SELECTED HIGHLIGHTS FROM APHA PIG DISEASE SURVEILLANCE REPORTS
JUNE 2015

- Neonatal diarrhoea outbreaks due to *Escherichia coli* and clostridial enterotoxaemia
- Ileitis (porcine intestinal adenomatosis) causing marked diarrhoea in grower
- Glässer's outbreak concurrent with fatal gastric ulceration
- Streptococcal meningitis with secondary water deprivation

Reproductive disease

Bacterial placentitis identified in an abortion
An unusual bacterial cause of abortion was identified at Bury St Edmunds when *Bacillus pumilis* was isolated in pure growth from the foetal stomach contents of a single foetus. At post-mortem examination, a purulent exudate was present on the placenta and there was fibrin stranding in the body cavities. Histopathology confirmed a placentitis and an epicarditis, with features consistent with a bacterial aetiology. *Bacillus* species are widely distributed in the environment and *B. pumilis* is closely related to *B. licheniformis* which is a more common cause of abortion in ruminants. Three abortions had occurred at 90-100 days gestation from a batch of 68 sows; the aborting sows were healthy and were in new paddocks, not used by pigs previously. It is not known if the *Bacillus* species was involved in the other abortions as only one foetus from one litter was submitted. Submission of several whole aborted or stillborn litters is important for full diagnostic investigation of significant outbreaks of reproductive disease.

Alimentary Disease

Neonatal diarrhoea outbreaks due to *Escherichia coli* and clostridial enterotoxaemia
All piglets in a litter of 15 were found dead at one day old on a smallholding with 12 sows. Three piglets from a litter of eleven three-week-old piglets had also died previously. Three dead piglets from the two affected litters were examined at Shrewsbury. They had reddened small and large intestines with watery content and enlarged mesenteric lymph nodes. Haemolytic K88 antigen (F4) positive *Escherichia coli* was isolated in heavy growth pointing to enteric colibacillosis; no PEDv was detected by PCR in any of the three pigs and no rotavirus was detected.

In a second incident of neonatal diarrhoea and deaths, necrotic enteritis due to *Clostridium perfringens* type C enterotoxaemia was diagnosed as the cause of clear watery diarrhoea, dehydration and death within 24 hours of the onset of clinical signs in two-day-old pigs. About two litters in a batch of 24 litters farrowing were affected each week for the three weeks prior to submission, with litters from sows of any parity being affected. The farm was outdoor and organic. There was necrosis and haemorrhage in the jejunum, typical of this type of clostridial enterotoxaemia and the diagnosis was confirmed by detection of toxins in intestinal contents. These also tested negative for porcine epidemic diarrhoea virus (PEDv).

Salmonellosis outbreaks due to monophasic variants and conventional *Salmonella Typhmurium*
Monophasic *Salmonella* 4,12:i:- phage type 193 (Typhimurium-like) was isolated by direct culture from the colon of a four-week-old pig submitted to investigate the cause of diarrhoea and wasting in 10% of 1000 housed piglets which had just been weaned. Three died in the first 24 hours after weaning. Only Salmonella culture was requested and the results suggest salmonellosis was involved the disease. However at this age, testing for possible involvement of *E.coli* or rotavirus is also recommended. A similar monophasic *Salmonella* 4,5,12:i:- PT193 was isolated from a rectal swab collected from five to
six-week-old outdoor pigs in which 1% had diarrhoea and three had been found dead. In another example submitted to Shrewsbury, diarrhoea in five-week-old weaned pigs was found to be associated with a monophasic *Salmonella* 4,12:i:- infection.

Acute salmonellosis was diagnosed as the cause of sudden onset diarrhoea in nine-week-old growers. A high percentage of the group of about 2000 were affected with diarrhoea with ten deaths in pigs showing signs of dehydration with sunken eyes. Examination of pigs to Thirsk revealed evidence of enterocolitis and one of the pigs had a perforated gastric ulcer with extensive peritonitis. A multi-drug resistant *S. Typhimurium* *Copenhagen* phage type U288 was isolated confirming the diagnosis and it may be of significance that the pigs were being treated with amoxinsol when salmonellosis developed, as resistance to this antimicrobial would favour colonisation by the *S. Typhimurium*.

**Ileitis (porcine intestinal adenomatosis) causing marked diarrhoea in grower**

One 10-week-old pig was submitted live for post-mortem examination from a group of 60. Approximately 20% of the pen of 60 pigs had watery diarrhoea and five had died. The entire length of the intestinal mucosa showed raised nodular ridges; particularly marked in the small intestine (Figure 2). From the mid-jejunum to the ileum, diphtherisis was evident and the large intestinal contents were grey-brown and liquid. The gross post-mortem findings were suspicious of *Lawsonia intracellularis*, possibly with concurrent salmonellosis and/or PCV2-associated disease. Histopathology confirmed multifocal proliferative enteropathy (porcine intestinal adenomatosis) due to *Lawsonia intracellularis* with no evidence of PCV2-associated disease, and no *Salmonella* or *Brachyspira* species involvement was detected by laboratory testing.

Figure 1: Thickened and corrugated small intestine of a 10-week-old pig with porcine intestinal adenomatosis.

*Brachyspira pilosicoli* colitis in finishers

Colitis due to *Brachyspira pilosicoli* was diagnosed as the cause of looseness in 14-week-old housed pigs, in which 5% of 1200 were affected and none had died. The organism was detected by PCR. *B. pilosicoli* causes a milder colitis than the related organism *B. hyodysenteriae*, the cause of swine dysentery. Interestingly, there has been a decline in the diagnostic rate of swine dysentery in GB pig herd at APHA and SAC CVS as illustrated in Figure 1, with only one diagnosis recorded in the first six months of 2015 compared to 11 in the same period in 2014. This is encouraging and suggests that new outbreaks of swine dysentery have reduced, however measures to prevent introduction of swine dysentery remain vital as it is still possible that there are commercial or non-commercial pig units that do not know that they have endemic swine dysentery infection, and others that are known to be swine dysentery-infected which do not submit repeated samples for diagnosis as they already know their positive status. Measures which protect pig units from introduction of swine dysentery are, of course, also of benefit in reducing the risk of introducing other contagious pathogens such as PEDv and PRRSv.
Figure 1: Annual GB incidents of swine dysentery in pigs as a % of diagnosable submissions (data for 2015 is incomplete and for the first six months only)

**Systemic Disease**

Mixed findings including Glässer’s disease in a batch of weaners with illthrift

Three live five-week-old pigs were submitted to Bury St Edmunds as part of a series of submissions from a continuous single-source nursery unit with wasting as well as respiratory disease, diarrhoea and mortality in the post-weaning period. Submissions from earlier batches have revealed salmonellosis, PRRS-related pneumonias and disease due to *Haemophilus parasuis*. On this occasion, one pig had Glässer’s disease, a second had pneumonia due to PRRSv and a third had enteropathy of undetermined aetiology, demonstrating the importance of examining a batch of pigs in disease investigations.

Glässer’s outbreak concurrent with fatal gastric ulceration

Eight pigs were found dead overnight from a group of 1800 seven-week-old pigs from three breeding sources. The pigs were vaccinated against PCV2 and *Mycoplasma hyopneumoniae*. Several on-farm post-mortem examinations had revealed Glässer’s-like disease in some pigs and fatal haemorrhage from gastric ulcers in others. Three pigs were submitted to Bury St Edmunds, two of which were severely anaemic due to haemorrhage from gastric ulcers, and the third had severe fibrinous polyserositis typical of Glässer’s which was confirmed by isolation of *Haemophilus parasuis* from the meninges and spleen. PRRS virus was also detected in this pig, likely due to field challenge although sequencing would be needed to confirm this as the pig had been vaccinated in the last month. No *H. parasuis* was isolated, nor any virus detected, in the pigs with gastric ulceration, although *H. parasuis* is a difficult organism to culture. An interruption of normal feeding is a risk factor for development of gastric ulcers and diseases or management factors therefore needed to be reviewed, as well as dietary factors and stress.

**Nervous Disease**

Streptococcal meningitis with secondary water deprivation

*Streptococcus suis* (likely type 7) septicaemia, meningitis and polyserositis was diagnosed as the cause of recumbency, nervous signs and mortality in a batch of 1800 housed nine-week-old pigs. Sixty were affected, 50 of which had died. There was concern about possible oedema disease because some pigs had swollen eyelids. This concern was allayed when *S. suis* was isolated from meninges and livers of submitted pigs. As the experienced practitioner had indicated that the signs were not typical of streptococcal meningitis, brain histopathology was undertaken on two pigs and confirmed meningitis consistent with a bacterial cause. However, interestingly, in one of these there were also features of eosinophilic meningoencephalitis likely to reflect water deprivation. In view of the bacterial disease in this pig, the water deprivation was likely to be secondary to the nervous signs in the pig, preventing normal water intake and this illustrates the complications which can occur in cases which are do not respond rapidly to treatment or are not detected and treated promptly.
Recumbency and fitting in *Haemophilus parasuis* disease outbreak

Losses were reported in growing eight week old pigs on a rearing unit. A few pigs were found dead and some were also found recumbent and fitting prior to death, some were reported to have responded to penicillin injection. Gross examination showed predominantly pneumonia, but also fibrinous exudates in abdominal cavities and slight cloudiness of the meninges in two out of the three pigs examined at Shrewsbury. Findings suggested possible septicaemia and *H. parasuis* was isolated from two of the pigs after extended incubation despite the group having been given antibiotic-mediated feed.

Ongoing mortality of around 5% mortality in a group of about 1600 nine-week-old pigs was also suspected to be due to *H. parasuis* infection. Initially pigs were seen recumbent and possibly fitting before death, some had improved with antibiotic treatment. More recently pigs were being found dead without clinical signs having been seen. Three were submitted to Shrewsbury where fibrinous exudates was found in body cavities, there was generalised lymph node enlargement and reddening, and interlobular pulmonary oedema and congestion. No bacterial were not isolated from a variety of tissues but histopathology revealed well-established meningitis with reactive hepatitis and splenitis consistent with a septicaemia and *H. parasuis* and *S. suis* were considered the most likely causes. Given the negative bacteriology, *H. parasuis* may be more likely as it can be harder to isolate than *S. suis*.

**Musculoskeletal Disease**

**Staphylococcal arthritis in a weaner**

As part of a submission to investigate various ongoing problems in weaned piglets, a dead five-week-old pig was submitted to Thirsk to investigate swollen hock and carpal joints apparent since weaning. Postmortem examination revealed thickened joint capsules and turbid joint fluid and a moderate pure growth of *Staphylococcus hyicus* was isolated from one of the affected carpal joints. This organism is usually associated with greasy pig disease but can, occasionally, cause septicaemia or joint infections. In this instance it may be an incidental finding as it was only isolated from one affected pig.