Schmallenberg Virus (SBV) was the commonest diagnosis by far among aborted lambs examined at Kilkenny. The full range of clinical signs was observed; arthrogryposis, torticollis, scoliosis, domed skull, hydrocephalus (Fig.5), hydranencephaly, aplasia of cerebrum, cerebellum, spinal cord and of whole brain. Almost all suspect cases were confirmed by PCR for SBV, as detectable virus nucleic acid seems to persist until full term more often in lambs than in calves (possibly related to the shorter gestation).

Salmonella

Two four-month-old foetuses were submitted. Foetus 1 was decomposed and scavanged. Foetus 2 had a large volume of fluid present in the abdomen and an enlarged liver. Salmonella dublin was isolated. Control of Salmonella abortion in sheep involves prompt and strict isolation and early diagnosis. Dividing the flock into two or three separate lambing groups may help to limit the spread of infection. Treatment of in-contact animals with appropriate antibiotics may be attempted. Avoidance of contamination of feedstuffs and water is important: hence animals should not be exposed to land treated with infected manure. There is currently no vaccine licensed in Ireland for use in sheep.

Other Species Swans

An adult swan was submitted to Kilkenny RVL. Grossly, the swan was very thin. The liver appeared normal. The kidneys displayed evidence of localised fibrosis. There were a large number of parasites in the GIT. Respiratory tract displayed no gross lesions. Bacteriological, serological and virological assessment revealed little of major significance. A tentative diagnosis of nephritis was made. Histology of the kidney revealed severe interstitial medullary and cortical fibrosis with associated scattered infiltrates of heterophils and lymphocytes/plasmacytes. There was widespread tubular dilation with pale basophilic (mucinous) to more dense palely eosinophilic (proteinaceous) casts and attenuation of lining epithelia. There were a number of clusters of eggs/coccidia present within the fibrotic areas (Fig.6). Large diameter ducts filled with mucinous material plus clustered intact and degenerate macrophages/occasional multinucleate giant cells and heterophils. A final diagnosis of
severe chronic coccidial nephritis was made. *Eimeria christianseni* has been reported to cause lethal coccidiosis in the mute swan, but there is little information surrounding this parasite as a renal pathogen. *Eimeria truncata* has been associated with renal coccidial disease in mallards, pintail ducks and geese. While the renal pathogenicity of *E truncata* in ducks has been demonstrated, the concept of non-affected carrier fowl has not been dismissed.

**Coccidiosis in Rabbits**

An eight-week-old-week-old rabbit from a breeding establishment with suspected salmonellosis was submitted to Kilkenny Regional Veterinary Laboratory. A number of rabbits had died with a history of diarrhoea and stunted growth. Gross post mortem revealed that carcass preservation was good but was in poor body condition. The small intestine and contained gas and mucus-like material. The caecum was enlarged and the wall was friable. Faecal examination revealed a large number of coccidial oocysts (Fig. 7). Histopathology revealed severe villous atrophy in the small intestine. A diagnosis of coccidiosis was reached.

**FURTHER OBSERVATIONS**

- Schmallenberg Virus (SBV) was a common diagnosis among aborted lambs examined at Kilkenny. There is widespread seroconversion to SBV in the south eastern counties of Ireland. In these counties, a clinical diagnosis of SBV can be made in animals with two or more of the clinical signs listed above and demonstration of virus is not necessary.
- There were a number of sheep and goats submitted with a history of poor thrive. On post mortem, they revealed varying degrees of chronic parasitic hepatitis consistent with fascioliosis.
- The common causes of bacterial bovine abortion isolated included *Listeria monocytogenes*, *Trueperella pyogenes* and *Bacillus licheniformis*.
- There is widespread seroconversion to SBV in the south eastern counties of Ireland. In these counties, a clinical diagnosis of SBV can be made in animals with two or more of the clinical signs listed above and demonstration of virus is not necessary. The disease is not notifiable in Ireland, which is in line with policy in other European countries.

**EAST/NORTH EAST**

**Bovine Abortion**

**Fungal Abortion**

Dublin necropsied an eight-month-old foetus submitted with placenta. Gross examination revealed intercotyledonal placental thickening while histopathology revealed a severe suppurative placentitis with arteritis, fungal hyphae associated with lesions were in evidence. *Aspergillus* sp. was isolated from the placenta confirming a diagnosis of mycotic abortion. Mycotic abortion tends to occur sporadically, and this case highlights the usefulness of submitting placenta with the foetus in cases of abortion.

**Schmallenberg**

A presumptive diagnosis of Schmallenberg virus infection was made in a deformed bovine foetus which had caused dystocia based on the history, the post mortem findings and the positive dam serology for Schmallenberg virus.

**Pseudomonas**

*Pseudomonas aeruginosa* was cultured from the first abortion (at seven months of gestation) in a winter milk herd. Pseudomonas is cited as a cause of abortion in dairy cows. It is postulated that the organism may be secondary to either septicemia in the dam or ascending infection through the vagina and cervix or due to persistent endometritis.

**Listeria**

*Listeria monocytogenes* was cultured from the stomach contents and placenta of foetuses from a Holstein Friesian herd experiencing an abortion storm. The herd consisted of both imported and home reared cows. A concurrent outbreak of mastitis, arthritis and pneumonia was seen in cows and was thought to be due to *Mycoplasma bovis* infection. *Listeria monocytogenes* can cause placentitis and fetal septicemia. Abortions are usually sporadic but may affect 10-20% of a herd.

**Congenital Atresia jejuni**

Dublin saw a 10-day-old calf with a history of depression from shortly after birth. Post mortem examination revealed a diaphragm of tissue blocking the jejunal lumen; the intestine proximal to this blockage was greatly distended with faeces, while the intestine distal to the lesion was empty and shrunk. Atresia jejuni was diagnosed.

**Older bovines**

**Bovine Viral Diarrhoea**

Transient BVD infection was diagnosed in home-reared yearling replacement Friesian heifers with intractable green scour containing mucus. High temp was noted initially with some respiratory signs. Histopathological findings in the GIT included multifocal rumen ulceration, villous atrophy in the jejunum, Peyers patch depletion, loss of crypts and...
crypts lined by attenuated epithelium, crypt abscesses and submucosal vessel thrombosis (Fig. 8).

**Ovine abortion**

Toxoplasma

Toxoplasmosis was diagnosed in a one-day-old lamb which couldn’t stand, had abdominal breathing, brachygnathia, with severe diffuse non-suppurative meningoencephalomyelitis associated with protozoal cysts throughout the brain (Fig. 9). Another lamb from the same flock which was stillborn had torticollis and arthrogryposis and Schmallenberg virus was detected by PCR in the brain of the stillborn lamb. Enzootic Abortion of Ewes

A presumptive diagnosis of EAE was made based on the presence of suppurative and necrotic placentitis associated with intracellular basophilic staining suggestive of *Chlamydophila sp* organisms.

**Other Species**

**Birds**

Wasting and a drop in egg production were investigated in 35-week-old broiler breeders. Lymphoma was diagnosed in the liver and small intestine of birds. A breakdown in vaccination against Marek’s disease was suspected. A section of caecum from one bird also showed severe mural granulomatous colitis associated with protozoa, the appearance of which was suggestive of *Histomonas* species. The vaccination protocol in the hatchery was changed to include a second vaccination against Marek’s disease.

Wild Birds

One Red Kite which had been found dead was submitted to Dublin by the National Parks and Wildlife Service. No significant findings emerged from the gross post mortem examination of the carcass. However, tissue samples and intestinal contents were submitted to state laboratory for analysis, testing revealed the presence of carbofuran and alphachloralose, both of these agents are known to be toxic to birds. Alphachloralose is only permitted to be used as rodent bait indoors, and carbofuran has been banned for many years.

**Other Observations**

Dublin saw a seasonal increase in the submission rates for aborted bovine foetuses. Severe diffuse cholangiohepatitis due to liver fluke was diagnosed in pining 18-month-old hoggets with pale conjunctival mucous membranes.

**North West**

**Calves**

Congenital

Sligo diagnosed a ventricular septal defect in a two-week-old calf with a history of bruxism and dyspnoea. There was hepatomegaly and pulmonary oedema at necropsy. Abomasal ulceration

Sligo diagnosed a perforated abomasal ulcer with resulting peritonitis in a three-week-old-week-old calf. The abdomen was full of digesta which had leaked through the perforation.

**Weanlings**

Intestinal volvulus was diagnosed in a nine-month-old weanling presented to Sligo. Sligo detected BVD virus in the serum of a homebred eight-month-old hogget with pale conjunctival mucous membranes.

**PERICARDITIS**

Sligo diagnosed suppurative pericarditis, with a large volume of foul smelling pus in the pericardial sac in a four-year-old adult cow with a history of wasting. Sligo also diagnosed vegetative endocarditis in a feedlot bullock that had collapsed and died.

**Older sheep**

**Twin Lamb Disease**

Sligo found abscessation of two teeth in the lower mandible of an adult ewe which had wasted away. The ewe was carrying twins and unsurprisingly was ketotic. In another ewe carrying twin lambs, which had wasted away as a result of having lost all her teeth, there was also ketosis. There was enteritis and the liver showed evidence of lipidosis (fatty liver). Liver fluke eggs were found in the faeces.

**Jaagsiekte**

Pulmonary adenocarcinoma (Jaagsiekte) was diagnosed by histopathology in an eleven-month-old hogget, which had been submitted with a history of respiratory distress. There was diffuse consolidation of the lungs and the lungs had a rubbery texture.

**Other Species**

**Deer**

*Mycobacterium bovis* and *Trueperella pyogenes* were cultured from the lungs of a Fallow deer with severe suppurative pneumonia. The deer came from an area where there was a high prevalence of TB among cattle.

**Further Observations**

- Several sheep were presented to Sligo with evidence of chronic and chronic active fasciolosis. In more chronic cases there was extensive liver fibrosis with peritoneal and thoracic effusions.
where hypoproteinaemia was more marked. Concurrent findings of clostridial disease or high trichostrongyle egg counts in these flocks were not unusual.

- Sligo found low-to-marginal kidney selenium levels in several full-term aborted foetuses and calves that died in the neonatal period.
- Toxoplasmosis and enzootic abortion of ewes were the two most common causes of abortion in aborted ovine foetuses submitted to Sligo.
- Sligo diagnosed parovirus enteritis in a five-month-old unvaccinated sheepdog.
- Sligo had a few cases of Pulpy Kidney Disease in last years lambs.

SOUTH WEST

Bovine abortion
Only two cases of *Salmonella dublin* abortion were diagnosed in Cork Regional Laboratory, this represents a significant decrease compared to other years. There was also a significant increase in the number of foetal submission in January compared to previous years; many of them presented severe congenital abnormalities, from which Schmallenberg virus was commonly isolated.

Congenital
Cerebellar Hypoplasia
Cerebellar hypoplasia was diagnosed in a newborn calf with a history of in-coordination (Fig 10). PCR assay produced a positive BVD. Initially, the neurological symptoms and cerebellar lesion were believed to be the result of SBV since the herd had animals with antibodies to the virus, however PCR confirmed BVDV, a negative result was obtained for SBV antibodies and antigen.

Calves
Ovine abortion
As with bovine foetuses, several lambs with congenital deformities were submitted to Cork RVL, and SBV was diagnosed in some of them.

Other Species
Canine
A17-month-old greyhound was submitted for post-mortem examination which had been racing 48 hours previously. Twenty four hours post-racing the animal appeared depressed, with a distended abdomen, it was treated with antibiotics and anti-inflammatories but died the following day. At post-mortem, there was an omental laceration, approximately 6-8cm in diameter, at the ileocaecal junction and approximately 2m of small intestine had herniated through opening and become strangulated.

FURTHER OBSERVATIONS
- Rotavirus was the most common diagnosed pathogen in calf enteritis, and 31% of samples from calves under four weeks were positive.
- The most common bacteria isolated from aborted bovine foetuses were *Trueperella pyogenes* and *Bacillus licheniformis*.
- Calves exhibiting polyserositis, or fibrinous peritonitis on its own, caused by omphalitis (navel ill) were a common occurrence in January

MIDLANDS
Calves
Enteritis
Salmonellosis was diagnosed in a three-day-old calf with a history of diarrhoea. *Salmonella dublin* was isolated from the lung, liver, kidney and faeces. In a two-week-old calf with a history of diarrhoea, hypogammaglobulinaemia and enteritis were observed. *Cryptosporidium* species and *Aspergillus* species were detected.

Torsion
Mesenteric torsion caused the death of a three-week-old calf with history of diarrhoea, while caecal torsion was diagnosed in a two-week-old calf.

Weanlings
Pneumonia
Bovine RSV pneumonia was diagnosed in an 11-month-old weanling with a history of sudden death when RSV was detected by PCR. *Pasteurella/Mannheimia* pneumonia was diagnosed in a four-month-old calf submitted for post mortem with a history of coughing.

Older bovines
Peritonitis
Peritonitis was diagnosed secondary to a twisted caecum and perforation of the colon in a 15-month-old bullock with a history of pyrexia.

Clostridial Disease
Black disease was diagnosed in a 12-year-old cow with a history of sudden death. There was a 3-5cm raised firm dark lesion with a yellow necrotic centre in the liver and excess blood stained pleural and pericardial fluid. Fluorescent Antibody Technique for *Clostridium novyi* was positive.

Ovine abortion
There were 31 submissions of ovine foetuses during the month. Toxoplasmosis and Enzootic abortion of ewes were the most commonly diagnosed conditions.

Lambs
Meningitis and hypogammaglobulinaemia in a six-day-old lamb with a history of dullness, inappetance and dying roaring.

Older sheep
There was a case of Psoroptic mange and secondary pyodermatitis and emaciation in a two-year-old ram with a history of skin abscesses and losing wool.

Other Species
Canine
Gastric dilatation and volvulus was diagnosed in an eight-year-old male Labrador dog with a history of sudden death. The abdomen was massively distended and on opening the stomach was observed to be distended with gas and had twisted 360 degrees at the oesophageal end.

FURTHER OBSERVATIONS
• Large number of cases of hypogammaglobulinaemia and septicemia in neonatal calves less than two weeks old.
• Aspiration pneumonia was diagnosed in four calves from different herds by Athlone during January. All four calves were less than four days of age.
• 23 ZST tests were carried out of which 69.5% showed that the calf had received inadequate colostral immunity.
• Bleeding abomasal ulcers were seen in a number of calves between six weeks and three months of age.
• Several isolates of *Trueperella pyogenes* and *Bacillus licheniformis* from bovine abortions.
• 31% of serum copper concentrations from bovines, tested during the month, were below the normal range.
• Multiple cases of subacute/chronic active fasciolosis in ewes and cattle.

MIDWEST
Bovine abortions & stillbirths
*Mycoplasma bovis* was isolated from the abomasal contents of an aborted bovine foetus submitted to Limerick during the month. A number of suspect Schmallenberg virus (SBV)-infected stillborn lambs and calves were diagnosed by Limerick during the month. One of the stillborn animals was positive on PCR. A one-day old calf that died following a short period of meningitis-type symptoms cultured positive for *Escherichia coli* from all organs (colisepticaemia). A ZST reading of 11 units indicated poor absorption of colostral antibodies. A four-day old suckler calf found dead in a herd where two similar deaths had occurred in the previous few weeks was diagnosed with septicemia associated with *Salmonella typhimurium* infection by Limerick. A five-week old suckler calf with a history of stiffness and poor thrive for five days before death was found by Limerick to have lesions of hydroperitoneum and enteritis. *Salmonella dublin* was isolated from the liver and intestines. Mesenteric root torsion was diagnosed by Limerick to be the cause of death of a four-week-old suckler calf found dead with no history of illness.

Weanlings
Poor nutrition and gastrointestinal parasitism was suspected by Limerick to be the cause of death of a 14-month-old Limousin-cross heifer from a farm where a number of animals were reported to be in poor body condition. This animal was undersized for its age and had a faecal trichostrongyle egg count of 1,900 eggs per gram.

Older bovines
An eight-year-old Friesian cow submitted to Limerick with a history of inappetence and fever. The animal was treated with antibiotics and improved, but deteriorated again one week later. The cow became dyspnoeic and moribund before dying. On gross PM examination lesions of suppurative pericarditis (‘bread-and-butter’ type) were seen (Figure 11). An abscess associated with the wall of the reticulum suggested a diagnosis of traumatic reticulo-pericarditis, though no foreign object such as a nail or wire was found.

Ovine
A three-year-old ewe with a history of inappetence for one week before death was found by Limerick to have severe, diffuse hepatopathy associated with chronic fasciolosis.

FURTHER OBSERVATIONS
• *Bacillus licheniformis* and *Trueperella pyogenes* were common abortefacients isolated by Limerick from bovine foetuses during the month.
• Limerick diagnosed colisepticaemia in a number of young calves during the month.
• Animals submitted to Limerick RVL continue to show evidence of chronic fasciolosis.