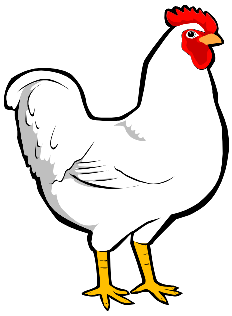

GB avian quarterly report

Disease surveillance and emerging threats

Volume 24: Q2 – April-June 2020

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the second quarter of 2020, April to June. It contains analyses carried out on disease data gathered from APHA, Scotland's Rural College (SRUC) Veterinary Services and partner post mortem providers and intelligence gathered through the Avian Expert Group. In addition, links to other sources of information including reports from other parts of the APHA and Defra agencies are included. A full explanation of how data is analysed is provided in the Annex available on GOV.UK.

https://www.gov.uk/government/publications/information-on-data-analysis

Issues & Trends

Industry trends – chick and poult placings

Broilers

There was a 1.9% decrease in placings of broiler chicks from UK hatcheries during June 2020 compared with June 2019 (Figure 1), at 82.3 million chicks, representing an average of 20.4 million chicks per week for the quarter. The decline in the number of placings in April and May coincides with the COVID-19 pandemic.

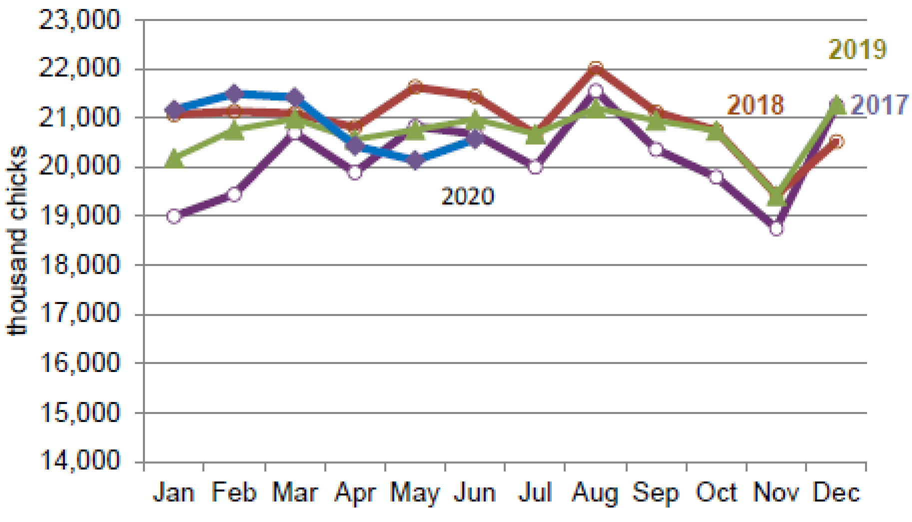

Figure 1 Average number of broiler chicks placed per week in the UK from UK hatcheries

Turkeys

There was a decrease of 26.0% in the number of turkey poults placed during June 2020 compared with June 2019 (Figure 2), at 1.1 million, representing an average of 0.26 million poults placed per week for the quarter, slightly below the average in recent years.

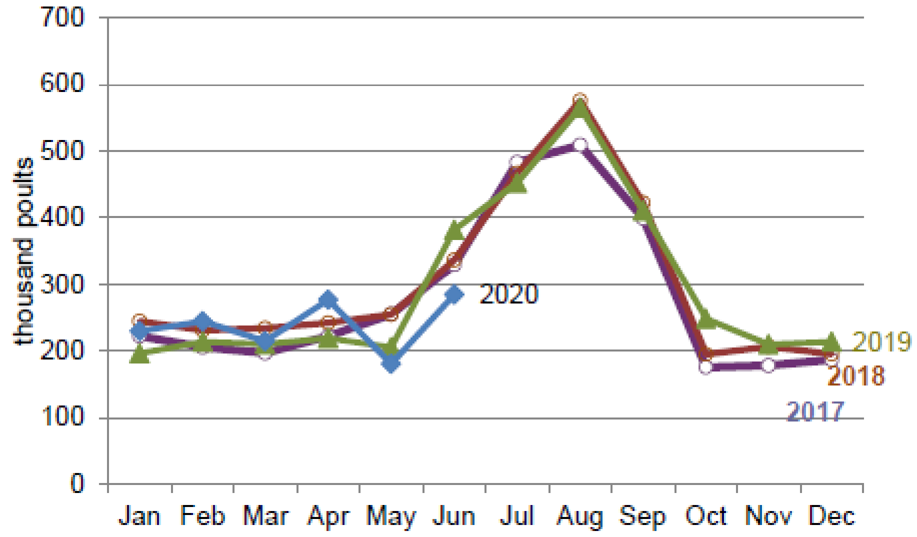

Figure 2 Average number of turkey poults placed per week in the UK by UK hatcheries

Layers

The number of layer chicks placed during June 2020 was 9.4% higher than the corresponding figure for June 2019, at 3.5 million chicks (Figure 3). UK packing station egg throughput in Q2-2020, at 7.7 million cases, was 2.9% lower than in Q2-2019 and 1.4% lower than Q4-2020, reflecting a small decrease in packing station throughput although it remains close to historically high levels. Free range eggs accounted for 51.9% of eggs packed in Q2-2020, compared with 53.2% in Q2-2019. Free range egg output during Q2-2020 exceeded enriched colony system output by 10.4%. Barn and organic production remained at low levels, although there was a small increase in output from both compared to the previous quarter. Average UK farm gate prices for eggs in Q2-2020 were 3.8% higher than the preceding quarter, and 10.4% higher than Q2-2019.

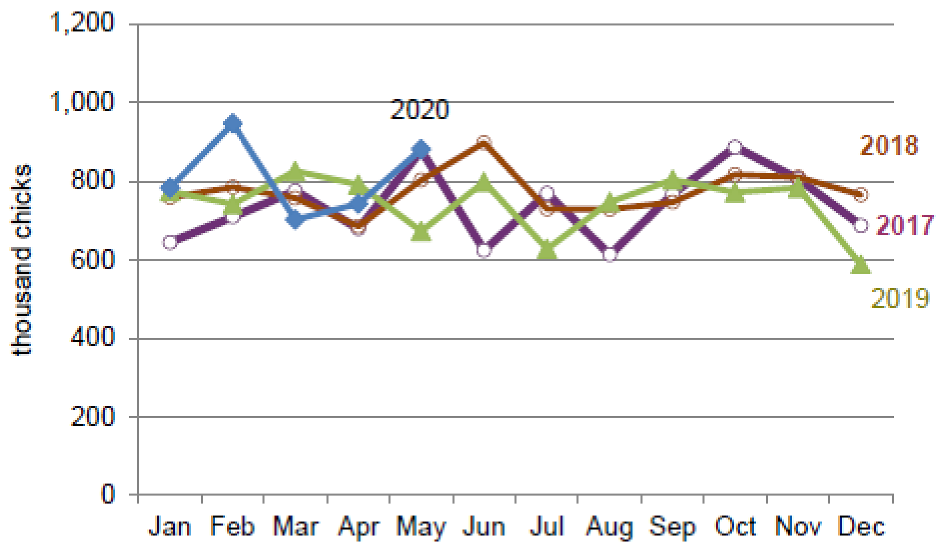

Figure 3 Average number of layer chicks placed per week in the UK by UK hatcheries

The poultry industry statistics are available online at:

Poultry and poultry meat statistics:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/902967/poultry-statsnotice-23jul20.pdf [accessed 4 August 2020]

Egg statistics:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/905051/eggs-statsnotice-30jul20.pdf [accessed 4 August 2020]

New and re-emerging diseases and threats

Please refer to the annex on GOV.UK for more information on the data and analysis.

Highly Pathogenic Avian influenza (HPAI) in Europe

There were no outbreaks of Highly Pathogenic Avian Influenza (HPAI) in poultry in the UK during Q2-2020 and no detections in wild birds in the UK.

During Q2-2020, 202 outbreaks of **H5N8 HPAI** were reported in Hungary between 3 April and 9 June as summarised in the updated outbreak assessments of these dates at https://www.gov.uk/government/publications/avian-influenza-bird-flu-in-europe. The outbreaks have affected commercial poultry of all types, but most frequently geese and ducks as summarised at: https://ec.europa.eu/food/sites/food/files/animals/docs/reg-com_ahw_20200618_hpai_hun.pdf. These outbreaks are a continuation of those described in the previous quarterly report in terms of the strain of virus and its origin (APHA 2020).

During 2020 nine outbreaks of HPAI were reported in Bulgaria up to 18 June, comprising both **H5N8** and **H5N2 HPAI**, in chickens and ducks. The last outbreak was confirmed in layer chickens on 4 June and was confirmed as H5N8: https://ec.europa.eu/food/sites/food/files/animals/docs/reg-com_ahw_20200618_hpai_bul.pdf The updated situation assessment dated 9 June states that "The H5N8 viruses identified from outbreaks in Bulgaria so far in 2020, have the same genetic composition a the H5N8 circulating in the country in 2018/19, while the H5N2 is a reassortant strain, with the HA and M genes related to the Bulgarian H5N8 viruses, and the other genes correlated with LPAI viruses collected in Eurasia from domestic and wild birds. The first outbreak in Bulgaria this year, on 17 February in ducks, was a co-infection with both subtypes. However, for all outbreaks in Bulgaria since, H5N2 viruses were all confirmed in laying hen farms and all H5N8 viruses were confirmed in duck farms" (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/892142/hpai-europe-update17-2020.pdf)

The origin of the outbreaks in Europe is believed to be spread from wild birds. There are no molecular markers to indicate increased human pathogenicity. Mortality has been the

principal clinical sign described in turkeys and in other domestic bird species. Measures have been implemented in accordance with Council Directive 2005/94/EC, including culling of birds, and disposal of their carcasses at all affected premises. Summaries of the outbreaks in the different countries up to June are given in the regulatory committee presentations at:
https://ec.europa.eu/food/animals/health/regulatory_committee/presentations_en

The most recent Updated Situation Assessment (#17) produced by the Defra/APHA International Disease Monitoring team, dated 9 June 2020, quoted above, concludes that: "the risk of HPAI incursion in wild birds into the UK is still considered to be **LOW** (i.e. no change at present). We are monitoring this very closely.

The overall risk of infection of poultry in the UK remains low, but the risk of introduction to individual premises depends upon the level of biosecurity implemented on farm to prevent direct or indirect contact with wild birds. We recommend biosecurity measures should be maintained.

Immunity of UK wild birds to H5 HPAI may be low at present. We recommend that all poultry keepers stay vigilant and make themselves aware of the latest information on www.gov.uk, particularly about recommendations for biosecurity and how to register their flocks. We will continue to report on any updates to the situation in Europe and, in particular, any changes in disease distribution or wild bird movements which may increase the risk to the UK."

Update (September 2020): outbreaks of **H5N8 HPAI** have been reported in **Russia** with high mortality both in poultry and wild waterfowl, on the border with Kazakhstan. The update concludes that "Currently the risk of HPAI incursion in wild birds in the UK is **LOW** (i.e. no change at present), and we are monitoring the recent outbreaks in Russia in terms of assessing the risk for further outbreaks over the coming months and increased probability of its spreading westwards during the autumn. The risk for poultry in the UK remains **low** for introduction of infection onto individual premises, but will depend on levels of biosecurity."
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915180/poa-avian-influenza-H5N8-russia-Sep20.pdf

Low Pathogenicity Avian Influenza in Europe

No outbreaks of **notifiable** Low Pathogenicity Avian Influenza (LPAI) were identified in Q2-2020 in the UK. In Italy, H5N3 LPAI was confirmed in ostriches in June and H7N1 LPAI in turkeys in April (https://www.oie.int/wahis_2/public/wahid.php/Diseaseinformation/WI).

Avian notifiable disease exclusion testing scheme ('Testing To Exclude', TTE, Testing For Exclusion) in Great Britain (GB)

The scheme started in May 2014 (Gibbens and others 2014) and is ongoing (http://apha.defra.gov.uk/vet-gateway/tte/nad.htm; accessed 13 May 2020). There were two exclusion testing investigations during Q2-2020 (Table 1). The scheme is very valuable in enabling possible LPAI to be investigated where it is considered to be a differential diagnosis for the clinical signs seen in birds on a site. The scheme currently only applies to chickens and turkeys.

Species and purpose (where information available)	Clinical details	Cloacal and oropharyngeal swabs taken	Results	Outcome
Turkeys - breeders	25% egg drop over previous four days; no other signs reported	Yes	Negative M-gene (AI virus) PCR results.	Avian notifiable disease excluded.
Chickens - layers	Marked drop in egg production over six days and small rise in mortality on one day	Yes	Negative M-gene (AI virus) PCR results.	Avian notifiable disease excluded.

Table 1 Summary of findings from the Notifiable Avian Disease Exclusion Testing Scheme during Q2-2020

Differential diagnosis of negated notifiable disease report cases in GB

This scheme was introduced in autumn 2018 to offer differential diagnostic testing through APHA and its partners in cases where suspicion of Notifiable Avian Disease (NAD) has been reported and are subsequently negated on either clinical grounds or by laboratory testing. The scheme is also available for TTE cases referred to above where NAD has been ruled out by laboratory testing. The scheme is described in more detail by Welchman and others (2019).

A differential diagnostic investigation was undertaken on one negated notifiable disease report case in Q2-2020, involving a small holder chicken flock with a history of respiratory disease. Histopathology showed evidence of likely *Mycoplasma* or *Avibacterium* involvement in the respiratory disease, and lesions suggestive of Marek's disease were also detected. Scaly leg (*Knemidocoptes*) mites were also identified. A differential investigation was also undertaken in a negated TTE case in a layer flock with a drop in egg production (Table 1). Testing was limited to PCR testing on oropharyngeal and cloacal swabs for infectious bronchitis virus (IBV), and no IBV was detected.

Pigeon paramyxovirus investigations

There were nine submissions of material tested for Pigeon Paramyxovirus-1 (pAAvV-1, formerly PPMV-1)) at APHA Weybridge during Q2-2020, all of which were from birds submitted as report cases. PAAvV-1 was not detected in samples from any of these birds, although in one submission in May, two sera were positive for antibodies to the virus, suggesting previous exposure.

Other diseases

Rotavirus in gamebirds

Rotavirus is a common cause of enteritis and mortality in young gamebird chicks, particularly in pheasants but also in partridges (Figure 4). An example of a rotavirus outbreak from which samples were submitted to APHA in Q2-2020 was a case where 120 pheasant chicks had died by seven days of age out of a group of 3000. Yellow frothy caecal contents and haemorrhagic small intestinal contents were described by the practitioner undertaking the post-mortem examination. Diffuse villous atrophy was identified in histological sections of intestine and this, together with a positive rotavirus polyacrylamide gel electrophoresis (PAGE) test result, was consistent with rotaviral enteritis. All the gamebird cases in Q2-2020 were identified by PAGE as atypical Group A rotaviruses. Previous published reports such as that by Legrottaglie and others (1997) have also confirmed the detection of Group A rotaviruses in pheasant chicks with watery diarrhoea, differing from Group A detected in calves. Atypical Group A rotaviruses were shown to be pathogenic in young pheasants (Gough and others 1986).

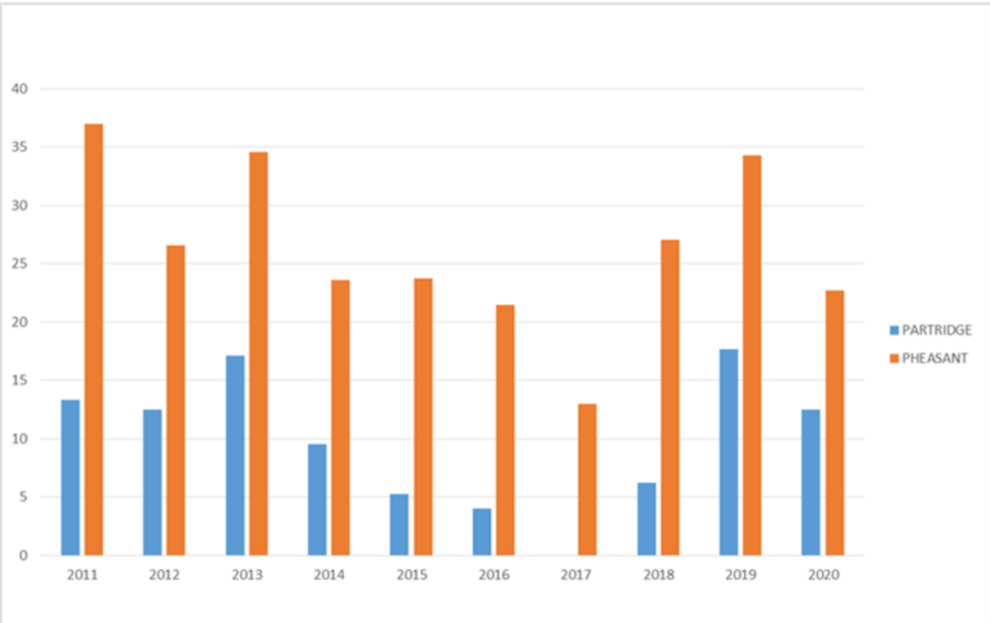

Figure 4 VIDA diagnoses of rotavirus in pheasants and partridges in quarter 2, 2011-2020, as a percentage of total pheasant and partridge diagnoses in the quarter.

A novel group A rotavirus has been described in pigeons, originally in Australia and subsequently a similar strain in Europe, associated with severe hepatic necrosis

(McCowan and others 2018, Rubbenstroth and others 2019). This effect of rotavirus has not previously been described in any bird species, and no evidence of hepatic necrosis has been found in association with rotavirus in gamebirds in the UK.

Rotavirus infections have been described in a large variety of species both birds and mammals, as well as in humans. It has been reported that rotavirus A strains can re-assort causing the emergence of viruses with new antigenic and pathogenic properties. Re-assortment has mainly been described for mammalian strains with the potential of the emergence of new zoonotic strains. Very little is known as to whether avian strains can re-assort resulting in strains which are infectious for mammals. Based on phylogenetic analysis avian strains are quite different from mammalian strains suggesting that the avian and mammalian rotavirus A strains are a different evolutionary line. The viral protein VP4 is the viral outer capsid protein and hence determines the antigenic characteristics of the virus.

Patzina-Mehling and others (2020) investigated the potential of avian rotavirus A to re-assort with mammalian virus. For their *in vitro* work the authors used a very well characterised strain which originated from a chicken as well as a well characterised mammalian virus. Whilst the authors failed to produce a re-assorted virus on the avian backbone, they successfully introduced VP3 and VP4 segments into a mammalian rotavirus strain. It is important to remember that these findings are only from *in vitro* work. Nevertheless, these results show the potential for re-assortments between mammalian and avian strains, though *in vivo* experiments would be necessary to characterise any re-assortments further.

Outbreaks of rotavirus in gamebirds will continue to be monitored for evidence of changes in epidemiology, pathology or emergence of new strains including surveillance for any rotavirus cases involving hepatic necrosis.

Unusual diagnoses

Erysipelas causing arthritis in goslings

Five, four-week-old goslings were submitted to APHA from a unit where 150 goslings had been placed at one day old in a barn. During the 48 hours prior to submission, 22 birds had been found dead. The remaining birds were well with no clinical signs reported. At post-mortem examination the gross findings in all birds were similar and included unilateral swelling of a hock joint and the associated tendon sheaths, soft, friable livers and enlarged spleens. External scabbing of the skin overlying the hock joints was noted in some of the birds. *Erysipelas rhusiopathiae* was identified on bacterial culture in pure growth from livers, heart blood and hock joints.

Erysipelas caused by *E. rhusiopathiae* is typically characterised as a rapid onset disease with mortality in well-grown birds and this case was unusual in the young age of the birds affected. It was also unusual in the involvement of the joints and tendon sheaths although this has been recorded previously in geese (Eriksson 2020). The source of infection in erysipelas outbreaks is usually considered to be asymptomatic carriage by a variety of animal species which can potentially act as a reservoir, or survival of the organism in the environment. It is noteworthy that APHA records show that this farm had experienced previous cases of erysipelas, most recently in turkeys in 2017, suggesting there may have been a reservoir of infection on the farm. Disease is seen more commonly in birds in free-range systems, or those reared on earth-floored houses.

Histopathology confirmed the presence of intravascular bacteria in the bone around the hock joint and there was an inflammatory reaction in some areas of the tendon sheath and synoviae, with clusters of intravascular bacteria. Inflammatory debris was present within the synovial spaces. There were similar findings in the hip joint and femoral head with additional evidence of osteomyelitis within the femoral head. The character of the intravascular bacteria, tenosynovitis and osteomyelitis was consistent with an *E. rhusiopathiae* infection, which was isolated by bacteriology. Although not detected in the samples examined, the skin abrasions over the hock joints may have accounted for the initial infection or alternatively the legs may have been involved as part of a systemic infection.

Infection is often believed to be introduced through damaged skin and mucous membranes, such as the skin abrasions seen on the legs in this case and flock stressors may also be implicated in outbreaks. A review of litter hygiene and depth was advised. Antimicrobial treatment of flocks may reduce mortality, but is unlikely to eliminate infection from the flock. Vaccination can be an effective means of prevention, coupled with hygiene and management practices. The veterinary practitioner was also asked to remind their client about the zoonotic potential of the organism, with infection in people mainly arising through skin abrasions.

This case was described in the APHA disease surveillance report for June 2020 in the Vet Record at http://dx.doi.org/10.1136/vr.m2774.

Changes in disease patterns and risk factors

Mortality in turkey poults associated with unsuitable bedding

Deaths of young turkey poults were reported on a farm with three poultry houses. Typically the birds had performed well in the first few days then mortality had increased daily. The clinical signs described were depression and lack of activity, reduced feeding and drinking, leading to weakness, recumbency and death. The birds were bedded on a blue paper-based product. Mortality in one house was around 6 per cent by day 11.

Post-mortem examination at APHA showed that the poults were significantly below the target weight and only one had a reasonable amount of food material in its gizzard and crop. There were few gross pathological findings but enlarged gall bladders and lack of food material were consistent with the history of lack of feeding although they had ingested non-food items; a variety of pieces and types of plastic, wood chips and tinfoil was present in the gizzards (Figure 5).

Histopathology showed pneumonia with fungal hyphae, pericarditis, meningitis, hepatitis and ventriculitis, most of which were relatively mild but were evidence of a bacterial and fungal challenge. These changes were most likely to be related to a combination of environmental challenge and the consumption of the non-digestible items. There was a variety of different types of material in the gizzards which would not have been intended components of the bedding and a review of the bedding type was recommended. This case coincided with a reported shortage of wood shavings as result of the COVID-19 pandemic. This case was described in the APHA disease surveillance report for July 2020 in the Vet Record, http://dx.doi.org/10.1136/vr.m3130.

Figure 5 Unsuitable bedding material in the gizzard of a turkey poult

Marek’s disease in small and backyard chicken flocks

Marek’s disease continues to be regularly diagnosed in both commercial poultry and in small flock and backyard chickens. VIDA data show an apparent increase in incidents in 2020 (Figure 6) although it is not known if this represents a genuine increase or an artefact of the data.

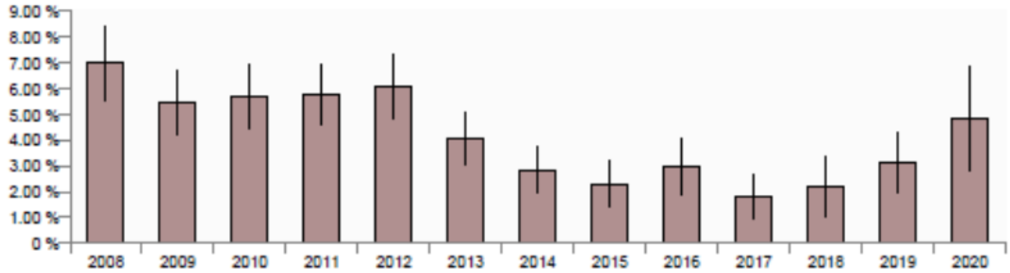

Figure 6 Incidents of Marek's disease in chickens as a percentage of diagnosable submissions

In some recent cases investigated by APHA and its partners in small and backyard chicken flocks, the disease has been characterised by lymphoma formation in a diverse range of organs. In one case, lymphomas were demonstrated by histology in liver, spleen, lung and proventriculus in an 18-month-old chicken, and virulent Marek's disease virus was confirmed by PCR testing in the liver and spleen.

In a separate case there had been an outbreak of ataxia in homebred chickens approximately three months of age. The farmer lost 8 of 20 birds with three affected on the same day. The post-mortem findings varied from no gross lesions in one chicken to multiple white nodules including free nodules adjacent to heart, proventriculus and mesentery (Figure 7) in another. Histopathology confirmed lymphomas including peripheral nerve involvement and thereby a presumptive diagnosis of Marek's disease.

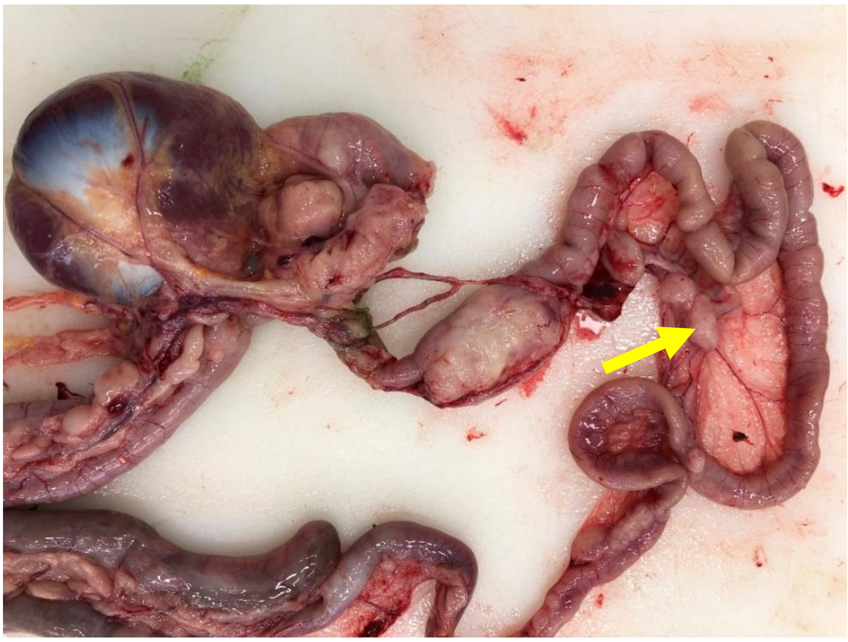

Figure 7 Lymphomas (arrowed) in the mesentery of chicken (image courtesy of Royal Veterinary College (RVC) - FAPD)

In a further case a single backyard chicken under one year of age had shown respiratory distress and died. It was still in a very good body condition and was one of a new batch of four chickens that replaced the previous three chickens that had all died earlier in the year. Post-mortem examination revealed a large mass (~10 x 5 x 4cm) in the pectoral muscle (Figure 8), a markedly enlarged ovary and a subcutaneous mass. The lungs were diffusely consolidated. Histopathology confirmed again lymphoma likely due to Marek's disease in the pectoral and subcutaneous masses and also the lungs.

Figure 8 Lymphoma (arrow) in the pectoral muscle of a chicken (image courtesy of RVC-FAPD)

In another case, two backyard chickens developed sudden onset leg paralysis within a few days of each other. These two were the only chickens on the small holding of 12 that were not vaccinated against Marek's disease. Nodular or diffuse enlargement of multiple internal organs was noted and lymphoma likely due to Marek's disease was again demonstrated by histopathology.

It is recognised that factors influencing the distribution and nature of lesions include the strain of virus, with more virulent pathotypes often causing more visceral lymphomas, the virus dose and route of infection, genetics of the host, age of exposure, environmental and stress factors and possibly gender (Nair and others 2020). Many home-bred small flock and backyard chickens are not vaccinated. It is not possible to determine which of these factors apply in each of the cases described above, but a possible role of highly virulent pathotypes in the development of multiple lymphoma lesions cannot be ruled out. Such pathotypes could potentially be disseminated through these types of flock by the widespread purchase, sale and showing of birds.

Duck virus enteritis in small breeding flocks

Two cases of duck virus enteritis (DVE) were investigated by APHA and its partner providers in April. In the first, two adult Muscovy ducks (*Cairina moschata*) were submitted from a smallholding that had been breeding various ducks for several years for non-commercial purposes and the pleasure of keeping them. Over the previous ten days 15 breeding ducks had developed clinical signs of weakness and apparent flaccid paralysis and died within 24 hours, initially leading to a suspicion of botulism. However it was striking that the ducks affected were almost entirely Muscovy rather than other breeds. Post-mortem examination showed occasional small multifocal, sharply demarcated acute ulcers filled with a diphtheritic membrane, in the small and large intestines of both ducks, and the findings were otherwise unremarkable. Histopathological examination confirmed the presence of a severe fibrinonecrotising enteritis with marked lymphoid necrosis, multifocal peracute necrosis of the spleen and liver and intranuclear inclusion bodies within multiple hepatocytes typical of those caused by DVE herpesvirus.

There is variation in disease susceptibility to DVE between duck species and breeds with Muscovy ducks considered more susceptible than mallards (*Anas platyrhynchos*) (Metwally and Cheng 2020) and unfortunately, a total of 37 out of the 40 breeding Muscovy ducks on this smallholding eventually died. Ducks of other breeds had continued to remain clinically well but, as DVE is a herpes virus and can establish a carrier status, there was the risk that surviving ducks would act as carriers and shed the virus intermittently in the future. The remaining Muscovy ducks were separated from the others and measures were put in place to improve water hygiene.

In the second case, 35 ducks of mixed breeds from a variety of sources were kept on around four acres of ground with a pond. No new birds had been introduced for several months. Initially a Khaki Campbell was noticed ill, lethargic and unsteady and this was followed by deaths in Muscovy ducks. Eventually 20 ducks died, including all of the Muscovy ducks, with only mallards remaining.

Post-mortem examination of two Muscovy ducks showed diphtheresis in the intestine of one bird, and in the other there was diphtheresis of the oesophagus (Figure 7), crusty plaques in the cloaca and miliary foci over the liver. There were fluid intestinal contents and splenomegaly in both birds. Histopathology confirmed frequent intranuclear inclusion bodies in the liver. PCR testing was undertaken on a range of tissues, which gave positive results for DVE herpesvirus in both birds with particularly strong positive results in the spleens.

VIDA records show that DVE has a strong seasonal incidence (Figure 8). Outbreaks in domestic ducks are often associated with visits in the spring and summer by wild mallard which are likely to act as asymptomatic carriers of the virus. Wild mallards were known to have visited the pond in both of these outbreaks. Control of the disease in smallholdings relies on keeping susceptible domestic ducks away from ponds visited by wild ducks, particularly during the peak season of disease incidence. Vaccination has also been used as a potential means of protecting susceptible ducks.

These cases were described in the APHA disease surveillance report for May 2020 in the Vet Record at http://dx.doi.org/10.1136/vr.m2352.

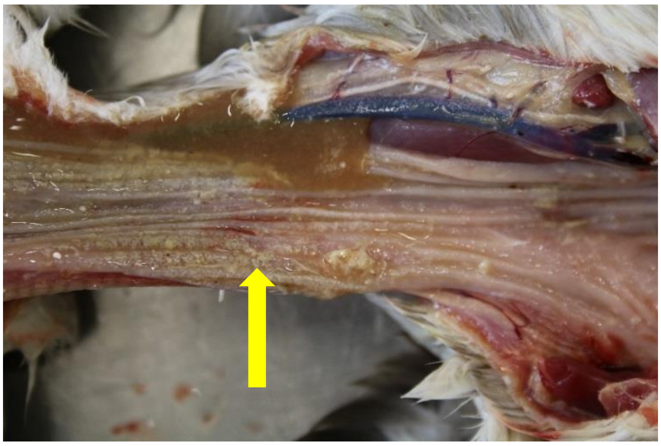

Figure 9 Diphtheritic lesions (arrow) in the oesophagus of a Muscovy duck with duck virus enteritis.

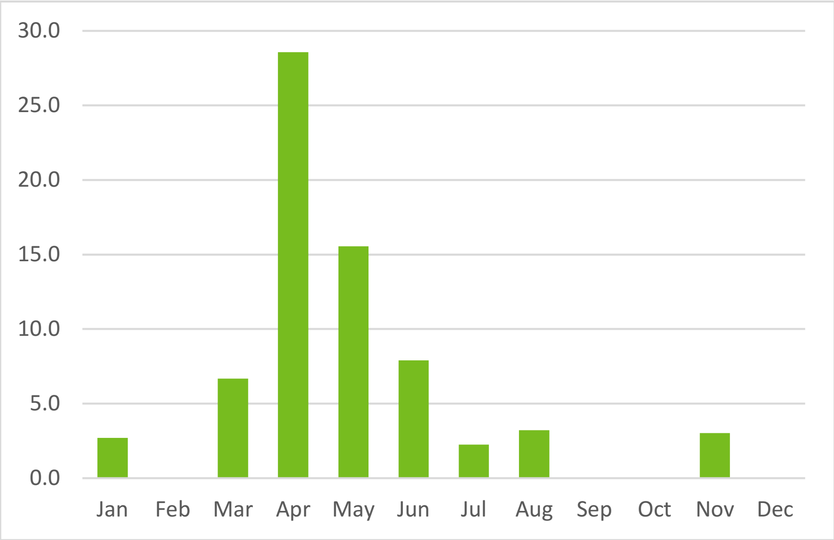

Figure 10 VIDA diagnoses of DVE in ducks on a monthly basis, 2010-2019, as a percentage of total duck submission each month

Horizon scanning

Newly described infectious bronchitis virus strains in Europe

Infectious bronchitis (IB) remains a common and economically important infectious disease of chickens worldwide, including in Great Britain, and a variety of strains of Infectious Bronchitis virus (IBV) have been identified, many of which are controlled by vaccination. As a single-stranded RNA virus, new strains of IBV can readily develop by mutation, and these vary in clinical significance and pathogenicity. Two significant new strains have recently been reported in Europe.

IBV D181 in the Netherlands

The D181 strain has emerged from a low level incidental finding in 2017 to become the second commonest strain in layers and breeders in the Netherlands in 2018 (Molenaar and others 2020). The strain was associated with reduced egg production, typically of 5 to 7 per cent, in 10 out of 13 layer and breeder farms surveyed, and in some of the affected flocks the reduced production was accompanied by eggshell abnormalities. There was also reduced feed intake reported on five layer farms, but respiratory disease was only reported on one farm. The new strain caused disease in flocks already vaccinated with live 793B (4/91) and QX strains and inactivated M41 strain of IBV.

Sequence analysis of the partial S1 gene showed a relationship to the D1466 strain of IBV, which is a genotype II, lineage 1 strain (GII-1) and appears to have evolved from it. It has been designated Genotype II lineage 2 (GII-2). As a genotype II strain, many of the standard primers used for routine RT-PCR detection of IBV were not considered fully suitable for detecting the new strain although primers specific for D1466 detected it successfully. APHA is therefore reviewing the primers used in the RT-PCR for IBV to ensure they are capable of detecting D181. The authors considered it likely that D181 can be successfully detected in tracheal swabs in the early stages of infection and cloacal swabs in the later stages.

IBV PA/1220/98-like variant in Poland

This new strain, also referred to as 516/2018, was identified in a broiler breeder flock that had been slow to come into lay. There was poor egg quality, reduced feed intake and, on post-mortem examination, swollen hyperaemic kidneys with urate deposition in the ureters and cysts in abnormally developed oviducts (Domanska-Blicharz and others 2020). The birds had been extensively vaccinated against IBV. This virus differed considerably from the dominant strains of IBV circulating in Poland but was most similar to a North American strain, PA/1220/98 first reported in 2000. It was subsequently identified in three further commercial layer flocks. The origin of the new strain and how it entered Europe was uncertain but introduction in wild birds or through the commercial poultry trade was suspected. The strain was detected by a standard RT-PCR method but could not be identified by the standard S1 sequencing method.

Relationship of avian coronaviruses and SARS-CoV-2

A recent editorial (de Wit and Cook 2020) has confirmed that avian coronaviruses (all of which fall within the genus Gammacoronavirus), including IBV, turkey coronavirus and pheasant coronavirus, do not replicate in mammals and do not induce an immune response in mammals. SARS-CoV-2 (or COVID-19) is in the genus Betacoronavirus. Recombination between gammacoronaviruses in different avian species can occur, and also between betacoronaviruses in different mammalian species, however recombination between viruses from the two different genera is considered extremely unlikely, not least because they cannot replicate within the same host.

References

APHA (2020) GB avian quarterly report - Disease surveillance and emerging threats, vol 24, Q1 (January-March 2020) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889973/pub-survrep-a0120.pdf (Accessed 7 September 2020)

DE WIT, J.J (Sjaak) & COOK, J.K.A. (2020) Spotlight on avian coronaviruses. Avian Pathology 49, 313-316

DOMANSKA-BLICHARZ, K., SAJEWICZ-KRUKOWSKA, J. & LISOWSKA, A. (2020) New PA/1220/98-like variant of infectious bronchitis virus in Poland. Avian Pathology 49, 380-388

ERIKSSEN, H. (2020) Erysipelas. In Diseases of Poultry, 14th Edition, Ed Swayne D.E., Wiley Blackwell, pp.1010-1018

GIBBENS, N., BROWN, I.H. & IRVINE, R.M. (2014) Testing for exclusion of notifiable avian disease. Veterinary Record 174, 534-535

GOUGH, R.E., WOOD, G.W. & SPACKMAN, D. (1986) Studies with an atypical avian rotavirus from pheasants. Veterinary Record 118, 611-612

LEGROTTAGLIE, R, RIZZI, V. & AGRIMI, P. (1997) Isolation and identification of avian rotavirus from pheasant chicks with signs of clinical enteritis. Comparative Immununology, Microbiology and Infectious Diseases 20, 205-210

MCCOWAN, C., CRAMERI, S., KOCAK, A., SHAN, S. & 11 others (2018) A novel group A rotavirus associated with acute illness and hepatic necrosis in pigeons (*Columba livia*), in Australia. PLOS ONE https://doi.org/10.1371/journal.pone.0203853

METWALLY, S.A. & CHENG, A. (2020) Duck virus enteritis (duck plague). In Diseases of Poultry, 14th Edition, Ed. Swayne, D.E., Wiley Blackwell, pages 463-464

MOLENAAR, R.J., DIJKMAN, R. & DE WIT, J.J. (2020) Characterization of infectious bronchitis virus D181, a new serotype (GII-2). Avian Pathology 49, 243-250

NAIR, V., GIMENO, I. & DUNN, J. (2020) Marek's disease. In Diseases of Poultry, 14th Edition, Ed. Swayne D.E. Wiley Blackwell, pages 565-566

PATZINA-MEHLING, C., FALKENHAGEN, A. & 3 others (2020) Potential of avian and mammalian species A rotaviruses to reassort as explored by plasmid only-based reverse genetics. Virus Research 286, 198027

RUBBENSTROTH, D., PEUS, E., SCHRAMM, E. & 14 others (2019) Identification of a novel clade of group A rotaviruses in fatally diseased domestic pigeons in Europe. Transboundary and Emerging Diseases, 66, 552-561 DOI: 10.1111/tbed.13065

WELCHMAN, D., HANSEN, R. & SCHOCK, A. (2019) Differential diagnosis of negated avian notifiable disease cases in Great Britain. Veterinary Record 184, 276, http://dx.doi.org/10.1136/vr.l938

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