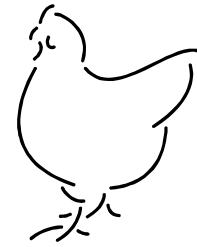


# Surveillance Report Avian



Quarterly Report Vol 11 No 3

July - September 2007

November 2007

## HIGHLIGHTS:

- ◆ QX STRAIN OF INFECTIOUS BRONCHITIS VIRUS IN THE UK (PAGE 7, 8)
- ◆ DUCK VIRAL HEPATITIS AND LPA1 H3N8 IN DUCKLINGS (PAGE 7, 8)
- ◆ GAMEBIRD DISEASE PROBLEMS (PAGE 9-10 )

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## OVERVIEW

During the quarter the profitability of the UK poultry industry has continued to be hit by rising feed prices, particularly of wheat, resulting in year-on-year price increases into double figures. Nevertheless the size of the broiler and layer industries has remained relatively stable in recent years as shown in the statistics on page 2 of this report. There was a seasonal increase in turkey poult placings during the quarter but the numbers placed were down on last year.

Low Pathogenicity Avian Influenza was recorded both in wild and farmed ducks during the quarter as tabulated on pages 3 and 5. However, Highly Pathogenic Avian Influenza remains a global threat and has affected three European Union Member States since June (pages 3 and 4).\*

The QX strain of Infectious Bronchitis virus has been reported in several European countries in recent years but so far not confirmed in the UK. However a closely (98%) related virus was isolated from a bantam chicken during the quarter, believed to be the first occasion that it has been detected in this country (pages 7 and 8).

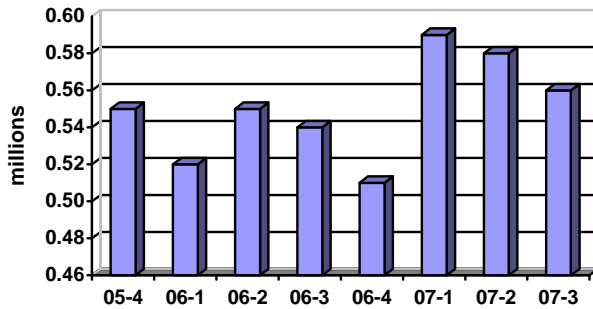
The heavy rainfall and cool weather conditions in July came at a critical time in the Gamebird rearing season and appear to have been linked with increased disease problems, including hexamitiasis (spironucleosis) and staphylococcal tenosynovitis (page 10).

## \*STOP PRESS

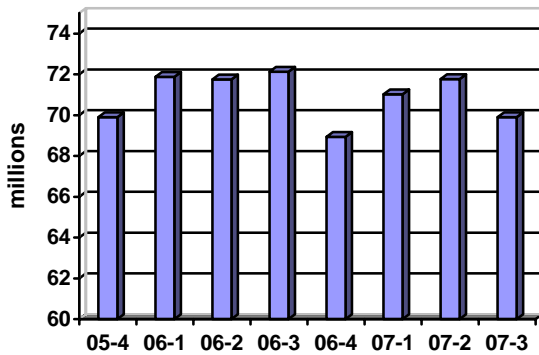
As this report was being prepared, HPAI H5N1 has been confirmed in turkeys in Suffolk .

## POULTRY STATISTICS

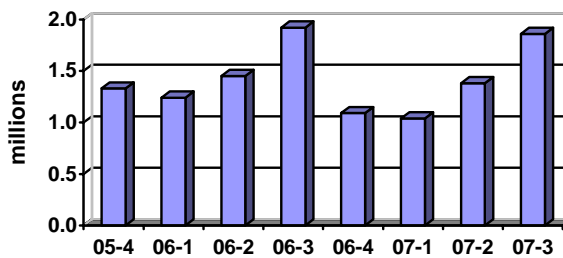
UK Quarterly figs for female Broiler Parent Chick Placings (Average Monthly figures)



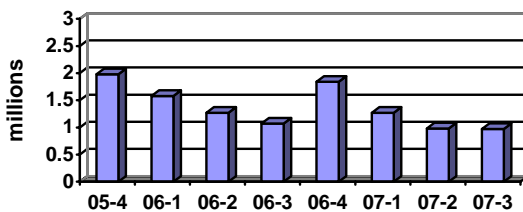
UK Quarterly figs for Commercial Broiler Chick Placings (Average Monthly figures)



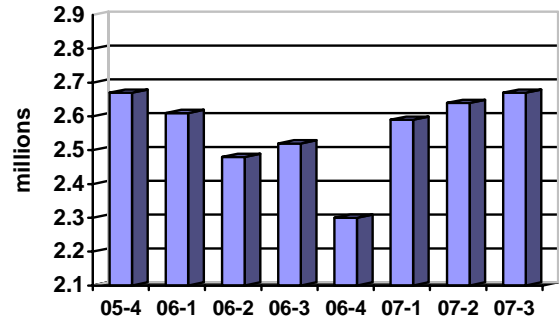
UK Quarterly figs for Turkey Poults Placings (Average Monthly figures)



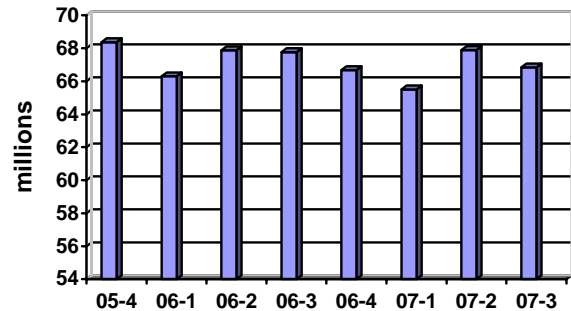
UK Quarterly Figs for Turkey Slaughterings (Average monthly figures)



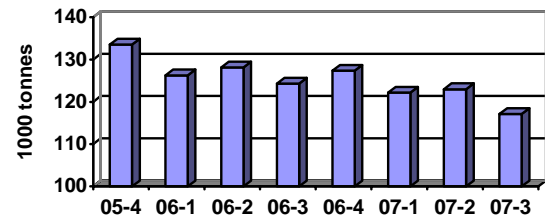
Av UK Quarterly figs for Commercial Layer Chick Placings (Average Monthly figures)



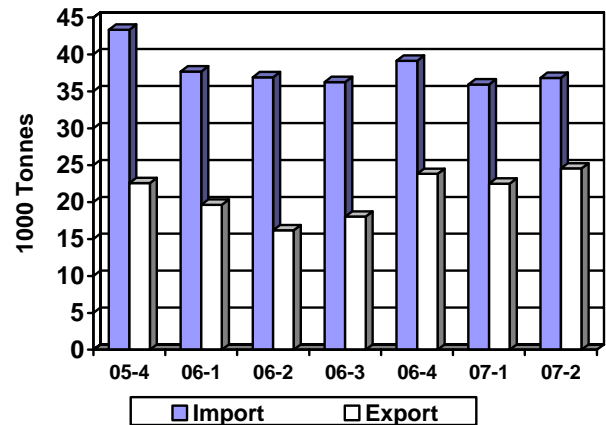
UK Quarterly figs for Broiler Slaughterings (Average monthly figures)



Total UK poultry meat production (Average monthly figures)



Total Poultry Meat Trade (Average Monthly figures) \*



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

**NOTIFIABLE DISEASE**  
**VLA Weybridge**

**Chickens:** No submissions were received from chickens during the quarter for notifiable disease investigation.

**Pigeons and doves:** Thirteen submissions comprising 24 swabs, 22 mixed viscera and 9 carcasses were received during the quarter. Pigeon paramyxovirus type1 virus was isolated from six of the submissions. Positive samples were received from various locations in the UK including Scotland and Wales.

**Waterfowl:** A total of 16 samples from two submissions from domestic geese were

received during the quarter. No haemagglutinating viruses were detected.

**Serology:** Fifteen pigeon sera were tested for PMV type1 antibodies as part of investigations into suspected outbreaks of PMV in pigeons and doves. Nine sera were received for avian influenza and Newcastle disease antibody testing. All nine were negative.

**Imported captive birds:** A total of 299 samples were received from the following birds in quarantine; chickens (88), raptors (169), pheasants (19), scrub jays (14), turkeys (8), parrot (1) and a peacock (1). No haemagglutinating viruses were detected.

Number of birds examined	Positive AI virus result and species of bird	Comments
AIV, 382 legally trapped (ringing)	None	Seasonal targeted surveillance, recommenced July 2007.
AIV, 103 legally shot	None*	Seasonal targeted surveillance, recommenced end August 2007.
AIV, 359 found dead	H3N6, Mallard ( <i>Anas platyrhynchos</i> )	Scanning surveillance, all-year-round.

\*One Mallard (*Anas platyrhynchos*) and one Teal (*Anas crecca*) were identified as being positive by influenza A matrix gene real time RT-PCR test. H5 real time RT-PCR and virus isolation results were negative for both birds.

Access to the Defra web page for AIWBS is available via this link:

<http://www.defra.gov.uk/animalh/diseases/notifiable/disease/ai/wildbirds/survey-results.htm>

**Summary of Current International HPAI H5N1 Asian lineage Status in Birds and People**

Asian lineage Highly Pathogenic Avian Influenza (HPAI) H5N1 remains an ever-present and evolving global animal and public health threat. Within South East Asia, notably Indonesia where AI is endemic in bird populations in most parts, there has been a marked resurgence over recent months in the frequency of reports of disease in both poultry and people. Similarly, confirmed reports of HPAI H5N1 continue in other parts of South East Asia, as far as Myanmar (Burma) and Bangladesh, the Middle East, West and North Africa (notably Egypt, also with linked human cases (WHO, 2007)) and southern parts of China and the Russian Federation. There is an apparent temporal trend of westward spread of these cases over the period March to September 2007 (FAO, 2007a) including confirmed reports in wild

birds with the majority in domestic poultry (FAO, 2007b). This is indicative of both spread and persistence of the virus in backyard and commercial poultry populations, some of which are vaccinated, as well as in wild birds. However, the true extent of infection is not known.

In people, according to World Health Organization (WHO) data (25 October 2007), there have been 204 deaths and 332 H5N1 cases globally since 2003 the majority of which have occurred in Thailand, Vietnam and Indonesia (WHO, 2007).

Within the European Union (EU) a total of 306 wild bird incursions of Asian lineage HPAI H5N1 have been reported since mid-June 2007 affecting three member states (MS): Germany (298), France (7), and the Czech Republic (1) (European Commission, 2007a). This emergent disease situation followed the confirmation of disease in the

Czech Republic affecting a 6,000-poult commercial meat-type turkey flock. In addition, domestic duck/goose flocks have also been affected in Germany. Of the wild bird incidents, only Mute swan (*Cygnus olor*) mortalities were reported in the Czech Republic and France; the arrival of Pochard (*Aythya ferina*) from Eastern Europe was suspected as the source of the outbreak in France. The German cases were confirmed in Mute swans, Canada geese (*Branta canadensis*), Greylag geese (*Anser anser*), with the vast majority in Black-necked Grebe (*Podiceps nigricollis*) (Defra, 2007; European Commission, 2007a).

HPAI H5N1 virus infection in wild birds from all three EU MS was identified as part of the EU supported active surveillance programme for AI in wild birds, conducted to provide an early warning of the presence of the virus in the EU (European Commission, 2007b).

Molecular and epidemiological studies indicated that these incidents were due to a new independent introduction of H5N1 HPAI virus into the EU. The phylogenetic group of this virus comprises a lineage originating from the Middle East and some Russian Federation isolates. It is considered a possibility that it may have been introduced into wild bird populations in a number of discrete pockets and maintained at a very low level that remained unnoticed. Dead wild waterfowl including swans continue to be good "indicator species" for the presence of H5N1 HPAI infection in wild bird populations. Such large birds are usually more visible than other species, which highlights the importance of AIV surveillance in 'found dead' birds.

During July 2007, Defra in consultation with ornithological experts conducted and published an updated qualitative risk assessment (Defra, 2007) based on these developments in the EU. The analysis concluded that a heightened risk of HPAI H5N1 incursion existed from the continent. Furthermore, of the wild bird species known to have been infected with HPAI H5N1 at that time, only Pochard (*Aythya ferina*) were likely to arrive in GB during the Autumn. Clearly seasonal migratory movements of other bird species will also be occurring. In response to these events AI wild bird surveillance activities in patrolled reserves identified as higher risk (those in the East and South East of England) were re-activated in late July

2007 to increase our levels of surveillance, with resumption nationally at the start of September, a month earlier than in 2006.

Therefore, given these developments internationally and the apparent westward dissemination of the virus, the likelihood of the potential introduction of the virus to Great Britain has now increased if infected, migratory wild birds should arrive in Great Britain (Defra, 2007). Furthermore, findings from Germany indicate that domestic ducks and/or geese may act as a 'silent' reservoir of HPAI H5N1 infection in the absence of clinical signs typically associated with disease in other poultry species, a facet of the evolving epidemiology also commented upon by the FAO recently (FAO, 2007c).

It should also be noted that aside from the possible risk migratory wild birds present, other pathways by which the virus may be introduced also remain, emphasising the importance of appropriate surveillance in wild bird and domestic poultry populations, enforcement of disease control strategies as required and maintaining high biosecurity standards in domestic poultry flocks.

The most significant international development aside from HPAI H5N1 is the detection of H7N3 HPAI in Canada (detail not yet available on the precise relationship to 2004 outbreak virus).

## References

WHO, (2007). Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO [, 25 October 2007.

<[http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2007\\_10\\_25/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2007_10_25/en/index.html)>

FAO, (2007a). EMPRES Cumulative HPAI Outbreaks by month (13 Mar 2007 - 13 Sep 2007).

<<http://www.fao.org/ag/againfo/programmes/en/empres/maps.html>>

FAO, (2007b). EMPRES Cumulative HPAI Outbreaks by species (13 Mar 2007 - 13 Sep 2007).

<<http://www.fao.org/ag/againfo/programmes/en/empres/maps.html>>

European Commission, (2007a). DG Health and Consumer Protection. Animal Disease Notification System: See Highly pathogenic avian influenza H5N1 cases in wild birds in

the Community reported to the Animal Disease Information System (ADNS) in 2007 (as of 30 October 2007).

<[http://ec.europa.eu/food/animal/diseases/adns/adns\\_wildbirds2007.pdf](http://ec.europa.eu/food/animal/diseases/adns/adns_wildbirds2007.pdf)>

European Commission, (2007b). DG Health and Consumer Protection. Wild bird surveillance in the EU: See Guidelines for AI surveillance in wild birds and poultry.

<[http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/eu\\_resp\\_surveillance\\_en.htm](http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/eu_resp_surveillance_en.htm)>

Defra, (2007). Highly pathogenic avian influenza – H5N1: Recent developments in the EU and the likelihood of the introduction into Great Britain by wild birds (Authors: Sabirovic, M., Hall, S., Wilesmith, J., Coulson, N.), 1A Page Street, London, SW1P 4PQ, United Kingdom. Version 1, Released 12 July 2007.

<<http://www.defra.gov.uk/animalh/diseases/monitoring/pdf/gra-recentdevelopments120707.pdf>>

FAO, (2007c). FAOAIDE news - Situation Update 48 (15 October 2007). Bird flu virus in Europe – a hidden danger.

<[http://www.fao.org/newsroom/common/ecg/1000685/en/AIDEnews\\_oct07\\_no48.pdf](http://www.fao.org/newsroom/common/ecg/1000685/en/AIDEnews_oct07_no48.pdf)>

### Submissions to the EU Reference Laboratory for Newcastle Disease and AI July to Sept 07

	Species	Virus type	Cleavage site seq	PMV-1 Lineage	ICPI/IVPI
UK	Chicken	PMV-1	GRQGRL	2	0.08
UK	pigeons	PPMV-1	RRQKRF	4b	ND
UK	Mallard (Farmed)	H3N8	ND	-	ND
UK	Mallard (Shot)	H3N6	ND	-	ND
GERMANY	Mute swans Duck & Goose	H5N1	PQGERRRKKRGLFH PAI	-	ND
ESTONIA	Chickens (Layers)	PMV-1	KRQKRF	4b	1.16/N.D.
CZECH REP	Swan Chicken	H5N1	PQGERRRKKRGLFH PAI	-	ND
FRANCE	Swan	H5N1	PQGERRRKKRGLFH PAI	-	ND
BULGARIA	Mule Ducks	H4N2	ND	-	ND
BULGARIA	Mule Ducks	H4N6	ND	-	
BULGARIA	Back Yard Poultry	PMV-1	RRQKRF	5d	ND
SLOVENIA	Mute Swan	PMV-1	ERQERL	6	ND
SLOVENIA	Yellow Legged Gull	H13N6	ND	-	ND
NETHS	Swans & Chicken	H7N7	PEIPKGRGLFLPAI	-	ND
NETHS	Turkey	H6N5	ND	-	ND
NETHS	Mallard	H10N7	ND	-	ND
NETHS	Mallard	H10N8	ND	-	ND
NETHS	Mallard	H8N4	ND	-	ND
NETHS	Mallard	H3N8	ND	-	ND
NETHS	Turkeys	H1N5	ND	-	ND
AUSTRIA	Pigeon	PPMV-1	RRKKRF	4b	1.04
AUSTRIA	Seagull	H4N6	ND	-	ND
AUSTRIA	Mallard	H?N8*	ND	-	ND

ND = Not Done

\* Further characterisation in progress

**FOWL CHOLERA**

Please see page 9 of this report

**FOOD SAFETY AND ZONOSSES**

**FOOD SAFETY**

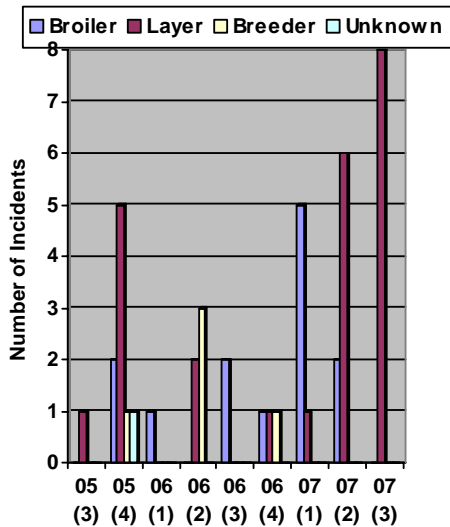
No food safety visits relating to poultry were undertaken by VLA during the quarter.

**SALMONELLA REPORT**

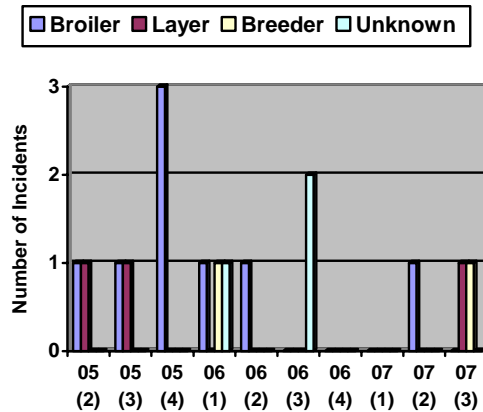
The quarterly incidents of *Salmonella* Enteritidis and *S.Typhimurium* in chickens for 2005 (3) to 2007 (3) are shown in Figs 1 and 2 below. The “breeder” category includes both broiler and layer breeders. The figures are provisional and subject to change.

Note: 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).

**Fig 1: Incidents of Salmonella Enteritidis in Chickens by Year and Quarter (2005-2007)**



**Fig 2: Incidents of Salmonella Typhimurium in Chickens by Year and Quarter (2004-2006)**



below:

	2002	2003	2004	2005	2006	2007 (Q1 - Q3)
Enteritidis (total)	12	38	12	23	11	22
Typhimurium (total)	50	23	11	9	6	3

The annual incidents of *S.Enteritidis* and *S.Typhimurium* in turkeys are shown below:

	2002	2003	2004	2005	2006	2007 (Q1 - Q3)
Enteritidis (total)	0	0	0	0	0	0
Typhimurium (total)	24	31	38	23	38	8

Note: The incidents of *S. Enteritidis* and *S. Typhimurium* exclude isolates arising from the 2006/07 EU survey of turkey flocks (see Quarterly Report, July-September 2006, appendix 1) or the previous EU layer and broiler surveys (Qu Rep July-Sept 2005 p4).

The annual incidents of *S.Binza* and *S.Orion* in pheasants are shown below.

	2002	2003	2004	2005	2006	2007 (Q1 - Q3)
Binza (total)	11	7	4	10	21	6
Orion (total)	7	6	1	3	3	1

**VACCINAL STRAINS OF S ENTERIDITIS**

As summarised in the Avian Quarterly Report Vol 9 N° 1 (Jan-Mar 2005) live vaccines are licensed for the control of *S.Enteritidis* and *S.Typhimurium*, and can be differentiated from field strains as described. The vaccine strains survive only a short time in vaccinated birds or in the environment, but can

sometimes be detected during the course of statutory or voluntary sampling. During the quarter vaccinal strains of *S. Enteritidis* were isolated on 7 occasions. Vaccine strains are excluded from the figures and tables above.

### **SALMONELLA ZO4 VISITS**

Ten Salmonella ZO4 visits were undertaken by VLA Regional Laboratories during the quarter, relating to the following serotypes/phage types: *S. Typhimurium* DT 56 variant, 8 and 30 on a mixed poultry/waterfowl farm, also *S. Indiana*; *S. Enteritidis* PT 4, 22, 23 and 7 in imported layer chicks; *S. Hadar* in ducks (3 other serotypes also identified); *S. Typhimurium* and *S. Saint Paul* in turkeys (visits to two separate sites); *S. Typhimurium* DT104 and *S. Kedougou* in turkeys; *S. Typhimurium* DT99 in backyard ducks and chickens; *S. Typhimurium* RDNC in a poultry breeding flock; *S. Enteritidis* PT4 in layers and *S. Kottbus* in turkeys.

### **FROM THE LITERATURE**

Valiente Moro, C and others (2007) Colonisation and organ invasion in chicks experimentally infected with *Dermanyssus gallinae* contaminated by *Salmonella* Enteritidis. *Avian Pathology* **36**, 307-311

This paper notes that red mite (*Dermanyssus gallinae*) is the most important and common ectoparasite of laying hens in Europe. Red mites infected with *S. Enteritidis* were given orally to day old chicks which resulted in colonisation of the chicks' intestinal tract, liver and spleen. The authors conclude that red mites can be a potential reservoir of *S. Enteritidis* in poultry houses, allowing the organism to persist as a source of infection for newly introduced birds.

A similar carryover of *Salmonella* Gallinarum by red mites has been demonstrated in the field.

### **ENDEMIC/NEW AND EMERGING DISEASE SURVEILLANCE**

#### **VIROLOGY REPORT**

##### **Virus Isolation and Identification:**

**Chickens:** A total of 46 samples from 21 submissions were received during the quarter for attempted virus isolation and electron microscopy (EM) examination from a variety

of commercial and backyard chickens. Adenoviruses were isolated from four submissions from 6 and 8-week-old birds with respiratory disease and broiler breeders with increased mortality and declines in egg production. A further submission from which an adenovirus was isolated did not supply details of age and clinical signs. Reoviruses were identified on four occasions from 11, 12 and 25-day-old broilers with signs of enteritis and in one case (12 d.o. broilers) clinical signs of "runting feather syndrome". As well as reoviruses, calicivirus particles were also detected by EM in samples from the 25-day-old broilers. No information was provided with one of the submissions from which reoviruses were isolated.

Infectious bronchitis virus was isolated on two occasions. The first case was from a mixed-age backyard flock with mortality and sinusitis/conjunctivitis. It was reported by VLA Penrith that *Mycoplasma gallinarum*, *Pasteurella* sp and *Mannheimia haemolytica* had been isolated from some of the birds. Serotyping of the virus using a panel of IBV reference antiserum suggested that the isolate was a variant strain of IBV unrelated to the reference strains. The second case was from a 6 to 8-week-old Pekin bantam in a backyard flock in Kent which was found dead with a "messy vent". At postmortem examination it was noted that the kidneys were pale and swollen and the ureters markedly distended with urates. Samples were submitted by VLA-Winchester for IBV investigation and a virus was isolated from the kidneys and caecal tonsils. Attempted serotyping of the isolate failed to demonstrate a relationship with any of the reference strains of IBV, representing the major serotypes found in the UK. Subsequent genotyping by RT-PCR, sequencing of a hypervariable region of the S1 spike gene and comparison with known IBV sequences showed that the isolate was related (98%) to the so-called Chinese QX strain of IBV. This strain has recently been reported in several European countries but we believe this is the first occasion that it has been detected in the UK.

**Game birds:** Thirty-four samples from 23 submissions were received mainly for EM examination. Rotaviruses were detected by EM in five samples from pheasants ranging in age from 4 days to 9 weeks. Rotavirus was also detected in a sample from immature partridges. Reovirus particles were detected

by EM in samples of intestine from 4-week-old pheasants and adenovirus particles were also observed in 5 to 6-week-old pheasants.

**Turkeys:** Seventeen samples from 8 submissions were received for virus isolation and EM examination. Adenoviruses were isolated from immature turkeys and a reovirus was detected in 2-week-old turkey poults. No clinical history was received with these submissions.

**Ducks and geese:** Eleven samples from 4 submissions were received during the quarter. A case involving heavy mortality in mallard ducks on a game farm resulted in the isolation of duck hepatitis type1 virus from the livers of 11 and 17-day-old ducklings. Further analysis of the samples resulted in the isolation of a haemagglutinating agent which was identified as a low pathogenic avian influenza virus subtype H3N8.

**Various:** A total of 11 samples from 5 submissions were received for attempted virus isolation from pigeons and psittacines. Pigeon PMV type1 was isolated on two occasions.

#### **Serology:**

**Infectious bronchitis (IB):** Eight sera were received from chickens (7) and pheasants (1) for IB/HI antibody testing using a panel of IBV antigens.

**Infectious laryngotracheitis (ILT):** A total of 47 chicken sera were tested by neutralisation test for ILT antibodies. Twelve sera from one submission were positive.

**Avian influenza (AI):** Forty-two sera were received from chickens (20), pheasants (20) and turkeys (2) for AI/AGP testing. All were negative.

**Avian paramyxovirus (PMV):** Two sera were received from a penguin (1) and a barn owl (1) for PMV-1 /HI testing. Both were negative.

**Avian encephalomyelitis virus (AEV):** Thirty-four sera were received from adult breeding pheasants and their progeny on a game farm where clinical and histological findings suggested AEV infection in newly hatched pheasant chicks. The sera were tested using a commercial AEV-ELISA kit and 27 of the sera were found to have significant antibody values for AEV.

**Comments:** The detection of calicivirus particles in the intestinal contents of 25-day-old broilers with enteritis was an interesting finding. These viruses have previously been detected by EM in the intestines of several avian species; including young chickens, pheasants and guinea fowl but their pathogenic role in avian species remains unclear.

The isolation and identification of the Chinese QX strain of infectious bronchitis virus (IBV) in the UK is an important finding, particularly as this strain of IBV has been associated in other countries with mortality due to kidney damage and significant egg production problems. The results of a European survey published last year showed that the QX strain was present in Belgium (22% of all IBVs detected), Germany (22%), The Netherlands (20%) and France (6.6%). None of the 1274 samples tested from the UK were positive for the QX strain. (*Worthington, K. J. & Jones, R. C. Fifth International Symposium on Avian Coronaviruses and Pneumoviruses and Complicating Pathogens. WVPA, Rauschholzhausen, Germany, 14-16 May, 2006.*)

Investigations into high mortality in mallard ducklings on a game farm in Sussex resulted in the isolation of duck hepatitis type1 virus (DVH) and avian influenza (AI) subtype H3N8. A similar outbreak occurred on a game farm in 1985 involving DVH type1 and AI subtype H4N6 and in both outbreaks the source of the DVH type1 virus could not be ascertained. No live DVH vaccine had been used and published evidence suggests that wild waterfowl do not act as carriers of DVH virus. In fact the only species reported to act as a carrier of DVH virus, apart from domestic ducks, is the brown rat.

A suspected case of epidemic tremor in pheasant chicks due to avian encephalomyelitis virus (AEV) was investigated during the summer. Although clinical signs and histology was indicating AEV infection several attempts to isolate the virus following passage via the yolk sac of embryonating SPF hens eggs were unsuccessful. Serum samples from surviving chicks and parent pheasant hens were tested for AEV antibodies using a commercial ELISA kit and high antibody values were recorded. In order to confirm AEV involvement samples of brain from affected

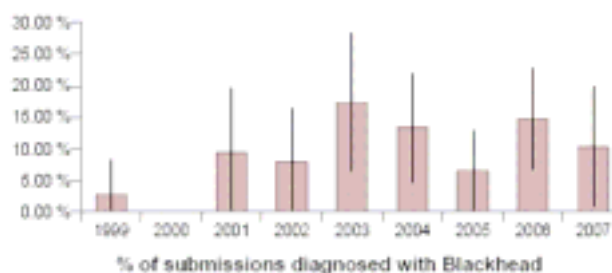
chicks were analysed by PCR and sequencing, with the following results; AEV was detected by RT-PCR and when sequenced showed 82-83% nucleotide identity with three sequenced AEV strains from chickens compared to 95 to 99% identity between the chicken strains. This result confirms that the infection in pheasant chicks was due to AEV but the strain appears to be distinct from those of chickens. It is probable that the breeding pheasants were asymptotically infected and vertically transmitted the virus to the progeny via the eggs. The fact that conventional virus isolation was unsuccessful in this case suggests there may be strains of AEV in the environment causing disease in other avian species that can remain undetected. The source of the infection in the case described here could not be established.

## OTHER AVIAN TOPICS

### Blackhead update

Two incidents of blackhead (histomoniasis) were recorded in chickens during the quarter (compared with 4 incidents in the same quarter last year), and 4 incidents were recorded in turkeys (Fig 3). The disease was also recorded in red-legged partridges and pheasants.

**Fig 3 VIDA incidents of blackhead in turkeys (as a percentage of diagnosable submissions), July-September 1999-2007.**



(vertical bars represent 95% confidence limits).

## FROM THE LITERATURE

Huber, K and others (2007). A preliminary study of natural and experimental infection of the lesser mealworm ..... with *Histomonas meleagridis*.....Avian Pathology **36**, 279-282.

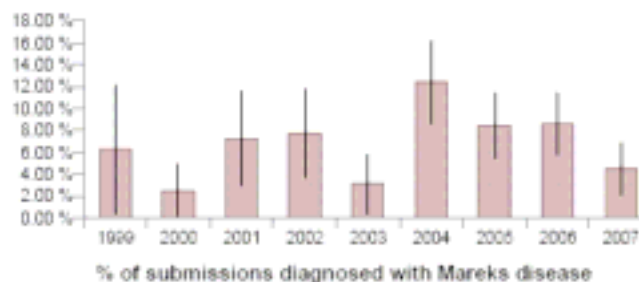
Although the worm *Heterakis gallinarum* is well known as a means of transmitting

histomoniasis (blackhead), the authors note that outbreaks can occur in the absence of this worm. *Histomonas* DNA was detected in mealworms collected in field outbreaks, and experimental infection of mealworms also demonstrated. However the authors concluded that mealworms appeared to have a low susceptibility to infection and would probably not be a major route of contamination between flocks.

### Marek's disease update

There was a decline in the number of Marek's disease diagnoses compared with the same quarter of last year (Fig 4).

**Fig 4 VIDA incidents of Marek's disease in chickens (as a percentage of diagnosable submissions), July-September 1999-2007.**



(vertical bars represent 95% confidence limits)

### Fowl cholera (*Pasteurella multocida*) update

Three incidents of fowl cholera were recorded on VIDA in chickens during the quarter and one in turkeys, both within the same 95% confidence limits as last year. One of the chicken incidents was in a flock of 5,000 organic layers, and an autogenous vaccine was already in use in an attempt to control the disease.

## OTHER GAMEBIRD TOPICS

### Tenosynovitis in pheasant poults

During the summer rearing season (July/August 2007), three cases of tenosynovitis in pheasant poults were submitted to one regional laboratory, two in July and one in August.

In the first case, 5% of a group of 4500 eight week old pheasants were described as lame.

The condition was present in seven pens of birds. The birds had arrived on site a week previously. Arthritis was detected at necropsy in five out of nine submitted birds and *Staphylococcus aureus* was isolated from turbid and caseous material from the tibiotarsal joint of one bird. Excess turbid fluid was described in the tibiotarsal joints of 3 other birds.

The second case occurred in a group of 1000 eight week old pheasants. A number of birds were affected with leg weakness. The birds had been placed 3 days previously in a release pen. Excess bilateral turbid synovial fluid with small fibrin clots were detected in the gastrocnemius tendon sheaths in one bird and unilaterally in 4 other birds at necropsy. *Staphylococcus aureus* was isolated in pure growth from several joints and from the liver of 3 birds, the spleen of one and the brain of two birds. Histology confirmed the presence of an acute septic fibrinoheterophilic tenosynovitis associated with Gram positive coccal bacteria.

The third case involved seven week old pheasants. Hock sitting and inability to walk was described in approximately 20 to 30 birds out of a group of 1000. Swellings above the hock joints just proximal to the insertion of the gastrocnemius tendon were noted. Turbid fluid, fibrin clots and haemorrhage were present in the swollen tendon sheaths. One bird had a pale focus on the cut surface of the proximal tibia. *Staphylococcus aureus* was isolated in pure growth from the tendon sheaths of 4 birds and also from the tibial lesion described above. It was also isolated from the liver of 2 birds. Histology showed an acute septic fibrinoheterophilic tenosynovitis and a septic osteomyelitis. Both lesions were associated with Gram positive coccal bacteria.

In all these cases, an acute septic tenosynovitis associated with *Staphylococcus aureus* infection was identified.

Anecdotal reports of a considerable number of cases seen by two practices were also reported to VLA. There was some suggestion from these reports that there may be an association with the removal of 'bits' (clips placed on the beak of the birds which are designed to prevent pecking of other birds). However there were also suggestions that this might be associated with the handling of the birds and it is interesting to note that

cases often occurred around 3 days to a week after moving. Wet weather during rear was also suggested as a potential contributory factor. It may lead to wet muddy conditions underfoot or another suggestion was that handling of wet birds might increase feather loss or small abrasions. No obvious portal of entry (e.g. leg or foot abrasions) were detected in the three cases above).

VIDA figures for the diagnosis of septic arthritis or tenosynovitis due to bacterial infection in game birds gave the following incidence: 2 cases in 2005, 4 cases in 2006 and 14 cases to date for 2007 suggesting there was a true rise in the incidence of this condition during this rearing season.

SAC also reported Staphylococcal tenosynovitis in four batches of pheasants in July after transfer to release pens.

#### ***Hexamita (Spiroucleus) in gamebirds.***

There was a marked increase in the VIDA diagnoses of *Hexamita (Spiroucleus)* in gamebirds in the third quarter of 2007 (59 VIDA diagnoses out of 290 diagnostic submissions) compared with the same quarter in the previous two years (30 out of 243 diagnostic submissions in 2006, 32 out of 239 in 2005). This increase may well be linked with adverse weather conditions over the summer. It is planned to present a further review of this disease in the next quarterly report.

#### **Enteritis and high mortality in red-legged partridges.**

Mortality over a period of two weeks was seen of 80% (400/500) of red-legged partridge poults placed at 9-weeks of age. Intestinal lesions were demonstrated which were similar to those previously described by the VLA associated with attaching and effacing *E.coli* (AEEC) (La Ragione *et al*, 2004. "Attaching and effacing *Escherichia coli* O103:K+:H- in red-legged partridges", Vet Rec, **155**,397), and O103:K+ AEEC was confirmed in this case also.

**VLA LASSWADE**  
**Avian Histopathology Submissions**  
**for the 6-month period from January to June 2007**

Number of cases: 450

Category of birds	No. of cases
Broilers	169
Broiler breeders	81
Commercial layers	62
Game birds	43
Turkeys	13
Miscellaneous (including "backyard" poultry)	82

### Broilers

As in the previous 6 months' submissions, the most common diagnoses in this category were non-specific chronic bursal atrophy in birds ranging in age from 29 to 44 days and acute/subacute bursitis consistent with IBD infection in birds ranging from 25 to 45 days of age (30 and 17 submissions respectively).

Other diagnoses included cholangiohepatitis in 42 day old birds and in birds at processing, pododermatitis in seven batches of birds ranging in age from 10 to 31 days, inclusion body ventriculitis (consistent with adenovirus infection) in seven batches of birds ranging in age from 18 to 30 days and inclusion body hepatitis in three batches of birds ranging in age from 27 to 68 days.

### Broiler breeders

Marek's disease was diagnosed in twelve batches of birds (30 to 52 weeks old). *Enterococcus hirae* encephalomalacia was recorded in four batches of chicks 5 and 7 days of age), ILT in two batches of birds 13 and 53 weeks old, IBH in one batch of 25 day old birds and keratoacanthoma (squamous cell carcinoma) in four batches of 35 day old birds. The aetiology of this condition is unknown but previous reports have suggested the possibility of pox virus involvement and fowl pox virus DNA has been demonstrated in squamous cell carcinoma lesions by PCR.

### Commercial layers

As in the previous 6 monthly report, the most frequent diagnosis in this category was Marek's disease (eleven batches of birds ranging in age from 19 to 56 weeks). ILT, mycobacterial infection and urolithiasis were all diagnosed in individual batches of adult birds.

### Turkeys

Pox virus glossitis was diagnosed in a batch of 52 week old breeding females where severe necrotic lesions in the tongues and palates were suspicious of mycotoxicosis. Numerous cytoplasmic inclusion bodies were visible in degenerating epithelial cells.

### Game birds

Severe acute interstitial nephritis consistent with coronavirus infection was diagnosed in three batches of adult pheasants and marble spleen disease was reported in one submission of adult birds.

### Miscellaneous

Diagnoses in this category included suspected polyomavirus infection in an adult Rosella parrot, suspected herpesvirus infection in a cockatiel, DVE in three submissions of adult ducks and one adult goose, suspected circovirus infection in three submissions of ducks, amyloidosis in an aged swan, a 29 day old duck and an adult backyard hen, oral trichomoniasis in a chaffinch, seminoma in a 20 year old touraco, fungal pneumonia in a gosling and a parasitic pneumonia in a 12 month old bantam.

**VLA LASSWADE  
COMMERCIAL POULTRY DIAGNOSTIC POST-MORTEM  
EXAMINATIONS  
July, August, September 2007**

**Broiler chickens**

Condition	No. of cases <sup>1</sup>	Age/range (days)
<i>E. coli</i> septicaemia	5	3-20
Yolk sac infection	4	1-5
Suspected hypoglycaemia	2	10 and 23
Wet litter – cause not determined	2	20 and 25
Caecal coccidiosis	1	25
“Lameness”/poor feathering – cause not determined – feed?	1	16
Vent/tail pecking	1	8
Stunting/rickets (cause not determined)	1	21
Intestinal torsion (free-range organic)	1	68
Septic arthritis	1	18

**Broiler breeders**

Condition	No. of cases	Age (days/weeks)
Peritonitis/septicaemia	4	29-53 wks
Traumatic tendon rupture	1	28 wks
Histomoniasis	1	32 wks
Staphylococcal septicaemia	1	49 wks
Vegetative endocarditis	1	28 days
Septic arthritis	1	9 days
Encephalomalacia ( <i>Enterococcus</i> species)	1	6 days
Yolk sac infection	1	1 day

<sup>1</sup> case = one submission of several birds in which this was the main finding.

**Commercial Layers**

Condition	No. of cases	Age (days/weeks)
Peritonitis/septicaemia	4	37-56 wks
Pecking/cannibalism	2	19 and 31 wks
Fowl cholera	1	76 wks
Erysipelas	1	56 wks
ILT	1	51 wks
Dehydration	2	1 and 35 days
Navel and yolk sac infection	4	2-4 days
Starve-out	1	6 days

**Turkeys**

Condition	No. of cases	Age (days/weeks)
Starve-out	1	6 days
<i>E. coli</i> septicaemia	1	17 days
Candidiasis of the crop	1	5 wks

**Game birds**

Condition	No. of cases	Age (days/weeks)
<b>Pheasants</b>		
Hexamitiasis/Spironucleosis	5	4-20 wks
Rotavirus infection	1	8 days
<b>Red-legged partridges</b>		
Suspected hypothermia	1	14 wks
<b>Grey partridges</b>		
Candidiasis of the crop	1	5 wks
Candidiasis/necrotic enteritis	1	9 wks
Coccidiosis	1	10 wks