VLA Monthly Surveillance Report for PIGS November 2008

Defra Food and Farm Group funds the VLA's pig surveillance work as part of the Veterinary Surveillance Strategy

Highlights

- **A virus similar to Porcine Enterovirus-8 (PEV-8) identified as the cause of neurological disease in 7-8 week old weaners**

- **High mortality reported in association with *Salmonella* Typhimurium of different phage types**

- **Swine Influenza diagnosed using immunohistochemistry in sows in which serology was inconclusive**

- **Several incidents of disease due to PRRSV, with and without other disease agents**

- **Oesophagostomiasis causing deaths in adult pigs**

- **Multicentric mesenteric lymphoma in a fattening pig**

Enteric Diseases

Coccidiosis causing scour in suckling piglets

Coccidiosis was considered the likely cause of scouring from 10 days old in farrowing houses, one to two pigs were being lost from each litter. A high coccidial oocyst count of 94,000 per gram faeces was detected in a sample from an 11-day-old piglet, no oocysts were detected in a faecal sample from an 18-day-old piglet. Diagnosis of coccidiosis from faecal samples is problematic in preweaned pigs as oocyst output can be low or undetectable in diseased pigs, histopathology on the intestines collected within minutes of death is ideal for diagnosis.

High mortality associated with *Salmonella* Typhimurium PT193 in weaners

Salmonellosis due to *Salmonella* Typhimurium phage type 193 infection was diagnosed from colon submitted from six-week-old pigs with diarrhoea, wasting and some deaths. A necrotic colitis was seen in on-farm necropsy. Forty of 150 pigs were affected with 20 deaths on this indoor nursery unit.

Co-infection with PRRSv and *Salmonella* Typhimurium PT 208 causing enteritis and poor performance.

Wasting, malaise and inappetence were reported in a group of 1,200 Hampshire pigs being reared outdoors from which 20 had died. Sows were vaccinated for PCV2. A chronic necrotic typhlocolitis was identified in two pigs submitted, one of which had a mild polyarthritis and the second had a chronic mild pneumonia. *Salmonella* Typhimurium phage type 208 was isolated from internal viscera as well as the intestines pointing to salmonella septicaemia. PRRS virus was detected in both spleens by PCR. As PRRS virus is immunosuppressive, its presence in these growing pigs was considered significant.

Septicaemia due to *Salmonella* Typhimurium PT U288 with high mortality

The carcases of two six-week-old Landrace cross Duroc pigs were submitted for postmortem examination. The pigs were from a group of 85 in which 20 had died. The group had a history of scour whilst in the farrowing crates. At necropsy there was a necrotising typhlocolitis and mild bronchopneumonia. Multi-drug resistant *Salmonella* Typhimurium phage type U288 was cultured from the large intestine. Histologic examination revealed a necrotising fibrinous colitis and necrotising hepatitis and cholecystitis, consistent with salmonellosis. In addition there was a necrotising tonsillitis and necrotising and fibrinous bronchopneumonia. Culture of the lung resulted in the growth of *Streptococcus suis* type 2 and also the identification of *Mycoplasma hyorhinis* by DGGE. There was no histological evidence of PMWS in these pigs. An advisory visit was carried out.

Oesophagostomiasis causing deaths in adult pigs

Three adult pigs were submitted from a 140-animal herd comprising of rare breeds where six adult pigs had died in the last month. It was reported that

the animals had lost weight but remained bright although they were inco-ordinated before death. All were emaciated and some had mild pneumonia and peritonitis, however the consistent finding in all three pigs were very large numbers of *Oesophagostomum* sp. parasitic worms in the colons. Oesophagostomiasis is usually considered as a cause of illthrift and reduced productivity and heavy infestations in the UK are infrequent, at least in housed pigs. However in this case the findings suggested that parasitism was an underlying cause of death, and indicated that a worming programme was required on the farm.

Porcine Proliferative Enteritis (PPE) causing poor performance

Three live eight-week-old piglets were submitted from a 60 sow breeding and fattening unit. Nine piglets were affected with wasting and diarrhoea and three had died. Both had marked mucosal thickening of the large intestine and thickening of the ileum was apparent in two of the three at post-mortem examination. Special staining revealed intracytoplasmic inclusions resembling *Lawsonia intracellularis,* the causative agent of this condition. This was confirmed on histopathology and no evidence of PMWS was found.

High mortality and morbidity associated with swine dysentery

Swine dysentery, caused by *Brachyspira hyodysenteriae*, continues to be diagnosed with some regularity. One case was typical: Three live pigs were submitted for post-mortem examination as part of an investigation into a scour problem in outdoor reared pigs on this nursery unit. Pigs arrive on the unit at 7 kg and were reared there until 40 kg. The unit comprises four pens each containing 200 pigs. It was run on an all-in/all-out basis and was populated over the space of approximately two weeks from one breeding source. Over the last two weeks, 60 pigs were reported to have been found dead in two of the yards, and in the other yards, nine deaths had occurred. Piglets were vaccinated against PCV2 and enzootic pneumonia. Gross post-mortem findings included marked thickening of the rugal folds of the caecal and (more so) spiral colon mucosa. There were flecks of necrotic debris present on the surface of the mucosa with pseudomembranous colitis and ulceration throughout the spiral colon. *Brachyspira hyodysenteriae* was grown from caecal contents, fluorescent antibody tests (FAT) were positive, and *B. hyodysenteriae*-specific DNA was found by PCR on faeces, all of which confirmed a diagnosis of swine dysentery. Control strategies were greatly facilitated by an already existing all-in all-out policy. The source of infection was not established.

Multicentric Mesenteric lymphoma in a fattener pig

A 17-week-old Large White cross Landrace pig was euthanased and submitted for post-mortem investigation, following a period of ill thrift and weight loss. The Peyer's patches and surrounding tissues of the jejunum were markedly enlarged (up to 2.5 cm in diameter). Some of these areas were

associated with intussusception and necrosis of the wall of the gut. The duodenum and anterior jejunum were markedly distended with liquid contents, as a result of obstruction.
Histology revealed that the pig was suffering from a suspected neoplastic condition (possible lymphoma). Lymphoma is the most common tumour of pigs and is usually detectable at two to three months of age. Animals can survive for four to six months. There is an autosomal recessive trait for lymphoma in Large White pigs. The gross findings and the histological picture suggest that the neoplasia was causing a physical blockage to peristalsis resulting in the intussusceptions and these in turn resulted in infarcted blood vessels leading to large areas of necrosis. See Figure 1 depicting the affected jejunum.

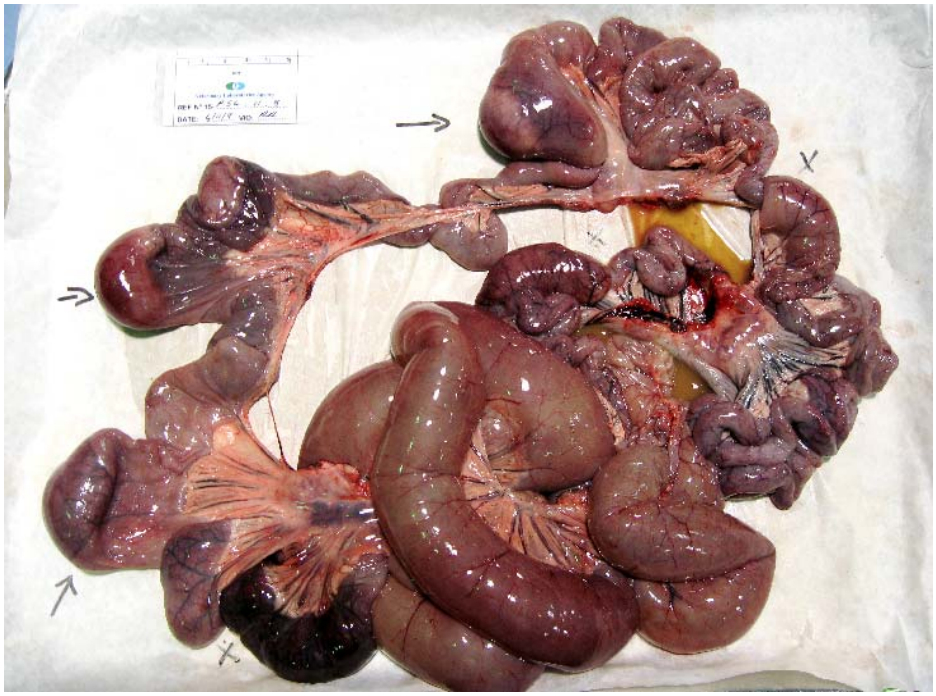

Figure 1: Jejunum of a 17-week-old pig affected with suspected neoplasia, causing markedly enlarged Peyer's patches which led to intussusception, necrosis and obstruction. The arrows point to the enlarged Peyer's patches and the crosses point to intussusception sites.

Respiratory Diseases

Swine influenza diagnosed in breeding herd by immunohistochemistry.

Swine influenza was suspected on clinical grounds when about 35 of a group of 70 farrowing sows became affected with inappetence, pyrexia and dyspnoea on an indoor breeding unit of 570 sows with weaning into outdoor cosikennels. The problem later spread to other dry sows and weaners. Approximately 60% of a batch of 700 weaners in outdoor cosikennels were reported to be coughing. Sows were vaccinated with live PRRSV, weaners were vaccinated for PCV2 and *Mycoplasma hyopneumoniae*. Two sow plucks submitted had gross lesions consistent with acute to subacute bronchointerstitial pneumonias with multifocal patchy consolidation suggestive of possible swine influenza virus infection. Two growing pigs were also submitted; one with a severe bronchopneumonia and the other, which was preweaned, with a mild multifocal pneumonia, pericarditis and polyarthritis. No swine influenza virus was isolated from these, however, a subacute bronchiolitis was present and immunohistochemistry confirmed active swine influenza infection in the preweaned pig and one sow pluck. Interestingly, paired serology from sows and convalescent sera from growing pigs did not show seroconversion or seropositivity respectively. Infection with H1N2 has, on one unit that we know of, also not produced detectable antibody in pen mates, possibly due to antigenic variation in the field virus compared to the laboratory strain used for serology. This is being investigated further and attempts to isolate and identify the virus continue.

Acute PRRSv pneumonia

Six, six-week old growing pigs were sacrificed to investigate an increased incidence of respiratory disease and mortality in post weaning piglets. The pigs originated from a 450 sow farrow to finish indoor high health status herd. Post mortem examination showed accumulations of haemorrhagic frothy mucus in the trachea, bronchi and bronchioles. Areas of coalescing petechial haemorrhage were present over the caudal parts of the caudal lobes of the lungs of all the pigs but with varying severity. ELISA examination of serum from the pigs showed high levels of antibody to PRRS. PCR examination of lung tissue from the pigs proved positive for PRRSV RNA. Histological examination of lung tissue identified an interstitial pneumonia in all of the pigs; this is suggestive of an uncomplicated viral pneumonia consistent with PRRS infection.

Pneumonia due to PRRSv and *Pasteurella multocida*

Two entire male 16-week old growing pigs were examined at post mortem examination. These pigs originated from a fattening unit of approximately 1,250 pigs. All were bought in at 40 kg weight from the same source and stayed in “bought in groups” of 40-45 but shared the same air space with other groups. As fattening proceeded the groups were split into smaller groups according to growth rate. One group of 45 pigs appeared to look dirty and started to “huddle”. One pig was found dead. Two days later a number of the pigs showed rapid breathing. One of these died and the other was shot because of deterioration in condition. Both pigs showed extensive pleuropneumonia from which *Pasteurella multocida* was isolated. PCR examination of lung tissue from each pig proved positive for PRRSV RNA. Histological examination of lung showed changes consistent with a severe acute bronchopneumonia but discrete changes indicative of PRRSV infection

could not be identified. Histological examination of kidney and inguinal lymph nodes failed to reveal any histopathological changes indicating that PCV-2 infection had a part to play.

Disease of the Nervous System

Primary disease due to *Streptococcus suis* type 2 in preweaned pigs
Ongoing low grade problems of lameness in preweaned pigs, meningitis-like signs in four to five-week-old pigs, and sudden deaths and pneumonia in growers were investigated by submission of typical cases from an indoor 240 sow breeder-finisher unit vaccinating for PRRSV. Disease associated with *Streptococcus suis* type 2 infection was diagnosed in three pigs; two with meningitis and one with arthritis and endocarditis with pulmonary oedema likely to be secondary to the heart disease, in this pig, the organism was isolated from both joint and heart valve. There was no evidence in these pigs of active PRRSV infection.

Nervous signs in finishers of likely bacterial cause occurring concurrently with swine dysentery
Approximately 20 of 1700 22-week-old finishers on an all-in all-out indoor 7 to 100 kg nursery finisher unit were affected over two weeks with non-progressive ataxia and incordination. Affected pigs were noticed to be slightly lean and then became weak and recumbent. When stimulated, they were able to rise but showed ataxia as if 'drunk'. They were treated with lincomycin or penicillin and most recuperated over several days, some were culled. Affected pigs still ate and drank and responded to stimuli. No fits or tremors were seen but two had head tilt. A small amount of scour was seen in two out of the eight rows of pigs on the unit. There was no history of an interruption to water supply and affected pigs were randomly distributed across pens. Two shot pigs were submitted and, given the clinical signs, submission of pigs euthanased with barbiturate was arranged. In one of the shot pigs, there was a haemorrhagic typhlocolitis and swine dysentery was confirmed. One of the barbiturate euthanased pigs had an infected aural haematoma and a purulent otitis media with osteomyelitis of surrounding bone which accounted for the nervous signs in this pig. However, there was no aural disease in the other barbiturate euthanased pig in which histopathology confirmed a severe subacute lymphoplasmacytic meningitis with tendency to abscess formation, consistent with a diagnosis of a subacute bacterial meningitis. No significant bacteria were isolated from the meninges and no PRRSV was detected in the spleen by PCR to explain the possible late outbreak of bacterial meningitis. *Haemophilus parasuis* and *Streptococcus suis* are two of the more common pathogens in growing pigs producing such lesions. Antibiotic treatment is likely to have adversely affected the bacteriology results.

Porcine Enterovirus-8 (PEV-8) identified as the cause of porcine neurological disease in 7-8 week old weaners

An update is provided here on an on-going investigation into a porcine neurological disease first reported in the June 2008 monthly report. Four pigs (8 to 10 weeks) were submitted from a 500 sow breeding and finishing unit. The piglets had hind limb ataxia but otherwise were bright and alert. The farmer had approximately 20 similar cases, all occurring at 7-8 weeks of age. There were no gross lesions in the CNS and no bacterial isolates from CNS tissue. Histopathology of brain and spinal cord (CNS) found nonsuppurative encephalitis (NSE). Cell culture, immunohistochemistry (IHC) and molecular techniques failed to find any of the common pathogens associated with NSE in pigs. Initial work on a virus microarray demonstrated minimal evidence for a porcine enterovirus and porcine teschovirus. Further work using RT-PCR, sequencing and phylogenetic analysis, confirmed that the virus was closely related to porcine enterovirus 8 (PEV-8). Ongoing work includes further sequencing, electron microscopy of lesions, developing an IHC test, and isolation of the virus in culture. PEV-8 has been associated with reproductive disorders (SMEDI syndrome) and possibly enteritis but not previously with polioencephalomyelitis.

Systemic Diseases

Porcine Circo-Virus Associated Disease (PCVAD) causing ill thrift and deaths on a small farrow to finish herd.

Three per cent of 150 two to three-month-old pigs on an indoor 50-sow breeder finisher unit were affected with illthrift and death. In part due to its small size, rearing pigs were managed in a continuous system with 20 to 50 weaned per week into a building with mixed ages and a scrape through system. PMWS had never previously been diagnosed on the unit though it had been suspected to be there at a low level. The submitted pigs were in poor body condition with mild colitis. Histopathology was consistent with a PCV2 challenge and immunohistochemistry identified intense/widespread labelling of PCV2 antigen in lymph nodes, gut associated lymphoid tissue and kidney. PCV2 vaccination has since been initiated on the unit.

Liver condemnations as a result of severe ascarid migration

A problem of liver condemnations on a 100 sow outdoor unit was investigated. From twenty finishing pigs, eight livers had been rejected by the abattoir. Other pigs on the farm were severely lethargic resulting in death or requiring euthanasia on welfare grounds. A dead pig and several post mortem samples were submitted for examination. The liver lesions were extensive and pale, suggesting a heavy ascarid migration, and histopathological lesions supported this diagnosis. An additional feature was the presence of blood in the gastrointestinal tract. Although a specific cause for this could not be identified, *Clostridium perfringens* alpha and epsilon toxins were identified in

gut contents, suggesting either type B or D *Clostridium perfringens* enterotoxaemia, an unusual observation in finishing pigs.