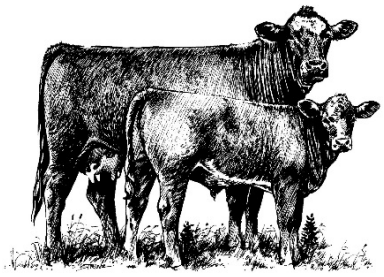
Animal & Plant Health Agency



SRUC

Great Britain cattle quarterly report - disease surveillance and emerging threats

Volume 28: Quarter 2 - April to June 2021

Highlights

- Schmallenberg virus enhanced surveillance update - page 3
- a review of Salmonella cases – page 5
- Osteogenesis imperfecta in Stabiliser calves – page 11
- facial paralysis in calves exposed to steelworks slag – page 13

Contents

Editor: Vanessa Swinson, APHA Thirsk
Telephone: + 44 (0) 208 5654574
Email: vanessa.swinson@apha.gov.uk

Introduction and overview

This quarterly report reviews disease trends and disease threats for the quarter 2 of 2021(April to June). 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

During quarter 2, the main cause for concern was having sufficient grazing for spring turnout, and the effects of marked changes in weather on forage quality, and pasture parasitic burden.

April began settled, but soon turned very cold, with some significant air frosts.

Many areas were very dry, with only parts of Wiltshire and northern Scotland exceeding 50% of average rainfall, making it the UK's fourth driest April in a series from 1862.

May was very unsettled and unseasonably cold, with frosts in many places and continued with frequent rain in most areas making it provisionally the UK's fourth wettest May in a series from 1862, with 171% of average (see figure 1).

The provisional UK mean temperature was 9.1 °C, which is 1.3 °C below the 1981 to 2010 long term average, making it the coldest May since 1996 (see figure 2). Sunshine was below average for most areas, which suppressed grass growth.

June was largely dry and warm. Areas from Wales and the Midlands northwards experienced less than a third of the usual rainfall in some areas, but south-east England was very wet, with more than double the average rainfall for some locations.

The dry weather and cold nights had a negative impact on grass growth and forage availability for livestock farmers. In July APHA re-issued the information note 'Hot weather and potential risks to livestock health and welfare'

A recent study undertaken by the University of Exeter was entitled managing extreme weather and climate change in UK agriculture: Impacts, attitudes and action among farmers and stakeholders (Wheeler and Lobley 2021).

This concluded that the main concerns for farmers included the impact of heat and drought on crop and grass growth, with knock-on impacts for yield and winter animal feed, the implications of heavy rainfall and flooding for soil run-off erosion and for field operations, such as drilling and harvesting.

However, some farmers felt there are more urgent issues to consider and/or that there was too much uncertainty around climate change to plan for it now.

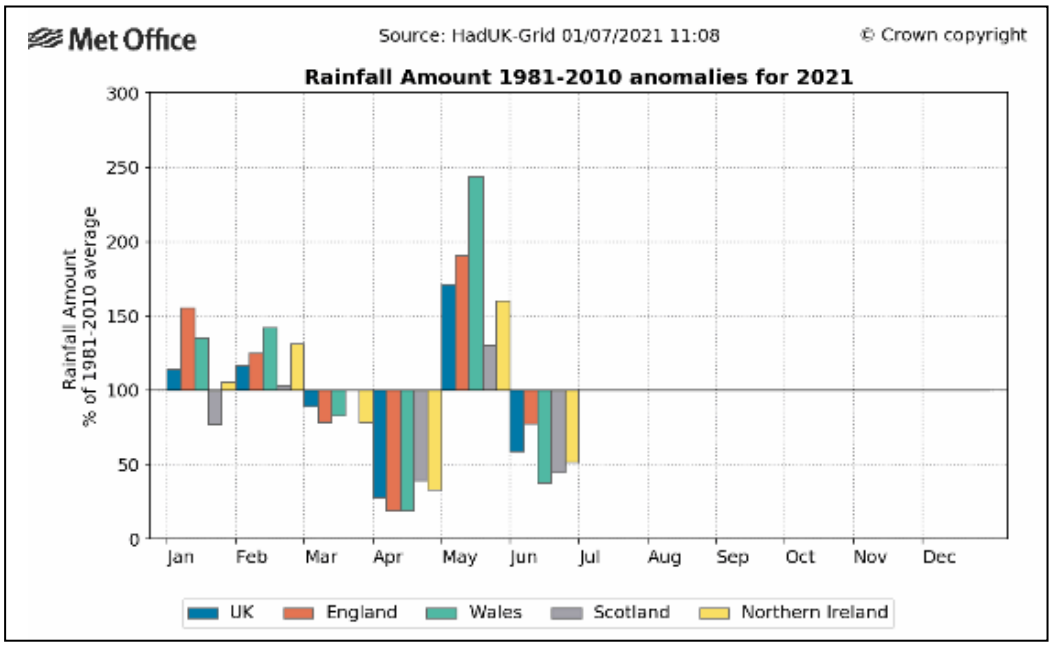


Figure 1: rainfall amount 1981 to 2010 anomalies for 2021

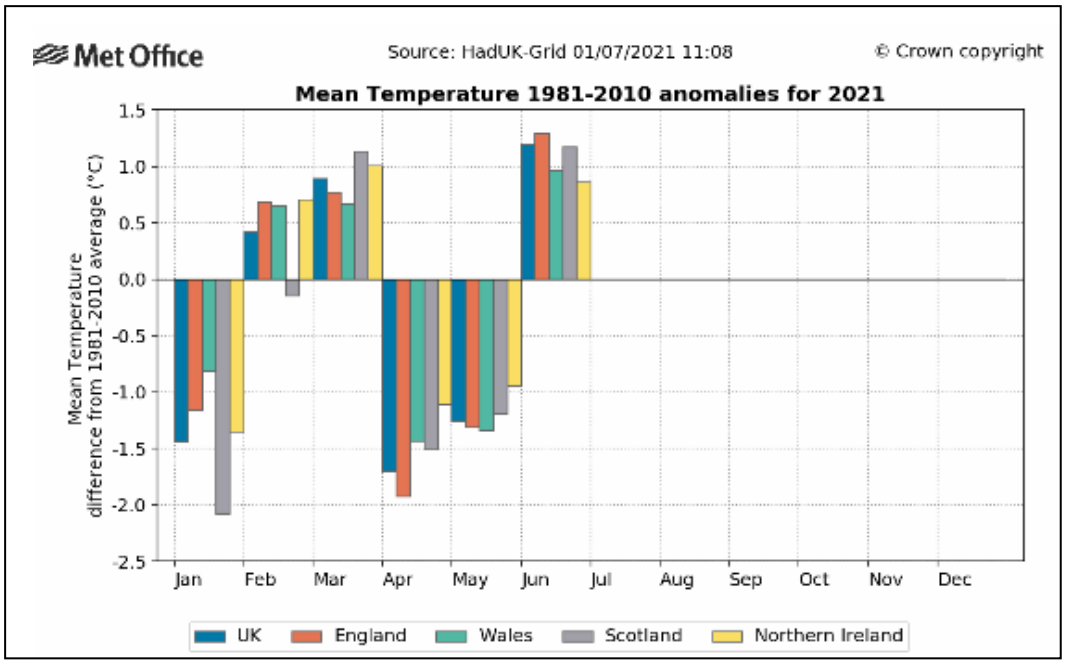


Figure 2: mean temperature 1981 to 2010 anomalies for 2021

Dairy update

To the end of June milk supplies have been falling from a very high seasons spring peak and are now in line with production outputs in 2020. This coincides with significant decreases in grass supply according to Grasscheck Great Britain.

At the end of June, grass growth on monitoring farms was only 42.7kg dry matter per hectare per day (DM/ha/day), which is 66% of the two year average at this time. This trend has continued throughout the summer, negatively impacting both grazing cows and forage supplies for the coming winter.

Despite the seasonal peak to milk production stable demand has helped to keep farmgate milk prices buoyant and, in some cases, prices have even increased further providing a positive outlook for the industry going forwards.

Predictions are that milk prices may continue to rise in coming months however, the challenge remains that this will be offset by higher feed, fuel, and fertiliser prices.

Towards the end of the quarter heat stress for both cows and calves was becoming a significant issue affecting herd health and productivity, a trend set to continue into the summer and quarter three.

Beef update

Quarter 1 ended with increasing prices, and this continued right through April, breaking 400 pence per kilogram (ppKg) getting to around 407ppKg average, before reducing slightly in early May.

Some international factors (reduced production in Europe, Brazil and Australia, demand from China) were generally increasing prices globally, though more local factors (strong retail demand and demand in EU) were more likely to be influencing UK prices.

When the price started dipping in May therefore, the wet weather was blamed, suspected to have reduced demand from eating out (given most places still required outdoor seating due to COVID-19 restrictions).

Prices did drop through most of the remainder of the quarter but were lifting again by mid-to-late June and finished well at around the 400ppKg mark.

Although the store market does not often closely match the finished prices, given the sustained period of excellent finished price it was no surprise that the store prices have been increasing steadily, particularly for native breeds.

There is a suggestion that supermarket driven native breed schemes may be behind this difference.

New and re-emerging diseases and threats

Schmallenberg virus enhanced surveillance update

During quarter 1 and 2 of 2021, several calves were submitted to investigate congenital deformities, under the enhanced surveillance for Schmallenberg virus (SBV) project. A total of four calves had positive SBV PCR test results. Other calves with similar pathology were also investigated, however SBV infection was not confirmed on PCR testing in these.

However, as the PCR test result can be influenced by the stage of gestation in which the dam was affected, a negative PCR result does not rule out SBV involvement. A low prevalence of affected calves was reported in those herds affected.

At APHA Veterinary Investigation Centre (VIC) Bury St Edmunds, fetopathy due to congenital SBV infection was confirmed by PCR testing in a fetus, expelled near to term, by a heifer from a 38 cow suckler herd. Severe deformities were recorded, with torticollis and arthrogryposis being the main ones.

Unusually, it also had brachygnathia superior, with its mandible about a centimetre longer than its maxilla (brachygnathia inferior is more commonly reported with SBV infection).

APHA VIC Starcross reported the following cases submitted in relation to SBV surveillance in quarter 2:

- SBV was detected via PCR testing of brain, which had been submitted from a beef fetus displaying congenital deformities. This dam was the only animal affected in the group of 70
- Arthrogryposis and torticollis were reported in a beef calf born by caesarean section, but the PCR was negative
- Arthrogryposis was reported in two beef cross calves, born without assistance on separate dairy farms. Schmallenberg PCR performed in the first case was negative. Schmallenberg antibody enzyme-linked immunosorbent assay (ELISA) testing of the affected dams was positive in the second case, however, brain was not submitted to perform confirmatory PCR testing

In Scotland a dairy farm imported 12 heifers from Germany in mid-April. A calf with torticollis and arthrogryposis was born one month after the animals arrived.

The practitioner performed an on-farm post-mortem examination (PME) and samples were submitted to SRUC-VS. Seroconversion to SBV was demonstrated in the dam, but a PCR for SBV on the calf’s brain was negative.

Histopathology of the calf brain and spinal cord identified micromyelia, with a marked reduction in the number of ventral-horn neurons and multifocal absence of ependyma, including within the mesencephalic aqueduct, with gliosis in the sub ventricular neuroparenchyma.

These lesions are typical of *in utero* orthobunyavirus (SBV) infection, towards the end of the risk period of 30 to 150 day's gestation.

The finding indicated that the dam was probably infected with SBV between September 2020 and January 2021 and would not have been viraemic at the time of importation.

In addition, April, when the calf was born, was considered to fall within the low-vector period, with lower than average temperatures.

Overall, the importation of these heifers was considered to represent a negligible risk of introducing SBV to the area. Screening of blood samples from the remainder of the imported group revealed the presence of antibodies to SBV in a further two animals, one of which originated from the same holding as the dam of the deformed calf.

Haematuria in organic dairy cows

The APHA Cattle Expert Group has received reports of at least four organic dairy farms on which cows have been affected with haematuria. The number of cows affected has ranged from 5 to 20. On two of these farms, blood biochemistry testing suggested renal compromise in a small number of the affected cows.

A common factor in the affected herds was the feeding of imported organic rape meal and the farms have reported that the issue improved, or resolved, when the quantity of rape meal being fed was reduced.

We would like to hear about any other similar cases to help with a greater understanding of this disease and if the criteria fit the case definition, the completion of our questionnaire would be of value.

Changes in disease patterns and unusual diagnoses

Salmonella Dublin osteomyelitis in a suckler calf

A three week old calf was received for PME at APHA VIC Shrewsbury. It was one of 10 calves which had become ill this spring, born to a group with 40 cows.

The calf which was received had had multiple treatments and was reported to have been 'walking on tip toes' on all four legs, leaning for support, and when recumbent, not wanting to get up. It weighed 71kg and was in fair to good condition.

The vertebral body of the 7th cervical vertebra was abnormal in shape with central necrosis and purulent infection, which had caused collapse of the vertebral body, and the overlying intervertebral disc membrane protruded into the spinal canal (see figure 3).

Salmonella Dublin was isolated from the vertebral body confirming salmonellosis. Although this is an infrequent manifestation of infection by *S*. Dublin several cases have been diagnosed PME in Shrewsbury in suckler calves (although it can also occur in dairy calves).

Figure 3: sectioned cervical vertebrae showing necrotic and purulent centre of the 7th cervical vertebral body causing distortion and collapse, plus protrusion of the overlying intervertebral disc membrane into the spinal canal

Other Salmonella cases, illustrating the variety of presentations of bovine salmonellae seen in quarter 2, are discussed below:

Salmonella Dublin

1. S. Dublin and Cryptosporidia were detected in two calves submitted to investigate the death of 10 calves in a group of 16, over two weeks. The two submitted calves were in poor condition and inadequate nutrition was considered a significant factor. A review of calf management and in particular feeding was recommended.
2. S. Dublin was isolated in septicaemic distribution, and Cryptosporidia were identified in the intestinal content of a two week old calf was submitted to investigate diarrhoea, tachypnoea and mortality.
3. S. Dublin was isolated from the faeces of a five day old calf submitted for PME. Calves on this farm were displaying recumbency, pyrexia and respiratory signs.
4. S. Dublin was isolated in purity from the foetal stomach contents of a set of twins, aborted at four months gestation on a dairy farm. The herd is housed all year round and 3 abortions had been reported recently.
5. S. Dublin infection was diagnosed in a freshly-calved dairy heifer submitted to investigate malaise, pyrexia, haemorrhagic diarrhoea, weight loss and milk drop. Advice was given regarding the zoonotic risk of *Salmonella.* The housing of sick cows in the fresh cow pen was likely to be a risk factor for introducing infectious

disease, such as *Salmonella,* to vulnerable animals, especially freshly calved heifers during a period of stress and adjustment. Vaccination can be used to help control this type of *Salmonella* infection.

6. S. Dublin was isolated from multiple organ sites and faeces in a five-week-old dairy calf with abomasal torsion.

Further information is available on the diagnosis and control of S. Dublin in a paper by Henderson and Mason (2017).

Salmonella Mbandaka and Salmonella Montevideo

1. S. Mbandaka and Johne's disease were identified in a four year old dairy cow, which developed diarrhoea and loss of condition.
2. S. Montevideo infection was confirmed as the cause of an abortion in a dairy herd of 130 cows, in which six abortions occurred in a two month period. This case history indicated that the organism is likely to persist on farms and, has the potential to cause significant disease.
3. S. Mbandaka was isolated from the faeces of a late gestational dairy cow, presenting with diarrhoea and pyrexia.

Salmonella Typhimurium U308

1. Scouring at around seven-days-old was reported in a group of suckler calves. S. Typhimurium U308, which is a fully sensitive *Salmonella*, was the only pathogen isolated from a faeces sample from an affected calf.

Further information on salmonellae in livestock can be found on GOV.UK.

Digestive system disease

Abomasal disorders

As was reported for quarter 1, abomasal disorders continue to be a prominent diagnosis, with a variety of presentations and pathogens involved. Some examples of quarter 2 cases are discussed below.

1. Enterotoxigenic (K99+) *E. coli* diarrhoea with abomasal lesions in pre-weaned dairy calves. *E. coli* (K99+ve) causes diarrhoea in calves less than 5 days old, and rapid death is a common feature.

2. Abomasal bloat in a five week old dairy calf with abdominal distention which was due to dilation of the abomasum. This was likely to have caused the death of the calf by pressure on the diaphragm resulting in respiratory failure.

3. Abomasitis and abomasal rupture in a nine day old dairy calf. A large perforation in the abomasal mucosa was noted, with a dark-brown discolouration to the abomasal mucosa, and emphysema and oedema of the mucosal folds. *Clostridium sordellii* was isolated from the abomasum on culture. Risk factors for abomasitis include poor quality powder, incorrect temperature, or concentration of feed, feeding of large volumes at irregular periods and dirty feeding equipment. In this case an area of scald was noted under the mandible, suggesting milk may be too hot when fed.

4. Abomasal volvulus in a nine week old beef suckler calf, which was the only calf to die out of a group of 90 calves. It had been noted to have a distended abdomen for a month. The abomasum had undergone a 360º rotation and the omasum was partially twisted also (see figure 4). Abomasal volvulus occurs sporadically in calves.

Figure 4: enlarged and reddened abomasum in a calf with a 360º abomasal volvulus (volvulus corrected prior to photograph)

Abomasitis and small intestinal obstruction in a dairy cow with pica

A four year old dairy cow was reported to have milk drop, inappetence and malaise for two days before it died. A further 7 to 10 cows were considered to have similar clinical signs, two of these had been diagnosed with a left displaced abomasum.

A large proportion of the herd was reported to be affected by pica (consumption of non-feed materials), characterised by eating stones from the cow tracks and around water troughs, in addition to plastic items such as buckets and pipes, and cubicle mattresses.

Reduced butterfat and milk protein concentrations were reported, followed by a reduced milk yield in the 430 cow herd, which block calves through February and March.

Although the cows were at grass, they were also fed 5kg per head per day of cake in the parlour, and salt blocks and powdered free-access minerals were available. Additional phosphorus had been added to the drinking water in the 2 weeks previously, without improvement in the pica.

Post-mortem examination of the cow identified reddened abomasal mucosa, with in-excess of 5kg of stone fragments up to 2cm diameter in the lumen.

The jejunum was distended with watery brown fluid, and the terminal 15cm of the ileum was impacted with stone fragments, this was associated with serosal and mucosal haemorrhages (see figure 5).

The pica observed in cows in the herd had led to a large quantity of stones accumulating in the abomasum and terminal ileum, this had caused inflammation and eventually impaction of the ileum. The mucosal damage probably allowed absorption of bacteria and/or toxins into the circulation with death occurring due to toxaemia and shock.

Figure 5: impaction of terminal ileum with stone fragments in a cow with pica

Respiratory system

Respiratory disease: quarter 2 of 2021

The number of diagnoses for pathogens associated with respiratory disease tends to see a decrease from April onwards, a consequence of warmer weather and animals being turned out at grass.

There were no significant trends for respiratory disease to report for quarter 2 of 2021 for England, Wales, and Scotland.

Systemic and circulatory disease

‘Cold cow’ syndrome

Two Shrewsbury practitioners described cows at pasture which had developed perineal oedema. In the worst affected herd of 200 cows there were around 20 affected animals, with diarrhoea also a feature.

The cows had recently moved onto fresh pasture, consisting of grass mixed with timothy and chicory, and a dietary cause was suspected at first. One cow was initially unexpectedly found dead, this was examined by the practitioner, but was severely autolysed and may not have been related to the others.

The next day the 20 cows showed variably marked perineal swelling, the herd had dropped 100 litres of milk, and most of the affected animals were also diarrhoeic.

When the practitioner called the next day, only the one cow which was photographed was still affected (see figures 6 and 7 which show ‘before’ and ‘after’ pictures of the cow respectively). This combination of signs is suspicious of 'cold cow syndrome' which is rarely reported in early spring.

Perineal oedema is not always a feature and some cows can have cold extremities, hence the name. Ataxia or ‘drunkenness,’ and an odd respiratory noise, have also been reported in some cases.

As with many 'syndromes' its aetiology is unknown, it has been suggested that there could be zearalenone produced by mycotoxins on pasture, although there is no evidence. If the cows are moved off the pasture, or given alternative feed, the condition is meant to self-resolve and the same pasture can be used again.

Figure 6: one of around 20 cows affected with perineal oedema'

Figure 7: much reduced but still noticeable oedema 24 hours later

(Images courtesy of the practitioner)

Aortic rupture in a suckler cow

Two suckler cows in a group of 30 died within a few days of each other. The herd of 120 cows had been turned out about a month.

The second animal which died was noticed to be quieter than normal, being usually rather 'savage', and was slightly unsteady on its feet. It did not eat its concentrates and was brought in and offered hay and water. It later drank water but was found dead the following morning.

PME at APHA VIC Shrewsbury confirmed generalised carcase pallor. Within the abdomen was much watery blood and blood clots, and a large blood clot was present around the aorta and in the retroperitoneal space surrounding the kidneys (see figure 8). An intraluminal thrombus consisting of soft necrotic exudate was present within the aorta, and this had caused erosion of the vessel wall.

Histopathology confirmed severe focally extensive chronic mural thrombosis with necrotising and proliferative vasculitis. The underlying primary insult which had caused the thrombus could not be determined; bacterial, fungal, or migratory parasitic infections were considered possibilities.

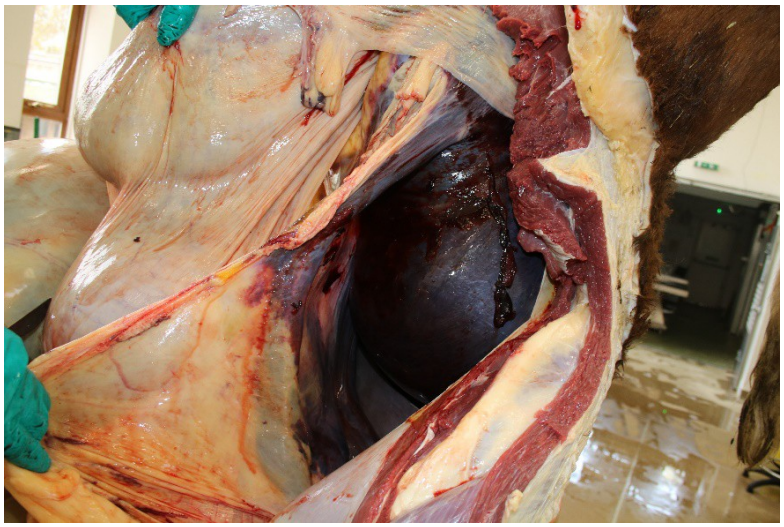


Figure 7: massive retroperitoneal haemorrhage around the right kidney

Musculoskeletal system

Osteogenesis imperfecta in Stabiliser calves

Three Stabiliser calves which were aborted in late pregnancy were received from three separate farms. The farmers and practitioners considered that the calves had abnormal limbs, and undershot lower jaws, and were concerned about the possibility of SBV infection.

The three calves had similar pathological features including multiple broken bones and healing fractures of the ribs, indicating that they had occurred earlier in gestation.

Another consistent feature was a blue-grey colour of the sclera of the eyes. The pathology was suggestive of osteogenesis imperfecta (OI) or ‘brittle bone disease.’

Histopathological examination of bones from each of the calves identified normal progression of endochondral ossification at the physes, but the cortices were thin and porous with only mild osteoid deposition and remodelling of the spongiosa, and notably thin and poorly connected primary trabeculae extending deep into the metaphysis.

The rib fractures had spicules of woven and laminar bone, arranged haphazardly, with proliferating fibroblasts, among a loose myxoid matrix, and multifocal haemorrhages. The skull had interconnected, radiating spicules of lamella and woven bone. This combination of lesions was consistent with OI.

Figure 8: marked doming of the skull in a calf with osteogenesis imperfecta

OI is a disorder of collagen production which results in weakened bones that are prone to fracture. Other features in calves include joint laxity, blue-grey sclera and abnormal dentine (dentogenesis imperfecta). Skin fragility has been observed in other species, though not in calves.

There are several forms of OI recognised in people, and in cattle OI has been reported in Holstein-Friesians, Fleckvieh and in Red Angus. In animals it is generally thought to be analogous to the type II OI (lethal form) in humans, which is associated with mutations in the COL1A1 and COL1A2 genes for collagen production.

In humans and in several reports of OI in animals, these are autosomal dominant and lethal, arising as do novo mutation in the affected individual or germ line mosaicism in the parent, and which may be the case here.

Each of the herds had used artificial insemination (AI) and all of the calves had the same sire. Three affected calves were reported in a group of 35 heifers and cows in one herd, there were also three affected calves in 21 heifers in the second herd, while only a single affected calf was reported in the third herd of 39 heifers and cows.

The findings have been reported to the breed society and to the AI company who have suspended sale of the bull semen, and further investigations into its suspected genetic origin are continuing.

Urinary System

Haemolytic leptospirosis with septicaemic pasteurellosis in a calf

A 10 day old beef suckler calf was submitted to the RVC's Farm Animal Pathology department following a clinical history of sudden death. The farmer reported having lost a few calves of similar age this year.

The submitted calf was well sized. It had widespread petechial and ecchymotic haemorrhages including in the subcutaneous tissue, omentum, kidneys, spleen, thymus, adrenal cortex and heart to such a striking level reminiscent of Bovine Neonatal Pancytopenia.

There were also orange serosal and joint effusions and the liver was slightly firm and large. Bacterial cultures revealed systemic infection with *Pasteurella multocida* and a relative failure of passive transfer of immunoglobulins (zinc sulphate turbidity (ZST) = 11 units (reference range less than 20 units)).

Histopathological examination revealed additionally a slightly unusual mild interstitial nephritis and dissociation of hepatocytes, which prompted additional PCR on kidney tissue for Leptospira spp. The PCR confirmed presence of a pathogenic Leptospira spp, which a research PCR at the RVC identified as *Leptospira icterohaemorrhagiae* and *L. copenhageni*.

Rats are considered the usual maintenance host for these *Leptospira spp*, but spillover into incidental hosts (for example, cattle) can result in haemolytic disease as in this case.

A diagnosis of haemolytic leptospirosis with septicaemic pasteurellosis was made in the submitted calf, but the significance of both pathogens for the previous calf deaths remains unknown.

Nervous System

Facial paralysis in dairy calves exposed to steelworks slag

A seven-week-old, crossbred dairy calf from a spring calving herd of 500 was examined post-mortem at APHA VIC Carmarthen.

It had a two-week history of having head swelling, ear droop (see figure 10), lameness and weight loss, with five other calves of a group of 12 to 15 also unwell, some but not all also showing head swelling. The calf had also exhibited a high temperature and laboured breathing and not improved after treatment with antibiotic and a non-steroidal anti-inflammatory.

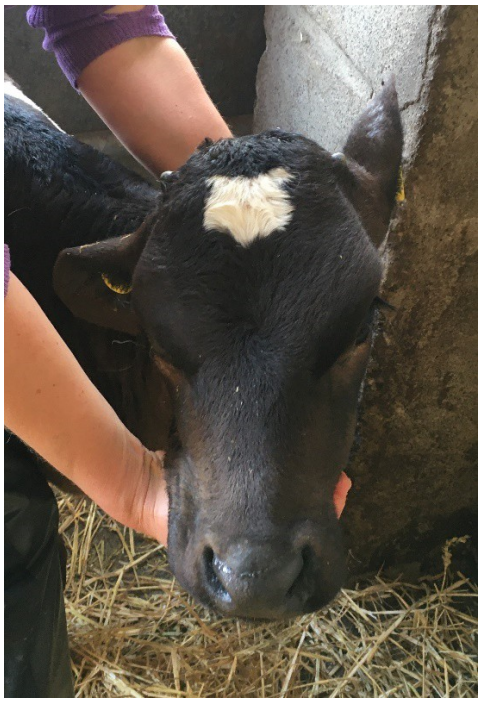


Figure 9: ear droop in a calf with facial paralysis

At PME diffuse firm thickening of the sub cutis of the face, nasal planum and muzzle was evident, with similar pathology affecting two teats. Lymphadenopathy and enlarged tonsils, with dark grey particles on the mucosal surface, were also identified.

Black inorganic material was present in the abomasum, this was suspected to be steelworks slag, which had been stored in the calf shed during the previous winter.

The slag is a by-product of steel manufacturing that some farmers use as a liming agent for soil improvement, due to its high pH and trace element content.

Histopathology of skin samples from the face of the calf confirmed marked inflammation and necrosis of the submucosa and sub cutis, possibly centred on the panniculus muscle, but without apparent significant injury to the overlying epidermis or mucosa.

The underlying aetiology was uncertain, and it was considered suggestive of a toxic, or possibly infectious, insult to the panniculus muscle or microvasculature. Testing ruled out a range of infectious agents including bluetongue virus.

A visit to the farm was undertaken to investigate further. Other calves also had facial paralysis but were quite bright, eating and drinking and not pyrexic. Small deposits of the steelworks slag were found around the outside of the calf shed and in one feed trough (see figure 11).

Figure 10: steelworks slag on a farm with calves with facial paralysis

The underlying cause of the clinical signs and pathological lesions was not established. It was considered possible that the exposure to and/or consumption of steelworks slag could have been causative.

It was speculated that the sharp, particulate nature of the slag could have penetrated the mucosal surface, such as via the tonsil or gingiva, leading to inflammation and necrosis of subcutaneous and submucosal tissues.

Eruption of deciduous incisors in the first month or so of life could also have been a portal of entry. It was advised that calves and other stock were prevented from access to the slag, that the shed and all equipment be thoroughly cleaned, and that care should be taken to ensure safe future storage and handling of this material.

Skin

Epitheliogenesis imperfecta and dermal dysplasia in Shorthorns

A near full-term fetus was submitted to APHA VIC Starcross from a block calving Shorthorn beef herd. It was the second abortion in the group, with both affected calves considered to be deformed. The skin of the foetus was diffusely reddened and hairless, apart from a longitudinal area over the shoulders and irregular areas of hair on the rump and the head. Numerous pale cream circular raised lesions were present on the hairless areas (see figure 12).

The ears were also abnormal and there was a complete absence of eyelashes and keratinised hoof. The lower jaw was also undershot (brachygnathia inferior) (see figure 13).

Testing for infectious agents including SBV was unrewarding. Histopathology on the skin confirmed lesions consistent with epitheliogenesis imperfecta and dermal dysplasia.

This condition is an autosomal recessive congenital skin disease affecting several cattle breeds including Holstein-Friesian, Hereford, Ayrshire, Jersey, Angus, Dutch Black Pied, Swedish Red Pied and German Yellow Pied, in addition to Shorthorns.

Figure 11: hairless skin with pale cream circular raised lesions

Figure 12: undershot jaw and ear abnormality in a calf with epitheliogenesis imperfecta

Reproductive system

Several cases of congenital deformity were seen over the post-mortem provider network during quarter 2 of 2021. Some of these are discussed above (under SBV, osteogenesis imperfecta and epitheliogenesis imperfecta) and others are discussed here.

Schistosomus reflexus (SR)

At APHA VIC Starcross a calf with SR congenital deformity was reported in a dairy calf born by caesarean section. A SBV PCR was performed on the brain and was negative.

The dam was tested and was shown to have seroconverted to SBV, indicating exposure to the virus, although not necessarily associated with the most recent pregnancy. SR is not a congenital defect which has been reported associated with SBV infection and is

considered a sporadic malformation. Interestingly the veterinary practice which identified the case reported an increased number of calves with this defect across their area this spring.

Earlier this year APHA VIC Shrewsbury examined a calf with SR, being the second successive calf born with similar abnormality in a group of 10 cows. It was in fact one of a set of twins, the sibling calf showing no congenital defect.

In a second suckler herd of 60 cows two schistosome calves were born two and a half weeks apart, and a third calf was reported with no sternum and an ‘open’ abdomen’ (or ‘sternal foramen’) which is considered another variation of the schistosomus deformity.

A recent ‘case report’ in the BCVA Cattle Quarterly discussed 15 cases in a large north Wales practice over a four-year period from 2016 to 2020 (Kemp 2021). There were 15 calves identified with SR and based on the number of calls for dystocia over that period being 2,415, the prevalence of SR was 0.62%.

This compares with a 20 year Australian study which reported a prevalence of 1.3% (Knight 1996). There is no data for the prevalence in the UK. In the north Wales study at least five of the cases were carrying twins with only one of the twins affected.

Neural tube closure defect

A fetus submitted from a dairy farm was examined post-mortem at APHA VIC Starcross. It had kyphosis, arthrogryposis, polydactyly, a large flap of skin attached to the spine, cleft lip, a flattened skull, and a meningocoele in the caudal skull attached to a visibly small cerebellum. Bacterial and viral infections were ruled out, including BVD and SBV, and testing for neosporosis was also negative.

Histopathology identified a severe cerebellar dysplasia and porencephaly with focal ependymal dysplasia indicative of a neural tube closure defect. Viral agents are not normally associated with such pathology and a spontaneous genetic mutation was thought most likely.

Multiple congenital defects in a pedigree Longhorn herd

‘Leg deformities’ had been reported in previous years, affecting one or two pedigree beef cattle grazing an area of conservation land. However, this year six of the 39 cows produced affected calves, all which were born three to six weeks prematurely.

Two of the affected calves were submitted, and pathological examinations confirmed lesions of kyphosis, scoliosis, and arthrogryposis and carpus valgus/varus (see Figure 14). BVD, SBV and *Neospora caninum* infections were ruled out by PCR testing, and no bacterial or fungal agents were identified.

No definitive cause of the defects was identified by brain and spinal cord histopathology. A genetic or hereditary aetiology was considered the most likely cause, and it was advised that the breeding history was investigated.

Figure 13: limb and spinal deformities in a Longhorn calf

Other non-infectious *in utero* insults that are considered potential causes of arthrogryposis include:

- specific plant toxins (plants containing certain quinolizidine or piperidine alkaloids such as lupins and hemlock)
- maternal systemic factors (hyperthermia has been confirmed as a cause in sheep)
- restriction of movement in utero due to insufficient uterine luminal volume, increased myometrial tension or less amniotic fluid than usual (oligoamnios)
- association with other malformations (congenital contracture syndrome or abnormalities of the neuromuscular junction and skeletal muscle)

It was proposed that the insult occurred in early gestation (less than 60 days) and hence the inherent difficulties associated with such investigations. A farm visit was offered during this risk period to identify any potential teratogenic plant exposure.

Congenital diaphragmatic hernia in a suckler calf

A one-week-old Stabiliser calf was submitted for PME. It had become recumbent after developing tachypnoea, tachycardia and increased lung sounds on auscultation. The abomasum had ruptured and there was brown fluid coating the abdominal viscera.

The lungs were partially collapsed and there was increased amount of pleural fluid. The heart was positioned immediately adjacent to the liver and it had an enlarged right ventricle, and there was no discernible diaphragm.

The findings were consistent with congenital peritoneo-pericardial diaphragmatic hernia (CPDH), which is infrequently identified in cattle (Hicks and Britton 2013).

At the time of submission, the affected calf was the only loss reported of 10 calves born in the herd of 60 cows, and this was likely to be a sporadic congenital defect. However, additional post-mortem examinations were recommended if further losses occurred.

Abortion

Border disease virus

Four cows in a dairy herd of 250 were reported to have aborted or suffered a resorption between the second and fifth months of gestation. The cows were otherwise not unwell and were vaccinated against BVD, leptospirosis and IBR. BVD tag testing had been carried out for the last two years.

Fertility in the herd was reported to be good. The fourth calf which was aborted was submitted to APHA VIC Shrewsbury for investigation. It weighed 6.1kg and was partially haired, consistent with its reported five months gestational age. No gross pathology was present. Bacterial cultures identified no significant bacteria, and no fungal hyphae were detected microscopically.

PCR testing of the thymus confirmed border disease virus (BDV) infection. Sporadic cases of BDV infection have been identified in the UK, since PCR testing to identify the different pestiviruses was introduced in 2004, including cases of suspect mucosal disease, and abortions and stillbirths (Cranwell and others 2007).

Since 2004, APHA VIC Penrith molecular testing unit has only identified BDV 21 times in cattle samples, compared with 991 submissions where bovine viral diarrhoea virus (BVDv) was identified. BVD vaccination is not considered to confer protection against BDV, and there is no BDV serological testing available in cattle.

The source of infection in this herd was uncertain, there is no direct contact with sheep. Further investigation for the virus was being considered, initially by testing the bulk tank.

Campylobacteriosis

A second trimester aborted calf weighing only 2.6kg was submitted from a 120-cow dairy herd. Four abortions had occurred during 2021, at approximately one per month. Fertility in the herd, which uses only natural service, was reported to be good. *Campylobacter fetus venerealis intermedius* was isolated from the stomach content using selective media.

This organism, which is similar to *Campylobacter fetus venerealis*, is a cause of abortions, and usually poor fertility, and is spread by natural service. Control relies on switching to artificial insemination, attempting to treat the bulls if they are of appropriate age, and possibly using an imported vaccine which can be obtained with a Special Imports Certificate.

Centre of Expertise for Extensively Managed Livestock

Tick-borne disease

As discussed in the quarter 1 report, we are offering free PCR testing for babesiosis on Ethylenediaminetetraacetic acid (EDTA) blood samples during the 2021 grazing season. These can be submitted from up to three cattle displaying clinical signs of babesiosis, per farm, during the current grazing season.

The information gathered will contribute valuable surveillance data on babesiosis and other tick-borne pathogens in England and Wales. Two cases have already been recorded in Northumberland during quarter 3 of 2021 and the submission pattern so far suggests that we are not going to see a summer dip in cases, as has been seen in other years.

Chemical food safety

Lead poisoning in group of 18 to 24 month old cattle due to soil ingestion

A group of 18 to 24 month old cattle were placed on a field of fodder beet in mid-March with access to silage (made on a different holding) and ad lib mains water.

Ten days later, one animal was affected with signs of blindness, drooling and lethargy, it was euthanised. The next day, five more were affected with a similar clinical presentation, with one further death. The animals were immediately moved from this field prior to the second animal to die being submitted for investigation.

The PME was unremarkable, and the brain did not fluoresce, making cerebro-cortical necrosis (CCN) unlikely. Kidney lead was 9.90 mg per kg fresh tissue (FT) (normal range 0 to 0.15 mg per kg FT).

A blood sample from the first case tested via a private laboratory was 2.33 µmol/l (normal range 0 to 0.15 µmol/l). Subsequently the farmer arranged for soil testing, which confirmed high lead in the soil in the field where the fodder beet was grown, the soil lead was over 1250 mg per gram (ppm).

There was a history of lead mining in the locality. In total 20 animals out of 50 were affected with three deaths. Advice was given on protecting the food chain and on how to minimise exposure of livestock in the future. This is aimed at minimising soil ingestion, using permanent pasture, and avoiding soil disturbance and poaching, such pasture is not suitable for growing root crops.

Further reading on managing pasture with high soil lead

- Payne, J. and Livesey, C. (2010), Lead poisoning in cattle and sheep. In Practice, 32: 64 to 69. https://doi.org/10.1136/inp.b5672. Food Standards Agency (FSA) Wales are informed of all such cases.
- The latest Chemical Food Safety report can be found on GOV.UK

Horizon scanning

Bluetongue (BTV) update

APHA no longer has access to the EU's Animal Disease Notification System (ADNS), hence we are now only using World Organisation for Animal Health (OIE) data (for mapping) and continue to monitor the weekly outbreak summary data published by the new EU Animal Diseases Information System (ADIS).

Recent OIE reports include one report of BTV-4 by Spain (Mallorca) reported on 27 July 2021.

This outbreak, along with nine others in the same area, where cattle and sheep were both affected, the first case was picked up by sentinel surveillance in cattle followed by a further nine clinical cases in sheep. France and Belgium still remain as restricted areas, as of 7 July 2021, according to the European Commission.

BTV levels in Europe for February to August 2021 are shown in figure 15.

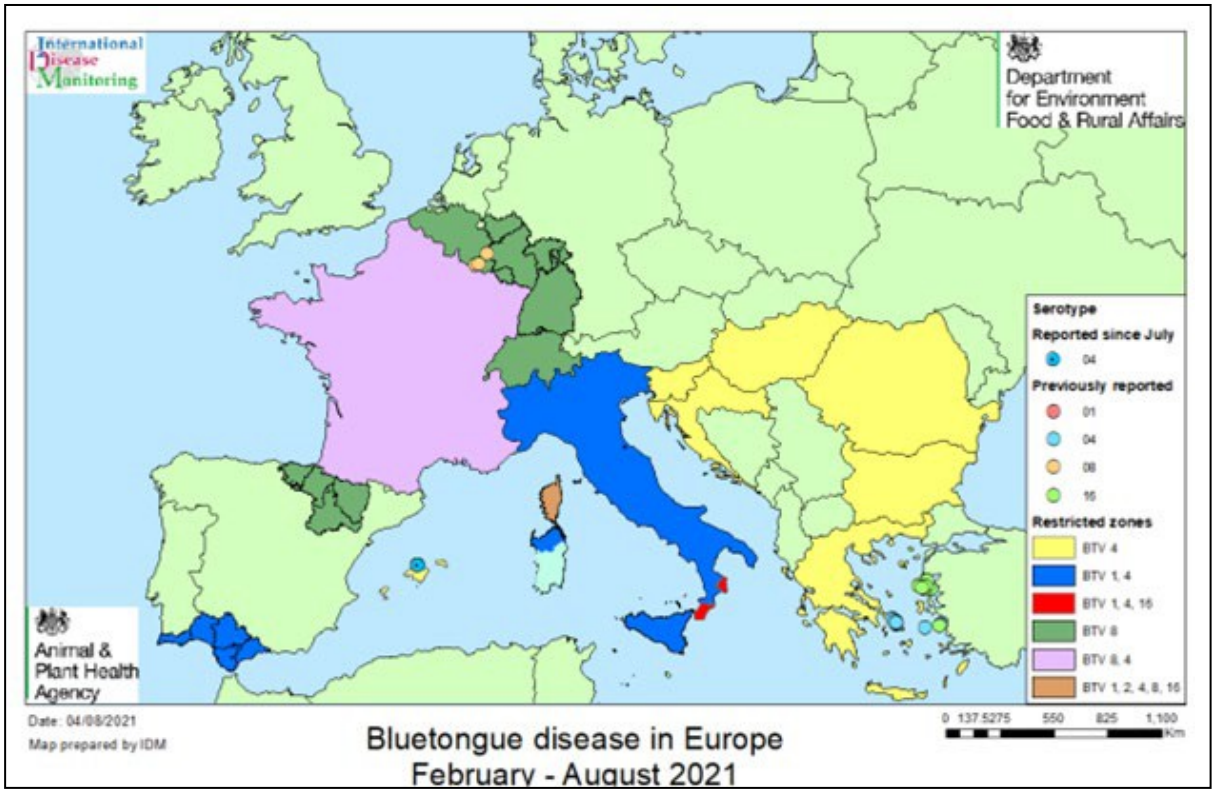


Figure 14: BTV levels in Europe for February to August 2021

Further reading

For more information:

- see our Outbreak Assessment on GOV.UK
- APHA have released a series of graphics on Facebook and Twitter to inform keepers of BTV.
- the updated BTV situation assessment on GOV.UK
- read our guidance on Bluetongue: how to spot and report the disease
- follow us on Twitter for updates on BTV status in UK

Publications

Written by APHA Staff

APHA (2021) Disease surveillance in England and Wales, June 2021. *Veterinary Record 189 (1) 21 to 24*

Millar M, Foster A, Borgeat K, Adams J, Woollatt S, Floyd T, Jewell N, Swinson V, Moore J and Strugnell B (2021) Congenital heart defects in calves. *Veterinary Record 189 (1)* 25 to 27

Fenemore, C., Floyd, T. and Mitchell, S. (2021) Rumen Fluke in Great Britain. Journal of Comparative Pathology 184, 31 to 36

Teale C. and Borriello P. A proposed scheme for the monitoring of antibiotic resistance in veterinary pathogens of food animals in the UK. Veterinary Record, e201

Bartley DJ, Jewell NJ, Andrews LM, Mitchell S and Morrison AA (2021)
Molecular and phenotypic characterisation of fenbendazole resistance in a field-derived isolate of *Ostertagia ostertagi*. *Veterinary Parasitology 289, 109319*.

Publications of interest

References

Cranwell, M. P., Otter, A., Errington, J., Hogg, R. A., Wakeley, P. and Sandvik, T. (2007) Detection of Border disease virus in cattle. Vet Rec 161, 211 to 212

Henderson, K. and Mason, C. (2017) Diagnosis and control of Salmonella Dublin in dairy herds. In Practice 39, 158-168

Hicks, K. A. and Britton, A. P. (2013) A fatal case of complicated congenital peritoneopericardial diaphragmatic hernia in a Holstein calf. Can Vet J 54, 687-689

Kemp, M. (2021) Case report. BCVA Cattle Quarterly, 4 to 5

Knight, R.P. (1996) The occurrence of schistosomus reflexus in bovine dystocia. Aust Vet J 73, 105 to 107

Wheeler, R. and Lobley, M. (2021) Managing extreme weather and climate change in UK agriculture: impacts, attitudes and action among farmers and stakeholders. Climate Risk Management 32, 100313

Statement regarding use of this material

This publication is available at:

https://www.gov.uk/government/collections/animal-disease-surveillance-reports

Any enquiries regarding this publication should be sent to us at SIU@apha.gov.uk

http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm

The Animal and Plant Health Agency (APHA) is an executive agency of the Department for Environment, Food & Rural Affairs, and works on behalf of the Scottish Government and Welsh Government.