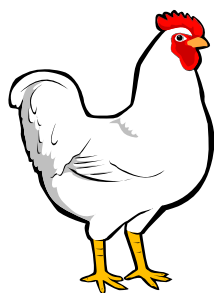


# GB surveillance

## Avian diseases

Quarterly Report: Volume 13. No. 2

Date: April – June 2009



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

- **Duck Virus Enteritis causing deaths in ducks** - *It is likely that the disease seen in domestic ducks was the result of contact with wild waterfowl (page 17).*
- **Salmonella Pullorum responsible for high mortality in chicks in a small backyard flock** - *This case illustrates that backyard flocks are a potential reservoir for this organism (page 18).*
- **Further outbreak of QX strain Infectious bronchitis in chickens** - *This strain of IB virus is believed to have been imported into GB having originated in China. This outbreak provides further evidence that the backyard poultry population can act as a reservoir of infection (page 18).*
- **Coccidiosis in Game Birds in Great Britain** - *A report of SAC and VLA findings from 2002 to 2008 (page 19).*

## 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

Data extracted from the GB poultry register (GBPR). On the 01 January 2009, there were 17,072 premises holding a total of 238,764,225 birds.

NB: It is only mandatory for premises with 50 or more birds to register on the GBPR. Some premises with fewer birds have registered voluntarily but many will not be represented.

**Table 1. GB poultry demographics as of 01 January 2009**

GBPR 01-Jan-09	England		Scotland		Wales		Total	
	Premises	Birds	Premises	Birds	Premises	Birds	Premises	Birds
Layers and layer breeders (chickens) (Premises with 50 or more birds)	4,503	29,815,799	364	6,176,187	325	1,257,653	5,193	37,249,639
Broilers and broilers breeders (chickens) (Premises with 50 or more birds)	1,775	112,935,417	198	13,013,868	129	7,341,785	2,103	133,291,070
Turkeys (Premises with 50 or more birds)	1,165	9,207,375	46	33,015	76	422,182	2,537	9,681,526
Ducks and geese (Premises with 50 or more birds)	2,290	6,239,362	297	220,529	153	81,424	2,740	6,541,315
Game birds* (Premises with 50 or more birds)	7,492	43,434,234	1,117	5,789,525	360	1,424,955	8,969	52,000,675
<b>Total (Premises with 50 or more birds)</b>	<b>14,498</b>	<b>201,632,187</b>	<b>1,710</b>	<b>25,233,124</b>	<b>864</b>	<b>10,527,999</b>	<b>17,072</b>	<b>238,764,225</b>
Flocks registered with GBPR with less than 50 birds	12,234	208,813	1,025	17,793	937	16,901	14,196	243,507

\*Game birds = pheasants and partridges.

N.B. As of 01 January 2009, there were 15 poultry premises (50 or more birds), holding a total of 117,090 birds in the GBPR that had not been assigned to a country by the coordinates assigned by RADAR (Rapid Analysis and Detection of Animal-related risks).

- The sum of the premises column will not equal the total as some premises will have multiple species.
- Turkeys and game birds numbers alter by month. For these premises the GBPR requires that the number of birds entered on the form is the number of birds 'usually present on the premises'.
- Small flocks with fewer than 50 birds do not have to register with the GBPR, so "backyard" flocks are under-represented.
- Species not included in this report but registered on the GBPR are: Guinea Fowl, Quail, Pigeons reared for meat, Ostriches, Emus, Rheas, Cassowaries and Kiwis.

Figure 1

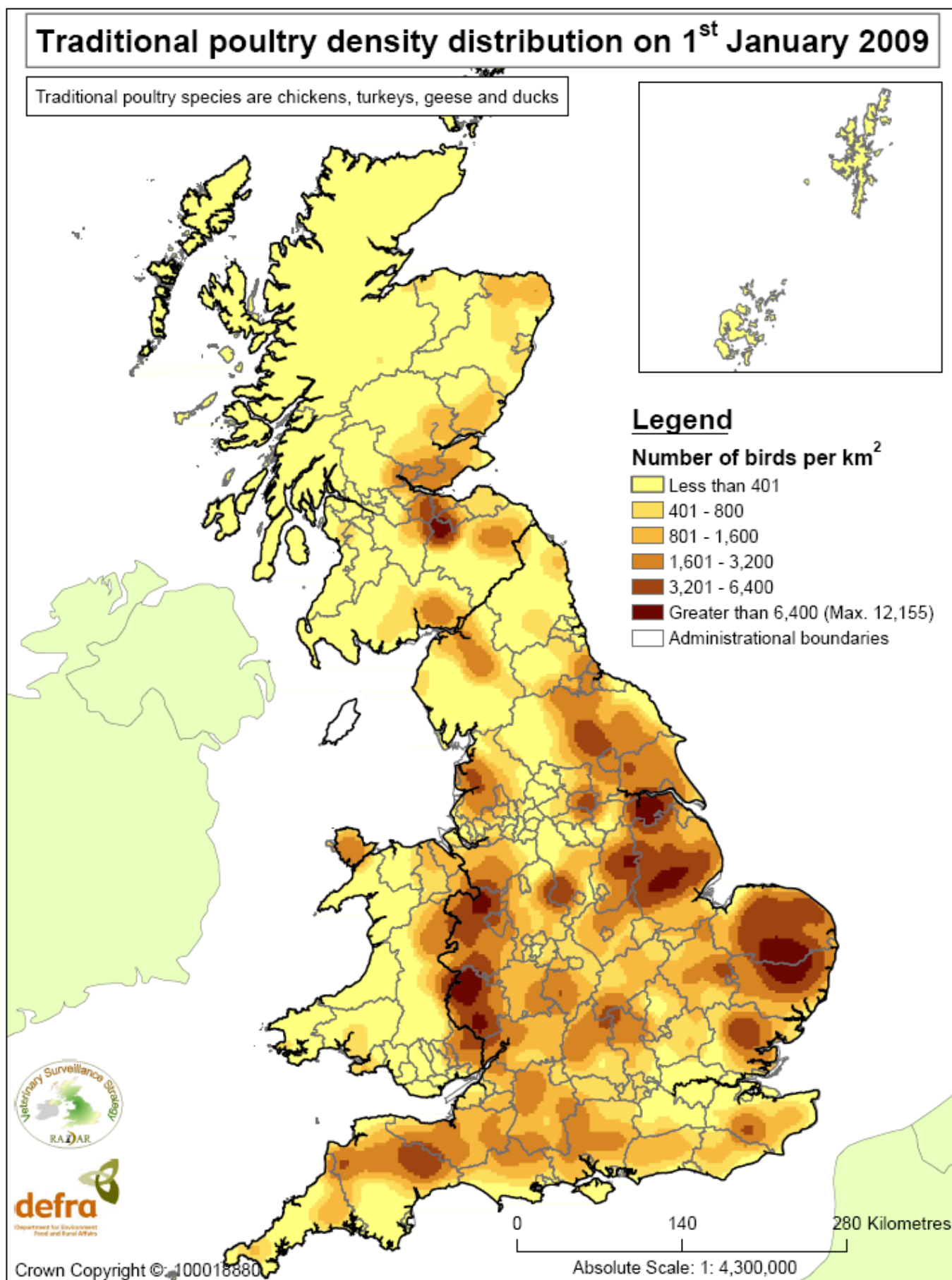
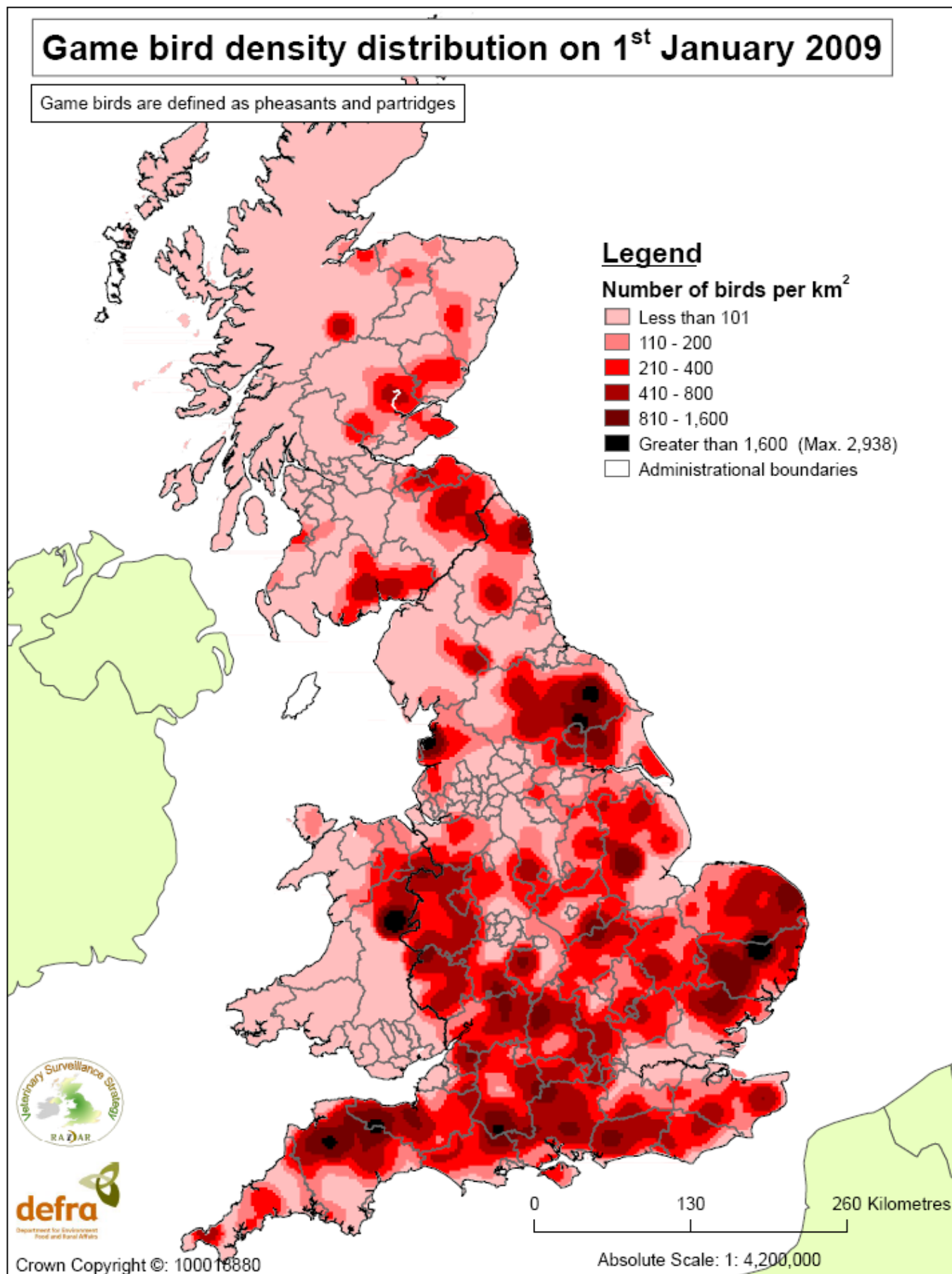


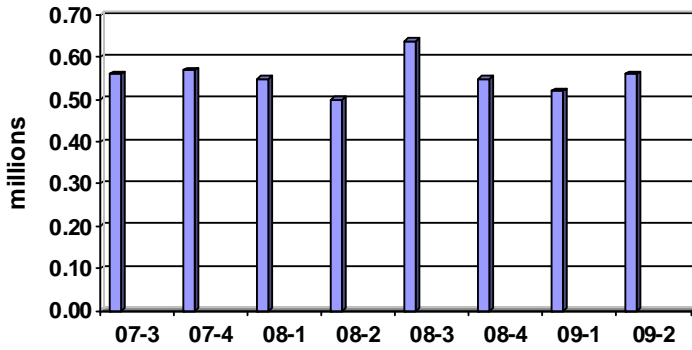
Figure 2



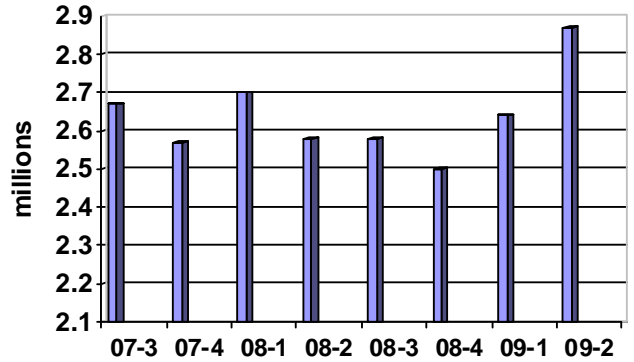
**Economics of the Poultry Industry**

1) Placings

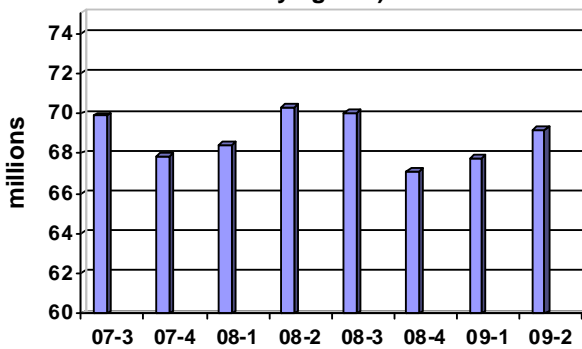
**Figure 3 UK Quarterly figures for female Broiler Parent Chick Placings (average monthly figures)**



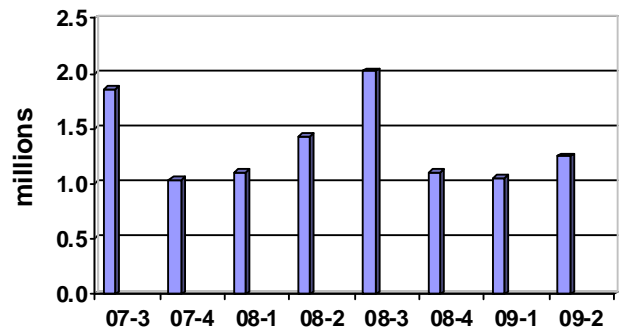
**Figure 4 UK Quarterly figures for Commercial Layer Chick Placings (average monthly figures)**



**Figure 5 UK Quarterly figures for Commercial Broiler Chick Placings (average monthly figures)**

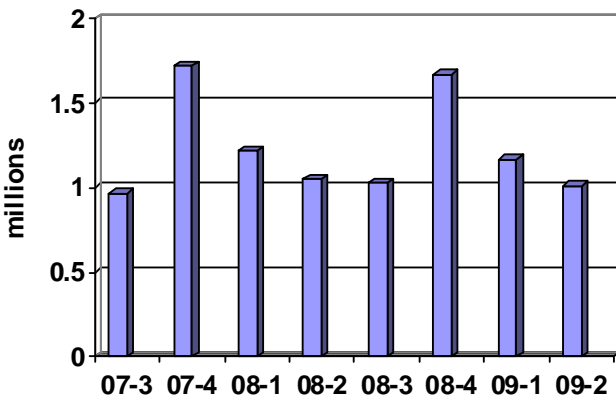


**Figure 6 UK Quarterly figures for Turkey Poults Placings (average monthly figures)**

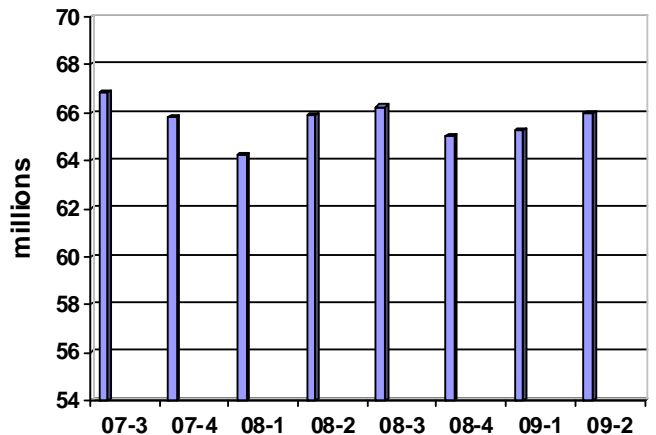


2) Slaughterings

**Figure 7 UK Quarterly figures for Turkey Slaughterings (average monthly figures)**



**Figure 8 UK Quarterly figures for Broiler Slaughterings (average monthly figures)**



3) Meat production

Figure 9 Total UK Poultry Meat Production (average monthly figures)

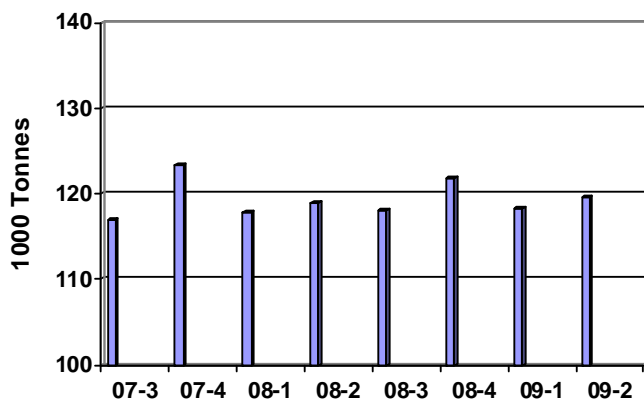
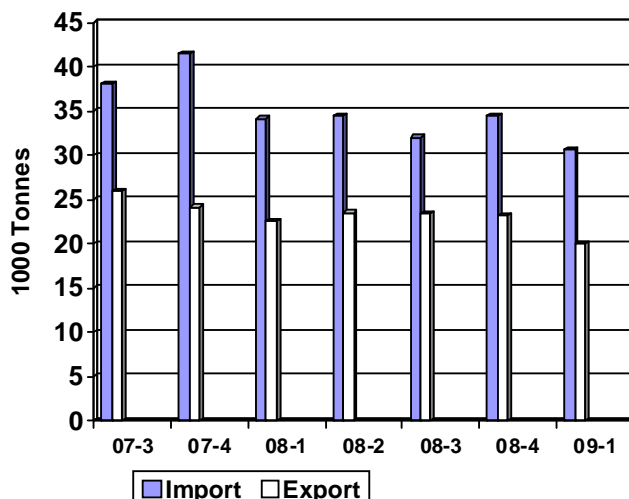


Figure 10 Total Poultry Meat Trade (average monthly figures)



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.

**Weather and Climate**

Mean temperatures across Great Britain in April, May and June were 0.5 to 2.0 °C above the average (of 1971-2000). In the first two months of the quarter, eastern England experienced the largest increases in temperature. In June, this occurred in western parts of Britain, and Western Scotland experienced the warmest June since 1992. By contrast, temperatures were close to the average in parts of North-east Scotland and England in June. In 2009, only in January have temperatures been below average in GB.

The rainfall pattern in the quarter was less consistent: In April, rainfall ranged from above normal in the western fringes of Scotland, Wales and south west England to well below normal in much of eastern Scotland and England, with less than 40% of average across East Anglia. Generally over England and Wales, April was the third consecutive month to be markedly drier than average.

In May, rainfall was above normal in north west England and much of Scotland, with most of north west Scotland receiving more than 160% of the average. By contrast, it was drier in southern England, with East Anglia and the south east receiving less than 75%. Elsewhere, rainfall was mostly close to average.

Rainfall in June was below normal in most of GB, but above normal in a few small areas, with parts of the West Midlands receiving around double the long-term average for June. The driest regions included Kent and Cornwall with around a third of the June average.

**Submissions for scanning surveillance****Table 2. Poultry Diagnostic Submissions in GB – 2<sup>nd</sup> Quarter**

April - June	Submissions			Carcases		
	VLA	SAC	Total	VLA	SAC	Total
2009	568	137	705	1264	306	1570
2008	538	156	694	1431	445	1876
2007	639	129	768	1384	357	1741
2006	846	170	1016	2434	461	2895
2005	575	145	720	1504	426	1930

The increased number of submissions and carcasses in April to June 2006 was due to the submission of wild birds for Avian Influenza screening.

**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 three cases of suspected AND in domestic poultry. Two of these investigations were in game bird flocks (located in Cumbria and Oxfordshire), and one in a backyard layer flock (in Essex). A total of 105 samples were received, comprising sera (18), oropharyngeal swabs (18), cloacal swabs (18) and carcasses (51); all were tested with negative results. In addition, one commercial poultry premises was 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.

**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://www.defra.gov.uk/animalh/diseases/notifiable/ai/keptbirds/#natsurvey>). 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. This year, for the first time, the survey has included the requirement to sample game bird flocks (game ducks, pheasants and partridges). As a result, the start date of the survey was brought forward to early May 2009, and initial efforts have focussed on the successful recruitment and sampling of game bird and duck flocks. Other types of poultry flock will also be included in the survey from early August onwards. During the survey period to 30 June 2009, twenty-nine submissions were received from game bird and duck flocks at the NRL, VLA Weybridge, comprising 1,797 serum samples, with 3,674 haemagglutination inhibition (HI) tests screening for H5 and H7 antibodies performed. One commercial duck flock (located in Wiltshire) was identified to have HI test results that were not negative to H7. As part of follow-up investigations of this flock, 141 samples, comprising oropharyngeal swabs (47), cloacal swabs (47) and sera (47) were tested. No evidence of circulating H7 virus infection was detected.

The survey continues to provide valuable information across the EU for an early warning system of H5 and H7 subtypes in poultry. In Great Britain, a random list of poultry premises is selected, including chicken, turkey, duck, goose and game bird flocks. 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 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.

### **Pigeon Paramyxovirus type 1 (PPMV-1) investigations**

In total, thirteen cases of suspected PPMV-1 infection in lofts of pigeons were investigated during the quarter in Great Britain (GB), resulting in the receipt of 78 samples. Nine of the cases were located in England (Cheshire, County Durham [2], Essex, Hampshire [2], Hertfordshire, Lancashire and Lincolnshire). Two of these nine cases resulted in the submission of serum samples only (5 each), with positive HI test titres (range  $2^4 - 2^8$ ). Serology was completed on all blood samples according to the standard protocol (CEC, 1992). Investigation of the other seven suspected cases in England resulted in the submission of pigeon carcasses (5), tissues collected at post-mortem examination (8), oropharyngeal swabs (6), cloacal swabs (22) and sera (7). PPMV-1 was detected from five of the seven cases (located in Cheshire, County Durham [2], Essex and Hampshire) by virus isolation. Of the remaining four cases investigated in GB, three were located in Scotland (Aberdeenshire, Angus and Lanarkshire), resulting in the submission of tissues collected at post-mortem examination (5), oropharyngeal swabs (5), cloacal swabs (5) and sera (3). PPMV-1 was detected from two of these cases (Aberdeenshire and Angus). The final case investigated was located in Pembrokeshire, Wales, with no evidence of PPMV-1 infection detected by attempted virus isolation of two swab samples submitted.

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.

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### **Great Britain AI Wild Bird Surveillance (AIWBS)**

H5N1 Highly Pathogenic Avian Influenza (HPAI) was not detected from any of the 125 wild birds tested during the last quarter in Great Britain, with no other avian influenza (AI) virus infections detected (Table 3) from any of the birds sampled.

**Table 3. Number of wild birds tested and results in GB – 2<sup>nd</sup> Quarter.**

Surveillance activity	Number of birds examined*	Positive AI virus result and species of bird	Comments
Legally trapped (ringing)	12 (Nil)	Nil	Seasonal targeted surveillance (Spring & Autumn).
Found dead*	113 (335)	Nil	Scanning surveillance, all-year-round

\* Number of birds examined: figures for April to June 2008 are shown in brackets.

## INTERNATIONAL TRADE

A total of 64 submissions were received for the purposes of International Trade and health certification testing during the quarter.

### **Export: Domestic poultry & Captive birds**

Twelve submissions were received from a variety of avian species for testing for Export purposes, of which nine submissions comprised swabs only (antigen detection), and three submissions comprised both swabs and serum (275) samples. In total, 554 swab samples were tested (419 cloacal swabs, 127 oropharyngeal swabs, 8 unspecified swabs). Species of origin included chickens (275), ducks (248) and pigeons (15), with single cloacal swab samples received from a lovebird (*Agapornis* spp.), an African Grey parrot (*Psittacus erithacus*), a Yellow-shouldered Amazon parrot (*Amazona barbadensis*), a Sun Conure (*Aratinga solstitialis*) and a Petz's Conure (or Half-moon Conure, *Aratinga canicularis*). Negative results were recorded for all samples by influenza A matrix gene RRT-PCR testing or virus isolation in embryonated fowls' eggs. Countries to which the birds were being exported included Australia, New Zealand, South Africa, South Korea, Trinidad and Tobago and the United Arab Emirates.

### **Avian Influenza serology**

A total of twenty-one submissions were tested for AI antibodies by AGIDT, comprising sixteen submissions totalling 1,887 chicken sera, two submissions totalling seven serum samples from turkeys, two submissions of single serum samples from Dusky-headed Conures (*Aratinga weddellii*), and one serum sample from an Amazon parrot (*Amazona* spp.). Seronegative results were recorded for all 1,897 samples. Four further submissions (of which three included swabs for Export testing, as above) totalling 395 chicken sera were also received and tested for AI antibodies by ELISA, all with negative results.

### **Avian paramyxovirus (APMV) serology**

Two submissions, totalling 53 pigeon sera were tested for APMV-1/Newcastle disease (ND) antibodies by HI test for Export purposes, with negative results. Three submissions, each with individual serum samples from a dove (1) and pigeons (2), were tested for screening purposes, of which one pigeon and the dove sample yielded positive HI titres ( $2^4$ ,  $2^5$ ).

### **Other serology**

Seven submissions totalling 140 duck sera were received and tested by HI test for EDS '76 antibodies, and one submission of 240 chicken sera was tested for ILT antibodies by SNT, all with negative results.

### **Imported Captive birds and Domestic poultry in Quarantine**

Twenty submissions were received from a variety of avian species, including Humboldt penguins (*Spheniscus humboldti*), Caribbean Flamingos (*Phoenicopterus ruber*), Gyrfalcons (*Falco rusticolus*), Tawny eagles (*Aquila rapax*), Greater Bird of Paradise (*Paradisaea apoda*), Red Bird of Paradise (*Paradisaea rubra*), Blue-headed Macaw (*Primolius couloni*), Crested Mynahs (*Acridotheres cristatellus*), Black Palm Cockatoo (*Probosciger aterrimus*) and pheasants (*Phasianus colchicus*) as part of statutory post-import/quarantine procedures. Countries of origin included Canada, Cuba, Chad, Kuwait, Qatar and the United Arab Emirates. In total, 222 samples (including viscera, faeces, faecal swabs, oropharyngeal swabs and cloacal swabs) were tested by virus isolation in embryonated fowls' eggs. No haemagglutinating viruses were detected.

## AVIAN INFLUENZA - INTERNATIONAL DISEASE TRENDS

### International H5N1 HPAI Events

During the quarter there were no reported detections of H5N1 HPAI in Member States of the European Union (ADNS, 2009; UNFAO, 2009). However, H5N1 HPAI incidents in wild birds were reported from Asia during May and June 2009 (Defra, 2009). In addition, there have been continued reports of H5N1 HPAI in poultry in central and south east Asia (including Vietnam, Bangladesh and Indonesia) and in Egypt (countries where disease is considered to be endemic). Poultry outbreaks were also reported in Tibet and Xinjiang, China (UNFAO, 2009; OIE, 2009a). During May, detection of H5N1 HPAI was also reported in wild birds found dead at Genggahu Lake, Hainan Prefecture, Qinghai in China (OIE, 2009b), comprising 107 Great crested grebes (*Podiceps cristatus*), three Bar-headed geese (*Anser indicus*), and 11 brown headed gulls. Further wild bird mortalities (162) were reported during late May in the Nanhai Prefecture, Qinghai (OIE, 2009c), and approximately 23,700 poultry were pre-emptively culled in the region. During late May, Mongolia also reported an outbreak of H5 HPAI in migratory Whooper swans (*Cygnus cygnus*) from Arkhangai, a central Mongolian region over 900 miles from Qinghai (OIE, 2009d; PROMED, 2009a). Furthermore, during June 2009, Russia reported the detection of H5N1 HPAI in 58 wild birds found dead at a lake (Ubsu-Nur) in Respublika Tyva (OIE, 2009e), a border region with north-western Mongolia.

Hong Kong also reported H5N1 HPAI detections. During February, wild birds (a large-billed crow, *Corvus macrorhynchos*, and winter migratory visitors, a grey heron, *Ardea cinerea* and a peregrine falcon, *Falco peregrinus*) and poultry (chickens, ducks and a goose) were found dead, either washed up along the coast or found dead inland (OIE, 2009f). During April, further detections were reported at the island location of Ping Chau, with two autolysed chicken carcasses found off the coast, and an H5N1 HPAI-positive Crested Mynah (*Acridotheres cristatellus*) detected as part of an ongoing wild bird surveillance programme. No spread of disease was reported to be evident (OIE, 2009g).

In combination, these seasonal and geographical patterns of H5N1 HPAI detections, notably those from wild birds in Central Asia (Qinghai, China followed by incidents in central Mongolia), are reminiscent of those seen during April-June 2005 and 2006 (Defra, 2005; PROMED, 2009b), with similar spread across Asia to the north and west at that time, and ultimately towards and across Europe, as well as Africa, during 2006 (Defra, 2009). Interestingly, Bar-headed geese have been identified as a migratory species that provide a spring migratory connection between Qinghai and breeding areas in central Mongolia (Prosser and others, 2009). It has also been suggested that migratory Whooper swans in Mongolia may act as sentinel species that become infected as a result of contact with other wild birds (Newman and others, 2009).

Whether these epidemiological patterns are to be repeated during 2009 remains to be seen. However, these events serve as a reminder of the global hazard posed by H5N1 HPAI infection, and the importance for all poultry keepers to maintain robust biosecurity measures, vigilance for clinical signs of disease and to promptly report suspect cases.

Other international notifiable avian influenza and Newcastle disease reports from the quarter have been summarised elsewhere (Sabirovic and others, 2009).

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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 4. Farm Investigation and Advisory Visits – 2<sup>nd</sup> Quarter**

April – June	England Wales	Scotland	Total Visits
2009	10	3	13
2008	13	N/A	N/A
2007	12	N/A	N/A
2006	4	N/A	N/A
2005	24	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](http://www.defra.gov.uk/vla/reports/rep_food.htm)

**Table 5. Food Safety Incidents – 2<sup>nd</sup> Quarter**

April – June	England Wales	Scotland	Total Incidents
2009	1	0	1
2008	1	N/A	N/A
2007	0	N/A	N/A
2006	1	N/A	N/A
2005	2	N/A	N/A

Following the diagnosis of lead poisoning in pet call ducks on a small holding, raised blood lead concentrations were detected in two birds in a group of 15 free-range laying hens. The hens were kept in the same area as the ducks and the source of lead was thought to be geochemical. The owner was advised not to eat the eggs until exposure to lead had been prevented and the blood concentrations of the hens had declined. Advice was also given to minimise access to the contaminated soil by considering provision of a hard base to the hen coop and remediation of the area by bringing in more suitable topsoil.

Lead toxicity was seen in a pair of Indian Runner ducks with weakness and ataxia leading to death. High lead values were obtained from kidney tissue. Lead airgun pellets were the possible source, although lead paint and bonfire ash were also identified as additional potential sources. No threat to the food chain was identified as neither eggs nor meat from these birds was being used for human consumption. Advice was given to prevent exposure of the remaining birds.

## 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>

Sampling of chicken broiler flocks according to the requirements of the *Salmonella* National Control Programme (NCP) for broilers has commenced in 2009. More details on the *Salmonella* NCP in broilers 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 6 below, and of *S. Binza* and *S. Orion* in pheasants in Table 7. In both of these tables the figures for 2009 (2<sup>nd</sup> Quarter) are provisional.

**Table 6. The annual incidents of *S. Enteritidis* and *S. Typhimurium* in turkeys**

	2005	2006	2007	2008	2009 (Q2)
<b>Enteritidis (total)</b>	0	0	0	0	0
<b>Typhimurium (total)</b>	23	38	12	1	0

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

	2005	2006	2007	2008	2009 (Q2)
<b>Binza (total)</b>	10	21	7	6	0
<b>Orion (total)</b>	3	3	2	2	2

#### ***Salmonella* Typhimurium phage type 8 in ducks**

*Salmonella* Typhimurium phage type 8 was isolated from four one-week-old mallard ducklings. In another apparently unrelated incident, *S. Typhimurium* was isolated from a group of mallard ducklings which showed an increase in mortality from ten days of age.

#### ***Salmonella* Typhimurium in game birds**

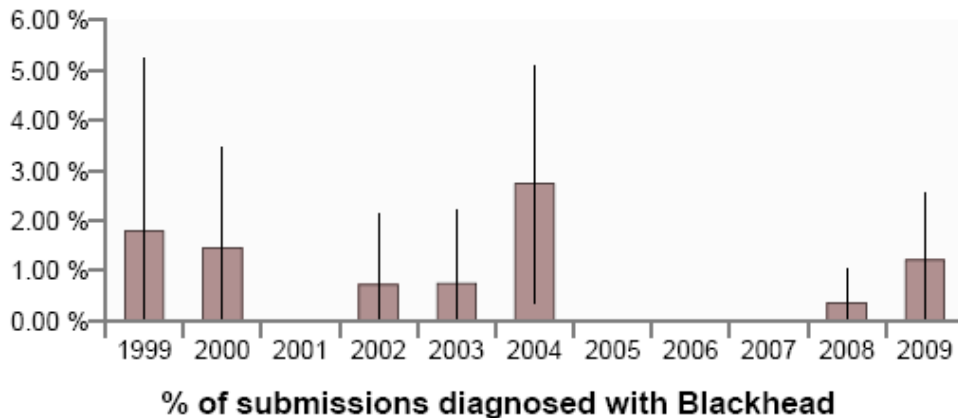
*Salmonella* Typhimurium DT8 infection, in association with rotavirus infection was diagnosed in two groups of 1000, seven-day-old pheasant chicks with a history of diarrhoea and increased mortality. Salmonellosis was also recorded separately, including a case where *S. Typhimurium* was identified as the cause of persistent high mortality in partridge chicks from 1-day-old. In this case there was a beneficial effect following antibiotic treatment, with reduced mortality.

## CROSS-SECTOR AVIAN DISEASES

### Blackhead (histomonosis)

Three incidents of histomonosis were recorded on VIDA in chickens during the quarter. There have been sporadic incidents of this disease in chickens during the quarter in recent years, as shown in Figure 11 below.

**Figure 11: VIDA incidents of histomonosis in chickens (as a percentage of diagnosable submissions) April-June, 1999-2009**



(Vertical bars represent 95% confidence limits)

Classical blackhead hepatic “target” lesions and severe immune-suppression were diagnosed in a batch of 60-day-old free-range organic broilers from a multi-aged farm with a history of poor growth and unevenness. Post-mortem examination was unremarkable in most of the carcasses but one, which showed multiple random classic target lesions on the liver surface and throughout the cut surface. Caecal lesions were not present. Histological examination confirmed liver lesions consistent with histomonosis in this carcass and a severe immune-suppression in most of the remaining carcasses characterised by diffuse bursal atrophy with heavy cryptosporidium infection in one. A revision of vaccination protocol was recommended.

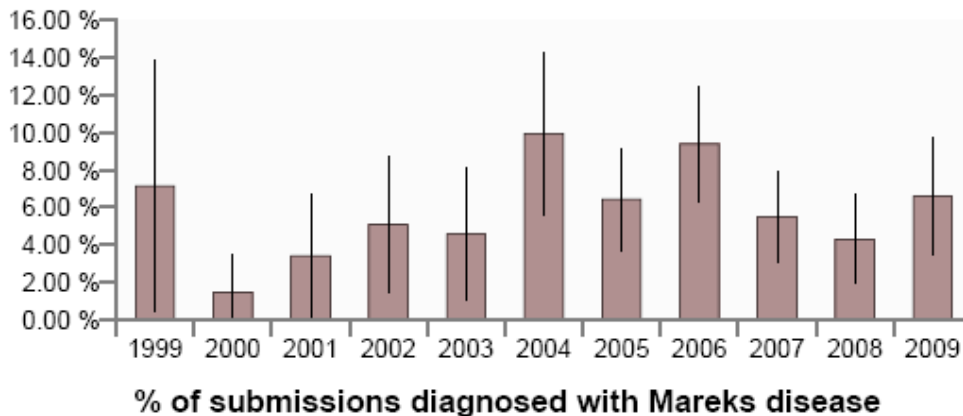
### Fowl Cholera (*Pasteurella multocida*)

One incident was recorded during the quarter, in chickens, where very high mortality was reported in a flock of 8,000 barn hens aged 64 weeks. The diagnosis was confirmed by the isolation of *Pasteurella multocida* from heart blood.

### Marek’s Disease

Sixteen incidents of Marek’s disease were recorded in chickens during the quarter, an increase on the same quarter last year (Figure 12). Many of these were in small hobby or backyard flocks.

**Figure 12: VIDA incidents of Marek's disease in chickens (as a percentage of diagnosable submissions) April–June, 1999-2009**



(Vertical bars represent 95% confidence limits)

## ENDEMIC DISEASE SURVEILLANCE

### COMMERCIAL LAYERS AND LAYER BREEDERS

#### Septic arthritis

Septic arthritis associated with enterococcal infection causing lameness and stunting in birds of between 2 and 4 weeks of age was diagnosed in a number of unrelated flocks this quarter. The likely source of the infection was not discovered.

#### Cannibalism and pecking damage

Cannibalism and pecking damage was the commonest diagnosis in this category of bird this quarter, followed by the peritonitis/salpingitis complex. In some cases both conditions occur in birds in the same submission, and it is likely that in some individuals pecking damage leads to peritonitis and septicaemia.

#### Erysipelas

Erysipelas, mentioned in the previous Quarterly Report, was seen in a further two flocks aged 50 and 54/55 weeks. Mortality can be significantly elevated for several weeks in affected flocks. Limited treatment options for commercial egg layers makes vaccination of subsequent flocks destined for affected premises highly desirable.

## **BROILERS AND BROILER BREEDERS**

### **Broilers**

#### **Vitamin B2 (riboflavin) deficiency**

Submissions this quarter showed few trends, with a large number of post-mortem cases being virtual "one-offs". However in both post-mortem submissions and referred histopathology there were several cases of birds around 25 days of age going off their legs and "walking on their hocks". In some, but not all of these, there was a peripheral neuropathy of the sciatic nerves consistent with vitamin B2 (riboflavin) deficiency. Response to riboflavin supplementation was reported to be variable.

#### **Encephalomalacia**

Vitamin E deficiency- Encephalomalacia, currently a rare condition in domestic poultry, was diagnosed in a flock of 1300, 25 day old free-range organic broilers. A history of nervous signs developing two days prior death and clinical signs including ataxia, lateral recumbency and tremors were reported. At post-mortem examination varying degrees of congestion and petechiation of the cerebellum were noted. Histological examination of brains revealed large areas of necrosis in the cerebellar folia with local haemorrhages and prominent hyaline fibrin microthrombi in blood vessels. No other part of the brain was affected.

#### **Other diagnoses**

Other unusual and uncommon diagnoses included histomonosis (blackhead) in free-range broilers, and aspergillosis affecting the trachea and syrinx and causing stunting and abnormal vocalisation in 29-day-old standard commercial broilers, and found to be caused by *Aspergillus versicolor*.

### **Broiler breeders**

#### **Rupture of the Achilles tendon complex**

The commonest problem seen in broiler breeders this quarter was rupture or partial rupture of the Achilles tendon complex (most often the gastrocnemius tendon) in birds in the early part of lay (from around 25 – 32 weeks of age). This condition presents as severe lameness necessitating culling. In some cases the rupture is acute while in others it has clearly occurred a week or two previously and has healed with extensive scarring and formation of a fibrous "lump" in the affected tendon. In most cases there is no evidence of infection in the affected tendons and it is assumed that the rupture has occurred because of overloading of poorly conditioned tendons, perhaps when additional strain is placed on the legs during mating, jumping from slats or nest boxes, or when attempting to escape the unwanted attention of other birds.

In two submissions for post-mortem examination, cases of both “mechanical” tendon rupture and septic arthritis/tenosynovitis due to Staphylococcal infection were found, but in different birds. The two conditions rarely occur in the same individual.

### **Cannibalism**

Cases of cannibalism were also seen in broiler breeders (see Layers, above).

This can be a persistent problem once it occurs, sometimes with only a few birds causing most of the trouble. Identifying and culling the culprits can be well nigh impossible. Dimming the lights or using red light bulbs sometimes helps in both broiler breeders and layers.

## **TURKEYS**

### **“Starve out”**

Two cases of “starve out” were described this quarter. The first resulted in mortality in a flock of 450 seven day old turkey poults. The second case was in a group of 6-day-old turkey poults. Presenting signs were empty crops and gizzards and enlarged gall bladders and a higher than expected mortality rate was observed.

### **Histomonosis**

Severe typhlitis due to histomonosis in a 3-year-old turkey was diagnosed in a hobby flock that had a series of sporadic deaths in one pen of turkeys.

## **DUCKS AND GEESE**

### **Water deprivation**

Water deprivation was the cause of 6% mortality in 2-day-old ducklings. Dehydration with proventricular haemorrhage was seen at necropsy. The drinkers had been elevated onto a grid to reduce contamination of the water by litter but had resulted in inability to access the water adequately.

### ***Tetrameres* sp. infestation**

*Tetrameres* sp. infestation was identified as the cause of several small red nodules noted in the proventriculus of an adult laying duck that had died of septicaemia due to *Staphylococcus aureus* infection.

### **Amyloidosis**

Hepatic and splenic amyloidosis was associated with ascites, abdominal distension and dyspnoea in an adult duck. The bird had a history of purulent arthritis.

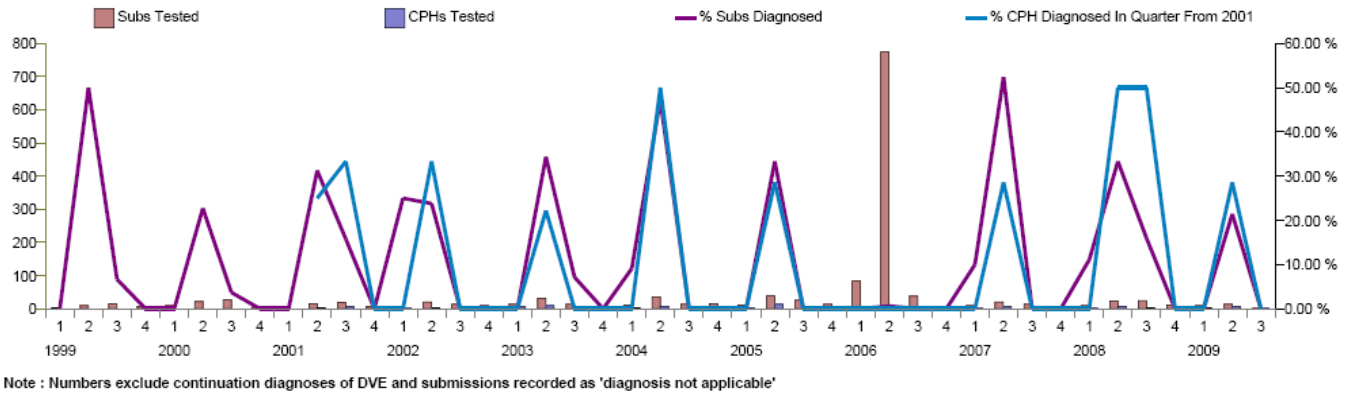
Ducks are particularly prone to amyloidosis, which can occur as a result of chronic infections. Ascites is also recognised as a further potential sequel.

### **Duck virus enteritis**

Duck virus enteritis (DVE) was seen on a number of occasions this quarter. Cloacal and oesophageal necrosis with multifocal hepatic haemorrhages were described in a Muscovy duck, which was one out of three birds in a small collection. Intranuclear inclusion bodies were detected in the liver. A further case was in one out of two Muscovy ducks on a smallholding. The bird had an enlarged, friable and mottled liver with multifocal pinpoint intestinal haemorrhages at necropsy. Intranuclear inclusion bodies were seen in the liver and intestine. Deaths in Runner ducks from a mixed flock of ducks, geese and chickens were associated with hepatomegaly and extensive linear oesophageal necrosis. Histologically the lesions were suggestive of duck virus enteritis.

Duck virus enteritis is caused by a herpes virus and Muscovy ducks are particularly susceptible. The strong seasonality of DVE - most cases tend to occur in the spring (see figure 13) - is coincidental with the spring migratory season and bird arrivals in the northern hemisphere, and the onset of wild waterfowl breeding season. Contact with visiting mallards has been stated as an epidemiological feature of DVE outbreaks in domestic waterfowl in the UK. Mallard ducks appear to be less susceptible to clinical disease and potentially can act as carriers of the virus. Mallards that survived DVE in N America have been shown still to be excreting virus after a period of four years, indicating a persistent infection, carrier status and the potential for recrudescence of the latent, causative herpesvirus. Water is important in the transmission of DVE virus between waterfowl, with large quantities of virus shed via the cloaca of infected birds. Natural infections of waterfowl may occur via the cloacal or oral routes.

**Figure 13. Seasonality of Duck virus enteritis in ducks 1999-2009**



**BACKYARD FLOCKS**

Cases this quarter again highlight issues regarding biosecurity in the backyard flock sector. Introduction of new birds to small flocks poses a constant risk of new infections arriving but there are also risks associated with the movement and mixing of show birds.

**Infectious Laryngotracheitis**

In one flock of birds, which is kept for showing, infectious laryngotracheitis was diagnosed in Ancona bantams that had been recently purchased at an auction. As the causative herpes virus can persist in a carrier state in apparently healthy birds, the possibility of onward spread at poultry shows should be considered.

**Pullorum disease**

Pullorum disease caused by *Salmonella Pullorum* is another disease where a proportion of infected birds can become adult carriers and spread the infection via their eggs. *Salmonella Pullorum*, phage type 17, was identified this quarter as a cause of high mortality among 7-day-old chicks on a small hobby farm of mixed breed chickens.

Chicks hatching from an infected parent can be a potent source of infection, producing widespread contamination of the chick-rearing environment, incubator and breeding areas. The disease is difficult to control as the organism can survive outside the body for many months and adult birds can become carriers to spread the infection vertically. As Pullorum disease is spread mostly by vertical transmission, it can be introduced on to a premises through the purchase of infected adult hens.

**QX strain of Infectious bronchitis virus**

The QX strain of infectious bronchitis virus was the cause of an outbreak of respiratory disease among approximately 1,200 rare breed chickens. An estimated 40% of a group of 500 young birds were affected by respiratory disease manifested as sneezing. Post-mortem examination revealed

inflammation of the tracheal mucosa with patchy congestion of the lungs. This strain of infectious bronchitis virus has been isolated previously from backyard chickens (Veterinary Record (2008), **162**, 99-100).

## GAME BIRDS

This quarter marks the peak of the game bird breeding season, and disease problems were reported both in adult breeding birds and in the young birds.

### Marble spleen disease

Marble Spleen disease has rarely been recorded in recent years, but one outbreak was described. The disease was diagnosed as the cause of sudden death of two 8-month-old pheasant hens submitted for post-mortem examination. The gross findings for both birds were very similar with very congested and oedematous lungs and an enlarged spleen with a 'marbled' appearance. Histological findings for the spleen of both birds were consistent with lesions seen in Marble Spleen Disease caused by type II adenovirus infection.

### Coronavirus infection

Four incidents of nephritis associated with suspected coronavirus infection were recorded in pheasants on VIDA. The disease is typically associated with the unexpected deaths of adult birds in good condition, within the breeding pens, for example in a case where nine birds had died out of a flock of 175.

Control of the disease can be problematic, with measures including robust hygiene and biosecurity measures and ensuring access to plentiful supplies of clean drinking water in the pens. Sometimes vaccination against Infectious Bronchitis Virus (IBV) coronavirus is advocated, but unless a specific strain of IBV is detected, protection against pheasant coronavirus strains may be incomplete.

### Rotavirus

Outbreaks of rotavirus disease can result in heavy mortality in pheasant and partridge chicks. In one outbreak 200 out of 800 pheasant chicks at four to seven days of age were affected with presenting signs of malaise, ill thrift, recumbency and death and rotavirus was demonstrated in the caecal contents. Outbreaks in young chicks can follow cross contamination at hatching, or infection acquired from a contaminated environment, and careful attention to hygiene is an important aspect of controlling the disease.

### Spiroplasma (hexamitosis)

Spiroplasma (hexamitosis) was recorded as the cause of mortality in pheasant poults from 2½ weeks of age, but it is anticipated that this disease will become more evident in the next quarter when poults are moved to release pens from July.

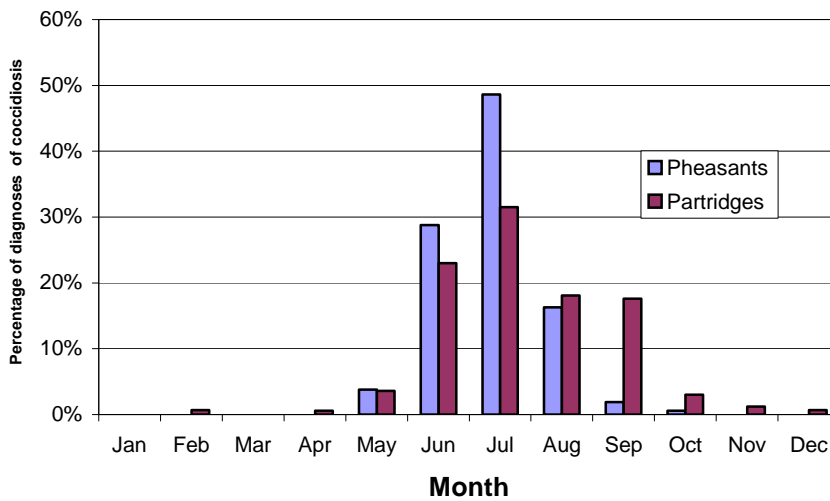
## COCCIDIOSIS IN GAME BIRDS IN GREAT BRITAIN 2002 TO 2008

Coccidiosis is still one of the commonest conditions diagnosed in game birds by Disease Surveillance Centres of SAC and Regional Laboratories of VLA. A diagnosis of coccidiosis must satisfy the diagnostic criteria of an appropriate clinical history and/or gross pathology, and either positive microscopy or histopathology.

In pheasants (*Phasianus colchicus*) the great majority of positive submissions between 2002 and 2008 occurred in the months June, July and August – 94% of all submissions of pheasants in which a diagnosis of coccidiosis was made. In partridges (red-legged partridges *Alectoris rufa*, grey partridges, *Perdix perdix* and other unspecified partridges) diagnoses of coccidiosis tended to persist into

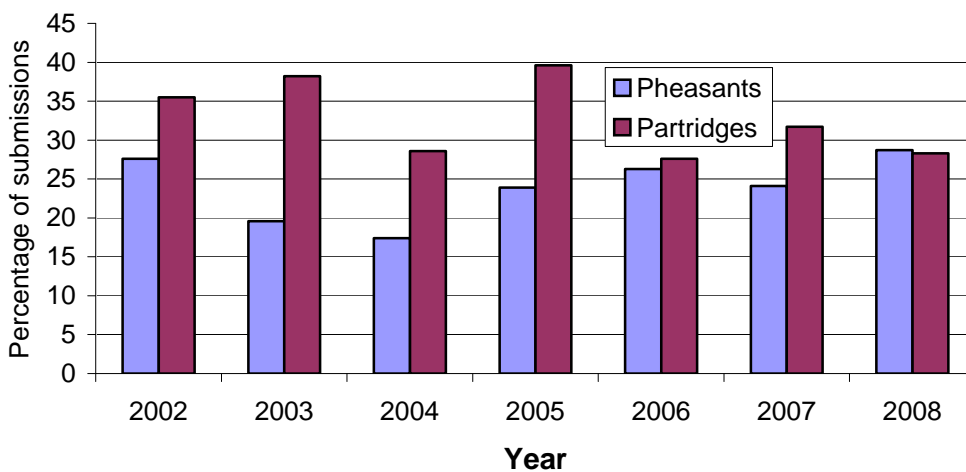
September, with 73% of all positive submissions in 2002-2008 occurring in June to August and a further 18% in September (Figure 14).

**Figure 14 Coccidiosis in pheasants and partridges in Great Britain 2002-2008: monthly distribution**



A diagnosis of coccidiosis was made in 24% of all pheasant submissions between 2002 and 2008, varying from 17% to 28% in individual years. In contrast, coccidiosis was a greater problem in partridges, being diagnosed in 28% to 40% (mean 33%) of partridge submissions between 2002 and 2008 (Figure 15).

**Figure 15 Diagnoses of coccidiosis in pheasants and partridges in Great Britain 2002-2008 as percentage of number of submissions**



The greater frequency of diagnosis and wider temporal spread in partridges compared with pheasants may reflect differences in the rearing and releasing practices, logistical difficulties in treating/controlling coccidiosis in partridges due to differences in feed and water consumption, and a tendency for coccidiosis in partridges to be clinically more severe than in pheasants.