These reports aim to identify emerging animal disease related threats. Their production is underpinned by a large amount of surveillance data and information compiled as part of the Defra Food and Farming Group animal disease surveillance programme. Some of these data can be viewed on the VLA website: http://www.defra.gov.uk/vla/reports/rep_intro.htm

VIDA diagnoses are recorded on the AHVLA FarmFile database and SAC LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both AHVLA and SAC are widely acknowledged, and unusual disease problems tend to be referred to either. However, recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

AHVLA Regional Laboratories and SAC Veterinary Surveillance Centres have UKAS Accreditation and comply with ISO 17025 standard.

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### Highlights

- **Submission trends:** Highest total number of Q4 and annual avian diagnostic submissions to AHVLA and SAC since 2007. During Q4-2011, the total number of avian diagnostic submissions increased by 50%, non-carcase diagnostic submissions up by 78% and carcase submissions increased by 23% compared with Q4-2010, largely due to a rise in chicken flocks submissions (pages 2-4).

- **New & Emerging diseases:** Gizzard erosion (ventriculitis) with suspected viral involvement investigated in free-range layer flocks. Ongoing investigation of an “autumn cough” syndrome in pheasants. Four other conditions investigated in poultry flocks and reported during 2011 (pages 4-5).

- **Unusual diagnoses:** Including Listeriosis, Aspergillosis, Salmonella Pullorum and Heterakis isolonche in pheasant, duck and backyard flocks (pages 6-7).

- **Changes in disease patterns and risk factors:** Unusual Newcastle disease outbreak in Europe. Some changes to industry demographics and husbandry practices in-year, including effects of high and volatile input costs and layer hen welfare legislation. Expansion of small-scale/backyard poultry flocks (pgs 7-9).
INTRODUCTION

DIAGNOSTIC SUBMISSION TRENDS: October to December 2011

October to December 2011 (Q4-2011) saw a 50% increase in the total number of avian diagnostic submissions received by AHVLA and SAC compared with Q4-2010 (643 vs. 432). This was primarily due to a 78% increase in the total number of avian non-carcase diagnostic submissions (359 vs. 202), of which there was an 83% increase in submissions of this type to AHVLA (351 vs. 192). The total number of avian diagnostic carcase submissions to AHVLA and SAC also increased during Q4-2011 (284 vs. 230), a rise of 23%. Therefore, Q4-2011 recorded the highest numbers of all avian diagnostic submission types to AHVLA and SAC during Q4 since 2007 (Figure 1).

Figure 1: Number of avian diagnostic submissions (excluding wild birds) examined in England & Wales and Scotland by the AHVLA and SAC during Q4 (October-December) 2007-2011

Comparing the four-year averages for this quarter (Q4-2007 to Q4-2010) and Q4-2011 showed similar overall results. There was a 39% increase (462 vs. 642) in the total number of avian diagnostic submissions (non-carcase and carcase) to AHVLA and SAC. This included a 77% increase in the number of non-carcase avian diagnostic submissions to AHVLA (198 vs. 351). There was also a 12% rise in the number of avian diagnostic carcase submissions (254 vs. 284), which was due to increased submissions of this type to SAC (40 vs. 68), whilst the numbers of avian diagnostic carcase submissions to AHVLA were almost identical (214 vs. 216).

Comments

A substantial rise in the numbers of diagnostic submissions from chicken flocks was responsible for the increased submission volumes seen during Q4-2011. Submissions from all types of chicken flock (broilers, broiler breeders, layers, layer breeder, backyard, other) comprised a total of 86% (n=552) of all poultry submissions (n=643) received by AHVLA and SAC during Q4-2011. In particular, the broiler sector has maintained confidence driven by retailer and consumer demand for poultry meat. Hence, levels of veterinary investigation have also been maintained. Specifically, this has resulted in a notable increase in the numbers of non-carcase diagnostic avian submissions to AHVLA in the face of financial pressure on producers and the industry. The number of diagnostic avian carcase submissions also increased during Q4-2011 compared with the same period last year. Overall, when compared with Q4-2010, there was an increase of two-thirds in the total number of chicken flock diagnostic submissions received by AHVLA and SAC (333 vs. 552), principally from Eastern, Northern and Western England and Scotland (Figure 2). Further comments regarding changes to and factors affecting the major poultry sectors are also provided in the ‘Changes in Disease Patterns, Industry and Risk Factors’ section below.
DIAGNOSTIC SUBMISSION TRENDS: January to December 2011

January to December 2011 saw a 13% increase in the total number of avian diagnostic submissions received by AHVLA and SAC compared with 2010 (2952 vs. 2622). This was primarily due to an increase of one third in the total number of avian non-carcase diagnostic submissions (1514 vs. 1137), of which there was a 36% increase in submissions of this type to AHVLA (1466 vs. 1075). These primarily represent submissions for histopathology and other specialist diagnostic tests (eg. IBV molecular assays). The total number of avian diagnostic carcase submissions to AHVLA and SAC was very similar during 2011 compared with 2010 (1438 vs. 1485) despite the changes made to AHVLA’s diagnostic surveillance service in October 2010: http://www.defra.gov.uk/vla/services/ser_diag_surv.htm. Therefore, 2011 recorded the highest numbers of all avian diagnostic submission types to AHVLA and SAC during since 2007. Comparison of the four-year annual averages (2007 to 2010) and 2011 showed similar overall results (Figure 3).

Figure 2: Number and species of avian diagnostic submissions examined by the AHVLA and SAC from poultry premises in the super-regions of Great Britain* during Q4 (October-December 2010 & 2011)

Figure 3: Number of avian diagnostic submissions (excluding wild birds) examined in England & Wales and Scotland by the AHVLA and SAC during 2010 and 2011
Comments
A substantial rise in the numbers of diagnostic submissions from chicken flocks (broilers, broiler breeders, layers, layer breeder, backyard, other) was responsible for the increased submission volumes seen during 2011 compared with the previous year. These comprised three-quarters of all poultry submissions (n=2177) received by AHVLA and SAC, compared with two-thirds (n=1768) during 2010. The increased number of chicken flock diagnostic submissions received by AHVLA and SAC were from Eastern, Northern and Western England. The numbers and geographical distribution of diagnostic submissions from other poultry species were broadly similar in 2011 to those in 2010 (Figure 4).

Figure 4: Number and species of avian diagnostic submissions examined by the AHVLA and SAC from poultry premises in the super-regions of Great Britain* during 2010 and 2011

NEW AND EMERGING DISEASES

October – December 2011
During Q4-2011 no new and emerging diseases were identified from analysis of available avian scanning surveillance information for broilers, broiler breeders, layer breeders, turkeys, ducks, geese, game birds and backyard flocks. However, one new and emerging disease investigation occurred in commercial layers. There were no other new and emerging disease investigations during the quarter.

Ventriculitis in commercial free-range layer flocks in the UK
Ventriculitis (gizzard erosion) with suspected adenoviral involvement was investigated in separate free-range layer flocks aged 25- and 33-weeks. Transient drops in egg production and slightly increased mortality were reported. Adenoviral ventriculitis is a well-recognised condition in commercial broiler chickens, but the appearance of a similar condition in layer hens is seemingly novel. Post-mortem findings included marked carcass pallor with blood-tinged upper digestive contents and focal areas of gizzard erosion and ulceration with the occasional perforation (Figures 5-7) and peritonitis. All birds submitted were fully in lay. Histological examination revealed focal ventriculitis with glandular epithelial necrosis and intranuclear inclusion bodies, the latter feature raising the suspicion of adenoviral involvement. Other similar cases in free-range flocks have also been recently reported to AHVLA from different locations in England and Northern Ireland, with no immediately apparent link. Adenoviruses cause a range of conditions in poultry, are considered ubiquitous, are often self-limiting and are not associated with public health or international trade implications. Investigations, including attempted virus isolation, are continuing and the situation will continue to be monitored through AHVLA scanning surveillance activities and contact with private veterinary surgeons (PVS). We would therefore also be interested to hear from colleagues who have experienced similar cases.
January – December 2011
AHVLA avian disease scanning surveillance activities, funded by Defra, and in partnership with private veterinary surgeons, continue to detect avian disease threats in GB (Irvine and others, 2010). In turn, these highlight hazards and risk pathways that may exist for the poultry industry and poultry populations in general. Several new and emerging disease threats were identified and investigated during 2011 (Table 1). These new and emerging disease investigations are also described in previous quarterly avian disease surveillance reports, and are available with other advisory material for vets and poultry producers on the VLA website: http://www.defra.gov.uk/vla/reports/rep_surv_avian.htm. Surveillance activities continue to monitor for the presence of any potential new or re-emergent disease threats in the GB poultry population.

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Table 1: New and emerging disease threats identified and investigated in poultry by AHVLA during 2011

ONGOING NEW AND EMERGING DISEASE INVESTIGATIONS

Seasonal respiratory disease in adult pheasants
During Q4-2010 an “autumn cough” syndrome was described affecting pheasants on a small number of estates in a localised geographical area of southern England (VLA, 2010). The disease is associated with pneumonia and airsacculitis in affected birds. The disease differs from the upper respiratory tract diseases more commonly observed in pheasants. Pneumonia and airsacculitis were identified grossly in pheasants examined in October and November 2011 from two game bird estates located in an area 55-60 km from the original sites. This suggests that the disease may be becoming more widespread. The disease appears to represent a respiratory complex involving various infectious agents including *Mycoplasma gallisepticum* (MG), viruses and secondary bacterial infection of the lungs and airsacs with organisms such as *Ornithobacterium rhinotracheale* (ORT) and *Avibacterium gallinarum*. As the “autumn cough” problem is seen in released pheasants in the autumn and winter, successful treatment is difficult to achieve. Some veterinary practices have adopted vaccination with commercial poultry MG, turkey rhinotracheitis (TRT) and other respiratory disease vaccines under the cascade system. However, their efficacy is unproven and outbreaks of lower respiratory tract disease may occur despite the use of vaccines. The problem currently remains seasonal, but AHVLA surveillance activities will continue to monitor for the presence of the disease and potential control methods.
UNUSUAL DIAGNOSES

October – December 2011

Listeriosis: Septicaemic listeriosis was diagnosed in two backyard flocks during Q4-2011. In one case, eight out of 11 free-range fancy fowl aged 10-weeks died following ill-thrift and diarrhoea. Concurrent Infectious Bronchitis virus (IBV) infection was also detected. In the second case, three of four bantams aged 13 weeks died due to myocarditis and hepatitis associated with *Listeria monocytogenes* infection. AHVLA VIDA records indicate that listeriosis is infrequently diagnosed in poultry - two cases were recorded during 2010, and one case per year from 2007-2009 (VIDA, 2010). *L. monocytogenes* is a well-recognised zoonotic agent, but transmission to man is predominantly food-borne and/or associated with food processing rather than from infected animals. The organism is ubiquitous and infection can occur following ingestion, inhalation or wound contamination. However, in poultry the disease is rare and young birds are more susceptible than older birds. Outbreaks are often associated with other risk factors or infections, as seen in one of these flocks where concurrent IBV infection was detected. Encephalitic listeriosis affecting red-legged partridges (*Alectoris rufa*) was also investigated and reported during Q3-2011 (AHVLA, 2011a). In this incident infection was suggested to have been acquired at the hatchery or during transit and unknown risk factors enabled disease to develop. In each case appropriate advice regarding zoonosis was provided to the flock owner. The situation will continue to be monitored through scanning surveillance activities and PVS contact.

January – December 2011

Backyard flocks

Separate cases of rodenticide poisoning and an outbreak of *Salmonella* Pullorum were diagnosed this year in backyard poultry flocks. Rodenticide poisoning occurred on two separate premises and highlighted the care required in the laying of poisonous baits for rodents in a backyard situation. The food safety implications of both cases were assessed and the owners advised accordingly. *S. Pullorum* infection was diagnosed in a small hobby breeding flock and was thought to also result in secondary rickets due to nutritional deficiency. *S. Pullorum* is a well-recognised agent that can be transmitted both vertically (*in ovo*) and horizontally, is considered to be of little public health significance and is now rare in chickens in Great Britain (VIDA, 2010). Disease is most often seen in young chicks infected from a carrier parent hen, and may also be occasionally detected in pheasants. In GB, *S. Pullorum* infection has been eradicated from commercial chicken flocks through a test and slaughter policy. The putative source of this outbreak was hatching eggs introduced onto the farm from another backyard flock. Therefore, backyard/hobby chicken breeding flocks may act as a reservoir of infection and present a risk to commercial flocks. Good biosecurity is essential to avoid introduction and appropriate control measures were advised. Further comments regarding backyard/hobby flocks are also provided in the ‘Changes in Disease Patterns, Industry and Risk Factors’ section below.

Ducks

An unusual intracellular infection in ducks was investigated. Clinically the group of sixteen Muscovy ducklings aged 5-weeks progressively developed lethargy and died over a period of days. At necropsy, pulmonary oedema was seen. This condition has been recognised previously based on characteristic histopathology findings (Randall and others, 1987) and may have a seasonal component in ducks. More recent work has reported that the cause may be an intracellular yeast infection (Millins and others, 2010). Further work on elucidating the causal agent and epidemiology of this disease is underway in collaboration with the University of Glasgow. During 2011, there were also several reports of unusual presentations of Aspergillosis in game birds, ducklings and adult ducks, including lameness in pheasants (due to infection of the spinal cord), acute and high mortality (up to 50%) in 10-day-old ducklings (Barnett and others, 2011; Parker, 2011; Walker, 2012) and feather folliculitis in 41-day-old commercial ducks resulting in a high number of carcase rejects at processing. The source of infection was attributed to mouldy bedding (variously wood chips or baled wheat straw) and favourable environmental conditions enabling the further proliferation of fungal spores. Control methods centre on the use of bedding that is not visibly contaminated by mould. The situation will continue to be monitored.

*Heterakis isolonche* in pheasants
Heterakis species worms are found in the caecum of poultry and game birds. *H. gallinarum* is very common in pheasants and is considered of little pathogenic significance. It can also be found in chickens and turkeys in which it is of significance as the vector of *Histomonas*, the causative organism of Blackhead. In contrast, *H. isolonche* is a specific pathogen of pheasants, in which it causes severe caecal lesions. *H. isolonche* has largely disappeared from commercially reared pheasants in recent years (Potts, 2009), probably because of factors such as management changes and increased use of anthelmintic products. However, two suspected cases of *H. isolonche* were recorded by AHVLA in two separate pheasant flocks during 2011. Damage to the caecum can be caused by both the adult and larval stages of the worm. The widespread use of anthelmintics means that *H. isolonche* is unlikely to emerge as a significant problem in captive reared pheasants, but the situation will continue to be monitored through scanning surveillance activities.

In each of these cases, no wider threats were recognised and no specific actions required other than for producers and veterinarians to maintain vigilance for disease problems and investigate as appropriate.

**CHANGES IN DISEASE PATTERNS, INDUSTRY AND RISK FACTORS**

**Atypical clinical presentation of Newcastle disease in laying hens**

A Newcastle disease (ND) outbreak was officially reported affecting a table egg layer barn premises of 5,120 hens aged 35 weeks) in Switzerland during December 2011 (OIE, 2011). Clinical signs were not typical of ND, comprising a severe drop in egg production (~90%) with abnormal egg quality and diarrhoea in the absence of mortality. Following molecular detection of velogenic ND virus the affected flock was immediately culled. The reported outcome of epidemiological investigations indicated no evidence of spread to other premises. However, the source of infection was not definitively identified, and was presumed to be wild birds. Vaccination against ND is prohibited in Switzerland. The primary threat is recognised to be the atypical clinical presentation - absence of mortality, respiratory or neurological signs - in a fully susceptible poultry population where a virulent ND virus is estimated to have been circulating for approximately 2-3 weeks prior to diagnosis. The primary risk is for the timely recognition and reporting of suspect avian notifiable disease through extant veterinary scanning surveillance mechanisms, hence increasing the high risk period (interval between infection and detection). In the UK, prompt clinical recognition and reporting may be further confounded by the widespread use of ND vaccination in commercial poultry, excepting broilers. ND vaccinated chickens can be infected and still shed infectious virus (albeit at lower levels than unvaccinated birds) and vaccination may substantially reduce the severity of clinical signs. Therefore, cryptic spread of ND virus may occur in vaccinated poultry with disease only manifesting when unvaccinated birds are infected. This episode also reinforces the threat of ND to UK and EU poultry as recently highlighted (Alexander, 2011; Irvine and others, 2011; AHVLA, 2011b). Some of the risk pathways may be mitigated by ensuring good biosecurity, in common with preventative measures for other avian notifiable and infectious diseases.

**Broilers**

The number of day-old broiler chicks placed during Q4-2011 was lower than the same time last year, with sector expansion slowing since Q3-2011 (Figure 8). Overall, the number of broiler chicks placed during 2011 was very similar to 2010 (897 vs. 887 million). Nevertheless, the industry remains buoyant with chick placings and broiler meat output higher than in recent years (2008, 828m; 2009, 844m chicks placed). During 2011 feed prices started high and were volatile, largely driven by financial market speculation rather than supply and demand. As the year progressed, feed costs reduced, improving margins. Wholesale prices for chicken meat have remained reasonably stable in the face of increased input costs. Broiler breeder flock hatchability, and hence chick availability, are reported to have improved over the past year conferring cost-savings to this sector at a time of financial pressure. Gut health, flock unevenness and wet litter have been dominant health issues, with the latter sometimes related to coccidial challenge. There has also been widespread adoption of live IBV vaccination strategies designed to protect against possible European IBV QX-like challenges, often incorporating a Massachusetts-based spray IBV vaccine in the hatchery and an IBV variant vaccine around 10-14 days of age.Whilst infection with European IBV QX-like strains has been detected in broiler flocks in different parts of the UK during the year, sometimes reported to be in association with health problems and/or poor performance, further work is required to better understand the epidemiology and impact of this IBV
variant in UK broiler flocks. The situation will continue to be monitored through scanning surveillance activities and PVS contact.

Layers

The recent decline in day-old layer chick placings continued during Q4-2011 (Figure 9), reflecting the continued gradual reduction in the size of the UK egg laying flock during 2011 to balance egg supply and demand, particularly in the free-range sector. Based on layer chick placing trends during 2011, and the strategy in-year of early culling of older flocks, the size of the UK egg laying flock dropped to 31 million birds in January 2012. This represents a sizeable reduction from the peak of approximately 33.6 million birds a year ago and brings the national flock size to a level last seen in February 2010, prior to the rapid expansion that upset the market. There has been a corresponding overall reduction in packing station egg throughput during Q4-2011 compared with the previous quarter (Figure 10), although throughput remains at an historically high level. Free-range eggs accounted for 45%, cage eggs 49% and barn and organic eggs 7% of the throughput. The reduced overall supply of eggs has meant that egg prices have remained stable during the quarter, improving the position since mid-year when the rapid rise in feed prices seen in Q1-2011 severely pressurised producer margins. Basic layers ration prices have continuing the downward trend seen since Q2-2011, dropping by some £60/tonne from the Q1-2011 peak of approximately £270/tonne. Point-of-lay pullet prices dropped during Q4-2011, to an average price of £3.78 per bird, roughly equivalent to prices a year ago. However, this still represents an increase of some 50p per pullet compared to Q1-2010. Sustained financial pressure on layer producers during 2011 resulted in cost-saving measures, particularly in the free-range sector. This included a general reduction in levels of veterinary consultation and submissions as costs of production exceeded income.

Whilst there is slightly more optimism in the domestic egg industry than a few months ago, egg producer margins remain very tight. This is compounded by current concerns regarding the implementation of the EU-wide conventional cage layer ban, Council Directive 1999/74/EC, which will be implemented as of 01 January 2012. The UK layer industry has invested an estimated £400million in order to comply with this legislation. However, concerns regarding the continued availability of lower-priced conventional cage layer eggs in the EU after 01 January 2012 remain a key issue.

Turkeys

The recent trend in higher day-old commercial turkey poult placings was not maintained during Q4-2011 (Figure 11). However, the overall total for the year was 9% higher (1.4 million poult) than in 2010. The turkey industry remains more buoyant than in recent years, having suffered a substantial decline over the previous decade (27 million day-old poult placed during 2000, to a nadir of 15.5 million placed during 2009/10). This reflects the continued demand for poultry meat, as also seen for the broiler sector. Turkey health reports indicated an improvement in gut health in some areas during 2011, attributed in part to favourable summer conditions and improved management strategies. Recurrent issues with ORT were also identified and vaccination has been used to assist with prevention. The situation will continue to be monitored through scanning surveillance activities and PVS contact.
Backyard & Hobby flocks

The continuing popularity of keeping backyard poultry in GB is illustrated by information from the British Hen Welfare Trust, an organisation that ‘re-homes’ approximately 60,000 spent hens a year into backyard flocks (http://www.bhwt.org.uk/cms/media/#facts). Another estimate indicates 700,000 people now keep backyard chickens - a rise of 80 per cent in three years (http://www.scottisheggs.co.uk/). This could equate to a population of some 3 million backyard hens (assuming an average flock size of four hens per person) – equivalent to 10% of the national commercial laying flock. In comparison, approximately 17,000 flocks of less than 50 birds are voluntarily registered with the GB Poultry Register, totalling some 360,000 birds (http://vla.defra.gov.uk/reports/docs/rep_avian_gbpr_2011.pdf).

AHVLA disease scanning surveillance activities continue to reflect the growing popularity of small-scale poultry keeping and highlight common avian endemic disease problems (eg. Marek’s disease, ILT, mycoplasmosis, endo- and ecto-parasitism), as well as detecting conditions considered to no longer be present in commercial poultry flocks (eg. S. Pullorum). However, concerns also exist with regard to the increase in backyard poultry flock ownership combined with variable levels of owners’ animal husbandry and biosecurity knowledge and veterinary supervision of flocks. However, AHVLA avian disease scanning surveillance activities, in partnership with private veterinary surgeons, have also detected outbreaks of avian influenza (2007) and Newcastle disease (2005, 2006) and several new and emerging disease threats in backyard/hobby flocks. The latter include IBV QX and Infectious Coryza, both of which were first detected by AHVLA in backyard/hobby flocks prior to their detection in commercial poultry (Irvine and others, 2010; VLA, 2010; Welchman and others, 2010). Hence, such small-scale poultry flocks, often of uncertain vaccination status, represent both sentinels and reservoirs of avian infectious diseases in GB. Furthermore, these scanning surveillance activities continue to detect disease threats, thereby highlighting hazards and risk pathways that may exist for the poultry industry and poultry populations in general. Maintaining good biosecurity standards, disease awareness and vigilance and prompt investigation of problems are essential to limit both the risk of introduction and spread of infection and the impact of disease outbreaks.

Avian diagnostic submission rates and surveillance information will be monitored to assess, where possible, the impact of financial and poultry demographic changes on scanning surveillance activities and endemic, exotic, new and emerging or re-emerging avian disease threats.

References


Further information about poultry industry statistics can be found at:

Specific information relating to the most recent statistics can be found at:

The comments are supplemented by reports from industry and Poultry World.