GB cattle quarterly report
Disease surveillance and emerging threats
Volume 25: Q4 – October- December 2019

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the fourth quarter of 2019, October-December. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland’s Rural College (SRUC) and partner post mortem providers and intelligence gathered through the Cattle Expert Group networks. In addition, links to other sources of information including reports from other parts of the APHA and Defra agencies are included. A full explanation of how data is analysed is provided in the annexe available on GOV.UK


Issues and trends

Weather

Q4 summary

The fourth quarter of 2019 saw regionalised heavy rain and some flooding across northern England, and Wales and parts of Scotland, which will have impacted on livestock not yet housed. Temperatures in the early part of the quarter were cooler than the 1981-2010 mean, but December was exceptionally mild. Generally, forage stocks this winter seem to be good.

Annual summary

2019 was a warmer year than the 1981-2010 average (Figure 1, right) which, viewed with the high proportion of warm years in the last ten years, suggests there is potential for a long term change in the pattern of growth for forage across the UK. Figure 1 (left) also shows the data for rainfall, which although the total for 2019 was about 107% of the 1981-2010 average, there were areas of the country where rainfall was much higher, and led to regional flooding in the Peak district and S Yorkshire in particular, and will have impacted on livestock health and welfare. Such more extreme weather events are predicted to become more frequent as global warming progresses. APHA has produced a risk assessment guide on the impact of flooding events on livestock for vets and farmers at

Dairy

Cumulative UK milk output for April – December 2019 was 115 million litres higher than the same period in 2018 despite of a reduction in output in the last three months of 2019. Level of production for 2020 are predicted to be similar to those in 2019 according to AHDB dairy. The average UK milk price for November 2019 was 29.69ppL, 1.9 ppL lower than the same period in 2018. This negative pressure on prices has influenced dairy farm profit predictions for 2020. The very wet start to 2020 has affected performance of seasonal spring calving dairy herds. Although grass growth appears to have been early and significant with the potential for an early spring, ground conditions are so wet that it is difficult to get cows to grass at this stage.

Colin Mason, SRUC

Beef

Quarter four 2019 started with a continuing reduction in prices generally, from a very poor start.

UK cattle numbers were reported to have reduced in all regions and across all sectors in an October AHDB report. Scottish cattle numbers were reported to be at a 60 year low.

Market analysis reports for the low prices pointed to higher storage of beef by processors, reduced commodity beef demand across Europe and reduced domestic demand in the UK, particularly for more expensive cuts, while total production was high, with September data
showing total production up 7% (year on year). Essentially, supply has been outstripping demand. There was some optimism for 2020, however, as supply is expected to reduce (linked to reduced numbers of breeding cattle in 2018) and possibly some positive impact of export markets to China (expected to open in early 2020), with world protein markets still affected by African Swine Fever in China.

Prices continued dropping to hit a low point of around 320ppKg deadweight, and did not show any upward trend until early November (peak demand is often in the run up to Christmas, and so prices often peak in November). Prices continued to rise to the end of the quarter, getting up to around 335ppKg, still well behind 5-year average figure of 350ppKg.

Tim Geraghty, SRUC

**New and re-emerging diseases and threats**

Please refer to the annexe on GOV.UK for more information on the data and analysis.

**Unusual diagnoses**

**Unexplained non-suppurative meningoencephalomyelitis**

An 18-month-old bull beef animal in a yarded group of 130 died 48 hours after showing nervous signs including ataxia, recumbency and paddling. Its condition did not improve after treatment with antibiotic, vitamins and corticosteroid. One other animal in the group had died earlier in the week after exhibiting similar signs.

Postmortem examination identified no specific gross pathology; the meninges were reddened and there was excess fluid in one of the limb joints. A pure growth of *E. coli* was isolated from the brain and the affected joint, likely to reflect agonal septicaemia. No *Listeria* species were isolated from the brain stem and the magnesium concentration within aqueous humour was within the reference interval. Histopathology indicated a severe diffuse subacute non-suppurative meningoencephalomyelitis with polyradiculoneuritis. The lesions were considered likely to be viral in origin; however, additional molecular testing ruled out infection by ovine herpesvirus-2 (the cause in UK of malignant catarrhal fever) and other herpesviruses, in addition to astrovirus and flavivirus (louping ill).

This is not the first such case identified by the APHA/SRUC/partner scanning surveillance network. Some cases with non suppurative encephalitis have proven positive for astrovirus infection, and cases of louping ill are sporadically diagnosed in cattle grazing tick-infested land. However, in other cases such as this one, no causative virus has been identified.
Salmonella Dublin osteomyelitis

An uncommon manifestation of an infectious disease was investigated at APHA Shrewsbury Veterinary Investigation Centre (VIC). Two euthanased male suckler calves were submitted a few weeks apart from unrelated Powys herds for postmortem examinations. They were 3 and 4 months old from herds of 60 and 70 animals. Over a period of several weeks, each similarly first became slightly lame on one foreleg, followed by increasing weakness of both forelegs. They spent more time down and had difficulty rising on their forelegs. The hindlegs were unaffected with normal strength and tone. They remained bright, and although there was increasing impairment the calves continued to suckle their dams though restricted by being recumbent. Various antibiotics, NSAIDs and steroids had been given with no improvement.

There were similar findings in the two calves. Removal of the spinal cord identified swelling of the underlying bone and cartilage at the level of the sixth cervical vertebra with protrusion dorsally into the spinal canal. Sectioning the spine longitudinally confirmed destruction of the sixth cervical vertebral body indicative of osteomyelitis. Salmonella Dublin was isolated in profuse growths from the lesion site of one of the calves, but not from the second, however for this calf serology by serum agglutination test (SAT) was strongly positive, supporting the same diagnosis of S. Dublin infection. There were no other signs of disease suggestive of S. Dublin infection in either herd.

Osteomyelitis is a rare presentation of disease caused by Salmonella Dublin. Healy and others (1997) reviewed 14 cases which were referred to the University of Dublin. Their series included dairy and suckler calves with an age range of 2 to 9 weeks at onset of clinical signs, and with a clinical course of between 5 days and 8 weeks, averaging 20 days. They described lesions variably in the sixth and seventh cervical, and the first thoracic vertebrae, affecting single vertebral bodies in eight cases and more than one in six.

![Figure 2: Swelling and destruction of the underlying bone and cartilage at the level of the sixth cervical vertebra with protrusion dorsally into the spinal canal](image)

Clostridium perfringens type D enterotoxaemia

A first-calved dairy heifer was submitted from a dairy herd of approximately 200 milking cows. The herd was at pasture and being supplementary fed grass silage and fodder beet.
The heifer had been seen by the submitting private veterinary surgeon the day before it died. It was recumbent, blind, exhibited twitching/trembling of the facial muscles and had an increased respiratory rate. It failed to respond to a variety of treatments, and subsequently died, and was submitted for postmortem examination. Haemorrhages were present within the omentum, on the mucosal surface of the trachea, on the epicardial and endocardial surfaces of the heart, the kidney cortices and the intestinal serosa. The pericardial sac contained serosanguineous fluid with a fibrin clot. Small intestinal contents were liquid and bloody and there was intense congestion of the mucosa. No bacteria were isolated and there was no evidence of lead toxicity. Tests for clostridial toxins within the distal small intestine content were negative. Histopathology on the brain identified a marked, multifocal, acute encephalomalacia consistent with *Clostridium perfringens* type D epsilon toxicity. This condition is only sporadically identified in cattle, with cases reported in all ages including one-day-old calves (Watson and Scholes 2009), growing cattle and adults. As in this case, the detection of epsilon toxin has been found to be poorly sensitive diagnostically compared with the histological identification of brain lesions (Jones and others 2015).

**Acute Paramphistomosis**

Disease caused by intestinal immature rumen fluke was first reported in cattle in the south west of England in 2012 (Millar and others 2012). In that year there was a particularly wet autumn. No other diagnoses have been made in England and Wales in cattle or sheep since, until this autumn in 2019, when it and was again identified at University of Bristol Farm Animal Pathology Service, Langford. A group of 15 to 17-month-old fattening cattle with unrelenting scour was investigated by postmortem examination of one of five which died. Whilst the upper intestinal mucosa was not particularly reddened, the content was extremely watery and many immature rumen flukes were seen when the contents were sieved (Figure 3).

![Immature rumen fluke in small intestinal content](image-courtesy-of-Michael-Millar-Farm-Animal-Pathology-Service-University-of-Bristol)

**Figure 3:** Immature rumen fluke in small intestinal content (Image courtesy of Michael Millar, Farm Animal Pathology Service, University of Bristol)

On histopathology many immature rumen fluke were seen attached to the mucosa, with associated inflammatory change (Figure 4).
The cattle had been grazing a particularly wet paddock where a sewer was discharging, presumably providing ideal conditions for the snail intermediate host, and subsequent release of many metacercariae.

![Image of H&E stained section of small intestine showing paramphistome larval form](image)

**Figure 4**: H&E stained section of small intestine showing paramphistome larval form (red circle shows the mouthparts) (Image courtesy of Nick Woodger, Finn Pathologists)

**Bleeding disorder/coagulopathy**

An unexplained coagulopathy was diagnosed by the Farm Animal Pathology Service, University of Bristol in a 4-month-old Dexter calf which had been found dead. Widespread ecchymoses, and larger areas of haemorrhage, were present throughout the carcase, including within the deep muscles of the legs, within the lungs and beneath the parietal pleura, and on the epicardial and endocardial surfaces of the heart. The brain was also very congested. No bacteria were isolated and additional testing ruled out lead poisoning and BVDv infection. Histopathology indicated widespread haemorrhages in various organs but there was no bone marrow pathology comparable with other bleeding disorders such as bovine neonatal pancytopenia. The possible causes of this unexplained coagulopathy which were considered include:

- Rodenticide poisoning; however, there was no access to rodenticides evident and there were no haemorrhages into body cavities
- Disseminated intravascular coagulation (DIC) of unknown aetiology; the usual cause is septicaemia and shock
- A clotting factor abnormality; this cannot be excluded and could suggest a genetic link, or it could be a sporadic occurrence.

**Ergotism in suckler cattle**

Disease was investigated in a herd of 80 suckler cows which had spring-born calves at foot, and were supplementary fed with baled silage from mid-September. The cows were housed late in October, when the farmer noticed that some were 'tender' or stiff on their hind legs. Over the next 2-4 weeks the affected animals gradually deteriorated. He attempted
treatment using antibiotic, thinking that the cows had ‘foul in the foot’, however there was little or no improvement.

The farm vet was consulted early in December 2019. At this stage two of the cows were recumbent and 10 others were severely affected such that on welfare grounds euthanasia was immediately arranged. One of the cows was submitted to APHA Shrewsbury VIC where postmortem examination revealed severe gangrene of the hind legs (Figure 5). A further 4 cows were euthanased over the next few days while the outcome of the investigation was awaited.

![Severe hindlimb gangrene in a cow due to ergotism](image)

**Figure 5:** Severe hindlimb gangrene in a cow due to ergotism

All affected animals had bilateral hind leg lesions, with only two also having fore leg lesions. They were reported to have continued to feed and nurture their calves at foot, none of which was affected. The farmer since noticed that six of the remaining cows have lost the ends of their tails, but their legs are unaffected.

The distal hind limb gangrene is consistent with a diagnosis of ergotism. A visit was made to investigate further and to try to identify the source of ergot. Ergot can be identified grossly in grain or silage as small black inclusions which may be seen protruding from the seed head and resembles mouse faeces. The onset of signs coincided with the feeding of baled silage which was made from an environmental conservation area (ECA). An ECA should not be cut for forage until after July 1st; in this case the farmer was unable to get a silage contractor until mid-September. Unfortunately, none of the bales from the ECA remained and it was therefore not possible to conclusively identify ergot-contaminated forage. Since
then alternative forage had been fed and there have been no fresh cases. Although second cut silage was also harvested at the same time as that from the ECA it is not suspected to be ergot-contaminated however, the farmer decided to discard these bales in an anaerobic digester and purchase replacement forage.

Advice on how to prevent ergot contamination in the future on this farm will be sought from an agronomist. It is considered likely that the late harvesting of the ECA facilitated the ergot contamination in this case. Two herds with ergotism were also identified by SRUC VS in Aberdeenshire last autumn, and outbreaks were identified in APHA VICs in water buffalo in 2009 (Millar and others 2010) and in dairy heifers in 1991 (Hogg 1991) which were all similarly associated with feeding contaminated silage. The changing climate and the desire to increase the areas of conservation land could lead to further cases, and practitioners should consider ergotism in any herds where cattle exhibit progressive hind limb problems.

**Hypomagnesaemia**

Three cows from a suckler herd of 40 were found dead; due to heavy rain causing flooding they had been housed about two weeks earlier and were fed silage. Postmortem examination at APHA Shrewsbury VIC found a purulent metritis and fibrotic pathology of the bile ducts in the liver consistent with past liver fluke infestation. The gall bladder was distended and the rumen was well filled with fairly fibrous forage. Biochemical analysis of the aqueous humour was done indicating a low magnesium concentration of 0.5 mmol/l (the blood magnesium reference interval is 0.8-2.0 mmol/l). Lead poisoning was also ruled out.

At APHA Thirsk VIC similarly, postmortem examination of an eight-year-old suckler cow which had been found dead in a herd of 120 animals, suspected hypomagnesaemia as the aqueous humour magnesium concentration was 0.6 mmol/l. The cows were fed on homegrown hay and haylage.

At APHA Penrith VIC hypomagnesaemia was diagnosed in a four-year-old lactating Holstein-Friesian dairy cow. The animal had calved 120 days previously and exhibited acute onset neurological signs including fitting before it became recumbent and died. Two other cows in the herd of 180 adult cows had presented similarly over the last three months. At postmortem examination vitreous humour was collected and biochemical testing confirmed a magnesium concentration of 0.4 mmol/l which was consistent with hypomagnesaemia. The diet fed to the cows was based on a nutritionist’s advice and included 12 kg concentrates via the robot system, in addition to grass silage, carrots, a protein blend and balanced minerals. Following this case dietary modifications were made and there were no further cases reported.

These three cases of hypomagnesaemia were all unusual as they occurred in housed animals, rather than at pasture, and in the last case in dairy cows on a supposedly balanced diet. A low eye fluid magnesium result may indicate a high probability of hypomagnesaemia but should not be regarded as an absolute diagnosis. Further investigations should be carried out to confirm diagnosis such as blood sampling animals in the cohort group.
Lysosomal storage disease

A Galloway calf was described to have been born able to hold up its head but could not stand. It also had an overshot lower jaw and a tremor when the head was manipulated. It was euthanased and examined postmortem. Other similarly affected calves were reported to have previously been born in the herd of 30 cows. The calf weighed only 19kg and was thought to have been born approximately four to six weeks prematurely. In addition to the undershot jaw, postmortem examination identified a domed skull, the eyes were smaller than normal and the brain had a flattened or compressed shape, with coning of the cerebellum and enlargement of some gyri. The lateral ventricles were dilated and contained an increased amount of cerebrospinal fluid. Due to the abnormalities in the brain the possibility of bluetongue virus infection was initially considered and was ruled out. Examinations for pestivirus and Schmallenberg virus infections by PCR testing were undertaken, with neither virus detected. Histopathology of the brain confirmed severe multifocal neuronal vacuolation with hydrocephalus, lesions consistent with lysosomal storage disease (LSD). Figure 6 below shows swollen Purkinje neuronal cell bodies with foamy cytoplasm (lysosomal storage material) and there are swollen axons within the inner granular layer (torpedos).

Figure 6: H&E stained section of cerebellar cortex of a calf with α-mannosidosis. Red bar is 20µm

Lysosomal storage diseases are enzyme deficiencies which are characterised by the accumulation of material within lysosomes. There are more than 30 inherited LSDs in humans, and a range of comparable conditions has been reported in a variety of domestic animals including cattle. Alpha-mannosidosis is rare in humans but is considered the most common and economically important disease in cattle. It has been particularly well
described in Angus cattle, and in addition affects the Murray Grey and Galloway breeds (Embury and Jerrett 1985, Jolly and Walkley 1997).

Most affected calves die shortly after birth, some surviving for up to a year, or exceptionally to 18 months, while some are aborted during pregnancy. Affected individuals have deficient lysosomal alpha-mannosidase enzyme, which is present in nearly all cells except hepatocytes. As a result of this defect, oligosaccharides accumulate in storage vacuoles and this affects the function of the cells. The effect on the cells of the nervous system produces the clinical signs. Head tremor, incoordination, aggression, nervousness and failure to thrive are features of the disease. Genetic testing is now available to screen breeding stock (https://weatherbysscientific.com/bovine_traits/).

Congenital Hepatic Fibrosis

Congenital Hepatic Fibrosis (CHF) was diagnosed in a two-week-old Aberdeen Angus calf submitted with a history of acute onset malaise and death. The carcase was strikingly jaundiced on gross examination and the liver was markedly firm and pale with prominent bile ducts on the cut surface. The gall bladder was massively distended, and bile ran freely from the liver tissue when incised. Histopathological changes in the liver were consistent with CHF, a severe form of ductal plate malformation or aberrant development of the biliary tree. CHF has been described in humans, calves and dogs. It is thought to arise from a genetic disorder which was considered most likely a spontaneous defect rather than a heritable trait in this case.

Husk re-infection syndrome and mannheimiosis

Four cows in a Derbyshire dairy herd of 300 were reported to have exhibited similar signs over a four week period. The cows were described to ‘froth’ at the mouth, exhibit increased respiratory rate and lose condition. Two of the cows had died. One of these, which had calved three weeks previously, was examined post mortem by the practitioner who observed an orange coloured liver and yellow fat suggestive of a metabolic problem; no further investigation was done. A cow which had been affected for four to five days became recumbent and was euthanased and submitted for examination. The 3-year-old animal was in poor condition weighing only 444kg. No lungworm were present in the airways but there were several randomly-distributed foci of consolidation with necrotic areas throughout the lung lobes (Figure 7). Also of note was marked reddening of the abomasal mucosa with numerous small raised nodular lesions. There was also a large area of yellowish necrosis within the muscles near one of the hip joints which was indicative of a contaminated injection. Thromboembolism was initially suspected as the cause of the lung lesions, however, histopathology indicated that the lesions were oriented on airways, rather than blood vessels as would occur with thromboembolism. The foci showed a two-phase chronic and acute reaction and were considered potentially to be due to ‘re-infection husk syndrome’, where animals which are partially immune suffer a significant lungworm challenge, but in such cases lungworm are not identified grossly. Histopathology on the abomasum confirmed an eosinophilic inflammatory infiltrate consistent with endoparasitism. A fourth affected animal on the farm subsequently died and was examined post mortem by
the practitioner who reported pneumonic changes and submitted samples of lung. Only contaminating bacteria were isolated and PCRs for viral pathogens were negative, however histopathology indicated a multifocal acute necrotising fibrinosuppurative bronchopneumonia, with oat cells and bacteria, the most likely cause being *Mannheimia haemolytica*.

![Image](image.png)

**Figure 7:** Randomly distributed foci of consolidation and necrosis consistent with re-infection husk syndrome

### Changes in disease patterns and risk factors

Please refer to the annex on GOV.UK for more information on the data and analysis.

### Enteric system

**Johnes disease**

A statistically significant decrease in diagnostic rate for Johne’s disease was seen in 2019 when compared to data from 2018. There was also a significant decrease seen between 2017 and 2018. These decreases were significant for APHA and combined GB data but not for SRUC data considered alone (Figure 8). The reason for this downward trend is not currently understood but may be related to a change in sampling and testing behaviour or an effect of increased engagement with Johne’s disease control, especially within the dairy sector. The Cattle Expert Group will continue to monitor this trend.
Salmonellosis

The annual data for *Salmonella* confirms the number of incidents of *Salmonella* spp isolated from bovine samples continues to be dominated by *Salmonella* Dublin. This has been the most common serovar for over 20 years in cattle with typical presentations being abortion, diarrhoea and systemic disease in young stock, although occasionally other manifestations of disease were diagnosed (see osteomyelitis case described above and occasional cases/outbreaks of systemic infection in adults). The significance of some of the exotic serovars which were isolated from animals with clinical disease was considered by the Cattle Expert Group. However, the incidence varies on an annual basis and further investigation into this area has been proposed. This will be considered in 2020. The unusual/exotic serovars are believed to have originated from imported feed. The updated
regulations relating to the cleaning of feed mills may have led to an increased risk of transmission of such serovars to the UK herd. Entry into cattle herds may then arise via subclinical carrier animals and feed, both straights and those produced in feed mills.

The Salmonella in Livestock Production in GB 2018 has been published on Gov.uk


Parasitic gastroenteritis (PGE)

PGE

A statistically significant increase was seen in the diagnostic rate for parasitic gastroenteritis (PGE) in 2019 when compared to 2018 (Figure 9). The increase was significant for combined GB data only. This change is likely to be related to weather conditions, with the dry, hot summer of 2018 leading to reduced survival of infective larvae on the pasture and consequently reduced number of diagnoses of PGE as a % of submissions tested. The wetter conditions seen in 2019 are likely to have allowed more infective larvae to survive with consequent increase in disease.
Figure 9: Annual incidents of PGE in all ages of cattle across GB as a % of diagnosable submissions (VIDA)

Liver fluke

A statistically significant decrease was seen in the diagnostic rate for fasciolosis in 2019 when compared to data for 2018 (Figure 10). This was the case for APHA, SRUC and combined GB data. This decrease is likely to be related to the dry, hot summer of 2018, which was not favourable for either the liver fluke or the snail host *Galba truncatula*. Although the summer of 2019 was much wetter and likely to have led to an increase in fluke and snail numbers, an increase in fasciolosis has not yet been detected from diagnostic submissions.

The life cycle of liver fluke, and development of disease following infection, is a slower process than seen with gastrointestinal nematodes. Wetter, more favourable conditions for fluke and the snail host in 2019 are likely to have led to high numbers of infective metacercariae being released onto pastures from August to October. Cows infected at this time may start to show clinical disease with fluke eggs detectable in faeces in late winter and early spring. Note that infections in cattle may be subclinical and require active monitoring for the disease, as part of a heard health plan.
Figure 10: Annual incidents of fasciolosis in cattle in GB as % of diagnosable submissions (VIDA)

Severe Summer Scour Syndrome (SSSS)

Two cases of suspected Summer Scour Syndrome from southwest England were investigated in July. These were reported in the Q3 report.

In summary, the two suspect cases were identified in the UK 2019, and at a later stage of disease. This farm will be investigated further in 2020 to try to obtain material from calves in an earlier stage of disease. The Republic of Ireland reported 4-5 suspect cases when, in recent years, around 15 has been more usual each year. The CEG and surveillance colleagues from RoI consider that this may be due to the drier grazing season experienced in 2020. We are continuing the project into 2020 and are keen to hear from colleagues in practice who suspect the condition. Please discuss in the first instance with your local surveillance provider.
Circulatory system

Bovine Neonatal Pancytopaenia

A significant reduction in the number of diagnoses of Bovine Neonatal Pancytopaenia (BNP) was observed in 2019. Cases have continued to be described in the UK in recent years, which likely reflected presence of historically Pregsure® vaccinated dams, but as these animals leave the national herd a decline in BNP cases is likely. However, the APHA and UK scanning surveillance colleagues have also recorded cases on BNP with an absence of Pregsure® vaccination, which may reflect an underlying low incidence of idiopathic BNP. The Cattle Expert Group is keen to hear of such cases.

The most recent quarterly newsletter for on farm chemical food safety has just been published on Gov.UK.


Horizon scanning

Bluetongue (BTV) update

The risk of introduction of BTV to the UK remains low.

In January 2020, there were reports of BTV-8 in Switzerland (1), Belgium (2), and France (1), BTV-16 in Greece (1), and BTV-4 in Italy (1). A map of the current BTV situation in Europe is shown in Figure 11.

For more information, see the updated situation assessment, at:
Figure 11: Bluetongue disease in Europe August 2019 – January 2020

References


Watson, P.J. and Scholes, S.F.E. (2009) Clostridium perfringens type D epsilon intoxication in one-day-old calves. Veterinary Record 164: 816-817
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