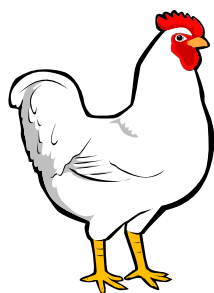


GB surveillance

Avian diseases

Quarterly Report: Volume 12. No. 4

Date: October – December 2008



The VIDA diagnoses are recorded on the VLA FarmFile 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 VLA 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 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.

VLA RLs have UKAS Accreditation and comply with ISO 17025 standard. SAC Veterinary Services have UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.

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Highlights

- **Riboflavin deficiency in young broilers** - *Some birds presented with classical "curled toe paralysis"; response to supplementary multivitamins in drinking water was rapid (page 14).*
- **Respiratory disease in turkeys dominant during quarter** - *Mycoplasma gallisepticum, M. synoviae and M. meleagridis, and Ornithobacterium rhinotracheale all demonstrated (page 15).*
- **A further case of pneumonia of unknown aetiology seen in ducklings** – *the disease is associated with basophilic intracellular bodies (page 16)*
- **Outbreaks of suspected Goose Parvovirus (GPV) in goslings traced to imported birds** - *Publication of the findings resulted in heightened awareness and interest from the poultry industry, veterinary surgeons and the media (page 16).*
- **Spirochaetosis in Game Birds** - *a report of SAC and VLA findings from 1996 to 2008 (page 18).*

OVERVIEW

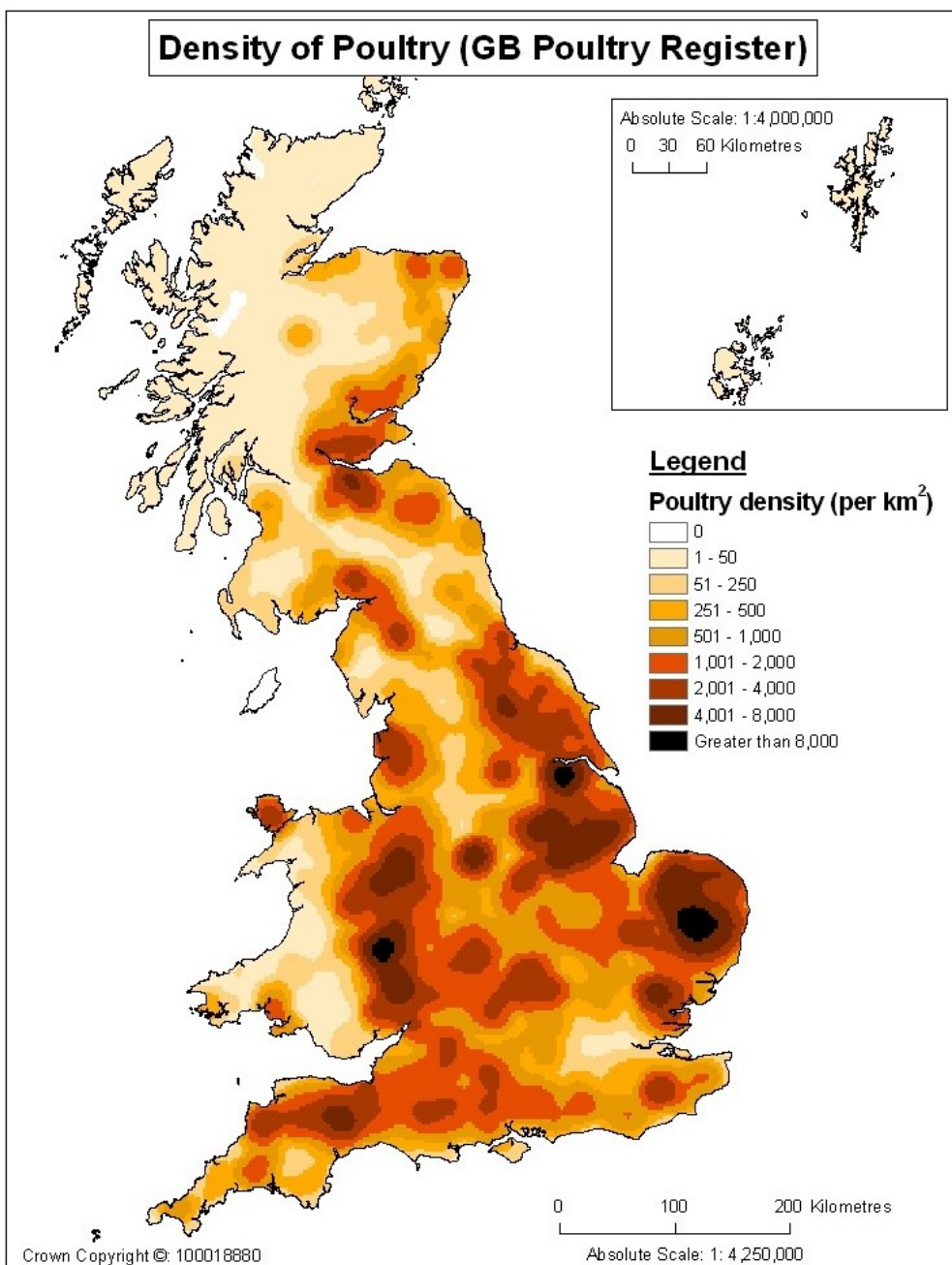
FACTORS INFLUENCING DISEASE AND SUBMISSION RATES

Many factors combine to influence the patterns of disease in poultry, and the ability to detect changes to these patterns through scanning and active surveillance. They include:

Poultry Demographics

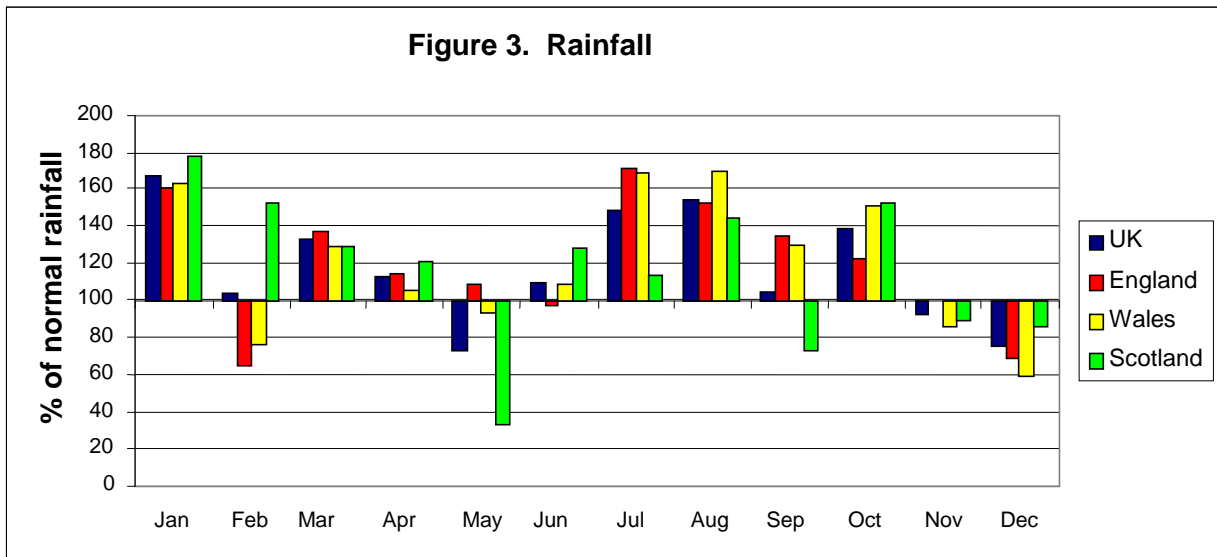
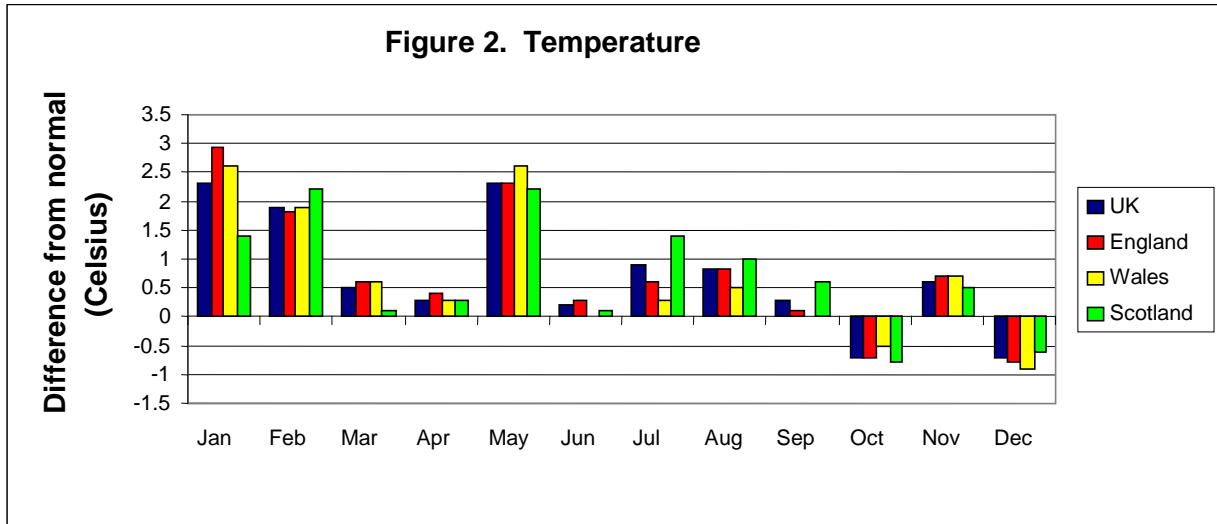
The number of poultry premises registered on the GB Poultry Register is 24,269 (on the 11th February 2008). These premises kept a total of 251,913,661 poultry. Figure 1 shows the distribution of the GB poultry population and is based on all premises registered as keeping poultry. It is mandatory for all premises which keep 50 or more poultry to register on the GB Poultry Register. Poultry are defined as chickens (including bantams), turkeys, ducks, geese, guinea fowl, quail, partridges, pheasants, pigeons reared for meat, ostriches, emus, rheas, cassowaries and kiwi.

Figure 1. Distribution of Poultry in Great Britain (2008)



This poultry density map was produced using RADAR. Further information relating to the RADAR poultry population dataset and its associated quality statement may be found on the Defra RADAR web page <http://www.defra.gov.uk/animalh/diseases/vetsurveillance/reports/pdf/poultry-registered080211.pdf>

Weather and Climate



In October, temperatures were all below average across GB. Most areas, provisionally, had their coldest October since 2003. Rainfall was well above average across N Wales and NW England, with some areas having over double their average rainfall. Provisionally for Scotland, it was the fourth wettest October since 1954.

In November, temperatures were generally close or slightly (up to 1°C) above average. Rainfall in GB was also close to average.

December was a very cold month across all of GB, particularly in the South and West. Maximum temperatures were generally below average and around 1°C below average across parts of southern England. Rainfall was below or well below normal in most areas, with only around 50% of normal over parts of England and Wales, but locally 150% in eastern Scotland.

Economics of the Poultry Industry

1) Placings

Figure 4. UK Quarterly figs for female Broiler Parent Chick Placings (Average Monthly figures)

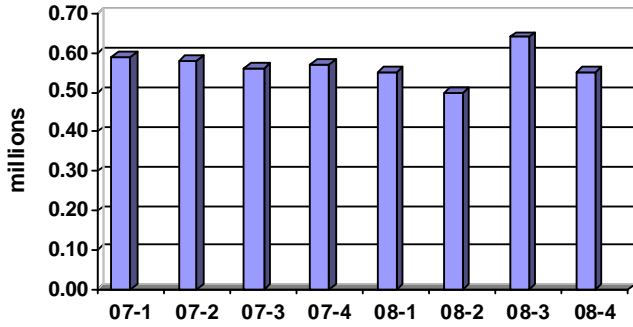


Figure 5. UK Quarterly figs for Commercial Layer Chick Placings (Average Monthly figures)

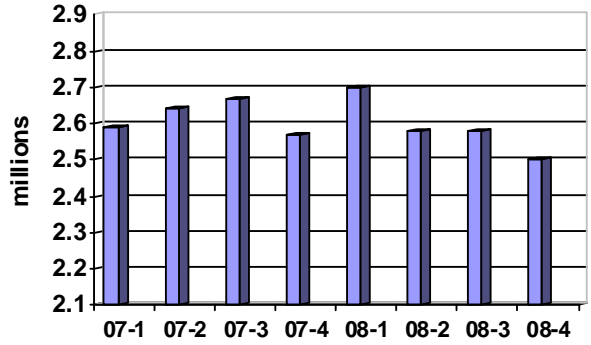


Figure 6. UK Quarterly figs for Commercial Broiler Chick Placings (Average Monthly figures)

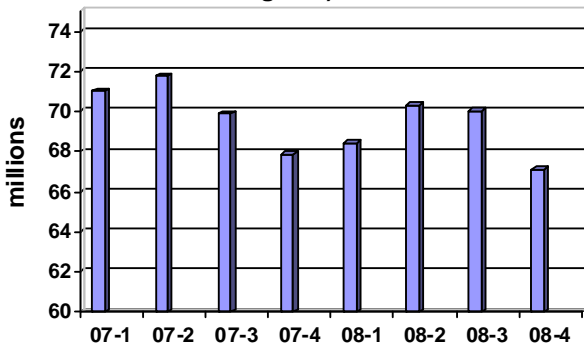
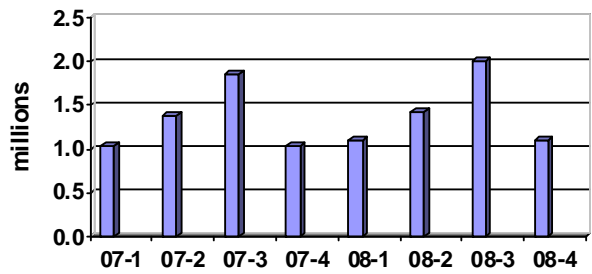


Figure 7. UK Quarterly figs for Turkey Poults Placings (Average Monthly figures)



2) Slaughterings

Figure 8. UK Quarterly Figs for Turkey Slaughterings (Average monthly figures)

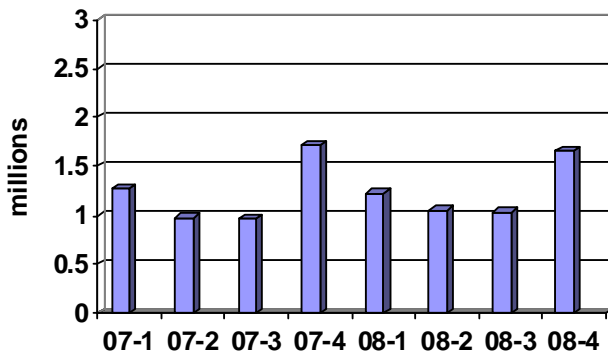
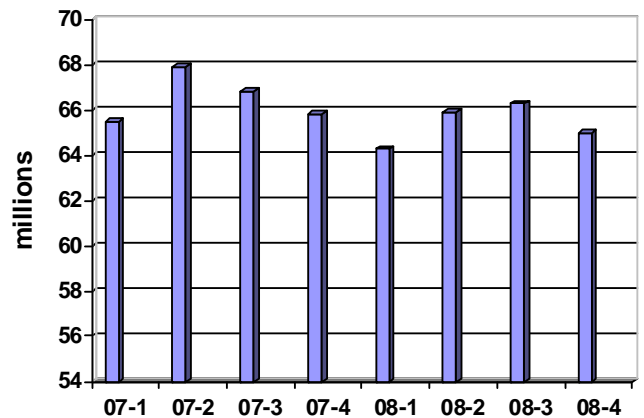


Figure 9. UK Quarterly figs for Broiler Slaughterings (Average monthly figures)



3) Meat production

Figure 10. Total UK Poultry Meat Production (Average Monthly Figures)

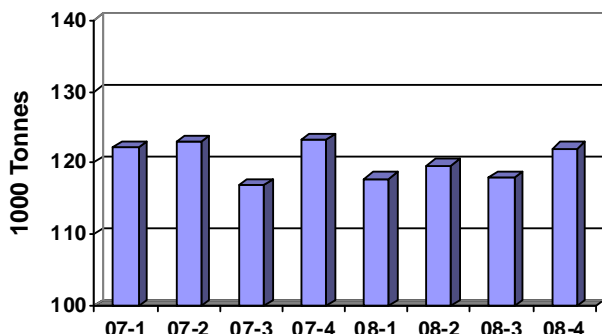
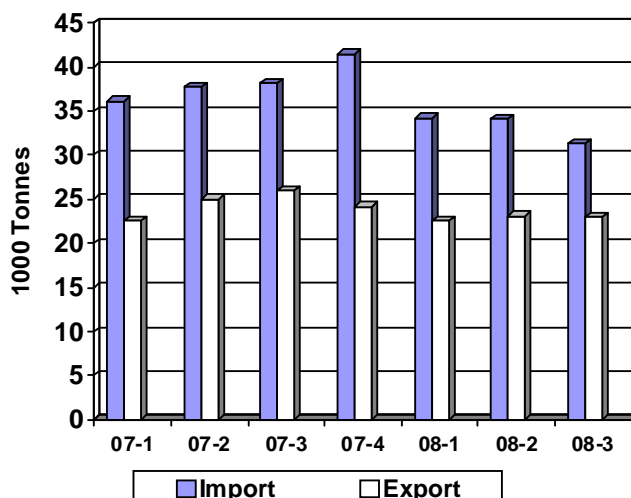


Figure 11. Total Poultry Meat Trade (Average Monthly figures)



These statistics may be found at <https://statistics.defra.gov.uk/esg/statnot/ppntc.pdf>. The data for the latest quarter may be subject to revision.

Submissions for scanning surveillance

Table 1. Poultry Diagnostic Submissions in GB – 4th Quarter

October – December	Submissions			Carcases		
	VLA	SAC	Total	VLA	SAC	Total
2008	389	52	441	917	110	1027
2007	405	28	433	1162	43	1205
2006	490	36	526	2065	112	2177
2005	500	87	587	1395	162	1557
2004	410	43	453	921	58	979

Table 2. Poultry Diagnostic Submissions in GB - Annual

Year	Submissions			Carcases		
	VLA	SAC	Total	VLA	SAC	Total
2008	1974	420	2394	5499	1053	6552
2007	2134	389	2523	5463	831	6294
2006	2570	473	3043	7553	1144	8697
2005	2458	477	2522	5411	1133	6544
2004	1836	381	2217	5647	1034	6681

NOTIFIABLE DISEASE – GREAT BRITAIN

Domestic poultry

No outbreaks of avian notifiable disease (AND) were confirmed during the quarter in Great Britain. Clinical material was however submitted to the National Reference Laboratory (NRL) for Avian Influenza (AI) and Newcastle Disease (ND), VLA Weybridge from two cases of suspected AND in domestic poultry, both turkey flocks. The premises were located in Hertfordshire and Cambridgeshire, and a total of 93 samples were tested comprising sera (28), oropharyngeal swabs (28), cloacal swabs (28) and carcasses (9). A further eight commercial poultry premises were subject to follow-up investigations and sampling during the course of the annual “National Survey for Avian Influenza Viruses of Subtypes H5 and H7 in Domestic Poultry” – details are described more fully below.

Overall in Great Britain during 2008 there were 73 Report cases of suspected AND in poultry (excluding pigeons), with samples submitted to the NRL at VLA Weybridge from 24 Report cases that were located in 15 counties. Eight of these flocks were investigated and sampled as part of the AI National Poultry Survey (described further below). Fourteen Report cases were investigated during June, and H7N7 HPAI was detected affecting one free-range layer flock in Oxfordshire (summary in Avian Quarterly Report Vol.12, No.2: http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlya0208.pdf). Following the confirmation of this outbreak (04 June 2008) a further thirteen Report cases were investigated during the month, four of which were located in Oxfordshire, with four other cases investigated in Warwickshire (2), Worcestershire (1) and Northamptonshire (1). Only one of the four Oxfordshire Report cases resulted in the submission of samples, the other twelve cases were negated following field visits by Animal Health (AH).

Four submissions were also received from three separate premises undergoing restocking as a result of recent AND outbreaks. In total, 332 samples were tested comprising sera (120), oropharyngeal swabs (106) and cloacal swabs (120).

Psittacines

One further submission was received from a Report case of suspected AND in a flock of parakeets in County Durham that had experienced rising mortality over a three-week period following the introduction of new birds. A total of 41 samples were received and tested, comprising 20 oropharyngeal swabs, 20 cloacal swabs and one carcase, all with negative results.

National Survey for AI viruses of subtypes H5 and H7 in Domestic Poultry

The European Commission requires all Member States of the European Union (EU) to undertake surveys each year for avian influenza (H5 and H7) in domestic poultry (http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/eu_resp_riskreduction_en.htm). This routine annual survey has been running since 2003, typically during the autumn/winter months, and has been a success thanks to cooperation between individual poultry keepers, the poultry industry, Animal Health, VLA and Defra. The survey continues to provide valuable information across the EU for an early warning system of H5 and H7 subtypes in poultry. A random list of poultry premises is selected from across the UK, and includes chickens, turkeys, ducks, geese and quail. Blood samples are taken from a number of birds on each premises, which are then screened for the presence of antibodies to avian influenza viruses of subtypes H5 and H7 by haemagglutination inhibition (HI) test. If any H5 or H7 HI test results are not negative according to the methods prescribed in the EU Diagnostic Manual for AI (CEC, 2006), the premises is subject to a follow up investigation and sampling.

During the 2008 survey period (mid-August to December) 346 premises were sampled in Great Britain (compared with 330 premises during 2007), resulting in 358 submissions to the NRL at VLA Weybridge, with approximately 11,000 serum samples received. In total, over 22,000 HI tests screening for H5 and H7 antibodies were performed. Eight flocks were identified to have HI test results that were not negative to either H5 (three duck flocks and four goose flocks) or H7 (one goose flock) over the period October to December. These flocks were located in Devon, Powys, Cheshire, Lancashire, Lincolnshire and Norfolk. In total, 1,049 samples were tested as part of follow-up investigations, comprising oropharyngeal swabs (334), cloacal swabs (334) and sera (381). No evidence of circulating H5 or H7 virus infection was

detected. Further background information about the AI National Poultry Survey can be found at: <http://www.defra.gov.uk/animalh/diseases/notifiable/ai/keptbirds/index.htm#natsurvey>.

AI Wild Bird Surveillance (AIWBS)

H5N1 Highly Pathogenic Avian Influenza (HPAI) was not detected from any of the 1,722 wild birds sampled and tested during the last quarter in Great Britain. Evidence of infection with other avian influenza viruses was however detected from seven birds that were sampled as part of normal live wildfowl trapping activities. An H6N2 virus was detected from a Teal (*Anas crecca*) and an H2N2 virus was isolated from a Mallard duck (*Anas platyrhynchos*). Evidence of influenza A virus infection was also detected from a further five legally trapped wild birds (Table 3). This period also represented the first quarter during which the revised Defra AIWBS policy has been operational, whereby activities are focused on the patrolling of designated reserves by skilled wild bird ecologists and wardens. Members of the public are also asked to remain vigilant for 'mass mortality' incidents involving 10 or more birds, and report these to the Defra Helpline (**08459 33 55 77**). Further information is available at: <http://www.defra.gov.uk/animalh/diseases/notifiable/disease/ai/wildbirds/survey.htm>.

Table 3: Number of wild birds tested and results in GB (October - December 2008).

Surveillance activity	Number of birds examined	Positive AI virus result and species of bird	Comments
Legally trapped (ringing) [†]	1,569	H6N2 Teal x1 (<i>Anas crecca</i>) H2N2 Mallard x1 (<i>Anas platyrhynchos</i>)	Seasonal targeted surveillance.
Legally shot	Nil	Nil	Surveillance activity ceased.
Found dead	153	Nil	Scanning surveillance, all-year-round.

[†] Of the Legally trapped birds tested, a further five birds (four Mallard ducks and one Whooper swan, *Cygnus cygnus*) tested positive for influenza A virus infection by Matrix [M] gene RRT-PCR. H5 RRT-PCR and virus isolation in embryonated fowls' eggs were negative for these birds.

The most significant AIWBS event of 2008 in Great Britain occurred at the turn of the New Year with the detection of H5N1 HPAI from three Mute swan (*Cygnus olor*) carcasses that had been collected from the South Dorset coast and were tested as part of the routine surveillance activities for 'found dead' wild birds. In total, ten Mute swans and one Canada goose (*Branta canadensis*) carcasses were positive for H5N1 HPAI, all having been found within the Fleet and wetland reserves along the adjacent South Dorset coast during January and February with no evidence of spread to the domestic poultry population. Defra published an epidemiology report summarising the incident (Defra, 2008a), and phylogenetic analyses of isolates indicated closest relationships to a cluster of viruses recovered in mid to late 2007 from wild and domestic birds in the Czech Republic, Romania and Poland.

Overall in Great Britain during 2008, a total of 4,350 wild birds were sampled and tested for the presence of AI virus (AIV) infection, with thirty-five wild birds positive for AIVs, H5N1 HPAI, H5 LPAI or influenza A virus infection. A further 100 wild bird environmental faecal samples were tested during the H5N1 HPAI wild bird incident in South Dorset (Table 4).

Table 4: Number of wild birds tested and results in GB (January - December 2008).

Surveillance activity	Number of Birds Tested [†]	Number Positive	Species Positive	Results [‡]
Legally shot ^{††}	36 (590)	0	n/a	n/a
Legally trapped	2,913 (3,742)	1 2 5 13	Mute swan Whooper swan Teal Mallard	H5 LPAI H1N1, M gene x 1 H6N2, H5 LPAI x2 M gene x 2 H2N2, M gene x 12
Found dead	1,401 (1,934)	1 1 12	Herring Gull Canada goose* Mute swan*	M gene H5N1 HPAI H5N1 HPAI x 10, H3N8 x 1, M gene x 1
Live bird faeces ^{‡‡}	100 (1,330)	0	n/a	n/a

Number of Birds Tested[†] - Comparative figures for 2007 are shown in brackets.

Results[‡] - M gene refers to the number of wild birds positive to influenza type A Matrix (M) gene RRT-PCR test and negative by H5 RRT-PCR and virus isolation in embryonated fowls' eggs.

n/a = not applicable.

Legally Shot^{††} - Number of birds tested relates to samples from seasonal wildfowling activities received in early 2008. Sampling was then ceased.

* H5N1 HPAI detected from ten Mute swans (*Cynus olor*) and one Canada goose (*Branta Canadensis*) during wild bird incident in Dorset (January-February 2008).

‡‡ 100 wild bird environmental faecal samples tested during H5N1 HPAI wild bird incident in Dorset, January-February 2008. This sample type was also collected for testing during the Redgrave Park H5N1 HPAI poultry outbreak in November-December 2007.

Within the European Union (EU), the United Kingdom was the only EU Member State (MS) to report H5N1 HPAI in wild birds during 2008 (EUROPA, 2008a). However, in Switzerland H5N1 HPAI was also detected from a live, healthy common pochard (*Aythya ferina*) that had been trapped, sampled and released on Lake Sempach during February (OIE, 2008a), as part of routine national surveillance activities (summarised in Anon, 2008a). Genetic sequencing also revealed the virus to show high homology to the viral sequences found in Eastern Europe during 2007. Disease due to H5N1 HPAI infection was also reported around the Black Sea basin during January and February. Backyard poultry were affected along the northern coast of Turkey (OIE, 2008b), the source of which was attributed to contact with hunted wildfowl viscera (UNFAO, 2008a). Commercial and backyard poultry and wild birds (coots [*Fulica atra*], cormorants [*Phalacrocorax carbo*] and a gull [*Larus* spp.]) were affected on the Crimean peninsula of the Ukraine (OIE, 2008c), the wild bird cases providing further evidence to suggest the presence of H5N1 HPAI in the wild bird population of the Black Sea basin.

During October 2008, Germany reported the detection of H5N1 HPAI in domestic ducks on one premises in Saxony (OIE, 2008d; summary in Avian Quarterly Report (AQR) Vol.12, No.3: http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlya0308.pdf). Preliminary phylogenetic analysis indicated a high similarity to H5N1 HPAI viruses detected in wild birds in the EU during early 2006 (specifically an isolate obtained from a Tufted duck (*Aythya fuligula*) in Germany), being distinguishable from those H5N1 HPAI viruses associated with cases detected in both wild birds and poultry in Europe since June 2007 (events summarised in AQR Vol.11, No.3: http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlya0307.pdf).

Whilst the programme of AIV surveillance in EU wild bird populations resulted in only sporadic detections of H5N1 HPAI in wild birds during early 2008, low-level maintenance in discrete local populations of wild birds cannot be discounted. Defra also updated their Veterinary Risk Assessment in light of these developments (Defra, 2008b). In addition, further notifiable AI (NAI) outbreaks have occurred in the UK and other EU Member States (MSs) during 2008, serving as a clear reminder of the importance of both surveillance and early detection of infection and disease caused by H5 and H7 NAI viruses other than H5N1 HPAI. In GB, an H7N7 HPAI outbreak affected a free-range layer flock in Oxfordshire during June/July (Defra, 2008c). Waterfowl, probably linked to a pond present on the premises, were implicated as a plausible source of the putative H7 LPAL virus infection, with subsequent mutation to HPAI phenotype and genotype following at least a two-week period of H7 LPAL virus circulation in the layer population. During the period October to December 2008, Germany experienced an on-going

outbreak of H5N3 LPAI, mainly affecting turkeys. Twenty-nine premises were confirmed positive in Lower Saxony (OIE, 2009) resulting in approximately 440,000 poultry being culled (EUROPA, 2009a). In addition, during December, H5N2 LPAI and H5 LPAI virus infections were confirmed on two separate holdings in Belgium following seropositive H5 results detected from geese on each premises (EUROPA, 2009b) as part of the EU-mandated National AI Poultry Survey activities (described more fully in AQR, Vol.12, No.4 above). Serological evidence of H7 LPAI virus infection was similarly detected in a layer flock (11,500 hens) in the Calabria region of southern Italy (EUROPA, 2009c). In both of these MSs all poultry on the affected holdings were culled. H7 LPAI infection was also confirmed in Norway affecting a backyard flock of layers and geese.

These events all serve as a reminder of the threat of occasional incursion of H5 and H7 LPAI viruses into poultry, presumably of wild waterfowl origin, with the risk of more extensive secondary spread in areas of higher poultry population density. Such LPAI viruses can often cause subclinical infections in poultry; therefore recognition and detection of disease may also be hampered, a further potential contributory factor conducive to spread. Furthermore, the UK outbreak of H7N7 HPAI in common with the H5N1 HPAI outbreak in November 2007 (Defra, 2007) clearly demonstrated the potent hazard of locating free-range poultry production units in close proximity to open water, both likely to attract wild birds and predispose to an increased likelihood of contact and risk of transmission of avian influenza viruses.

INTERNATIONAL TRADE

A total of 47 submissions were received for the purposes of International Trade and health certification testing during the quarter.

Export: Domestic poultry & Captive birds

Fifteen submissions were received for antigen detection from a variety of avian species, including ducks, birds of prey (including Peregrine Falcons [*Falco peregrinus*]), racing pigeons, budgerigars, hummingbirds, African Grey parrots (*Psittacus erithacus*) and Painted finches (*Emblema picta*). Of these, thirteen submissions comprising oropharyngeal swabs (60), cloacal swabs (238) and faeces (24) were tested by influenza A matrix gene RRT-PCR with negative results. The two further submissions, one of 30 cloacal swabs from budgerigars and a pooled faecal sample from 12 hummingbirds were tested by virus isolation in embryonated fowls' eggs. No haemagglutinating viruses were detected.

Avian Influenza serology

A total of nine submissions were tested for AI antibodies by AGIDT, comprising seven submissions totalling 1,692 chicken sera, one submission of 10 sera from fancy pigeons and one serum sample from an African Grey parrot. One submission of 80 chicken sera was also received for AI ELISA testing. Seronegative results were recorded for all 1,783 samples.

Avian paramyxovirus (APMV) serology

Thirteen submissions totalling 195 sera were tested for APMV-1/Newcastle disease (ND) antibodies by HI test for Export purposes, all with negative results. Nine of these submissions were from racing pigeons (187 sera), one submission comprised five sera from Emerald doves (*Chalcophaps indica*), with three further submissions of individual serum samples from an unspecified dove, a Thick-billed Parrot (*Rhynchopsitta pachyrhyncha*) and a Peregrine Falcon. In addition, the five Emerald dove sera were also tested for Fowl pox antibodies by AGIDT with negative results.

Three submissions were also received from zoological collections. These comprised single serum samples from a Luzon Bleeding-heart dove (*Gallicolumba luzonica*), an Emerald dove and an Ocellated Turkey (*Meleagris ocellata*) for detection of APMV-1/ND antibodies by HI test. HI titres were negative for all three birds.

Imported Captive birds in Quarantine

Six submissions were received from a variety of avian species including birds of prey, Scarlet Ibis (*Eudocimus ruber*) and Goldfinches (*Carduelis carduelis*). The latter were apparently seized at Heathrow

airport having arrived on a flight from Turkey. Three submissions comprising oropharyngeal swabs (48) and cloacal swabs (48) were tested by influenza A matrix gene RRT-PCR with negative results. The three other submissions (two Goldfinch faecal samples, four falcon faecal samples, and Goldfinch viscera) were tested by virus isolation in embryonated fowls' eggs. No haemagglutinating viruses were detected.

Pigeon Paramyxovirus type 1 (PPMV-1) investigations

In total, eight cases of suspected PPMV-1 infection were investigated during the quarter in lofts of pigeons (7) or doves (1). The presence of PPMV-1 was confirmed on four occasions. Four of the investigated cases were located in England (Bedfordshire, Durham, Hull, Cleveland), of which one was positive. The other four cases were investigated in Scotland (Aberdeenshire, Dumfries & Galloway, Midlothian), of which three were positive. During 2008, a total of 23 cases of suspected PPMV-1 were investigated in pigeons (22) and doves (1), of which fourteen pigeon cases were positive. PPMV-1, a virulent variant ND virus, is the causative virus of the continuing panzootic that began in racing and feral pigeons almost 30 years ago. Although a pigeon variant virus, PPMV-1 still meets the internationally recognised virulence criteria, and under EU legislation when it is found in any poultry species the infection must be regarded as ND. None of these cases were in pigeons reared for meat.

In addition, two cases of suspected PPMV-1 infection in wild pigeons and doves (from Norfolk and Jersey) were investigated during the quarter. Submitted tissues were subject to attempted virus isolation in embryonated fowls' eggs. No haemagglutinating viruses were detected.

AVIAN INFLUENZA - INTERNATIONAL DISEASE TRENDS

Globally, reports of H5N1 HPAI have continued across three continents, including the Eastern hemisphere and Asia where disease is considered endemic, mainly affecting domestic poultry (UNFAO, 2008b; 2008c), and where under reporting of disease remains a significant concern. Certain countries have also seen a continued H5N1 HPAI escalation in poultry during 2008. In July, Egypt officially informed the OIE that H5N1 HPAI was endemic in the country (OIE, 2008e). A hotspot of disease continued to intensify along the border of India (West Bengal) and Bangladesh, with significant numbers of poultry affected. Outbreaks were also reported in Pakistan (North West Frontier province) and Myanmar. Disease also re-emerged in poultry in West Africa (including Nigeria, Togo and Benin), China, the Russian Federation plus several countries in the South East Asian peninsula (PROMED, 2008; OIE, 2008f; OIE, 2008g).

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INVESTIGATORY AND ADVISORY FARM VISITS

VLA and SAC veterinarians visit farms at the request of private veterinary surgeons, to assist with the investigation of unusual, severe or difficult disease incidents. VLA veterinarians also visit for statutory purposes (for example, under the Zoonoses Order to investigate outbreaks of salmonellosis). From 2007, the VLA and SAC VS harmonised the way in which these more detailed investigations involving visits to farms were recorded. This is why comparable data is not available for previous years.

Table 5. Farm Investigation and Advisory Visits - 4th Quarter

October – December	England Wales	Scotland	Total Visits
2008	8	0	0
2007	12	N/A	N/A
2006	7	N/A	N/A
2005	10	N/A	N/A
2004	11	N/A	N/A

Table 6. Farm Investigation and Advisory Visits - Annual

Year	England Wales	Scotland	Total Visits
2008	36	4	40
2007	50	N/A	N/A
2006	25	N/A	N/A
2005	53	N/A	N/A
2004	31	N/A	N/A

FOOD SAFETY INCIDENTS

Details of incidents investigated by VLA are published in a quarterly newsletter, which is available at: http://www.defra.gov.uk/vla/reports/rep_food.htm

Table 7. Food Safety Incidents – 4th Quarter

October – December	England Wales	Scotland	Total Incidents
2008	0	0	0
2007	2	N/A	N/A
2006	1	N/A	N/A
2005	1	N/A	N/A
2004	1	N/A	N/A

Table 8. Food Safety Incidents - Annual

Year	England Wales	Scotland	Total Incidents
2008	2	0	2
2007	3	N/A	N/A
2006	4	N/A	N/A
2005	3	N/A	N/A
2004	2	N/A	N/A

The two food safety incidents that occurred during 2008 involved poisoning due to lead shot in the environment, one incident in ducks and the other in organic laying hens. These cases follow a similar incident involving lead shot in geese in November 2007. A warning alert appeared in the news section of the September 2008 edition of Poultry World highlighting the dangers of lead shot to free range poultry. Farmers Weekly interactive also picked up and published this alert. The information for the articles had been obtained from the VLA's Food Safety Quarterly newsletter.

ZOONOSES

Salmonella

In the tables and figures below, an incident is defined as 'the first isolation and all subsequent isolations of the same serovar or serovar and phage/definitive type combination of a particular *Salmonella* from an animal, group of animals or their environment on a single premises, within a defined time period (usually 30 days).

No clinical cases of disease due to *S. Enteritidis* have been recorded on VIDA in chickens during the quarter, or since 2004 when the last case was recorded.

Sampling of chicken layer flocks according to the requirements of the *Salmonella* National Control Programme (NCP) for layers is ongoing. More details on the *Salmonella* NCP in layers can be found on Defra's website: <http://www.defra.gov.uk/animalh/diseases/zoonoses/ncp.htm>

The annual number of incidents of *S. Enteritidis* and *S. Typhimurium* in turkeys is shown in Table 9 below, and of *S. Binza* and *S. Orion* in pheasants in Table 10. In both of these tables the figures for 2008 are provisional.

Table 9. The annual incidents of *S. Enteritidis* and *S. Typhimurium* in turkeys

	2004	2005	2006	2007	2008
Enteritidis (total)	0	0	0	0	0
Typhimurium (total)	38	23	38	12	1

Note: The incidents of *S. Enteritidis* and *S. Typhimurium* exclude isolates arising from the 2006/07 EU survey of turkey flocks (see Avian Quarterly Report, Vol. 10, No 3, July-September 2006, Appendix 1).

Table 10. The annual incidents of *S. Binza* and *S. Orion* in pheasants

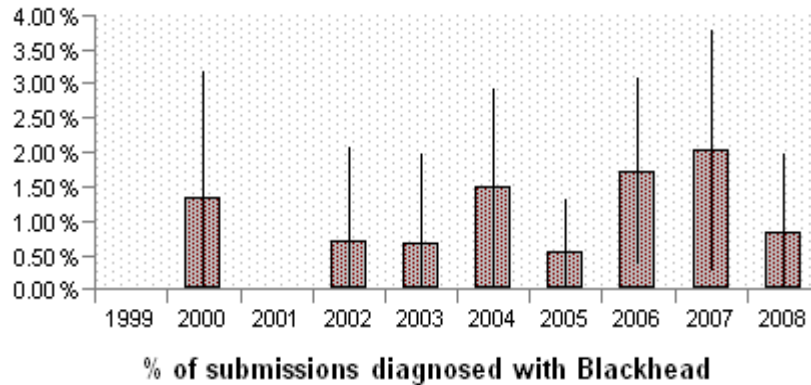
	2004	2005	2006	2007	2008
Binza (total)	4	10	21	7	6
Orion (total)	1	3	3	2	2

CROSS-SECTOR AVIAN DISEASES

Blackhead (histomonosis)

Fewer incidents of blackhead were recorded in chickens during the quarter compared with the last two years (Figure 15). However, an outbreak of classical blackhead was diagnosed in a flock of 24,000 free-range layers, aged 24-weeks, with slightly increased mortality and a slight drop in egg production. Post-mortem examination revealed multiple random “target” lesions on the liver surface and throughout its substance. Focal caecal ulceration and formation of caecal cores were also present in some carcasses.

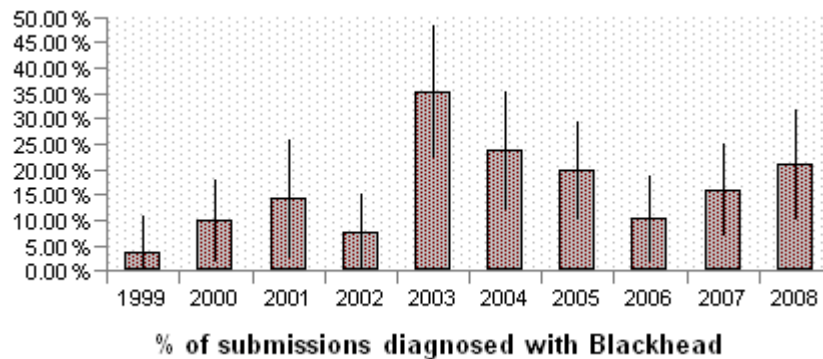
Figure 15: VIDA incidents of blackhead in chickens (as a percentage of diagnosable submissions) October-December 1999-2008



(Vertical bars represent 95%confidence limits)

There was an increase in blackhead incidents in turkeys compared to recent years (Figure 16), and all of the recorded incidents were in small flocks. In one unusual incident, two turkeys were received from a small organic flock of 27 birds of which 5-6 had died at 16 weeks of age. Post-mortem examination showed striking lesions in the liver in the form of multiple pale 1cm diameter firm tumour-like areas, and there was also variable thickening and necrosis of the caecal wall. The possibility of Marek’s disease was considered in view of the tumour-like lesions in the liver, but this was negated following both histopathology and Marek’s disease PCR testing. Histology showed a marked cellular infiltration in the liver along with histomonad-like forms and it was concluded that the liver lesions were a chronic reaction to *Histomonas* (blackhead). It is uncommon to find liver lesions as chronic as this in blackhead, death often occurring at the more acute stage of the disease

Figure 16: VIDA incidents of blackhead in turkeys (as a percentage of diagnosable submissions) October-December 1999-2008



(Vertical bars represent 95%confidence limits)

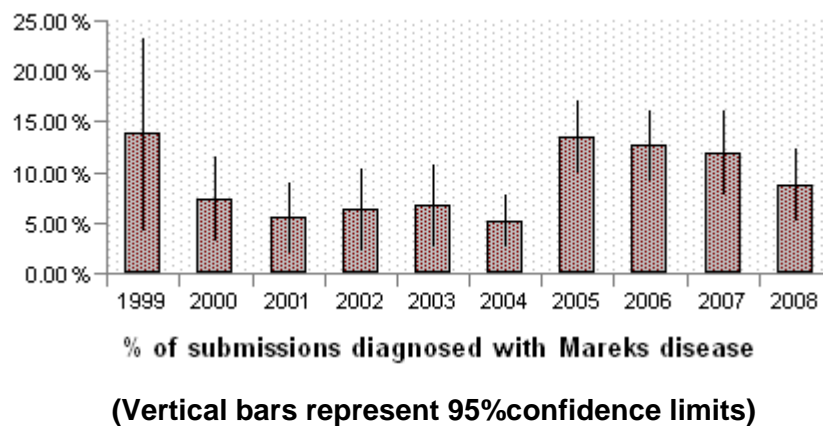
Fowl Cholera (*Pasteurella multocida*)

Five incidents of fowl cholera (*Pasteurella multocida*) were recorded during the quarter; none were reported as having unusual features.

Marek’s Disease

The gradual decline in incidents of Marek’s disease continued during the quarter (Figure 17). Most of the incidents recorded were in small backyard or hobby flocks (the majority of which are unvaccinated), but the visceral form of Marek’s disease was also confirmed in a flock of 34-week-old caged layers with a history of increased mortality. Tumours in liver and spleen were confirmed histopathologically as lymphomatous infiltrations consistent with Marek’s disease.

Figure 17: VIDA incidents of Marek’s disease in chickens (as a percentage of diagnosable submissions) October-December 1999-2008



ENDEMIC DISEASE SURVEILLANCE

COMMERCIAL LAYERS AND LAYER BREEDERS

Erysipelas

Two flock episodes of septicaemia due to infection with *Erysipelothrix rhusiopathiae*, both in free-range organic layers, were diagnosed this quarter. Elevated mortality can persist in affected flocks despite treatment. Ideally, subsequent flocks destined for affected premises would be vaccinated during the rearing period. There is currently no erysipelas vaccine licenced specifically for use in chickens in the UK.

BROILERS AND BROILER BREEDERS

Poor Growth and Unevenness

A number of birds from broiler flocks were presented for investigation because they were behind target weight and showing variability in size at around 28 to 30 days of age. By the time size differences become noticeable, and birds have fallen a few days behind, the cause (or causes) may be long gone and it can be difficult or, more often, simply not possible to know what caused the problem in the first place. Increased mortality is usually not a feature, and sometimes it can actually be lower than normal. As with the wet litter problems (see Quarterly Report July-September 2008, page 11), in some cases birds showed chronic bursal atrophy raising the possibility of a previous IBD challenge, and a few showed evidence of previous caecal coccidiosis. The exact cause of the poor performance in these cases was not determined.

Spiking mortality

A small number of further cases of Spiking mortality were seen in 24-28 day old flocks. Spiking mortality discussed in detail in the Quarterly Report July-September 2008, page 11 http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlya0308.pdf.

Riboflavin deficiency

A cluster of cases of riboflavin deficiency in young broilers occurred in one area over a two-week period towards the end of the Quarter. Some presented with classical "curled toe paralysis", with a high percentage of chicks of around 8-10 days of age off their legs in some flocks. Response to supplementary multivitamins, including vitamin B2, given in the drinking water was rapid.

Acute rupture of the achilles tendon complex

Lameness in a small proportion of a flock of breeder pullets in the early part of lay was found to be due in most cases to acute rupture of parts of the Achilles tendon complex (most often the gastrocnemius tendon) of one or both legs. Histological examination confirmed tendon rupture with haemorrhage, in the absence of any evidence of infection in the tendons or tendon sheaths, although sometimes there was evidence of scarring and fibrosis consistent with previous damage adjacent to the site of rupture.

TURKEYS

Respiratory disease

Respiratory disease continued to dominate the last quarter of the year. *Mycoplasma gallisepticum* was detected by DGGE PCR in a case of upper respiratory disease in 8-week-old turkeys being reared for the Christmas market. *M. gallisepticum* was also isolated from follow-on submissions in a case of acute pneumonia in 8-week-old turkey poults. *Mycoplasma meleagridis* was detected by DGGE PCR in a group of 10,000 10-week-old turkeys being reared in a polytunnel for the Christmas market. Sinusitis with bilateral swelling of the infraorbital sinuses containing mucopurulent material was seen and mortality of 10 birds-a-day over a seven-day period was described. Turkey rhinotracheitis was suspected in a group of 100 eight week old poults with gaping, swollen heads and ocular discharges.

Bacterial pneumonias

Bacterial pneumonias were also seen during the quarter. *Ornithobacterium rhinotracheale* was isolated from respiratory tract lesions in fifteen-week-old turkeys. This organism was also identified in conjunction with *Mycoplasma synoviae* in a septicaemia in 12-week-old turkeys. Wasting and swollen heads were the presenting clinical signs. Deep pectoral myopathy was detected as an incidental finding in the flock. Unilateral pneumonia, infraorbital sinusitis and airsacculitis from which *Pasteurella*

multocida was isolated caused losses in batches of 17-week and 20-week-old turkeys. The infection eventually led to lameness in the same group of birds. Unilateral lung consolidation and necrosis from which *P.multocida* was isolated also caused losses in 12-week-old poults.

Opisthotonus and mild diarrhoea and 20% mortality in 9 to 12 week old poults prompted a notification to the DVM of possible involvement of notifiable disease. There was no coughing, sneezing, nasal or ocular discharge, but lung consolidation, airsacculitis and fibrinous perihepatitis were seen on post mortem examination. Profuse growths of *E. coli* were isolated from several sites. Inhalation of faecal-contaminated dust is thought to be the cause of *E. coli* respiratory infections. A damaged respiratory system allows *E. coli* to enter the blood circulatory system directly through the air sacs.

Erysipelas

A case of acute erysipelas in 6-month-old turkeys presented with congestion of carcasses, petechial haemorrhages in the proventriculus and on the surface of the pancreas and mucoid to haemorrhagic contents in the small intestine, demonstrating the similar, but non-specific, pathological appearance of this disease to avian notifiable diseases such as Newcastle disease and avian influenza. Erysipelas also caused the death of five birds in a flock of 520 turkeys. Pigs had been kept on the premises some years previously and normally the turkeys were vaccinated but the farmer had not done so for the last two years. On a third farm dyspnoea and purple discolouration of the heads was seen in a group of 4-month-old turkeys. Mortality was 5% and *Erysipelothrix rhusiopathiae* was isolated in septicaemic distribution. Aspergillosis also complicated this case. In another incident, 200 out of 600 turkeys aged 5 months had died and erysipelas was diagnosed. Feather pecking and cutaneous damage were seen which might have allowed the organism to invade.

DUCKS AND GEESE

Pneumonia of unknown aetiology

The pneumonitis due to unidentified organisms reported in the July-September 2008 Quarterly Report (page 13) http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlya0308.pdf was seen again this quarter in 6-week-old ducklings that were affected by a short fatal illness of 2 to 3 hours duration. Lungs were congested grossly and showed diffuse consolidation with obliteration of air capillary spaces associated with numerous basophilic organisms as previously described.

Goose parvovirus

Six cases of suspected Goose Parvovirus (GPV) were investigated by Avian Virology and VLA Regional Laboratories (RLs), four of which were traced back to a batch of affected goslings imported from Denmark. The investigations resulted in timely communication to the VLA Avian Group, all VLA RLs and Defra and included a GPV veterinary information sheet to be sent to Private Veterinary Surgeons. In addition, a letter summarising the cases was published (Irvine and others, 2008; Veterinary Record, **163**, 461). This resulted in heightened awareness and interest from the poultry industry, vets and media, including GPV being in the 'Top 5' of the most popular poultry stories on Farmers Weekly interactive during November, featured in Poultry World and covered on Radio 4's 'Farming Today' programme in an interview with Jeremy Blackburn (British Poultry Council). These investigations reflected the multiple contributions of all involved across the VLA and RL network, providing further evidence and justification for the value and role of VLA's scanning surveillance activities.

BACKYARD FLOCKS

Listeriosis

Listeriosis is an uncommon diagnosis in poultry, but three of a backyard mixed aged flock died after a period of weight loss with no specific clinical signs. Aggregations of serous fluid were present within the peritoneal cavities, but the main post mortem finding was enlargement of the spleen, which was indurated with tiny white foci. *Listeria monocytogenes* was isolated from the spleen. In poultry enteric colonisation with *Listeria* may occur without birds showing clinical signs and disease is rare although sporadic outbreaks do occur. Clinical signs include sudden death, progressive weight loss or nervous signs. These are associated with either a septicaemic and or an encephalitic infection.

Broiler ascites

Eight backyard broilers died at approximately 12-weeks of age. They had been purchased between four and eight weeks of age and fed ad-lib rearer pellets. One bird examined had a large volume of pale brown fluid with gelatinous clots within the abdomen and an enlarged liver and heart. Broiler ascites was suspected.

This is a recognised condition in rapidly growing broiler birds, but not often diagnosed by the VLA in backyard flocks as broiler ascites.

Fungal pneumonia

Aspergillus fumigatus was isolated from lung lesions in a female bantam. This bird as in very poor body condition prior to death and was reported to have shown long term poor weight gain and loose faeces. It was the second of three birds to die. At post-mortem necrotic plaques were present in both lungs surrounded by an area of dark haemorrhage.

This type of fungal infection usually reflects poor management and poor environmental conditions for the birds. Although it can cause acute respiratory disease and mortality in young birds, survivors can develop slowly progressive respiratory distress and severe loss in condition before death.

Infectious Bronchitis virus (IBV) QX variant

Infectious Bronchitis virus (IBV) QX variant was isolated on two occasions in Great Britain (GB) during 2008 from backyard chickens in Yorkshire and Cornwall. In total there have been three isolations of IBV QX from backyard chickens since the first reported isolation in August 2007¹ as a result of VLA scanning surveillance activities for endemic and new and emerging diseases: These episodes clearly highlight the presence of this IBV variant within the poultry population. However, the extent of virus circulation is currently unquantified; hence the potential threat that this novel IBV variant may pose to the commercial poultry sector is unknown. Nephritis appears to be a typical pathological finding in chickens infected with IBV QX, often with elevated mortality. Egg production problems have been reported in layers^{2, 3} and proventriculitis in affected broiler flocks in China⁴.

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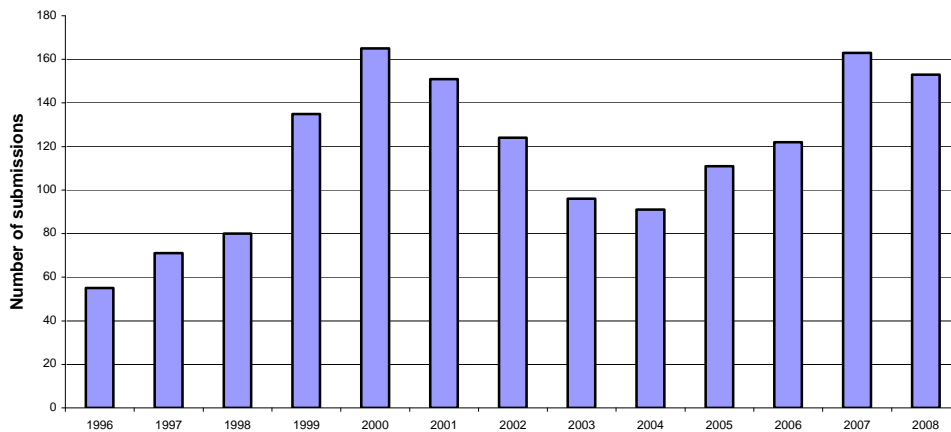
GAME BIRDS

Spironucleosis in Game Birds in Great Britain 1996 to 2008

Spironucleosis (at one time referred to hexamitiasis or hexamitosis) is a common cause of weight loss, diarrhoea and death in reared and released pheasants and red-legged partridges. At one time the prevention and treatment of this condition relied on the use of in-feed and in-water medication containing dimetridazole, but in recent years these products have not been available to the game bird industry. Instead, control is based on good management and hygiene practices, and treatment of affected groups with tetracycline antibiotics in the drinking water appears to be beneficial. *Spironucleus meleagridis* is a motile protozoan organism found mostly in the small intestine – two other motile protozoa that have been associated with disease in game birds, *Trichomonas phasianus* and *Histomonas meleagridis*, are found in the caeca.

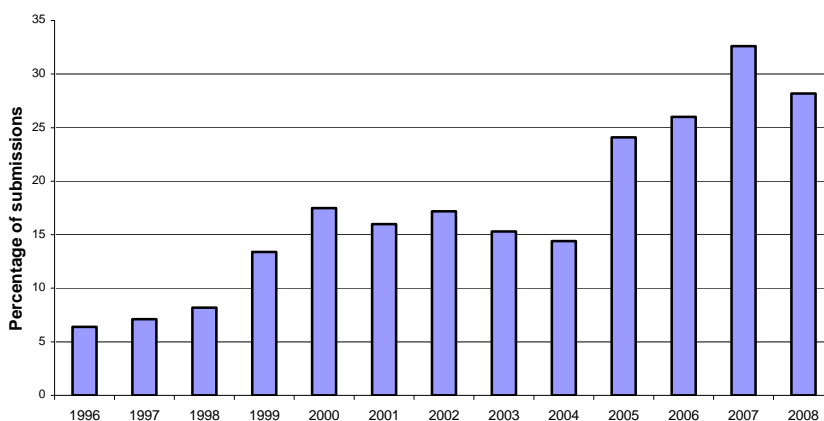
Figure 12 shows the number of batches of game birds submitted to Disease Surveillance Centres of SAC and Regional Laboratories of VLA in which infection with motile protozoa (excluding trichomonosis and histomonosis) was diagnosed.

Figure 12 Diagnoses of infection with motile protozoa in game birds submissions to SAC/VLA 1996 - 2008



A cyclical pattern can be seen between 1996 and 2008, apparently unrelated to the withdrawal of dimetridazole from 2002. However when the diagnoses are expressed as a percentage of the number of game bird submissions received (Figure 13), it can be seen that the percentage of diagnostic submissions in which spironucleosis was diagnosed has been steadily increasing since 2005.

Figure 13 Diagnoses of infection with motile protozoa as a percentage of game birds submissions to SAC/VLA 1996 - 2008



Disease was especially common in 2007, and a breakdown of the diagnoses by month (Figure 14) shows that this rise was largely the result of increased cases in September 2007. The reason for this is unclear, but may be related to the fact that mean temperatures in August 2007 were the coldest in many areas of GB for over ten years, possibly adversely affecting the health of the birds immediately prior to September 2007.

These figures suggest that spironucleosis will continue to be a problem for game birds in the years to come, and that the control of this disease should form a major part of health plans prepared by game bird rearers and their veterinary advisers.

Figure 14 Diagnoses of infection with motile protozoa in game birds submissions to SAC/VLA 2005-2008

