

In the summer months gamebird flocks may experience health problems and veterinarians may be presented with pheasants, partridges, or other gamebirds. It is therefore important to be aware of and consider some of the common gamebird diseases to aid the investigation and differential diagnosis of such health problems.

## Health problems during the first three weeks of life

**Rotavirus** infection is commonly seen in pheasants and partridges as the cause of illness, diarrhoea and death, mostly between the ages of 4 and 14 days. Grossly, there is distension of the intestinal tract and caeca by frothy yellow fluid. Secondary bacterial infections may cause pericarditis, perihepatitis, hepatomegaly or splenomegaly. Usually, gamebirds are affected by group A rotaviruses, but non-group A (atypical) rotavirus infections also occur. Rotavirus detection is usually by polyacrylamide gel electrophoresis (PAGE). Please note that commercial mammalian ELISA kits are not recommended for this diagnosis. Diagnosis by post-mortem examination (PME) and PAGE test of faeces.

'**Starve-out**' occurs when chicks are unable to find feed. Similar to other avian species, mortality peaks around day 4 as yolk sac reserves are exhausted. Grossly, the liver is pale, the yolk sac remnant is small and the GI tract is empty or contains bedding/litter shavings. A review of husbandry at placement is recommended, in particular feed presentation and availability, environmental temperature and water supply.

**Salmonella** infections, in particular with *Salmonella* Typhimurium, can result in high mortality, especially in the first 2-3 weeks of life, with post-mortem lesions including pericarditis, perihepatitis and caseous caecal cores. Pullorum Disease (caused by *Salmonella* Pullorum) can cause mortality as high as 50% in the first 1-2 weeks of life. At PME, lesions include infected yolk sacs, pale nodules in the wall of the caecum and rectum, caseous caecal cores and white nodules in the lungs. Salmonellosis can also be secondary to other enteropathogens. It should be remembered that *Salmonella* organisms have a zoonotic potential and personal hygiene precautions should be taken accordingly.

## Rearing pens (2-7 weeks)

During the rearing stage, growing gamebirds are given access to an outside run attached to a brooder pen/house. At this stage, development of a good quality, complete and waterproof feathering is essential for gamebirds to endure adverse weather conditions. Feather pecking and aggression between gamebirds poults may have a significant impact on plumage quality. Stocking rates, boredom/stress, ill-health, unbalanced diets and poor management may be contributory factors that can lead to feather pecking and have a detrimental effect on birds' plumage.

**Motile protozoa:** *Spironucleus meleagridis* (Hexamita) and *Tetratrichomonas gallinarum* are motile protozoa that commonly cause health problems in gamebirds, notably diarrhoea and mortality, during the summer months. *S. meleagridis* has whip-like flagella and is highly motile with a quick jerky action. In contrast, *T. gallinarum* is longer and moves more slowly and smoothly. Large numbers of the motile protozoa can be seen in wet preparations of intestinal mucosa from freshly culled affected birds from 3-weeks of age onwards. Submission of live birds for PME is essential for detection of motile protozoa.

Clinical signs can include weight loss (sometimes leading to emaciation), frothy yellow diarrhoea, dehydration and death. Grossly, the intestines and caeca are dilated with frothy and watery contents and small boluses of semi-solid material. Enteritis due to motile protozoa is typically observed in two age groups - the rearing pen and the release pen. In the rearing pen, young poults can be badly affected with losses up to 50%, foamy diarrhoea and weight loss. In the release pen, the disease takes a chronic form, and birds may become very thin and lethargic, with ensuing losses.

**Coccidiosis** is often caused by *Eimeria colchici* and *Eimeria legionensis*, which inhabit the caeca of pheasants and partridges, respectively. Coccidiosis is most commonly observed in birds in-rear around 3-5 weeks of age and is associated with diarrhoea, weight loss and ruffled feathers, and sometimes sudden death in red-legged partridges. Grossly, there are off-white cheesy cores in the caeca, or fluid/frothy contents in the intestines. Coccidiosis control may involve a reduction of the environmental challenge and anticoccidial drugs in feed or in water. Diagnosis

by PME, direct examination of intestinal smears and/or faecal samples.

**Infectious sinusitis** (aka 'bulgy eye') is a common disease of pheasant poults in the late summer and autumn. It is characterised by swelling around one or both eyes, shaking of the head, an oculonasal discharge, respiratory noises and dyspnoea, followed by purulent conjunctivitis and keratitis, with loss of feathers around the eyes. As the disease progresses the sinuses become progressively more swollen with caseation of the contents, at which stage treatment is impractical. A range of respiratory agents may cause swelling of the infraorbital sinus, and the most common agent is usually *Mycoplasma gallisepticum*, but other agents like avian metapneumovirus (TRT) and avian coronavirus can also be found. Diagnosis by mycoplasma PCR/DGGE and/or histopathology. Serology by rapid slide agglutination test for is not considered reliable in pheasants.

In poults, *Aspergillus* sp. can cause a severe airsacculitis. Mouldy straw bedding is usually considered the source of *Aspergillus* sp. and other fungi. *Ornithobacterium rhinotracheale* (ORT) can also be found, but it is usually secondary to other agents such as *Mycoplasma* spp.

### Adult birds

**Pheasant coronavirus nephritis** is characterised by gross enlargement and pallor of the kidneys, urate impaction of one or both ureters and deposition of urates on the surface of the liver and heart. It is essentially a disease of adults. Affected birds may die suddenly, in good body condition, showing non-specific malaise and sometimes staining of the vent with white urates. A reduction in egg production and egg peritonitis may also feature. For Infectious Bronchitis virus (IBV) and IBV-like gammacoronaviruses, APHA has developed a real-time RT-PCR (RRT-PCR) assay. Diagnosis by PME, histopathology and PCR.

**Marble Spleen Disease** (MSD) is also another viral disease of adult gamebirds that causes sudden death, and is caused by a siadenovirus (formerly group II adenovirus). Grossly, the lungs are heavily congested and the spleen is usually markedly enlarged and with confluent grey foci, giving it a 'marbled appearance'. The digestive tract may be full. MSD appears to be widespread in some populations of pheasants, and stress may precipitate viral shedding, resulting in disease in

naïve birds. Diagnosis by PME, histopathology, or AGIDT (for antigen).

***Pasteurella multocida* and *Erysipelothrix rhusiopathiae*** septicaemia can cause outbreaks of sudden death in well-grown pheasant poults after release, or in adults. Signs of septicaemia are found grossly at PME, and in birds with pasteurellosis the lungs are often congested or consolidated, resembling Marble Spleen Disease. Diagnosis by PME and bacteriology culture.

**Endoparasites:** The most common endoparasites found are *Syngamus trachea* (the gapeworm), *Heterakis gallinarum* (the caecal worm) and hairworms of the subfamily Capillariinae. Diagnosis by parasitological examination of faeces.

The gapeworm *Syngamus trachea* is probably the most important parasitic worm of pheasants and is associated with coughing, sneezing, head shaking, neck-stretching and gaping (dyspnoea). It is associated with weight loss, egg production drop and sometimes death. Diagnosis by PME and observation of red gapeworms in the trachea.

Caecal nematodes include *Heterakis isolonche* and *Heterakis gallinarum*. In pheasants, *H. isolonche* causes necrotic typhlitis by burrowing deep in the caecal mucosa. *H. isolonche* is now considered very rare. *H. gallinarum* is a caecal nematode that usually does not cause major problems. However, heavy burdens of *H. gallinarum* may affect breeding performance and body weight, particularly if birds are on a poor plane of nutrition. *H. gallinarum* is the vector for the protozoan organism *Histomonas meleagridis*, the cause of Blackhead (or histomonosis).

**Blackhead** is a protozoal disease that affects gamebirds and poultry, characterised by multiple necrotising lesions in the liver (circular depressed area of necrosis circumscribed by a raised ring) and caeca (severe ulceration and/or necrotic cores). Red-legged partridges are susceptible and rearing birds on the same ground/location year after year may increase the risk of disease. Infection occurs when birds ingest the eggs of the nematode *Heterakis gallinarum* or earthworms, containing the *Histomonas* organism. Pheasants are less susceptible. Clinical signs include sudden mortality, weight loss, emaciation and yellow diarrhoea. Diagnosis by PME and histopathology.

**Pheasant ataxia** is a sporadic condition that causes incoordination and ataxia in pheasant poults from seven weeks of age onwards, affecting up to 1% of birds. This condition is now

very rare, but may be confused with tenosynovitis of the Achilles (gastrocnemius) tendon sheath, which is commonly due to *Staphylococcus aureus* infection. Diagnosis by PME and histopathology. It should be included in the differential diagnosis of Notifiable diseases, along with fungal encephalitis, cerebral listeriosis, lead poisoning and botulism.

**Notifiable disease:** Pheasants and partridges are susceptible to both Newcastle disease (ND) and Avian Influenza. A variety of clinical signs have been described in outbreaks of ND, but the presence of an increasing incidence of birds with unexplained neurological signs (including blindness) should always give rise to suspicion, as well as unexplained mortality.

Several conditions can result in multiple pale foci throughout the liver parenchyma, including hepatic tumours (see below also) and bacterial diseases. Bacterial cultures and smears will differentiate between granulomata caused by avian tuberculosis, *E. coli*, *Clostridium colinum* (Ulcerative enteritis), Listeriosis and *Pasteurella* species, Yersiniosis/Pseudotuberculosis (*Yersinia pseudotuberculosis*) and Histomonosis. Diagnosis by PME, histopathology and bacteriology.

**Lymphomatous tumours** in gamebirds may be caused by Marek's Disease virus. Grossly, there may be enlargement of the liver with pale foci, enlargement of the spleen and thymus, focal or diffuse thickening of the mucosa of the proventriculus and nodular lesions in the duodenum, caecum, pancreas and kidney. Cutaneous and oropharyngeal lymphomas are also seen, in which nodular swellings occur in the skin around the eyes, external openings and hard palate.

**Respiratory cryptosporidiosis:** Since the Autumn of 2010, several outbreaks of respiratory cryptosporidiosis causing sinusitis have been detected in free-living red grouse in the Scottish Borders and Northern England. Affected birds show swelling of one or both infraorbital sinuses and eyelids with mucoid/catarrhal nasal discharge and similar discharge in the nasal passages, trachea, sinuses and upper respiratory tract. Laboratory testing confirmed the involvement of

*Cryptosporidium baileyi*. This presentation may be confused with *Mycoplasma gallisepticum* infection, a common cause of sinus swelling in pheasants and partridges (see Infectious sinusitis above). Diagnosis by PME, direct impression

smear of the conjunctivae and/or histopathology and PCR.

**Investigation & diagnosis of disease:** Contact a Veterinary Investigation Officer (VIO) at your local APHA or SAC laboratory, who will be happy to provide guidance in diagnostic investigations:

- Veterinary Investigation Centres & post mortem examination centres:  
<https://www.gov.uk/government/organisations/animal-and-plant-health-agency/about/access-and-opening#post-mortem-examination-centres>
- APHA Surveillance Price List:  
<https://www.gov.uk/laboratory-test-price-lists>
- SAC Veterinary Services:  
<http://www.sruc.ac.uk/info/120107/veterinary-services>

**See the APHA Surveillance Reports at**  
[www.gov.uk/government/publications/apha-disease-surveillance-reports-2015](http://www.gov.uk/government/publications/apha-disease-surveillance-reports-2015)

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