

OVERVIEW

- **Abortions due to *Aspergillus fumigatus* in beef cows**
- **Congenital swayback in Lleyn lambs**
- **Multiple losses due to urolithiasis in lambs grazing fodder beet**

GENERAL INTRODUCTION

The mean temperature for April was 0.2 °C above the long-term average, and it was mildest relative to average in western areas. The far North had a wet month with double the average rainfall, but this was balanced by below normal rainfall across central and southern areas to give an overall figure of 92 per cent of average. Sunshine hours were 97 per cent of average.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in July 2021. Given similar climatic and production conditions, they could also be important this year.

- **Babesiosis in cattle**
Babesiosis outbreaks can occur after groups of naïve cattle are introduced to areas of tick habitat for the first time. Affected animals may have been purchased and there may be a history of previous problems on the land. If such areas cannot be avoided, then high risk animals should be monitored closely for signs of disease.
- **Cerebrocortical necrosis (CCN) in lambs**
Diagnoses of CCN in lambs peak between three and six months of age. This may reflect ruminal dysbiosis with increased numbers of thiaminase-producing bacteria associated with factors such as diet changes at weaning.

CATTLE

Parasitic diseases

A rearing and finishing beef unit reported the death of six yearlings from a group of 40. A total mixed ration comprising barley, wheat straw and distillery by product was available ad lib. No supplementary minerals were given. In all cases the affected animals had become recumbent before dying within 12 hours. Postmortem examination findings in two cattle consisted of marked dehydration and scant diarrhoeic to mucoid faeces with occasional admixed mucosal debris in the large intestine. Coccidial oocyst counts of 13,250 and 511,200 oocysts per gram consisted of predominantly pathogenic species with *Eimeria zuernii*, *bovis* and *alabamensis* all identified. Histopathology confirmed severe subacute to chronic active coccidiosis. Additional findings included secondary attaching and effacing *Escherichia coli* infection and likely dysbiosis in one and localised bacterial bronchopneumonia with active bovine herpesvirus 1 infection in the second. Liver analysis confirmed selenium, vitamin E and vitamin A deficiency in both cases. Sections of skeletal muscle and diaphragm from animal two were examined histologically revealing changes consistent with nutritional myopathy. There were no further losses after decoquinate and minerals were added to the ration and the group were injected with vitamin E/selenium.

Generalised and systemic conditions

A five-month-old rigget Galloway calf was found dead a short time after developing acute respiratory signs. A small number of ticks were found on the carcass, and it was confirmed that the cattle were grazing an area of good tick habitat. Seventy per cent of the lung tissue was consolidated and there was evidence of splenomegaly. Bacteriology cultures of lung and spleen remained sterile, but histopathology findings were consistent with a subacute bacterial bronchopneumonia, most likely due to one of the *Pasteurellaceae* spp. PCR testing of lung tissues confirmed the presence of *Mannheimia haemolytica* and *Pasteurella multocida*. *Anaplasma phagocytophilum* DNA was detected on PCR testing of the spleen. Underlying immunosuppression caused by tick borne fever was suspected to have predisposed to the pneumonia and death.

Reproductive tract conditions

A herd of 40 housed beef cows reported five abortions/stillbirths over a period of two weeks and samples from three fetuses were submitted for investigation. Pure growths of *Aspergillus fumigatus* were cultured from the stomach contents of two and considered significant as the cause of the problem. Bacteriology was not carried out in the third case as suitable samples were not available. It was advised to check for and avoid

exposure to any obviously mouldy or spoiled forage and bedding.

SMALL RUMINANTS

Nutritional and metabolic disorders

Five lambs from 175 born to 125 Lleyl gimmers were reported to be unable to stand. Affected lambs had been sired by two separate rams and lambs born to ewes were unaffected. Some were affected from birth and others from a few days of age. A live lamb submitted for euthanasia and postmortem examination was bright but recumbent with paresis particularly of the hind limbs. Neuropathology findings included a mild paucity of myelin and presence of chromatolytic neurones in the red nucleus of the midbrain and pons consistent with a diagnosis of swayback. The ewes had received trace element boluses, however these did not contain copper so did not explain why only gimmers' lambs were affected. They had been grazed separately and this may have played a role as the area stocked by gimmers was less heavily slurried.

Generalised and systemic conditions

A group of 360 homebred hogs that had been outwintered on grass and concentrate feed was housed two weeks prior to lambing. Six lambs born during the first third of lambing were found in lateral recumbency while lambs born to ewes that had been housed all winter were unaffected. A live, new-born lamb was submitted for investigation of the problem. This lamb was atypical in that it could maintain sternal recumbency however menace and proprioceptive reflexes were absent. No lesions were detected in the brain, spinal cord, joints or muscles on postmortem examination and an unusual pale orange appearance to the lungs was the only abnormality recorded. A low liver copper result of 214 $\mu\text{mol/kg DM}$ (reference range 314 to 7850 $\mu\text{mol/kg DM}$) suggested a diagnosis of swayback. This was not confirmed on histopathology which revealed a circulating leucocytosis involving the brain, spinal cord and liver plus diffuse thickening of the alveolar septae. As the lamb was only a few hours old these findings were considered to represent pre-natal bacterial infection. It was advised that the low copper result was significant for the rest of the group and swayback could not be ruled out as the cause of recumbency in the other affected lambs.

Reproductive tract conditions

Six fetuses and placentas were submitted from a flock experiencing a 50 per cent abortion rate in a group of 100 homebred hogs. There were no similar issues in the ewes. The farmer commented that a cat was present on the farm for the first time and foetal fluids tested positive for antibodies to *Toxoplasma gondii* in all cases. In

addition, acid-fast bacilli were detected on modified Ziehl Neelsen smears of two placentas. Morphologically these were considered suspicious of *Coxiella burnetii* in one case and more typical of *Chlamydia abortus* in the other. The possibility of Q fever was negated on PCR of placenta. Tissues from both fetuses were examined histologically. A non-suppurative encephalitis with foci of gliosis was described in both brains and there was an additional intercotyledonary placentitis typical of EAE confirming co-infection with *Toxoplasma gondii* and *C. abortus*. Overall, the pathology relating to toxoplasmosis was most severe and this was considered the primary cause of the abortion storm. The hogs had received an EAE vaccine and the placentitis was not visible at postmortem examination. It was suggested that it may have resulted from infection with *C. abortus* that had occurred pre-vaccination.

Musculo-Skeletal conditions

The carcase of the third Texel ewe to be found dead prior to lambing was submitted for postmortem examination. The ewe was in good body condition, but a large volume of free blood and clot was found in the thorax. This was associated with an area of blackening and haemorrhage within the muscle of the diaphragm close to the aortic hiatus. *Clostridium chauvoei* was detected on fluorescent antibody testing but histopathology confirmed this to be an unusual incidental finding with only very occasional clostridial-type bacilli present and a complete lack of gas formation. The underlying cause was shown to be an acute necrotising myositis of unknown aetiology with multifocal acute myofibre necrosis and inflammation. Subacute myofibre damage with fibre loss and replacement by plump spindle cells was also present further negating primary *C. chauvoei* myositis. A syndrome of diaphragmatic haemorrhage has been described in Texel sheep, some of which had subacute or chronic pathology in the diaphragm.¹

Nervous system disorders

Two pregnant Scottish blackface ewes were submitted to investigate progressive weight loss and weakness culminating in recumbency. They were the only animals affected from a group that had received moxidectin 2 per cent injection and copper oxide boluses four weeks previously. Postmortem examination of one ewe detected an extensive area of necrosis within the right upper neck muscles with extension of infection into the atlanto-occipital joint and spinal canal. Histopathology confirmed that the spinal canal had been infiltrated by granulation tissue containing purulent tracts. Extension of inflammation into the vertebral bone and compression of the spinal cord resulted in extensive axonal injury that explained the clinical signs. No foreign material was detected, and unhygienic injection technique was considered to be the initiating factor. A single, copper

oxide bolus lodged within the tissues of the upper neck with associated swelling and necrosis confirmed a dosing gun injury in the second ewe.

Renal diseases

A lowland farm stocked with 2,200 fattening lambs experienced 50 cases of urolithiasis over a six-week period. Two groups were grazing turnips and the third was stocked on fodder beet. All groups had access to a grass run back, hay and *ad libitum* dark grain/sugar beet/barley blend. White faced lambs (Texel and beltex cross) grazing fodder beet were predominantly affected. Postmortem examination of two lambs detected irregular white stones blocking the distal urethra of both (Fig 1). Bladder rupture with uroperitoneum had occurred in one and hydronephrosis was evident in the second (Fig 2). Analysis confirmed that both magnesium ammonium phosphate (struvite) and calcium oxalate uroliths were present. Fodder beet leaves are high in oxalate which combines with dietary calcium to form insoluble uroliths. In addition, the calcium:phosphorus ratio in the blend was below the 2-3:1 ratio recommended for the prevention of urolithiasis. Around four weeks prior to the start of the problem fodder beet tops ran out and lambs were left to graze mostly roots which also have a low Ca:P ratio. It was also noted that Texel sheep absorb more dietary phosphorus than other breeds which may have predisposed white-faced lambs to the problem. Ammonium and sodium chloride were added to the blend following emergence of the issue. Prevention of oxalate uroliths is challenging when fodder beet is being fed. Grazing only female and/or dark faced lambs on the fodder beet was suggested as an option for the future.



Figure 1 – Uroliths within the urethra at the pelvic flexure



Figure 2 – Hydronephrosis secondary to blockage of the urethra

PIGS

Alimentary tract disorders

840 five-week-old pigs from a single source were introduced to a holding and divided equally between four straw bedded pens. The pigs appeared healthy on arrival with only a small number of thinner animals observed. Over the next three weeks multiple pigs failed to thrive and 30 were euthanased. Bloat and scour were reported in addition to the ill thrift. Two pigs were submitted for postmortem examination and found to be thin with grey diarrhoeic faeces. The mucosa of the ileum, caecum and colon was thickened, and histopathology confirmed severe chronic typhlocolitis. *Lawsonia* and *Brachyspira* spp were suspected to be involved and were detected by PCR. The latter was confirmed to be *B pilosicoli*. *Bordetella bronchiseptica* was also isolated from localised areas of lung consolidation in one pig.

References:

- 1 Waine K, Strugnell BW, Howie F *et al*. Diaphragmatic lesions and fatal haemorrhage in Texel sheep. *Vet Rec Case Rep* 2019; 7(2): e000745, 01.05.2019

An Investigation into Kyphosis ('Humpy Back') in growing pigs.

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Kyphosis ('Humpy Back') is a spinal abnormality seen sporadically on some pig farms, usually involving individual growing pigs (Madson *et al*, 2019). The condition renders the pigs non-productive as they generally suffer substantial physical impairment, poor growth and welfare issues that result in pigs failing to attain slaughter weight. Affected pigs are usually culled by producers at an early age for welfare reasons. This report describes an investigation involving a unit in the south of Scotland that experienced an unacceptably high number of 'humpy backed' pigs.

Clinical History

The farm is an upland arable and beef farm that had expanded into pig-finishing about 9 months previously using converted cattle buildings and a new purpose-built large finishing shed. Newly weaned commercial crossbred piglets were bought in at 4 weeks of age, every 3 weeks, from an outdoor High Health breeding unit, in batches of approximately 350. Their breeding was crossbred sows (Duroc/Large White/Landrace) and Hampshire boar. The piglets were fed on commercial compound weaner rations (Harbro Farm Sales Ltd) for the first 6 weeks. The grower and finisher rations were formulated by the same feed company using home-produced cereals, with other required ingredients supplied by the feed company. Concerns were raised by the producer over an increasing number of piglets in each batch that were showing humped backs and poorer growth by 10 weeks of age.

The investigation

For ease of inspection, the producer had separated 36 piglets of concern from the batch, many of which had obvious humpy back abnormalities (Figs 1 and 2). The average weight of this cohort was 21.5kg (range 11.5 – 22kg) as compared with an average of 24.5kg (range 23 – 39.5kg) for another cohort of 36 not specifically-selected piglets without evidence of spinal deformity from the rest of the batch. Estimating the arrival weight as 7.5kg (average QMS/AHDB figure), the average growth rate of the poorer piglets from weaning to 10 weeks of age was 333 g/day and for the representative other piglets was 414 g/day.



Figure 1



Figure 2

Inspection of pigs in the grower and finishing stages showed small numbers of pigs with 'humpy backs' that had not shown obvious deformity at a younger age but had gone on to develop the lesion. One such pig is shown in Figure 3, as compared with its age-matched pen mates. That pig, though able to walk, had an abnormal side-to-side swinging gait and was evidently compromised. It was culled for welfare reasons and submitted to the University of Edinburgh for CT scanning and investigation into the cause of the deformity. The pig weighed 49kg as compared with the average

estimated weight of 85kg for pen mates. Overall, the producer estimated that 3% of piglets from the recent batches had required culling on account of 'humpy back', a situation that he found emotionally difficult and unacceptable.



Figure 3

CT scanning report.

Full-body 64 slice MD-CT imaging was carried out at the University of Edinburgh and is reported in full as information with this level of detail is not described in the literature. There were 7 cervical, 17 thoracic and 6 lumbar vertebrae. Abnormalities were evident in the section of spine from T13 to T17 (Fig 4).



Figure 4

T13/T14 had mineralised material and a small, rounded gas pocket in the intervertebral disc space, plus marked T13 caudal endplate lysis. T14 had a hemivertebra malformation, with a left wedge-shaped vertebral body component and absent right component, causing scoliosis, kyphosis, and crowding of the right 14th and 15th ribs. There was also lysis of the T14 vertebral body. T15 had an unfused spinous process and was angled in relation to T16. The cranial endplate of T15 showed osteolysis. T15 was markedly deformed and moderately displaced dorsally and sinistrad. At the ventral aspect of the vertebral body there was irregular new bone formation. Marked osteolysis of the vertebral body was present, which was most pronounced caudally. Large isolated osseous fragments, which were irregular in outline were associated with this finding. The costal facets were ill-defined. The normal architecture of the articulation with T16 was completely lost, and the spinal canal was narrowed at the junction between T15 and T16. Similar

changes affected the cranial aspect of T16 and the right rib was displaced ventrocranially, the left rib mildly dorsally. Both ribs were vestigial. T17 was a transitional vertebra with a vestigial right rib and a left transverse process. In summary, there were supernumerary thoracic vertebrae, T14 had hemivertebra conformation, T15 showed spina bifida and T17 was a transitional vertebra causing caudal thoracic kyphosis and scoliosis. The spondylitis and discospondylitis between T13 – 16 might have involved an opportunistic bacterial infection but this could not be confirmed.

Discussion

The causes of 'humpy back' are described as genetic, nutritional or traumatic. Genetic causes arise due to the condition having moderate heritability involving multiple genetic loci (Holl *et al.*, 2008). It is more prevalent in pigs selected for longer thoraco-lumbar spines to increase loin length. The number of spinal vertebrae in each section of the spine is highly heritable. This form of kyphosis usually presents at an early stage, before 12 weeks of age. The supernumerary thoracic vertebrae confirmed in this pig is highly suggestive of a genetic cause in this instance. Nutritional causes can be implicated if the mineral component of the ration is inadequate or imbalanced. This form is usually accompanied by pigs suffering from spontaneous fractures and limb deformities such as shortened and bowed front legs. No such problems were seen in the pigs on inspection. Although the diet was not analysed independently for mineral composition, inadequate bone mineralisation was not indicated in pigs that had died of unrelated causes, that were examined post mortem at SRUC (St Boswells Disease Surveillance Centre). The bone density and strength were considered to be normal.

Trauma can cause back problems in heavier pigs in instances where boars are prone to 'riding' submissive individual animals later in the grow-finish phase. This activity is not generally evident in weaners before 10 weeks of age and was not reported or seen in the affected piglets at the time of the visit.

Further investigation of potential genetic factors would require genotyping of affected pigs for a range of markers that have been associated with kyphosis, with in-depth analysis to determine statistical significance. More immediately, identification of piglets by litter and interrogation of breeding records could be of help. Identifying sows or boars strongly associated with breeding humpy backed piglets could assist in eliminating the problem through judicious genetic selection at the farm level.

Acknowledgement

Thanks are due to Tobias Schwarz, the Royal (Dick) School of Veterinary Studies, University of Edinburgh for assistance with radiologic interpretation.

References

- J W Holl, J.W., Rohrer, G.A., Shackelford, S.D., Wheeler, T.L., Koohmaraie, M. (2008). Estimates of genetic parameters for kyphosis in two crossbred swine populations. *J Anim Sci.* (2008). Aug;86(8):1765-9.
- Madson, D.M., Arruda, P.H.E and Arruda, B.L. (2019). Nervous and Locomotor System. In: *Diseases of Swine*, 11th edition, Eds: J.J Zimmerman, L.A. Karriker, A.Ramirez, K.J.Schwartz, G.W. Stevenson and J. Zhang. Pp 357 – 358.