

Regional Veterinary Laboratories Report

July 2023

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 397 carcasses and 21 fetuses during July 2023. Additionally, 1,771 diagnostic samples were tested to assist private veterinary practitioners with the diagnosis and control of disease in food producing animals. This report describes a selection of cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in July 2023.

The objective of this report is to provide feedback to veterinary practitioners on the pattern of disease syndromes at this time of the year by describing common, and highlighting unusual, cases. Moreover, we aim to assist with future diagnoses, encourage thorough investigations of clinical cases, highlight available laboratory diagnostic tools, and provide a better context for practitioners when interpreting laboratory reports.

CATTLE

Bovine respiratory disease complex (BRD) and, to a lesser extent, enteritis were the most common diagnoses at necropsy in cattle in the RVLs during July 2023.

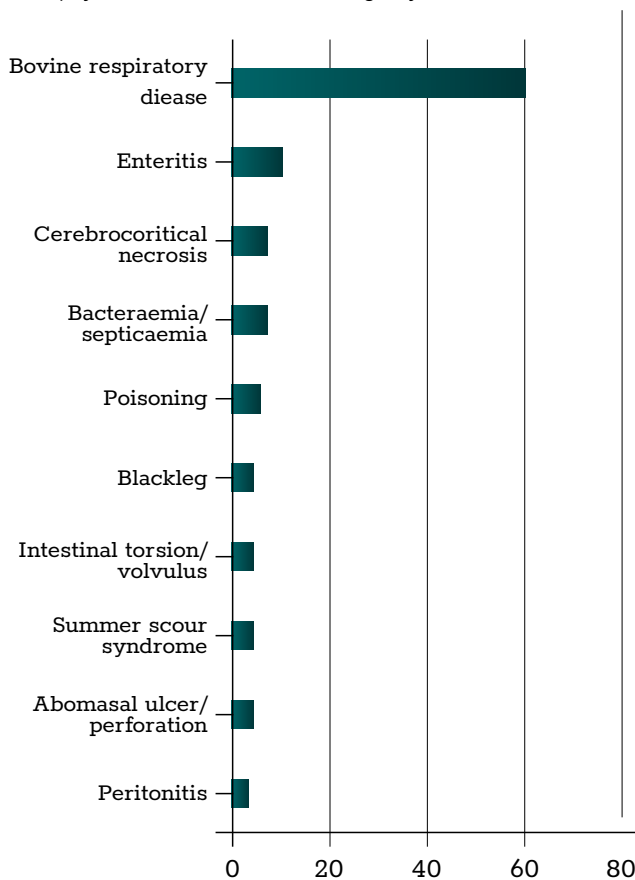


Table 1: The most common diagnoses in cattle submitted for necropsy in July 2023.

GASTROINTESTINAL TRACT

Typhlitis

A three-month-old Angus weanling from a dairy herd was submitted to Limerick RVL. It had been one of 15 weaned calves in the group at grass. There had been a history of poor thrive, fever and scour in the group over the previous few days. Two had died prior to the submitted calf; the other

animals were treated and appeared to improve. Splenomegaly and hepatomegaly were disclosed at necropsy. Ulcerative typhlitis involving thickening of the caecum and distal small intestine (ileum) were observed. There were watery intestinal contents with flecks of necrotic debris. Abomasal oedema and pulmonary congestion were also seen. *Salmonella enterica* serovar Typhimurium was isolated.

Perforated abomasal ulcer

A three-month-old calf died suddenly and was submitted to Kilkenny RVL. There was a severe diffuse fibrinous peritonitis disclosed at necropsy. The source of infection was a perforated abomasum ulcer. There were also additional deep (non-perforated) abomasum ulcers. There was moderate oedema in the folds of the abomasum. There were severe adhesions between the intestines, the content was bloody in segments. *Salmonella* Typhimurium was isolated. This is a zoonosis and elevated precautions are indicated to prevent human infection.



Figure 1: Partial thickness (left) and fully perforated (right) abomasal ulcers. Photo: Aideen Kennedy.

Salmonella Typhimurium

Salmonella Typhimurium has a very different epidemiology to *Salmonella* Dublin. Transmission is

mostly by the typical *Salmonella* faecal-oral route, but foetal materials and placentae are also high-risk and need to be carefully handled and responsibly disposed of. Ruminants are atypical hosts, and the disease usually has a monogastric source (poultry, pigs, wild birds or a rodent infestation). The carrier state is not really a feature of *S. Typhimurium* in ruminants, and faecal shedding lasts for days-to-weeks rather than weeks-to-months.

Summer scour syndrome

An eight-month-old weanling that had displayed ill thrift was euthanised and submitted to Kilkenny RVL. The weanling was dehydrated and there was faecal staining on the coat. There was a small ulcer on the muzzle and necropsy disclosed an oesophagitis. The intestinal content was very liquid. On histopathology, there was a severe, diffuse, necrotising, ulcerative oesophagitis. Bovine viral diarrhoea (BVD), *Salmonella sp.*, coccidiosis, and other diarrhoea-causing pathogens were not detected by laboratory tests and summer scour syndrome was considered a likely diagnosis.



Figure 2: Oesophagitis in a weanling diagnosed with summer scour syndrome. Photo: Aideen Kennedy.

Jejunal haemorrhagic syndrome

A five-year-old cow was found recumbent and was submitted to Kilkenny RVL after not responding to treatment. There was multifocal peritonitis found at necropsy. There was a large, firm blood clot in the jejunum approximately 60cm long; caudal to the clot the intestinal content was bloody. There were no significant findings on laboratory tests and a diagnosis of jejunal haemorrhagic syndrome was made. Jejunal haemorrhagic syndrome has been reported in both beef and dairy cows. The disease occurs sporadically. Mechanical obstruction of varying lengths of jejunum with clotted blood is characteristic. The aetiology is unknown; a history of sudden death, or of decreased milk production, anorexia, abdominal distension, melena, and distended loops of intestines on rectal examination has been reported. Neither surgical nor medical treatment has been very successful, and the prognosis for affected cows is very poor. A recent evaluation in California of 314 cases examined over a 16-year period concluded that

there was no association with infectious disease, including clostridial enterotoxaemia which was initially thought to be the cause.

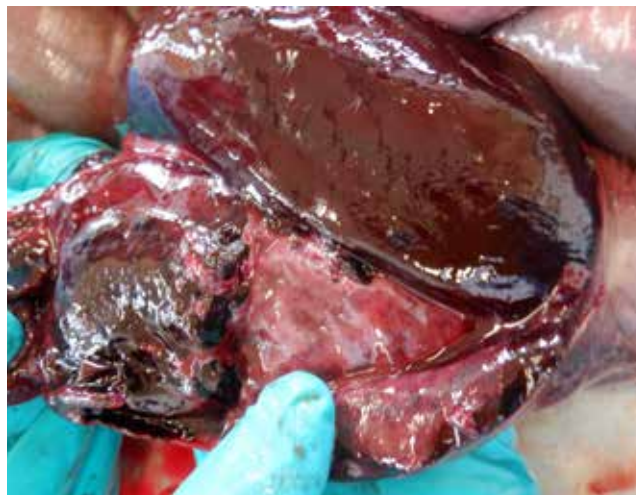


Figure 3: A blood clot in a case of jejunal haemorrhagic syndrome. Photo: Aideen Kennedy.

RESPIRATORY TRACT

Bovine respiratory disease

Parasitic bronchitis due to infection with the lungworm *Dictyocaulus viviparus*, or pneumonia subsequent to lungworm infection, continues to be an issue in first season grazing calves. Warm humid weather provides the ideal environment for the rapid development of the parasite resulting in high pasture burdens.

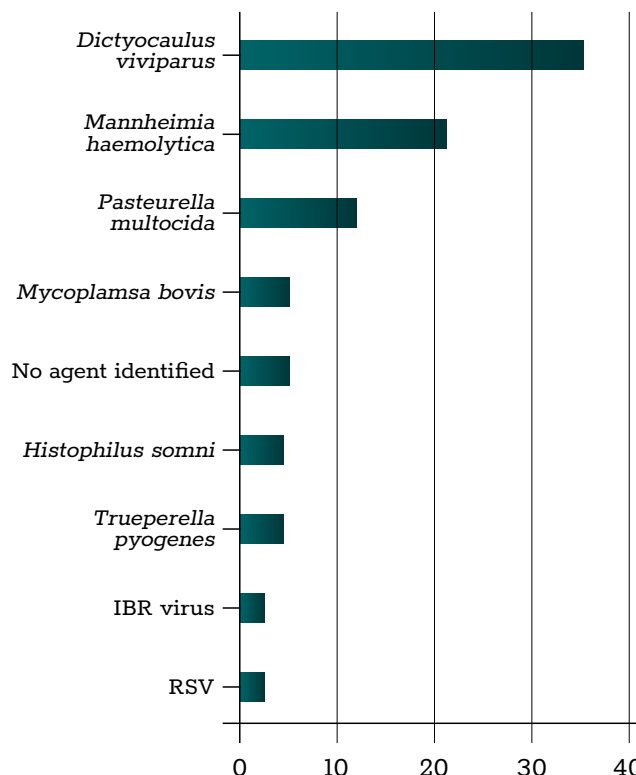


Table 2: The most commonly identified respiratory pathogens identified at necropsy in bovines during July 2023.

Parasitic bronchitis

Examples of submissions where lungworms were identified included a five-month-old Friesian heifer with a history of coughing, onset three days prior to death, submitted to Limerick RVL. Necropsy disclosed adult lungworms in the trachea, and cranioventrally distributed, consolidated, congested pneumonia. A diagnosis of parasitic bronchitis with subsequent pneumonia was made. Inflamed abomasal mucosa and liquid intestinal contents were also observed, and faecal egg counts (FEC) were high, suggesting concurrent parasitic gastroenteritis. The PVP was advised that herd parasite management should be reviewed as a matter of urgency.

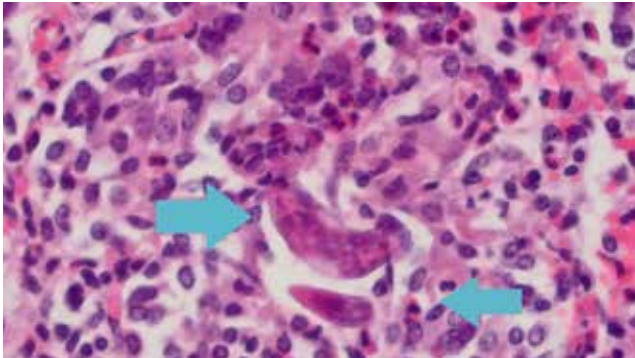


Figure 4: *Dictyocaulus viviparus* (arrows) in cross section in bovine lung. Photo: Maresa Sheehan.

A similar case involved a four-month-old calf with a history of dyspnoea, and other calves in the herd coughing. Necropsy disclosed lungworms in the trachea and bronchi, and congested consolidated pneumonia with 'ground glass' emphysema. Inflamed abomasal mucosa, thickened small intestinal mucosa and liquid intestinal contents were again seen. Pneumonia was judged to be, most likely, a sequel to parasitic bronchitis.

Another case involved an 18-month-old bullock with a history of recurrent respiratory signs. Necropsy disclosed adult lungworm in the trachea, and cranioventrally distributed, consolidated, congested pneumonia. Abomasal mucosa was inflamed, and nematodes were observed upon microscopy of abomasal scrapings. It may be noted from this case that the danger from *D. viviparus* is not confined to cattle in their first year of life, although their risk is obviously greater.

Pneumonia

A five-month-old weanling was submitted to Kilkenny RVL with a history of respiratory signs. At gross examination, there was cranioventral consolidation affecting approximately 30 per cent of the lungs. There was microabscessation within the consolidated region. Caudally, the lungs were 'meaty' and there was 'ground glass' emphysema. Approximately 80-90 per cent of the lung tissue was affected in total. Polymerase chain reaction (PCR) tests for viruses were negative and lungworm was not detected. *Histophilus somni* was identified on culture and PCR. *Mycoplasma bovis* was detected also.



Figure 5: Cranioventrally distributed consolidation and 'ground glass' emphysema in a case of pneumonia. Photo: Aideen Kennedy.

URINARY/REPRODUCTIVE TRACT

Urachal abscessation

A one-month-old calf was found dead and was submitted to Kilkenny RVL. The calf was moderately dehydrated. There was a purulent abscess at the cranial pole of the bladder. The mesentery was adhered to the abscess. One kidney was very bloody, and the liver was rounded suggesting hepatomegaly. The lungs were congested and oedematous. *Trueperella pyogenes* was cultured from multiple organs indicating a bacteraemia. Urachal abscessation typically results from post umbilical infection in calves; a review of navel hygiene at calving was advised.



Figure 6: Urachal abscess. Photo: Aideen Kennedy.

Babesiosis

Athlone RVL examined an eight-year-old suckler cow with a history of very sudden onset of sickness, she was noticed stumbling and falling and died before the vet arrived. The mucous membranes were slightly pale, the liver was pale and moderately jaundiced, and the gall bladder was distended with thick inspissated bile. The kidneys were brown and there was a small amount of dirty brown/red urine in the urinary bladder. The lungs were pale, suggesting anaemia. Liver and kidney

copper levels and kidney lead levels were within normal ranges. PCR testing on the spleen was positive for *Babesia divergens* and babesiosis (red water) was concluded to be the cause of death.

CARDIOVASCULAR SYSTEM

Myocardial and renal abscessation

A three-year-old Friesian cow, at grass in a 250-cow dairy herd, was submitted to Athlone RVL. Over a six-day period, the animal had been declining steadily, showing signs of depression. It was euthanised after nil response to treatment. Necropsy disclosed poor body condition. Multifocal pinhead abscessation of the myocardium was present throughout the heart and there were associated pericardial adhesions. Miliary pinhead abscessation of both kidneys was also found. The urine was clear. Abscessation of the heart and kidneys was diagnosed. *T. pyogenes* was cultured from the heart and the kidney. PCR testing was positive for the rickettsial species *Anaplasma phagocytophilum*, the causative organism of tick-borne fever (TBF). Immunosuppression due to TBF may have facilitated the bacterial infection.



Figure 7: Pinhead abscessation of the kidneys in a cow due to *Trueperella pyogenes* infection. Photo: Alan Johnson.

Pulmonary thromboembolism

A 10-month-old weanling presented to Kilkenny RVL with a history of neurological signs prior to death. On post-mortem examination, there was a large vegetative mass on the atrioventricular valve. The cut surface of the mass revealed purulent material. There were multiple thrombi in the pulmonary arteries and multifocal areas of abscessation throughout the lungs. On histopathology, there were multiple septic thrombi visible within the pulmonary arteries. Abscesses or chronic infections such as mastitis or metritis are thought to play an important role in the pathogenesis of this disease by causing the initial bacteraemia and endocarditis. There was no obvious source of infection found in this case.

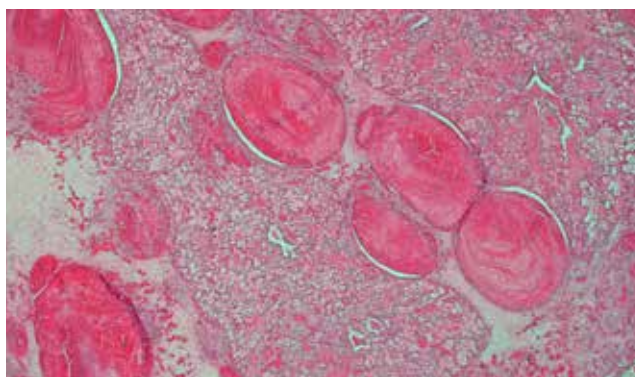


Figure 8: Septic thrombi associated with an endocarditis. Photo: Lisa Buckley.

NERVOUS SYSTEM

Cerebrocortical necrosis

Athlone RVL examined a six-month-old weanling with a history of having been found 'fitting' a few days earlier; it went blind, was treated for meningitis with no response, and was euthanised. There was yellowing and softness of the brain surface and flattening of the gyri on the cerebral hemispheres upon gross examination, and the brain fluoresced under ultraviolet (UV) light. Kidney lead levels were within the normal range. Histopathology disclosed lesions of laminar necrosis in the sections of cerebrum examined. A conclusion of cerebrocortical necrosis (CCN) was made.

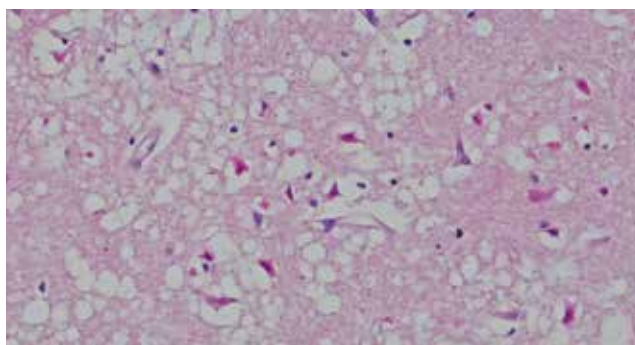


Figure 9: Dead neurons associated with cerebrocortical necrosis. Photo: Maresa Sheehan.

Kilkenny RVL continues to see cases of CCN in both lambs and calves; these animals present with a history of nervous signs and sometimes recumbency. On gross examination, the brains of these animals appear swollen and show apple green fluorescence under UV light. On histopathological examination, there is laminar vacuolation in the cerebral cortex with neuronal necrosis.

Cerebrocortical necrosis

Cerebrocortical necrosis is typically associated with Vitamin B1 or thiamine deficiency. Thiamine deficiency is due to the proliferation of thiaminase producing bacteria in the rumen after a change of diet, usually onto lush pasture or carbohydrate diet. The condition may also follow the ingestion of plants high in thiaminases; brassicas contain high levels of sulphur which

destroys thiamine. Other possible causes of laminar cerebrocortical necrosis include: sulphide/sulphate intoxication due to high sulphur diets, or salt poisoning caused by water deprivation.

POISONINGS

Yew poisoning

Athlone examined three four-month-old calves with a history of sudden death while at grass. Pieces of yew tree leaves were found in the rumen contents of all three calves. There were a lot of oats in the rumen of one calf and the rumen pH in that calf was 4.9. Values <5.2 are suggestive of ruminal acidosis. All three calves had mild pulmonary congestion and soft intestinal contents. Yew tree poisoning was concluded as the cause of death. Yew trees contain taxine alkaloids which are cardiotoxins. In addition, a review of the inclusion rate of oats in the diet of comrades was also advised.



Figure 10: Yew tree leaves from a case of poisoning. Photo: Denise Murphy.

SHEEP

Parasitic gastroenteritis and pneumonia were the most common diagnoses at necropsy in sheep in the RVLs during July 2023.

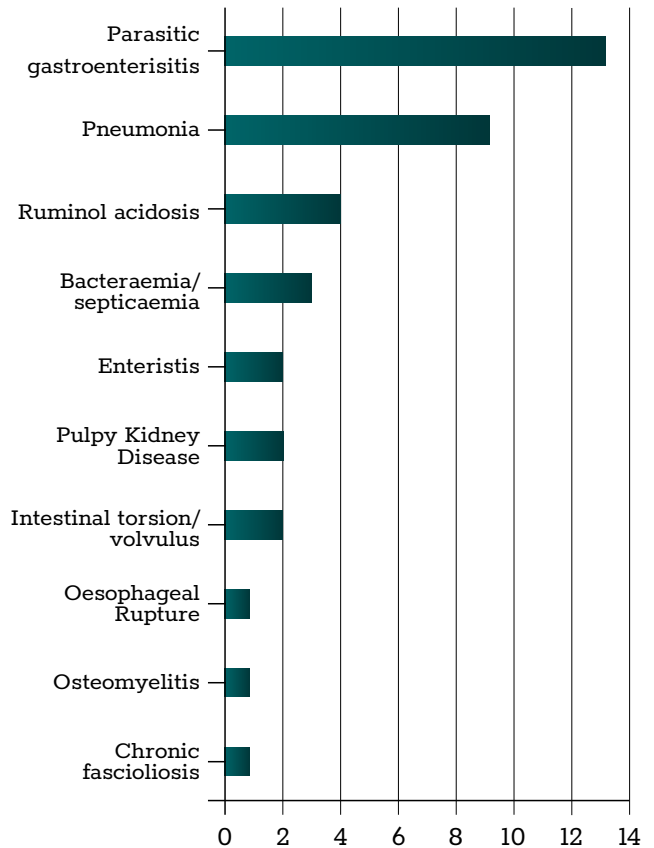


Table 3: The most common diagnoses in sheep submitted for necropsy in July 2023.

THIN EWE SURVEY

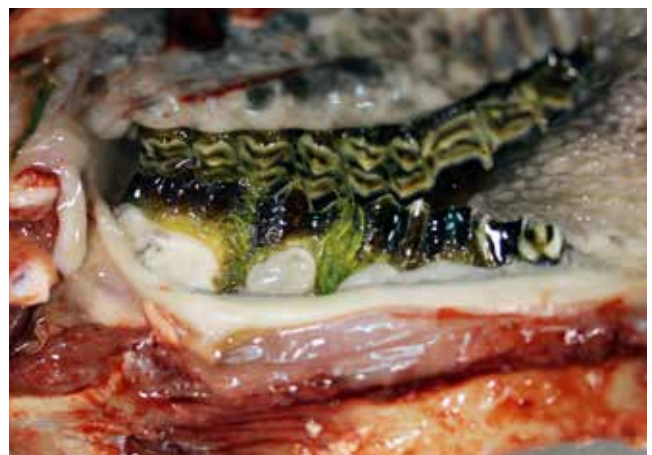


Figure 11: Impaction of grass around the molar teeth in a ewe with ill thrift. Photo: Denise Murphy.

Parasitism and dentition

Athlone RVL examined three ewes from a flock as part of the thin ewe study. Body condition was poor, with weights

from 35-48kg. There was impaction of grass around the lower left first molar tooth in one ewe, and loose teeth and a thickened mandible in another. The abomasal mucosa was thickened and intestinal contents and faeces were soft in all three ewes. There were multifocal, firm 1-2mm grey lesions on the caudodorsal lung lobes, suggestive of lungworm in all three ewes. Liver, kidneys, mammary gland and feet were unremarkable. Histopathology of the lungs showed multifocal parasitic granulomas (lungworm) throughout the section examined. In the abomasal sections, there was marked lymphocytic infiltration of the base of the lamina propria and hyperplasia and metaplasia of glands consistent with parasitic gastroenteritis. Testing for border disease virus, ovine pulmonary adenomatosis (OPA), Maedi-visna virus, caseous lymphadenitis, and Johne's disease proved negative. Parasitic gastroenteritis, lungworm and dental problems were identified as the likely causes of the ill thrift.



Figure 12: Multifocal parasitic granulomas due to lungworm infection in a ewe with ill thrift. Photo: Denise Murphy.

HORSES

Ragwort poisoning

A 24-year-old pony was submitted to Limerick RVL. At necropsy, the gross appearance of the liver was strongly suggestive of cirrhosis; the serosal surface was uneven and the parenchyma was firm and difficult to cut. Histopathology of the liver disclosed biliary hyperplasia, and diffuse, severe, chronic, portal and bridging fibrosis, with hepatocellular megalocytosis, necrosis, and loss. These findings are consistent with pyrrolizidine alkaloids toxicity or aflatoxin toxicity. Pyrrolizidine alkaloids are produced by a number of plants as a deterrent to consumption by herbivores. They become hepatotoxic by conversion to their metabolically activated form, dehydropyrrolizidine. Ragwort (*Jacobaea vulgaris*), which was present on the submitting farm, is an example of such a plant.

ALPACA

Choanal atresia

A three-day-old alpaca cria presented to Kilkenny RVL with

a history of respiratory issues shortly after birth. On post-mortem examination, there was evidence of unilateral choanal atresia. This condition is caused by failure of the inner nares to open during embryologic development and is a relatively common congenital defect. It can be unilateral or bilateral, and may result in complete or partial blockage. Because camelids are obligate nasal breathers, the primary clinical presentation is respiratory distress in the neonate. Distress becomes more apparent during nursing, and crias commonly gasp as milk is inhaled. Surgical correction is not recommended. A historically narrow gene pool is likely the reason that congenital defects are relatively common in camelids. Affected individuals commonly have more than one defect.

FARM INVESTIGATIONS

Pneumonia

Three calves were submitted to Cork RVL from a dairy herd with a history of calf pneumonia leading to high mortality rates among pre-weaned calves. All three calves had severe bronchopneumonia with multiple bacterial respiratory pathogens present in the lungs, including *Mannheimia haemolytica*, *Pasteurella multocida*, *H. somni* and *Mycoplasma bovis*. A visit to the farm was carried out to investigate further. Thoracic ultrasound (TUS) examinations were performed on 12 randomly selected calves of the 40 present in the herd. All 12 showed evidence of lung consolidation with TUS scores of between two and five out of five (Ollivett and Buczinski, 2016), confirming the severity and widespread nature of the respiratory problem.

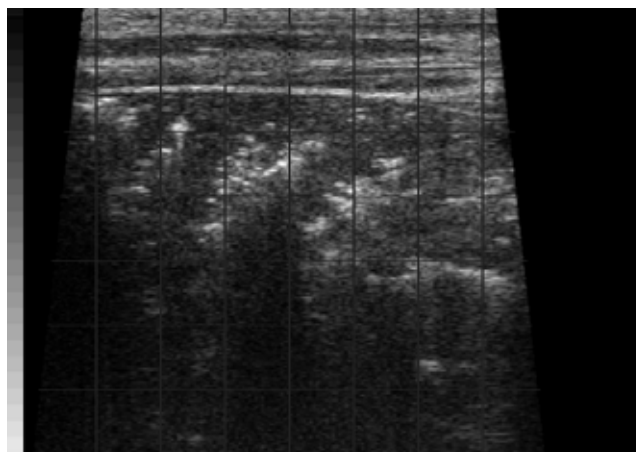


Figure 13: Consolidated lung as viewed via thoracic ultrasound in a case of pneumonia. Photo: Ciara Hayes.

The visit revealed a number of factors that were thought to be contributing to the problem. History collection revealed that there was frequent buying-in occurring in the herd. The dairy herd was bred with beef-breed stock bulls and all dairy replacements bought-in. There was also a very spread-out calving pattern, meaning the calf accommodation was rarely empty to allow thorough disinfection and resting. Additionally, floor space was restricted throughout, with no pens providing the recommended minimum of three square metres per 45-99kg calf.

The farmer reported that, while 70-80 per cent of calves were fed colostrum within two hours of birth, only 2.5L was fed rather than the recommended 3L and there was no assessment of colostrum quality carried out. Calves were fed 4L/day transition milk before joining a group fed by automatic feeder at 10-14 days. On the feeder, calves started at 5L/day and then increased to the maximum of 6L/day after 17 days on the feeder. This meant calves were roughly four weeks old before they were allowed to consume the recommended minimum of six litres of milk or milk replacer per day.

The biggest factors contributing to the pneumonia problem in this herd were thought to be colostrum management, undernutrition, lack of opportunity to rest calf accommodation, restricted space in calf accommodation and the herd's open status. At the first follow-up visit, five actions were agreed with the PVP and herd owner:

1. Increase colostrum feeding to a minimum of three litres per calf.
2. Bleed ten calves in autumn and spring to assess passive transfer status.
3. After the colostrum feed, feed a minimum of three litres twice a day of transition milk, and the same when the calves go on to milk replacer.
4. Introduce concentrate feed and water to the calves from two-to-three days of age.
5. Clean out bedding in the calf sheds (without pressure washing) every two weeks.

A review visit was planned for the autumn, with further ultrasound examination of new calves to determine the effectiveness of the agreed actions.

REFERENCE

DOI:10.1016/j.cvfa.2015.09.001 On-Farm Use of Ultrasonography for Bovine Respiratory Disease. T. Ollivett, S. Buczinski (2016) Veterinary Clinics of North America: Food Animal Practice