Parasitic gastroenteritis and cobalt deficiency in lambs

APHA Disease Surveillance Report
September 2014

- Acute Schmallenberg virus infection
- Suspected oxyclozanide toxicity in sheep
- PRRS disease alert
- Botulism in wild birds

CATTLE

Respiratory disease

Husk was diagnosed at several Veterinary Investigation Centres. An outbreak with significant morbidity and mortality was diagnosed in a dairy herd. Clinical signs included an increased respiratory rate, coughing, nasal discharge and milk drop. At the time of submission of an animal for postmortem examination, two cows had died and 14 others had become recumbent and were euthanased. The younger animals in the herd were more severely affected than the older cows. IBR had also been suspected but was ruled out when large numbers of adult lungworm were found throughout the bronchial tree. Dictyocaulus viviparous larvae were also detected in a pooled faeces sample from another three affected adult animals.
At Penrith, a diagnosis of husk was reached on Baermann’s examination of faeces samples from three of a herd of 160 Holsteins. Approximately 40% of the cows were coughing despite having been treated for lungworm four weeks previously. As in previous years, this case is a reminder of the difficulty in controlling the disease which requires a balance between exposure and immunity. Prophylactic anthelmintic administration has an unpredictable effect on lungworm infestation, as proven in this case.

**Systemic disease**

**Schmallenberg virus** (SBV) infection was suspected at Carmarthen in a dairy herd associated with milk drop, pyrexia (range 39.3 to 39.7°C), inappetance and swelling of the hind limbs below the hocks. Rising titres to the virus were demonstrated in paired blood samples from two of five dairy cows which were tested. PCR testing for SBV proved negative. A high bulk milk ELISA was also identified. A total of six of the herd of 230 cows was affected with the initial cases seen in late August. All recovered with or without treatment with a non-steroidal anti-inflammatory drug (NSAID). Similar signs were also reported in dairy cows on the neighbouring farm although laboratory testing was not pursued. APHA comments that should SBV infection be suspected in pregnant animals, the potential for congenital malformations should be borne in mind.

**Black disease** was diagnosed at Penrith in a four-year-old Holstein cow. It was in a dry cow group of 11 animals and was seen to be in obvious discomfort whilst out at grass, and death ensued rapidly. At postmortem examination a large focal area of necrosis was evident on the diaphragmatic surface of the liver. Histopathology confirmed this to be a necrotising hepatitis associated with intralesional sporulated bacilli, whose morphology, together with a positive FAT result for *Clostridium novyi*, confirmed the diagnosis of Black disease. There was no evidence of fasciolosis which is most often considered the underlying ‘trigger’ for this disease, and no other precipitating factor was identified.

**Dilated cardiomyopathy syndrome** was diagnosed at Shrewsbury in a two year old Holstein heifer. The animal was first identified with brisket oedema and tachycardia, leading to respiratory distress and poor peripheral circulation with cold extremities. It died four days later. The heart and liver were grossly enlarged and the diagnosis was confirmed by histopathology. This syndrome, which results in right sided heart failure, is well known in Holstein-Friesians and is thought to be associated with an autosomal recessive gene. A review of nine affected animals examined at Glasgow University reported an age range of 1.2 to 6 years and duration of illness between 1 and 5 weeks (Nart and others 2004).

**Nervous disease**
Clostridial epsilon enterotoxaemia was suspected as the cause of neurological signs and death of a four year old Holstein-Friesian cow which was examined postmortem at Shrewsbury. It was the second cow to die in two days in a high yielding group of 125 cows in a herd of 310 animals. The first cow was found dead in a passageway in the cubicle house. The second was found recumbent in a cubicle and was initially lifted and could walk unsteadily with a swaying gait, leaning on the side of the building. Although the cow was moved to a loose box and given magnesium, she died an hour later. Postmortem examination findings were largely restricted to subcutaneous haemorrhages in the head which were probably related to self-inflicted trauma when recumbent. No infectious agents were identified and the significance of a relatively low rumen liquor pH of 5.4 was uncertain. Brain histopathology confirmed a cerebral vasculopathy which was strongly suggestive of Clostridium perfringens epsilon intoxication. The clinical presentation of this condition in cattle is more variable than in sheep where ‘pulpy kidney disease’ is well recognised and has more consistent findings. Diagnoses have been made in the UK in neonatal calves (Watson and Scholes 2009) and occasional cases have been identified in growing cattle and adult cows. Confirmation relies on the demonstration of characteristic brain histopathology and the identification of epsilon toxin.

SMALL RUMINANTS

Enteric disease

Parasitic gastro-enteritis: Throughout September parasitic gastro-enteritis (PGE) was frequently diagnosed at all Veterinary Investigation Centres (VIC). PGE was the cause of ill thrift and diarrhoea in a group of 600, six-month-old lambs of which six had died. They had last been wormed six weeks previously with a macrocyclic lactone. Blood samples had also been submitted from five lambs from the group, showing marginal cobalt concentrations in two lambs. The animal submitted to Carmarthen was in poor condition and the following parasites were detected in the gastro-intestinal tract:

<table>
<thead>
<tr>
<th>Total Worm Count</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abomasum</td>
<td></td>
</tr>
<tr>
<td>Trichostrongylus. axei</td>
<td>1500</td>
</tr>
<tr>
<td>Teladorsagia/Ostertagia</td>
<td>53800</td>
</tr>
<tr>
<td>Immature / L4</td>
<td>800</td>
</tr>
<tr>
<td>Abomasum</td>
<td></td>
</tr>
<tr>
<td>Nematodirus battus</td>
<td>10700</td>
</tr>
<tr>
<td>Trichostrongylus spp.</td>
<td>21900</td>
</tr>
</tbody>
</table>

Fig 2 Total worm count in a single lamb

This indicates high numbers of Teladorsagia, Nematodirus battus and Trichostrongylus spp sufficient to have been the cause of death. 3900 Trichostrongyle-type eggs were also detected in a faeces sample taken from this lamb. Urgent effective anthelmintic treatment was advised.
In a further submission from this farm there had been failure to improve in some lambs with three further deaths since treatment with a combined macrocyclic lactone and flukicide product. The submission of an emaciated lamb 11 days after treatment revealed the following:

<table>
<thead>
<tr>
<th>Total Worm Count</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abomasum <em>Teladorsagia/Ostertagia</em> spp.</td>
<td>8600</td>
</tr>
<tr>
<td>Abomasum Immature / L4</td>
<td>8400</td>
</tr>
<tr>
<td>Small intestine</td>
<td>No worms seen</td>
</tr>
</tbody>
</table>

Fig 3: Total worm count in a second lamb after treatment

1850 *Trichostrongyle*-type eggs were also detected in the faeces from this lamb. This result is highly suspicious of macrocyclic lactone resistance in *Teladorsagia/Ostertagia* spp. if the animal affected had been correctly dosed and was representative of affected animals. The farm also had known benzimidazole resistance, and urgent treatment with a different class of anthelmintic together with cobalt supplementation was advised. Movement of the animals after a number of days to less contaminated pasture should also be considered. It was also strongly recommended that tests to assess anthelmintic efficacy on this farm be carried out, probably with next year’s lamb crop to help draw up a parasite control plan for the future.

APHA comments: Faecal egg count (FEC) monitoring provides information about the worm status of a flock of sheep and can help in the decision making process. FECs can be used to help determine the need to treat, test the efficacy of a treatment, and give information on the amount of contamination going onto the pasture

They should also be considered for incorporation into flock health plans as early detection on worm burdens in advance of any detectable reduction in weight, or clinical signs, with appropriate treatment, can significantly reduce the production impact in a flock.

For more information refer to advice from SCOPS: [http://www.scops.org.uk](http://www.scops.org.uk)

VICs occasionally receive requests for worm egg counts in order to corroborate in-house testing or to provide quality assurance. APHA recommends that this approach is undertaken with a laboratory accredited to ISO 17025 standards.

**Oxyclozanide poisoning**: Shrewsbury suspected oxyclozanide poisoning where six ewes from a group of 140 developed swollen, oedematous heads and limbs and one died three days after dosing with a combined oxyclozanide and levamisole product. Blood sampling confirmed biliary stasis, with GGT 313U/l (reference interval 0-30 U/l). The ewes had been dosed to the weight of recently finished ewes from the farm, which were larger than the affected sheep. The product requires good mixing prior to use and continual mixing
during use. This was reported to have been carried out. However a combination of overdosing and the possible settling of the suspension were considered the likely cause of the toxicity. A food safety risk assessment was carried out and advice provided.

**Systemic disease**

**Cobalt deficiency** was diagnosed at Shrewsbury, Starcross and Penrith during September.

Twenty deaths in a group of 650 ewes and lambs prompted submission of an array of samples to Penrith following on farm postmortem examination. The ewes were ill-thriven and lambs were poorly grown. Parasitological examinations ruled out significant PGE and fluke eggs were not detected. Biochemistry testing on blood samples from six ewes with body condition score 1.0 to 1.5 and no other obvious cause of ill thrift (i.e. lameness, dental abnormalities etc.) found evidence of cobalt deficiency and selenium deficiency. Advice on sample selection from on farm postmortem examination was given to improve the chances of reaching a diagnosis as many of the samples taken were not useful in terms of laboratory investigation.

Starcross diagnosed cobalt deficiency following the submission of a five-month-old Black Welsh Mountain lamb with a history of non-specific illness prior to being found dead. Gross postmortem findings were unremarkable and bacteriological and parasitological tests were unrewarding. However, trace element testing of the liver revealed a significantly low vitamin B12 result consistent with a diagnosis of cobalt deficiency.

The ‘top four’ diagnoses from sheep diagnostic submissions during September 2014 from the APHA’s VIDA database were:

- Parasitic gastroenteritis: 31% of diagnostic submissions
- Pine/cobalt deficiency: 11%
- Johne’s disease: 7%
- Hyposelenaemia/hyposelenosis: 6%

All four of these most commonly diagnosed conditions are associated with ill thrift. Selenium deficiency is common in areas with acidic soils especially combined with high rainfall. Cobalt deficiency is also related to cobalt deficient soils. Although there was an increase in Johnes diagnoses in quarter 3 compared to the same quarter in the previous year, this increase was not statistically significant.

**PIGS**

**PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME DISEASE ALERT**
Trend analysis of the seasonality of GB porcine respiratory and reproductive syndrome (PRRS) over recent years shows that there tends to be a peak in diagnoses in the winter months as illustrated in the figure below. This probably reflects the fact that climatic conditions over the winter tend to favour survival of PRRS virus and promote transmission. Survival of the virus in contaminated pig accommodation, vehicles or on other fomites is also more likely as effective cleaning and disinfection and drying of surfaces is harder to achieve in wet and cold weather. This year, the diagnostic rate of PRRS during July to September was higher than in any of the same quarters over the last ten years. This raises concern that there will be more active infection present going into the cooler months, further increasing the risk of virus spread during this time. Obtaining an accurate diagnosis in respiratory disease outbreaks assists in determining whether PRRS virus is involved and in deciding on specific control measures. Outbreaks of respiratory disease may involve more than one infectious cause and, ideally, a batch of three typically affected pigs early in the course of disease should be sampled or submitted to provide the best material for both diagnosis and pig disease surveillance.

Fig 4: Seasonality of GB diagnoses of PRRS incidents as % diagnosable submissions (data for Q4 2014 incomplete)

**Alimentary Disease**

**Bowel oedema after arrival of pigs at their finisher site:** Increased mortality in 10-week-old pigs recently arrived from the breeding premises led to submission of four dead pigs to Penrith for postmortem examination. There had been 10 deaths and a further 15 pigs were affected with swollen eyelids, ataxia, hindlimb weakness and rapid death in the batch of 550. Cases did not respond to treatment with penicillin. The pigs were vaccinated against *Mycoplasma hyopneumoniae* and PCV2 at source and were fed a commercial ration containing amoxicillin for the first 10 days after arrival before switching onto unmedicated ration. The four pigs submitted were below target weight for age ranging from 13kg to 25kg and two appeared hairy and pale with watery blood, although iron deficiency was not present. Gross lesions were minimal with reddening of mesenteric lymph nodes and meningeal congestion. Haemolytic *Escherichia coli* isolated from the ileum was typed as strain E4; serotype O139:K82 which is a serotype associated with bowel oedema in pigs, confirming this diagnosis. The *E. coli* isolate showed *in vitro* resistance to apramycin, spectinomycin, trimethoprim/sulphamethoxazole, ampicillin and tetracycline, and the in-feed antimicrobial may have favoured better survival of this pathogen relative to other intestinal commensals.
Potential issues at the source unit were considered worth investigating given the uneven bodyweights of the pigs.

Respiratory Diseases

Porcine reproductive and respiratory syndrome (PRRS) underlying finisher disease and mortality: Pigs were submitted to Thirsk from a nursery-finisher unit, with problems in 50-60kg pigs that started to fade, then became pale and died. No obvious enteric or respiratory signs were detected. Pigs were vaccinated against Mycoplasma hyopneumoniae and PCV2. Postmortem examination revealed varying degrees of peritonitis, pleuritis and pneumonia. PRRS virus, Mycoplasma hyorhinis and M. hyoneumoniae were all detected by PCR, and Trueperella pyogenes was isolated from the pleura of one pig. Histopathology revealed interstitial pneumonias consistent with PRRS and some milder changes consistent with possible mycoplasmal infection. The lesions were fairly chronic in these pigs and the earlier involvement of Haemophilus parasuis or other pathogens cannot be ruled out.

Nervous Disease

Water deprivation after weaning and moving outdoors: Water deprivation was diagnosed in two combined litters of recently weaned 12-week-old pigs which had been moved to an outdoor pen. Four days after moving at least nine of the group of 16 pigs developed nervous signs including blindness, ataxia, aimless wandering and rapid respiratory rate after a short period of malaise and anorexia. These signs are typical for salt toxicity. Four died and were submitted to Bristol University for postmortem examination under the new arrangements for external postmortem examination provision with APHA. Findings included dry stomach contents and tacky subcutaneous tissues indicating dehydration. There was no evidence of bacterial meningitis from cultures and salt toxicity/water deprivation was confirmed by brain histopathology with mid-laminar cerebral cortical neuronal necrosis detected in the parietal and temporal cortex. There was no obvious reason why this had occurred but advice was given to ensure access to adequate fresh drinking water at all times, it is possible that the recent move meant that pigs had not found the water bowl or that there had been some temporary interruption to supply.

Musculoskeletal disease

Bacterial polyarthritis, meningitis and likely greasy pig disease in preweaned piglets: An 18-day-old piglet with meningitis-like signs and a nine-day-old piglet with swollen joints were euthanased and submitted to Camarthen to investigate the causes of both conditions. The herd was experiencing an increased incidence of joint ill (approximately 3-4% affected) in the farrowing house. Both conditions were reported to respond well to antimicrobial treatment. There was fibrinous exudate in several joints of both pigs and the meninges of both appeared congested. Streptococcus suis type 14, a cause of polyarthritis, septicaemia and meningitis in piglets, was isolated from the brain and one joint of the older piglet. Staphylococcus hyicus, the
cause of greasy pig disease, was isolated from two joints from the younger piglet and this piglet did have some skin lesions on the hindlimbs (Fig 5) resembling greasy pig disease. Both pigs also had limb abrasions suggestive of floor trauma which may have allowed the staphylococcal infection in the younger piglet to enter. Attention to colostral intake, improving hygiene and addressing any factors which could be damaging the skin, including an assessment of the flooring, were recommended.

Fig 5: Hind-limb skin lesions (likely greasy pig disease) in piglet with *Staphylococcus hyicus* joint infection

**Skin Disease**

**Staphylococcal skin disease causes skin lesions resembling pig pox:**
Three 18-week-old housed pigs were euthanased and submitted as part of a continuing investigation into porcine circovirus 2-associated disease (PCVAD) which had begun about five weeks earlier. Clinical signs included pallor, coughing, wasting and 15% mortality. Approximately 200 of 880 pigs were affected over the five-week period and were from a single source. PCVAD had been diagnosed in a previous submission and the virus was a PCV2b typical of previous viruses and not the PCV2b variant. The pigs were vaccinated for *Mycoplasma hyopneumoniae* and should have been PCV2-vaccinated but there was uncertainty about compliance with the vaccination schedule. Two of the pigs had multifocal circular raised lesions over the ear pinnae, dorsal neck, body and upper legs measuring 3mm to 3cm with pale peripheries and darker scabbed centres. Lesions in the more severely affected pig are illustrated in figure 6. Pig pox was considered a possible differential but pox virus was not detected by electron microscopy and histopathology was consistent with a primary bacterial cause, similar to juvenile impetigo, the pathogenesis of which involves staphylococcal exfoliative toxins. The pustules were more discrete and the acanthocytes were more numerous than is usual in *Staphylococcus hyicus* (greasy pig)-associated lesions. *Staphylococcus lentus* was isolated rather than *S. hyicus*; this organism is not usually associated with skin disease in pigs and is of doubtful clinical significance.
Fig 6: Bacterial skin disease causing lesions resembling pig pox

MISCELLANEOUS AND EXOTIC FARmed SPECIES

Alimentary disease

Endoparasitism was the predominant feature of submissions in September. Fasciolosis caused by both adult and immature fluke was detected in a reindeer which on post mortem examination showed jaundice, a swollen liver with irregular pale, firm areas throughout and an irregular capsule and a large amount of sero-sanguinous fluid free within the abdominal cavity. Examination of a 10-month-old reindeer with diarrhoea identified large numbers of immature forms, primarily of Teladorsagia/Ostertagia spp, on a total worm count on the abomasal contents confirming parasitic gastroenteritis. Haemonchosis was diagnosed in an adult female alpaca submitted for post mortem after a brief episode of clinical disease characterised by malaise and recumbency. The gross findings were of gelatinous clear oedema throughout the carcase. The intestinal contents were black and tar like whilst all blood vessels contained watery blood. Large numbers of worms, identified as Haemonchus spp, were observed in compartment 3 contents and mucosa.

Of particular interest was a faeces sample from a 3-week-old European Bison which showed signs of weakness. Parasitology identified 8400 Toxocara spp eggs per gram which bearing in mind the species of origin, were most likely, Toxocara vitulorum. Infection of young animals, usually less than three months of age, occurs through the ingestion of milk, with adult worms in the small intestines reaching patency in 3-4 weeks. The excretion of high numbers of eggs in the faeces then acts as a source of infection for older
animals, which following ingestion, the hatched larvae may become dormant in various tissues. This is of particular importance in female animals as the immunosuppression during pregnancy allows reactivation of these dormant larvae and lactogenic transmission to subsequent offspring. The main aim when controlling this parasite is to reduce the level of environmental contamination via routine anthelmintic treatment of young animals (at 3 and 6 weeks of age) and the removal of faecal material produced by this age group thereby reducing the risk of older animals becoming infected. The zoonotic potential of this parasite is unknown, but normal hygiene precautions should be followed when handling infected animals.

WILDLIFE

Systemic disease

Botulism: Over the months of July, August and September 18 submissions comprising 66 carcasses of water-birds were received at APHA Veterinary Investigation Centres with suspected avian botulism. The submissions came principally from the North-west of England and the Midlands and comprised mainly mute swans (Cygnus olor), mallard (Anas platyrhynchos), Canada Geese (Branta canadensis), coot (Fulica atra), moorhen (Gallinula chloropus) and black-headed gulls (Chroicocephalus ridibundus) all of which are the commoner species on inland waterways. Avian botulism in wild birds, in the absence of reliable, validated diagnostic tests, remains primarily a clinical diagnosis, and while the disease in the UK may occur in any month of the year, it is most frequent in the summer months. Provisional diagnosis at APHA was based on the clinical histories, with birds reluctant or unable to move their wings and fly and in some cases unable to walk. Avian Influenza virus and West Nile virus were not detected in any submission, nor were other pathogens isolated. It is assumed that the disease in the UK is caused by Type C botulinum toxin and does not pose a known risk to human health. However, the plight of birds with flaccid paralysis with a clinical course often lasting 2-3 days caused concern to both the public and those council authorities with responsibility for public water bodies. Avian botulism is recorded each year by APHA and the warm dry weather may have precipitated severe losses this summer. The distribution of the majority of cases in the North of England was not readily explainable.

The failure of an important mixed lesser black-backed (Larus fuscus) and herring gull (L argentatus) colony in Cumbria was investigated by a submission of dead gull chicks. This was an entire colony failure with deaths of potentially 7000 chicks, none of which were seen to fledge. All 4 chicks examined died from traumatic injury, with single severe punctate stab wounds, probably caused by other gulls. Avian influenza virus and West Nile virus infections were excluded. Observations by several cameras monitoring nests and by people watching the colony, supported the suspicion that the adults were attacking the chicks. It appears that both parents would leave their nests, and without a parent to guard the chicks, the chicks were then susceptible to attack. This large colony relied on a diet of natural marine
foodstuffs and it seems likely that a lack of food was behind the behaviour and the deaths. A smaller roof-nesting gull colony in a nearby city which relied on waste for food had a successful breeding season.

Carcasses of eighty two bats (*Pipistrellus* sp.) found dead in a 4m x 6m boiler room on a camp were examined. The room was last entered in April 2014 when there were no dead bats. The evidence suggested that the bats had died over a period of time. Many bodies were clustered around a rising main and suggested that temperature and moisture were a factor in the deaths. It is possible that the room became very hot when the boiler was working, and unable to find a way to exit the room, the animals died from the effects of an adverse environment. The bodies were in a mummified state and unsuitable for rabies virus or other pathogen testing. It is not clear whether there was local knowledge that the bats used the boiler room but perhaps it indicates that personnel responsible for unpopulated site maintenance should routinely check for bats and other groups of wildlife using the empty buildings.

**BIRDS**

*Broilers and Broiler breeders*

**Bumble foot and amyloidosis:** *Staphylococcus aureus* arthritis (bumble foot) combined with hepatic amyloidosis was seen in a flock of 40 week old breeders submitted with a history of protracted mortality. The postmortem findings included swollen plantar pads with turbid/caseous exudate from which *Staphylococcus aureus* was isolated and enlargement of the liver. Histological examination revealed amyloid atrophy in the liver. While the chronic plantar infection in this case was most likely precipitating amyloid deposition in the liver, similar systemic lesions can also be seen in association with other factors and further investigation may be merited.

**Commercial layers**

**Fowl cholera:** Increased mortality was described in a group of 12,000, 61-week-old layers. *Pasteurella multocida* was isolated from heart blood, liver and spleen swabs submitted by the practitioner, confirming a diagnosis of fowl cholera.
Turkeys

**Blackhead (histomonosis):** Several cases of blackhead (histomonosis) were diagnosed in turkey flocks, ranging in size from a small flock of eleven bronze turkeys to flocks of several thousand birds. One example was the sudden death over a four day period of fourteen birds in a group of 600 free range bronze turkeys aged twelve weeks. One bird seen alive prior to death showed non-specific clinical signs. Postmortem examination showed that the livers were enlarged and friable with extensive multifocal pale 3-5mm circular lesions visible on the surface. The caeca were markedly dilated and thickened with areas of haemorrhage and large fibrinonecrotic cores with concentric layers visible on cross-section. The caecal mucosa was thickened and white and there was watery brown fluid around the caecal cores. The lesions were typical of histomonosis and the diagnosis was confirmed by histopathology and demonstration of histomonad organisms in the lesions. The control of histomonosis in outdoor flocks continues to rely on control of the principal intermediate host *Heterakis gallinarum*, although other transport hosts including earthworms can also transmit infection.

**Backyard flocks**

**Marek’s disease and egg peritonitis:** The unexpected deaths of three point of lay birds in a flock of nine back-yard hens over three months prompted the submission of a carcase for postmortem examination. The bird had a heavy louse infestation with the ‘shaft louse’, *Menopon gallinae*, and egg peritonitis. The ovary was grossly enlarged with a granulomatous appearance and the egg peritonitis was probably associated with the abnormal ovary. Histopathological examination of the ovarian tissue indicated the presence of a lymphoma typical of Marek’s disease. The flock was not vaccinated for Marek’s disease. This vaccine needs to be given when chicks are day-old and the logistics of providing this in back-yard flocks can be difficult.

**Game birds**

**Hepatic disease:** Unexpected mortality was reported over a period of two weeks, affecting four out of 20 pens of red-legged partridges. The affected birds were 11 weeks old and there were 4000 partridges on the site. There was no response to various antibiotic treatments. Postmortem examination by the practitioner revealed microabscesses in the liver of affected birds, similar to those shown in fig. 7, accompanied by necrotic lesions in the caecum in some cases. Histopathology of the liver and caecum showed granulomatous lesions associated with protozoal bodies, different in appearance and more numerous than seen in blackhead (histomonosis). The character and distribution of the lesions and the parasite morphology were similar to lesions recently attributed to *Tetratrichomonas gallinarum*, which was identified by PCR testing in a similar case seen in another location in 2013 (Liebhart and others 2014). This newly identified disease appears to be associated with the
systemic spread of a single strain of *T. gallinarum*, circulating in partridges. The epidemiology of the disease is not known and no specific control measures have been identified.

**Pigeons**

**Salmonellosis**

*Salmonella* Typhimurium var Copenhagen phage type 2 was isolated from an adult female racing pigeon submitted with a history of 15 deaths over the previous few months from a loft of 500 birds. This bird had been found dead. If clinical signs were seen in the birds they were non-specific and included general malaise, dullness and ruffled feathers. Postmortem examination revealed a fibrinous peritonitis associated with the ovary with a 2cm diameter thick-walled, yolk-filled sac adjacent to, and attached to the ovary. The pericardial sac contained an excess quantity of pale fluid. The *Salmonella* organism was isolated from both liver and ovary. Salmonellosis is often associated with wing joint infections in racing pigeons, but joint lesions were not seen in this bird. The owner was advised of the zoonotic risks of *Salmonella* infections in the birds.

Fig 7: Microabscesses (arrows) in the liver of a red-legged partridge associated with *Tetratrichomonas gallinarum* infection.

**References**


Watson, P.J. and Scholes, S.F.E. (2009) ‘*Clostridium perfringens* type D epsilon intoxication in one-day-old calves’ *Veterinary Record* **164**, 816-7

This summary is produced by the APHA and is drawn from reports provided at the time of reporting by the former AHVLA laboratories at Bury St Edmunds, Carmarthen, Lasswade, Penrith, Shrewsbury, Starcross, Sutton Bonington, Thirsk and Weybridge and third party external postmortem providers to APHA (Bristol University, Royal Veterinary College, SAC C VS St Boswells). APHA monthly reports are available online at [https://www.gov.uk/government/publications/disease-surveillance-reports-2014](https://www.gov.uk/government/publications/disease-surveillance-reports-2014)