

Winter 20/21 Surveillance Newsletter

In welcoming a New Year we look forward to continuing to assist veterinary practitioners with farm animal cases through our surveillance service at the University of Surrey Veterinary Pathology Centre (VPC). After a challenging 2020 for many veterinary practices and farms, we hope that 2021 will see a return towards normality. Our team of experienced pathologists and surveillance officers are able to offer expertise in diagnostic pathology for all farmed, companion and exotic species.

Despite a third national lockdown, the department continues to examine cases and has been participating in APHA surveillance projects such as the 'Thin Ewe Project 2020/21'. We have also gathered client feedback on the surveillance service and made some improvements to our website.

Within this newsletter we bring you updates on:

- **Highly pathogenic Avian Influenza (HPAI)** and
- **African Swine Fever (ASF)**
- **Thin Ewe Project**
- **Interesting cases** that have been submitted to the Centre over the last few months, including:
 - *Tetratrichomonas spp.* infection in Red-legged partridges
 - Hydrocephalus *ex vacuo* in a Dexter calf – Bluetongue virus ruled out
 - Hepatic lipidosis in a 5-year-old Alpaca
 - A 6-week-old calf with severe necrotising cystitis and urethritis

In early 2021, we are pleased to welcome the return of Dr. Benedetta Amato (Veterinary Investigation Officer) after her maternity leave.

Finally, we are continually striving to improve the service our referring practices receive, and so should you have any comments or suggestions, please do not hesitate to contact us at vetpath@surrey.ac.uk.

With best wishes for the year ahead,

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Thin Ewe Project 2020/21

The University of Surrey has collaborated with the APHA on a project in England and Wales that aims to identify the prevalence of the 'Iceberg diseases' (Maedi Visna, OPA, Johne's disease and Border disease) and causes of ill-thrift in sheep flocks. With *post-mortem* examinations and ancillary testing free to practitioners and their clients, this is a fantastic opportunity for farm vets to examine for these diseases. The surveillance network plans to examine approximately 300 sheep by *post-mortem* examination and ancillary testing. Findings will be published in subsequent surveillance newsletters. We would like to thank all veterinary surgeons and farmers for participating in this project.

Update: Highly pathogenic avian influenza (HPAI)

As everyone has probably already heard, there have been recent outbreaks of avian influenza in the UK.

Avian influenza (AI) can be classified into two types, with highly pathogenic avian influenza (HPAI) (commonly referred to as high path AI) being more serious than low path AI. HPAI is invariably caused by H5 or H7 strains. It is often fatal in birds and mortality can approach 100%. The clinical signs are very variable, but can include:

- Increased mortality rate with sudden deaths
- Swollen head
- Blue discolouration of the head (including wattle and comb), neck and throat
- Loss of appetite
- Respiratory distress such as gaping beak, coughing, sneezing, gurgling, rattling
- Diarrhoea
- Egg drop



Figure 1. Avian influenza: Swelling and blue discoloured comb and wattle of an infected chicken on the left compared to a normal chicken on the right

Photo credit: United States of America Animal Health Association

In the United Kingdom, the assessed risk level of incursion of AI in wild birds has been increased to very high and the risk of exposure is medium for poultry with high biosecurity, and high for poultry with poor biosecurity. Accordingly, an Avian Influenza Prevention Zone (AIPZ) has been declared encompassing England, Scotland and Wales and new additional housing measures came into force on 14th December 2020 (Further details can be viewed at <https://www.gov.uk/government/news/avian-influenza-bird-flu-national-prevention-zone-declared>). Both highly pathogenic H5N8 and H5N1 have been confirmed in England. At the time of writing, within the catchment area of the VPC:

- There are no confirmed outbreaks or cases in the county of Surrey.
- One case of low pathogenic avian influenza (LPAI) H5N2 was confirmed at a premises near Deal, Kent in a mixed poultry premises of 480 birds. All birds were humanely culled.

The presence of H5N8 in the UK was not unexpected given the annual autumn migration of wild birds. Peak numbers of migratory waterfowl that overwinter in the UK are expected in December/January, but numbers may vary depending on weather conditions in Continental Europe. The UK is no longer free from notifiable avian influenza under the World Organisation for Animal Health (OIE) rules. Biosecurity on farm should be reviewed to prevent direct or indirect contact with wild birds. Further advice can be found at <http://www.gov.uk/guidance/avian-influenza-bird-flu#biosecurity-advice> where advice has been formulated in useful PDF documents and checklists for all types of poultry that can be forwarded to your clients.

Any suspicion of avian influenza must be reported to DEFRA Rural Services helpline 03000 200301. If dead wild birds are found they should be reported to the DEFRA helpline 03459 33 55 77.

Update: African Swine Fever (ASF)

Our previous newsletter (Autumn/Winter 2020) highlighted the increased need for vigilance of signs of ASF in our national herd. A Pig Veterinary Society webinar on ASF is available here and the section on clinical signs starts 23 minutes in: <https://thewebinarvet.s3-eu-west-1.amazonaws.com/Webinar+Video+2020/16Jun2020-African+Swine+Fever+%E2%80%93+what+ALL+vets+need+to+know.mp4>

Over recent months, cases of ASF in wild boar continue in eastern Germany along the border with Poland, in Poland and across most of ASF-affected countries in Europe. There have also been large numbers of outbreaks on backyard pig premises in Romania, a small number in Poland and Ukraine and several outbreaks on large commercial pig farms in Russia. The risk of incursion to the UK remains at medium level.

Subscribe to regular email Animal Health updates (including Avian Influenza and African Swine Fever) from APHA via the gov.uk website

Interesting cases

***Tetratrichomonas spp.* infection in Red-legged partridges**

A group of 14-week-old red-legged partridges experienced a mortality of 20% over the preceding 10 days. Moderate wasting of the birds had been observed by the gamekeeper. *Escherichia coli* had been cultured from a caecal swab and avian tuberculosis (TB) was suspected after practitioner *post-mortem* examination. Five birds selected at random from the remaining flock were euthanased and sent to the VPC for examination.

Due to the reported suspicion of *Mycobacterium spp.* infection, necropsy was performed in our Containment Level 3 (CL3) facility. Throughout the liver of 2/5 birds were discrete to coalescing 0.1x0.1x0.1cm to 0.3x0.2x0.2cm tan to cream, firm lesions that extended into the parenchyma (Figure 2.) These had a gritty texture on sectioning. The spleens of 2/5 birds were diffusely pale-pink and approximately 40% of the surface had multiple, well-demarcated 0.1x0.1x0.1cm cream lesions which extended into the parenchyma.



Figure 2. Liver: multiple discrete to coalescing, pale-tan, firm areas that extended into the parenchyma

Histopathological examination of the liver revealed severe, multifocal, necrotising hepatitis and severe splenitis both with heterophilic and lymphohistiocytic infiltration with scattered intralesional trophozoites believed to be either *Tetratrichomonas spp.* or *Histomonas spp.* Molecular testing of liver at the University of Veterinary Medicine in Vienna, sponsored by the APHA Avian Expert Group, confirmed *Tetratrichomonas spp.* as the aetiological agent in this case.

Tetratrichomonas gallinarum is one of the most commonly found flagellate protozoa in the intestinal tract of chickens, turkeys, guinea fowl, quails, ducks and

geese¹. Weather is reported to influence the prevalence of *T. gallinarum* infection with an increased prevalence during warmer periods and a peak of infection in autumn. The flagellate is transmitted via faeco-oral routes. Infected birds excrete live parasites as soon as 2 days post infection. *T. gallinarum* frequently occurs as a co-infection with other protozoa, especially *Histomonas meleagridis* and *Blastocystis spp.* Cysts, sexual stages and vectors are not known². Drugs with activity against other related protozoa (*H.melelagradis*, *Entamoeba histolytica* and *Giardia lamblia*) are active against trichomoniasis in pigeons and turkeys; however, none is approved for use in domestic birds.

Histomoniasis (Blackhead disease) is caused by the protozoan *Histomonas meleagridis*. Alongside secondary bacterial infection, there are often characteristic lesions in the liver. Interestingly, the black/purple colouring of the head of the bird that gives rise to the name of the disease is actually rather uncommonly seen. Other clinical signs of blackhead can include dull and listless birds, weight loss, bright yellow diarrhoea and sudden death. Typically this flagellate affects turkeys more severely than chickens or game birds and it is believed that the co-infection with *Heterakis gallinarum* is important in spread of the disease both by carrying the parasite and producing infected larvae that can be carried in earthworms. Direct faeco-oral transmission is also possible. Ground that is in contact with the birds can remain infected by the organism for many years. Control should focus on minimising sources of infection, hygiene in pens of birds and anthelmintic control. The remaining partridges did show signs of wasting and further mortality. As such, the decision was made to euthanase the remaining birds and to rear subsequent batches on new ground.

Hydrocephalus *ex vacuo* in a Dexter calf - Bluetongue virus infection ruled out



Figure 3. Stillborn Dexter calf: Domed cranium associated with hydrocephalus

¹ Amin, Aziza & Bilic, Ivana & Liebhart, Dieter & Hess, Michael. (2014). Trichomonads in birds - a review. *Parasitology*. 141. 1-15. 10.1017/S0031182013002096.

² Hess M. and McDougal L.R. (2016) Histomoniasis and other protozoan diseases of the intestinal tract, *Diseases of Poultry*, 13ed, 1180

A full-term stillborn Dexter calf from a 27-cow herd was submitted. Profound ataxia and opisthotonus were noted in the 2 previous calves born. The herd was not vaccinated against any infectious agents.

The calf had a domed cranium (Figure 3.) and brachygnathia superior. The enlarged head likely caused dystocia and there were multiple subcutaneous haemorrhages around the cranium and both orbits. The lateral ventricles of the cerebrum were markedly distended by cerebrospinal fluid (hydrocephalus) and the calvarium was moderately thickened.

Hydrocephalus is characterised by abnormal accumulation of fluid in the cranial cavity. In internal hydrocephalus, the fluid is within the ventricular system as in this case. It presents as variably dilated ventricles and may be inherited or acquired. The most common causes for acquired hydrocephalus in cattle are *in utero* infection by bovine viral diarrhoea (BVD) virus, Bluetongue virus and Schmallenberg virus. In light of a possibility of a Bluetongue viral aetiology, the APHA Notifiable diseases team and field veterinary service were informed. Temporary movement restrictions were placed on the farm whilst ancillary PCR-based testing for BTV was performed. This, and ancillary testing for BVDv and Schmallenberg virus proved negative.

At least six forms of congenital hydrocephalus have been identified in cattle. In congenital hydrocephalus, obstruction is quite often not demonstrable. The cavitating cerebral defects hydranencephaly (where the brain's cerebral hemispheres are thinned) and porencephaly (cysts or cavities in the cerebral hemisphere(s)), are associated with internal hydrocephalus. In this case it is likely to be an *ex vacuo* or compensatory hydrocephalus occurring due to a loss of cerebral tissue. Hydrocephalus also occurs in association with chondrodysplasias, especially in the 'bulldog' breeds of cattle. Type 5 hydrocephalus is one such form and has been reported in Dexter and Jersey cattle. The disease is a recessive trait with calves either aborted or stillborn. Animals that survive to term can have arrested development of the nasal bones and maxillae (as in this case), achondroplasia, kyphosis and cleft palate.

Congenital hydrocephalus is frequently associated with malformation of the cranium as in this case. Whether cranial malformation occurs or not depends on the time of onset of the hydrocephalus relative to the degree of ossification of the cranial bones and the development and strength of the cranial sutures, as well as the rate at which the fluid accumulates. The lateral and third ventricles are usually the most severely affected. Extensive cranial malformation resulting from congenital hydrocephalus can lead to dystocia.

Where increasing numbers of calves are being born with this defect, as on this farm, assessment of genetics including new bulls or lines being introduced to the farm should be considered.

Hydrocephalus in calves can be an indicator of Bluetongue virus infection; a notifiable disease. In this instance you should call APHA Notifiable Disease team on 03000 200 301 to discuss the case.

Hepatic lipidosis in a 5-year-old Alpaca

A 5-year-old male entire Alpaca was submitted to the VPC with a 3 to 4-day history of lethargy, anorexia, depression and then death. One other alpaca in the group of 9 had died with similar presenting signs 3 weeks previously.

Post-mortem examination revealed moderate hepatomegaly and diffuse hepatic pallor, multiple, shallow ulcers of the C3 mucosa and watery content in the duodenum. Histopathological examination revealed a marked, lipid-type vacuolar change within the hepatocytes consistent with a diagnosis of hepatic lipidosis (HL).

HL is the most common liver disease in South American camelids (SACs), occurring in both crias and adults. Affected individuals often present with sudden onset dullness and anorexia (as seen in this case) and even death. HL generally occurs when animals have experienced social or environmental stressors, conditions that cause increased energy demands (e.g. pregnancy or lactation) and gradual weight loss or anorexia over the previous 3-4 months. Injury to hepatocytes including toxic and nutritional insults can also lead to HL. As HL develops, the associated impaired liver function may lead to hepatic encephalopathy, which is manifest as depression and lethargy.

Ulceration of the C3 mucosa and gastritis can frequently cause illness and even death in llamas and alpacas. Although the exact cause of ulceration is often unknown, stress (from environmental/weather challenges, social changes or metabolic), are predisposing factors. There was a 8x0.5cm linear, irregularly shaped trichobezoar of variable thickness (0.3 to 4cm wide) in C3. The pyloric region of the third compartment leads to a narrow cranial portion of the duodenum and has been reported to be a common site for bezoar obstruction in camelids, especially in alpacas. In this case, there was no gross or histopathological evidence of ulceration associated with the trichobezoar and as such, this is likely an incidental finding in this case.

A 6-week-old calf with severe necrotising cystitis and urethritis

A 6-week-old, male entire Sussex calf presented with a 24-hour history of ataxia, lethargy and mild pyrexia. Despite treatment with antimicrobials and non-steroidal anti-inflammatory (NSAID), the calf died overnight and was examined at the VPC the following morning.

At *post-mortem* examination, there was an approximate 5cm diameter area of wet, matted hair around the prepuce. Both eyes were mildly sunken. Approximately 80% of the subcutaneous tissue of the abdominal wall contained both moderate

haemorrhage and oedema and the urachus was moderately thickened and dark-red. The abdominal cavity contained approximately 250ml of turbid, pale-brown, fetid liquid containing variably sized (up to 3x2x1cm), pale-yellow, soft clots (fibrinopurulent exudate). Approximately 60% of the serosal surface of the urinary bladder was haemorrhagic and had strong fibrous attachments to the surrounding peritoneum. The urinary bladder contained a discrete, 4x2x2cm, irregular, pale-yellow, mobile, gelatinous mass (Figure 4.).

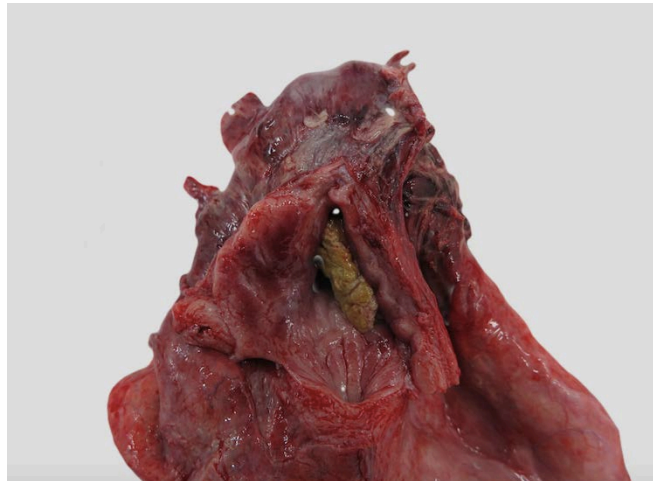


Figure 4. Opened urinary bladder: Mucoproteinaceous plug at the trigone and internal urethral sphincter

The presence of mucoproteinaceous material in the bladder and preprostatic and pelvic urethra was the likely result of urinary tract infection. This material would have contributed to urethral obstruction and then rupture of the bladder with subsequent development of fibrinosuppurative peritonitis. Urinary tract obstruction can result in electrolyte and acid-base disturbances. Post-renal uraemia can develop within 24 hours after obstruction. Concurrent dehydration, metabolic acidosis, hyperkalaemia, hyperphosphataemia and hypercalcaemia all contribute to a fatal disease state if left untreated, and likely led to death in this animal.

Conditions that predispose to urinary tract infection in calves include an infected urachal remnant with secondary cystitis (as noted in this case), pyelonephritis and congenital defects such as ectopic ureter with secondary infection. The most common source of infection of the urachus is an infected umbilicus. This can result from contamination from the external environment combined with poor husbandry practices and inadequate or delayed intake of colostrum. *Trueperella pyogenes* (formerly *Arcanobacterium pyogenes*) is the bacterium most frequently isolated from infected calf umbilical cord remnants, but *E. coli*, *Proteus spp.*, *Staphylococcus* and *Streptococcus spp.* also have been recovered. The urachal remnant is the most frequently involved intra-abdominal structure, however, communication between the urachal lumen and the bladder resulting in cystitis is less common³.

³ Trent A.M. and Smith D.F. (1984) Surgical management of umbilical masses with associated umbilical cord remnant infections in calves. *J Am Vet Med Assoc* 185:1531-1534.

'I've been using the Veterinary Pathology Centre for several years now for farm-animal post-mortems. They have always provided a really excellent service and go above and beyond on every case. The reception team are one of the most cheerful and helpful I have ever come across and the vets put a huge amount of time and effort into their work. They are always willing to go through cases over the phone and offer additional advice and insight. I get good feedback from clients too. I would be lost now without such a great facility so close by.'

Lissie Gercke MRCVS
Director, The Livestock Clinic

For further information on the services and facilities provided at the VPC please visit the [website](#) and to submit any cases please use the [submission form found here](#).