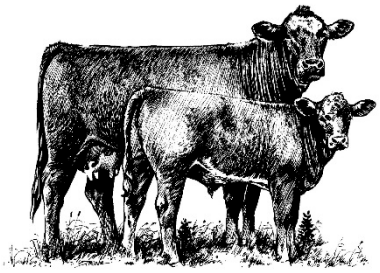
Animal & Plant Health Agency



SRUC

Great Britain cattle quarterly report

Disease surveillance and emerging threats

Volume 29: Quarter 3 July–September 2021

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter of 2021 (Q3), July - September. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland's Rural College (SRUC) and partner postmortem 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
https://www.gov.uk/government/publications/information-on-data-analysis

Issues and trends

APHA's Scanning Surveillance Network in England and Wales

The APHA's post-mortem examination and diagnostic testing service provides a major component of the GB scanning surveillance network. The network works closely with vets and farmers to detect and investigate new or re-emerging disease and diagnose endemic diseases in farm animals.

Key points about accessing PME in APHA's scanning surveillance network:

- Each PME Provider has an assigned area as shown in colour on the map on this link: Surveillance network map for England and Wales
- Within each assigned area, the hatched area shows where premises are eligible for free carcase collection and delivery of animals to the PME Provider
- Premises within non-hatched areas need to arrange to deliver animals themselves
- The postcode search tool identifies and provides contact details for the allocated PME provider and indicates if the premises is eligible for free carcase collection. This is based on the postcode of the premises from where an animal is to be submitted rather than a veterinary practice: APHA postcode search tool
- To arrange a PME, the vet calls the relevant PME provider to speak to the duty VIO/vet
- There will be some livestock premises for which the allocated PME provider has changed, and the free carcase collection service may no longer be provided for some holdings. The APHA postcode search tool allows farmers and vets to see the situation for individual premises.

More information about APHA's scanning surveillance and diagnostic services is available on Vet Gateway (link) below and in the attached farmer and vet information leaflets, which include a map showing the PME sites:

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

Weather

In general the summer months have had lower than average rainfall (Figure 1) and it has been warmer than average (Figure 2).In July the UK mean temperature was 16.6 °C, which is 1.5 °C above the 1981-2010 long-term average; the fifth warmest July for the UK in a series from 1884. In September the UK mean temperature was 14.7 °C, which is 2.1°C above the 1981-2010 long-term average; and ranks it as the second warmest September in a series from 1884.

With COP 26 convening in Glasgow during November, minds are focussing on climate change and the impacts of global warming. There has not only been extensive debate on the role livestock play in methane emissions, but also the role livestock farming plays in carbon sequestration. However, what is clear is that a healthy and efficient livestock industry is a vital part of sustainability in these changing times.

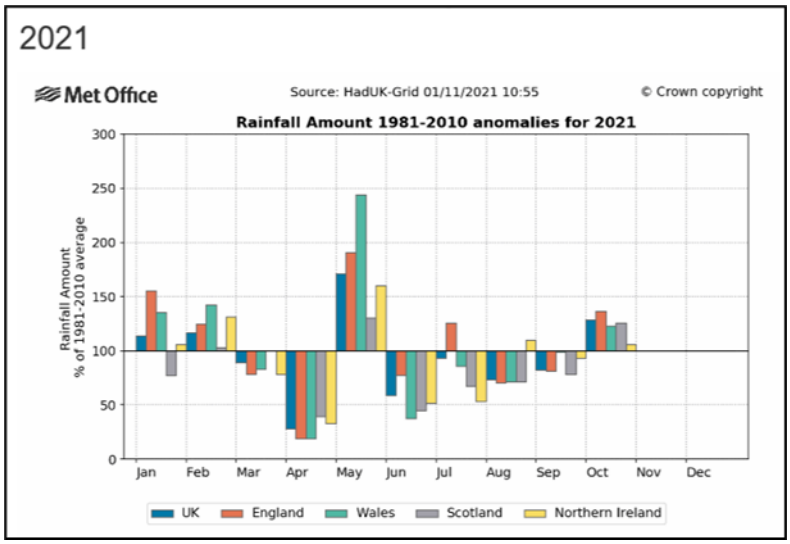

Figure 1 - Rainfall amount 1981 -2010 anomalies for 2021

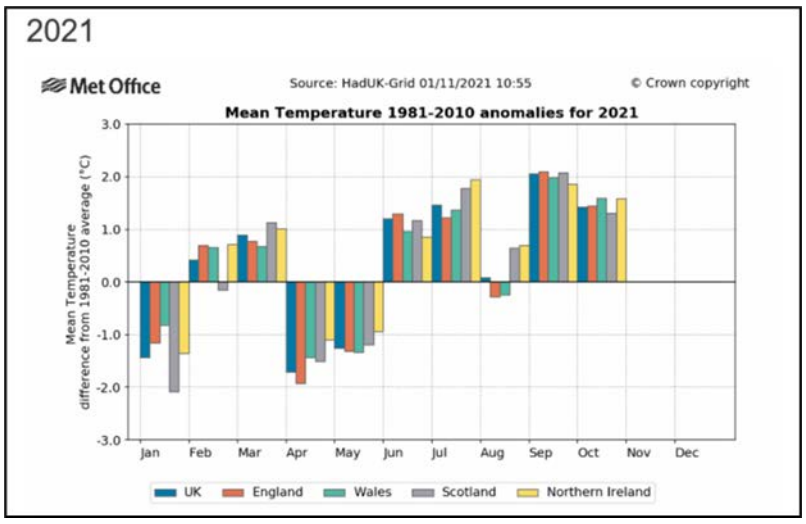

Figure 2 - Mean temperature 1981 - 2010 anomalies for 2021

New and re-emerging diseases and threats

Closantel toxicity

Animal and Plant Health Agency (APHA), Thirsk Veterinary Investigation Centre (VIC) investigated neurological disease in a group of 20 weaned fattening animals. Within a week of receiving Closantel as a pour-on, 70% of the group had lost weight and become recumbent. Four of these animals were blind. Blindness is not a common clinical sign but, may be identified in several diseases including lead poisoning, cerebrocortical necrosis (CCN), listeriosis, vitamin A deficiency and Closantel toxicity. Examples of cases of CCN and listeriosis, where blindness was reported, are described below in the 'Nervous Disease' section. Two of the affected animals were euthanased and presented for postmortem examination (PME).

There was no definitive gross pathology. Histopathology of the brain of each animal identified a severe multifocal symmetrical spongiotic leukencephalomyelopathy, with Wallerian degeneration of the optic nerves. These lesions were consistent with Closantel toxicity. Closantel, which is a salicylanilide, has a relatively narrow safety margin, and in cases of toxicity which have been investigated by the APHA, blindness has been a consistent clinical sign.

It is possible that we may see increased use of Closantel due to issues of lack of efficacy, or lack of availability, of other products. When using Closantel, it is essential that accurate dosing of livestock is done, and that ideally animals are weighed before treatment is administered. Furthermore, it is important that combination products are properly mixed before starting and whilst being used. The pour-on manufacturer was aware of this investigation and a report of this adverse reaction was made to the Veterinary Medicines Directorate.

Two outbreaks of toxic mastitis in dairy cows following drying off

Two outbreaks of toxic mastitis following drying off were diagnosed during this quarter. These cases illustrate the risks of suboptimal hygiene at drying off, which may be exacerbated by incorrect teat sealant placement.

In the first case, a dairy cow was submitted to investigate clinical signs suggestive of toxic mastitis, and deaths, in a group of 35 animals that had been dried off two days previously. A total of 10 animals died. Cows were dried off with a first-generation cephalosporin intramammary antibiotic and teat sealant. A live Bovine Viral Diarrhoea (BVD) vaccine had also been administered six days prior to the deaths.

PME revealed severe inflammation of the udder. A white pasty material, consistent with teat sealant, was detected high in the mammary cistern of all four quarters. There were multiple haemorrhages throughout the carcase, likely due to septicaemia and possibly terminal disseminated intravascular coagulation. *Pseudomonas aeruginosa* was cultured from the milk in pure growth and in mixed growth in the spleen, confirming mastitis due to

P. aeruginosa, followed by septicaemic distribution. *P. aeruginosa* was also isolated from the milk of three other affected cows.

P. aeruginosa is considered intrinsically resistant to many antimicrobials including first and second (and many third) generation cephalosporins, and on this farm a first-generation cephalosporin was the standard dry cow antibiotic administered. Outbreaks of mastitis due to *Pseudomonas spp* have been reported in cows that have recently been dried off. *P. aeruginosa* is generally considered to be an opportunistic pathogen and is widespread in the environment. Potential sources would include water, udder cloths and brushes, or contaminated tubes (antimicrobial or teat sealant). Contamination of the borehole water was investigated, and *P. aeruginosa* was cultured from five out of seven water samples submitted to a private laboratory.

The second case was a four-year-old dairy cow, the fifth to die in a group of 100, shortly after having been dried off using teat sealant and antibiotic intramammary tubes. At PME, the udder skin and all teats were purple, there was diffuse reddening of mammary tissue and emphysema in the fascia around the caudal aspect of the udder. The milk was discoloured dark-red and had a foul smell in one quarter, and another quarter was distended with foul smelling gas. White-grey paste, consistent with teat sealant, was present in the teat duct of one quarter and dispersed up inside the udder in the other three. Fully sensitive *E. coli* was isolated in pure growth from milk, liver, and udder.

In both cases, a thorough review of drying off procedure was recommended. It is vital to ensure that a strict aseptic technique is used to prevent introduction of bacteria into the teat canal. The presence of teat sealant in the gland cistern and not the teat canal would suggest incorrect application, and a review of this process was also recommended. When inserting teat sealant, the teat should be pinched at the base where it joins the udder, the sealant infused, and the tube removed before releasing the teat. The teat should not be massaged as the product must remain in the teat canal to be effective. Information on drying off dairy cows can be found at the **Agriculture and Horticulture Development Board** (**AHDB**) links below.

The introductory page:

https://ahdb.org.uk/drying-cows-off-early

The procedure for drying off:

https://ahdb.org.uk/knowledge-library/protocol-for-drying-off-dairy-cows

Changes in disease patterns and unusual diagnoses

Systemic disease

Metabolic disease in recently imported heifers

A dairy heifer was submitted for PME to APHA Shrewsbury VIC, being the second to die in a group of 98. The first death occurred one week earlier. They were purchased in-calf from Germany three weeks previously and had been turned onto pasture since their arrival. The carcase was very fat, and the liver was yellowish and diffusely swollen. The rumen was very small with its contents weighing only 1.37kg. The omasum and reticulum were empty and there was only brown fluid in the abomasum, with scant intestinal content. A 32kg calf was present in the uterus which had a 180^{o} torsion, although there was no indication of vascular compromise. The findings indicated that the animal had not eaten recently, and that death was probably due to ketosis associated with a 'fatty' liver. Severe diffuse hepatocyte vacuolation, consistent with excess fat infiltration, was confirmed on histopathology. Previous similar cases have been identified in APHA, also having a history of recent purchase from Europe, often in over-fat condition, and not being able to 'adapt' to UK systems. A letter describing other cases has been published in the Veterinary Record (Hepple and others 2010).

Malignant catarrhal fever outbreak

Malignant catarrhal fever (MCF) is usually a sporadic disease of cattle in the UK. However, outbreaks have been investigated where several animals in a herd were affected (Holliman and others 2007; Otter and others 2002). APHA Starcross VIC recently examined an adult suckler cow which had developed malaise, pyrexia, swollen conjunctiva and drooling over a two-to-three-day period and showed little response to antibiotic and anti-inflammatory treatments. It was the second similarly affected animal which died in a group of 50. As the clinical signs could have been suggestive of bluetongue, this was discussed with APHA Field Service colleagues who ruled out the possibility of notifiable disease. The affected animals were in a group of pregnant cows which had been on the same pasture for the last six weeks; prior to this it had been grazed by sheep.

PME identified markedly congested meningeal vessels and a large blood clot between the cerebellum and cerebral hemispheres. There was also mild generalised swelling of the head, and the mucous membranes were dark red and congested. A severe subacute multifocal lymphoplasmacytic vasculitis, which was consistent with MCF, was identified on histopathology of the brain; the diagnosis was proven using a PCR for ovine herpesvirus-2 (OvHV-2) DNA on the spleen. A further six cows in the group died after developing similar clinical signs, with PCR testing of heparin blood samples also confirming MCF.

It is uncertain why the rare herd outbreaks of MCF arise. Infection of cattle by OvHV-2 is by direct or indirect contact between sheep and cattle, sheep being the source of the OvHV-2; the infection is not considered to spread from cattle to cattle. This is supported by

the seasonal prevalence, with more diagnoses in the late spring and early summer months, reflecting the increased contact between cattle and sheep at this time. Preventing infection reaching cattle, or other susceptible species, can be very difficult, and disease occasionally occurs on sheep-free farms. Where sheep are also present on cattle farms, it is advisable to try to minimise creating dusts and aerosols when cleaning buildings and removing sheep bedding (perform on days when there is little wind and dampen the bedding if possible) and also, preventing access of sheep to cattle feeders.

Digestive system disease

Parasitic gastroenteritis in dairy calves

Two four-month-old dairy calves were submitted for PME from a group of 123 home-bred-dairy calves at pasture, where four had died suddenly over one day. The group had been grazing the same field for two months and were not wormed. During 2020, cows were grazed on this pasture. Gross pathology included: diarrhoea and dehydration, distended gall bladder, thickening and reddening of the abomasal mucosa, and enlarged, pale and oedematous gastric lymph nodes.

Table 1 - Parasitology results

Faecal egg counts	**Calf 1**	**Calf 2**
Trichostrongyle-type eggs (per gram)	2100	1850
Coccidial oocysts (per gram)	150	350
Total worm counts		
Abomasum - *Ostertagia spp.*	10500	5000
Abomasum - Immature or L4 worms	1900	8500
Small intestine	no worms seen	no worms seen

Parasitology testing confirmed a diagnosis of parasitic gastroenteritis (PGE), with *Ostertagia* spp playing an important role in the disease. Total worm counts (abomasum and small intestine) can be an important diagnostic tool in the investigation of PGE, particularly if lack of efficacy of anthelmintics is suspected.

Coccidiosis

Scotland's Rural College (SRUC) reported a case where a group of dry cows developed diarrhoea after being turned out to grass. Second-calvers that had not previously grazed this pasture, were the most severely affected. The farm had owned the land for three years and prior to that it was used by a calf-rearing enterprise. A faecal sample was submitted and found to contain 450 strongyle eggs and 60,600 coccidial oocysts per gram. Coccidial oocyst speciation was carried out and *Eimeria alabamensis* accounted for 100 per cent of the oocysts detected. The clinical signs resolved without treatment, and it was assumed that the cows had not previously encountered *E alabamensis,* which is most often reported as a cause of coccidiosis in youngstock at grass. It was suggested that the calf rearing unit may have been the original source of infection, with a subsequent annual increase in oocyst challenge.

A three-month-old beef calf was submitted for PME to investigate scour and deaths in a group of 80 housed calves. Diarrhoea was first noted three weeks previously and the animals were treated with a coccidiostat however, four animals died in the subsequent weeks. This animal was noted to be in poor body condition with faecal staining of the coat and markedly sunken eyes. A section of the caecum, and three sections of the colon displayed non-reducible intussusceptions, with affected mucosa appearing dark red to purple, with areas of black necrosis. Parasitology performed on caecal content found <50 worm eggs per gram, however the coccidial oocyst count was 98,950 per gram. Speciation results for the coccidial oocysts are displayed in Table 2. *Eimeria bovis* is pathogenic and given that this species accounted for 45% of the burden, this was deemed significant. Clinical coccidiosis was thought to be the most likely predisposing factor for the intussusceptions. Given the period of time since treatment, re-infection was deemed an important risk factor in this case, and advice was given on reducing the environmental build up through cleansing and disinfecting and reducing stocking densities.

Table 2 - Coccidial oocyst speciation results for a calf with coccidiosis

Test	Calf (Caecal Contents)
E. bovis %	45
E. auburnensis %	1
E. cylindrica %	1
E. subspherica %	53

Fibrinonecrotising abomasitis in a 13-month-old bullock

A bullock died overnight on a beef finisher unit and was submitted to Wales Veterinary Science Centre (WVSC). It had been examined and treated by the private vet five days previously, because it had a poor appetite. On examination, it was ataxic, had sunken eyes, and a delayed menace response. It was treated with vitamin B1 and steroids and the owners were advised to rehydrate with oral fluids. Five other bullocks were affected with diarrhoea and weight loss. The group had been drenched with levamisole and oxyclozanide the previous day and had received moxidectin one-month prior to that. They were at grass and being fed concentrates at night. At PME the bullock had a severe fibrinonecrotising abomasitis (Figure 3) and was severely dehydrated. Test results suggested that BVD and salmonellae were not involved, and histopathology suggested that the abomasitis was secondary to ostertagiasis, with later *Fusobacterium necrophorum* involvement also.

The following comment comes from the Control of Roundworms in Cattle (COWS Guide, January 2020).
https://www.cattleparasites.org.uk/app/uploads/2020/01/roundworm140120.pdf

"*This condition generally only affects a small proportion of animals in a group, but it can be serious and lead to death. The cause is the simultaneous development and emergence of inhibited (or arrested) larvae ingested at the end of the preceding grazing season. Instead of developing over the three weeks following ingestion (as normally happens earlier in the season), these larvae undergo a period of arrested development and lie dormant in the gastric glands as tiny, immature, fourth stage larvae (L4). The L4 persist in the stomach for several months until a trigger (currently unknown) stimulates them to resume development, when they can cause extensive damage to the abomasum, leading to severe clinical signs in affected animals. If you are suspicious of others in the group, and the worm egg counts are low then hypalbuminaemia, or elevation of plasma pepsinogen and abomasal pH may provide supportive evidence*".

Figure 3 - Fibrinonecrotising abomasitis

Respiratory system

Parasitic pneumonia

SRUC reported that many diagnoses, or suspect diagnoses, of parasitic pneumonia were made across Scotland during Q3 2021. In some cases, there was a suspected lack of efficacy of anthelmintic treatment. SRUC, APHA, and our partner postmortem providers, are keen to hear about any cases of suspected lack of efficacy of parasite treatments.

Respiratory disease presented in a 300-cow dairy herd, within which was a subgroup of 80 cows purchased six months previously. Of this group of 80, which are at pasture, 50 were affected with respiratory disease; mainly coughing, milk drop, and wasting, for two months. The submitted two-year-old cow had calved uneventfully two months previously. The management and vaccinal status of the group prior to purchase was not known. The rest of the herd, adults and youngstock, were healthy. Gross findings included: a severe consolidating pneumonia, lungworm and mucopurulent material in the airways (Figure 4), and poor bodily condition.

Figure 4 - Lungworm and mucopurulent exudate in the trachea of a two-year-old cow

Other lungworm cases this quarter included:

Case 1.

Lungworm in a nine-month-old suckler calf – the calf died suddenly having shown no prior clinical signs. It was the only one affected of a group of 16, from a herd of 205. The group had been wormed with ivermectin pour-on one month previously. There were adult lungworm in the bronchioles. Urgent treatment of the remainder of the group was advised as well as planning control of lungworm in the future.

Case 2

One cow in a 200-cow herd was reported to have dropped dead; it had exhibited respiratory signs and watery diarrhoea shortly before death. The next day a heifer was reported to develop weakness, ataxia, laboured breathing and watery diarrhoea. It was euthanased and submitted for PME which confirmed infestation with lungworm throughout the respiratory tract. There was lung consolidation also, with *Klebsiella pneumoniae pneumoniae* isolated in mixed culture.

Case 3

Five suckler cows in a group of 40 were reported to have shown signs of pneumonia. Pyrexia, coughing and increased respiratory effort were exhibited. Treatments with NSAIDs, steroids and antibiotics were given. The group was grazing permanent pasture and the calves, which were unaffected, had been wormed one month previously. One of the affected cows was found dead and was submitted for PME. Lungworm were present in the oropharynx, trachea, and bronchi, in addition to bloody froth, and there was significant emphysema within all lung lobes. Pneumonia caused by lungworm is unusual in adult suckler cows. The occurrence in this herd suggests that herd immunity had waned, either

through repeated anthelmintic treatment (this was not reported), or through grazing management, which had resulted in lack of exposure to the parasites over an extended period.

A useful document about the control of lungworm in cattle can be found here: https://www.cattleparasites.org.uk/app/uploads/2018/04/Control-of-lungworm-in-cattle.pdf

Musculoskeletal system

Nutritional myopathy ('white muscle disease')

Individual animals in a pedigree Red Devon herd were reported as intermittently having become recumbent during periods of gathering or movement. A mixture of both adult cows and yearling bullocks were affected over a period of two months. Most of the affected animals, when left recumbent for a few hours, recovered and were able to rise unaided. A yearling steer became recumbent when the group was gathered for worming. It was moved indoors and was able to stand again after eight hours. However, after two days, the animal developed severe hindlimb weakness, spending most time in sternal recumbency. Eventually it could only stand if aided. Clinical examination otherwise was unremarkable. It was euthanased and submitted to APHA Starcross VIC for PME. The possibility of an inherited disease was considered, as the affected animals were all pedigree Red Devon cattle, of which there is a relatively limited gene pool, and because of the relapsing and recovering nature of the previously affected animals. Bilateral pale discolouration of the hind limb muscles was evident, and histopathology confirmed moderate to severe, multifocal, subacute myonecrosis consistent with 'white muscle disease'. The selenium concentration in the liver was low at 0.78 mg/kg DM (reference interval 0.9-1.75 mg/kg DM). These findings suggested that an inherited condition was unlikely. Supplementation of the herd was recommended. It was considered that the previous cases, which had appeared to have "recovered", probably had less severe muscle damage than the animal examined postmortem, hence why they were able to rise and did not become permanently recumbent.

Horn loss from dairy cows' feet

The carcase of an adult dairy cow was submitted to APHA Starcross VIC to investigate the reported loss of horn from the feet. Six cows had been similarly affected over the previous six weeks. The problem was predominantly seen in the front feet, with some of the cows suffering horn loss of several claws. The cow which was submitted had initially lost the horn from the right foreleg and subsequently from the left foreleg. At PME, both forelimbs were visibly swollen, due to the presence of extensive subcutaneous gelatinous oedema. In the right forelimb, the deep digital flexor tendon sheath was also distended with floccular fluid. The claw horn was absent from the medial claws of both front feet. The cause of the horn loss was unclear. Histopathology indicated evidence of laminitis, deformation of the (remaining) hoof wall, and chronic vascular thrombosis and recanalization. These features implicated a primary ischaemic process over a prolonged period as the pathogenesis for

the claw loss. The specific underlying cause was uncertain; potential causes included ingested toxins (such as ergot), direct mechanical trauma, mechanical occlusion of venous drainage, or recurrent bouts of ruminal acidosis leading to thrombosis and laminitis. An urgent review of cow comfort, the under-foot conditions, cow management, foot treatments and nutrition, was advised.

Urinary System

Nephritis in two Wagyu calves

A group of 25 Wagyu cows and calves were turned out to grass and within a few days, three calves developed clinical signs of salivation and ataxia, progressing to recumbency and death after around 10 days. PME of two calves, aged two and three months, identified severe ulcerative lesions in the oral cavity, larynx, forestomaches and abomasum. One calf also had a haemorrhagic typhlitis and foci of necrosis were evident in the liver of the other. Histopathology suggested ruminal acidosis as a possible predisposing factor for systemic spread of bacteria and fungi which was supported by a rumen pH of 4.9 in both calves. The calves had access to a cereal based creep feed but, were reported to be only eating small quantities. Extensive chronic fibrosing and histiolymphocytic tubulointerstitial nephritis was detected in both calves. It was not possible to definitively distinguish the lesions detected between those of white spotted kidney, a consequence of bacterial nephritis in young calves, and those of secondary infection superimposed on renal tubular dysplasia (which can be an inherited condition in Wagyu cattle). Calves with the latter develop overgrown hooves, which were not apparent here, perhaps due to the young age of the calves. Screening for the two recognised pathogenic variants of the Claudin 16 gene in Wagyu cattle was recommended for further investigation.

Nervous System

Mycoplasma bovoculi keratoconjunctivitis

Mycoplasma bovoculi was detected on *Mycoplasma* DGGE/PCR testing of pooled eye swabs, from dairy cattle with persistent keratoconjunctivitis. Testing for mycoplasmal infection may be indicated in some cases of bovine keratoconjunctivitis.

Cerebrocortical necrosis (CCN) / polioencephalomalacia outbreaks in adult dairy cows

Three cows were submitted for PME at APHA Carmarthen VIC from a spring calving dairy herd of 330 cows. Over approximately one month (June to July) around 20 cows developed nervous disease. The clinical signs of affected animals were predominantly ataxia, recumbency, and blindness, while some also had melaena or diarrhoea. Fourteen were either euthanased or died, and the remainder responded to treatment and recovered. A diagnosis of cerebrocortical necrosis was confirmed by brain histopathology in each of

the three animals examined; although the brain lesions of CCN are not specific to the aetiology, by exclusion of other possible causes (lead poisoning, sulphate toxicity and salt toxicity/water deprivation) and the history in the herd, vitamin B1 deficiency was considered the likely cause.

CCN in adult cattle is less commonly identified than in young stock, and especially an outbreak affecting so many animals. The Veterinary Investigation Diagnosis Analysis (VIDA) data for 2010 to 2021 suggests the age groups in which CCN was diagnosed were: adult 19%, post-wean 61.5%, pre-wean 3% and unknown 16.5%.

The ‘trigger’ for the outbreak is uncertain, possible factors which may have contributed to the development of disease in this herd, were considered to be:

- poor grass growth due to unfavourable conditions in the spring which may have led to inadequate forage intakes in the herd. A lack of forage can affect rumen function, and cause changes in the bacterial and protozoal flora within the rumen, with an increased number of thiaminase-producing organisms ultimately resulting in a lack of available thiamine (vitamin B1).
- the borehole drinking water became intermittently ‘rust-coloured’ when the storage tank was low, and it was suggested that the cows could have drunk less when this occurred due to poor palatability. Alternatively, it was wondered whether sediment disturbance resulted in a change in the water constituents, such as sulphur concentration; however, testing samples of the water showed normal element levels, including sulphur. It was recommended that the testing was repeated when the water was discoloured.

A further consideration was whether ingestion of bracken ferns, which contain thiaminases, was a contributory factor, as bracken was growing in the hedgerows, and small bracken fronds were found in the rumen of one cow postmortem. If bracken toxicity were involved, suppression of bone marrow activity should have been identified on histopathology, but none was evident.

Listeriosis in a yearling bull

A yearling Montbéliarde bull was euthanased and submitted for postmortem examination from a dairy herd of 450 cows. There was concern about the possibility of ragwort poisoning, following a previous investigation of a group of heifers. The bull had been in an adjacent pen and had been given different feed. Over a period of a week the animal developed inappetence, although he ate a little cake. Blindness, mild ataxia, and head pressing were reported, and he was euthanased after failing to improve with treatment. No definitive pathology was identified grossly at PME and no *Listeria* species were isolated from the brain stem using selective culture. However, histopathology confirmed a marked multifocal subacute necro suppurative encephalitis consistent with listerial infection. Liver histopathology indicated no evidence of ragwort toxicity. *Listeria* infections are often associated with feeding spoilt silage, although direct ingestion by animals on muddy pasture, or on a floor feeding system, can also be the source.

Non suppurative encephalitis and maxillary fracture in a suckler calf

A 3-month-old suckler calf developed a range of nervous signs. It appeared to be blind and had a head tilt. It was also reported to have run off and jumped over gates and had exhibited other unusual behaviour. Two other calves in the group of 40 calves with their dams had died around the same time. The calf was euthanased and submitted for PME. It was in reasonable condition weighing 108kg. The maxilla was fractured, the nasal turbinates were inflamed; and several ulcers were present on the upper gums, especially around the cheek teeth, with a large necrotic sinus connecting the nasal chamber and oral cavity. It also had a 10cm full thickness split of the soft palate. No gross pathology of the brain was evident however, histopathology identified a severe non suppurative encephalomyelitis. Immunohistochemistry for louping ill virus and bovine herpesvirus-1 was negative. It was concluded that the calf had suffered trauma, which had caused the maxillary fracture and the related inflammation and ulceration of the nasal and oral cavity. This trauma was not considered to be the cause of the encephalomyelitis, the morphology being most suggestive of an unknown, possibly viral, infectious aetiology.

Skin

Sucking lice infestation and pneumonia in a four-week-old calf

Twenty-five of a group of 40 calves were reported to have lost condition by three months of age, with 20 of those affected having died. There were no other specific clinical signs, such as diarrhoea or respiratory disease. The calves were only fed around four to five litres once daily of a combination of fresh milk and powdered milk, which was insufficient. A calf was received which had lost condition over a period of four days and had died despite being treated with antibiotics. The carcase was emaciated, had diffuse pallor, and was covered with large numbers of *Linognathus vituli* lice, mainly over the head (Figure 5). Some ‘storage’ mites were also identified. There was also cranioventral lung consolidation affecting approximately 30% of the right side and 10-15% of the left side, and one abscess containing cream coloured pus. *Pasteurella multocida* and *Bibersteinia trehalosi* were isolated from the pneumonic lung. The pallor, indicative of anaemia, was at least in part due to the heavy sucking lice burden (*Linognathus vituli*) and immediate treatment for the lice was recommended for the other calves in the group. A review of feeding was also recommended, including the provision of at least two feeds a day, and closer monitoring of the calves’ conditions. The debilitation due to inadequate feeding and lice infestation could have made the calf more susceptible to pneumonia. Mortality in calves associated with heavy sucking louse infestation has previously been reported (Otter and others 2003).

Figure 5 - *Linognathus vituli* sucking lice on a 3 to 4-week-old calf

Reproductive system

Abortion

Salmonella Dublin

Salmonella Dublin infection was confirmed as causing abortion in a 320-cow dairy herd. There was only a single abortion reported in the herd in 2021, however salmonellosis had previously been identified in calves in 2020. A review of salmonellae control within the herd was recommended. It is the late summer and autumn months when we usually see the most *Salmonella* Dublin infections in cattle (Figure 6).

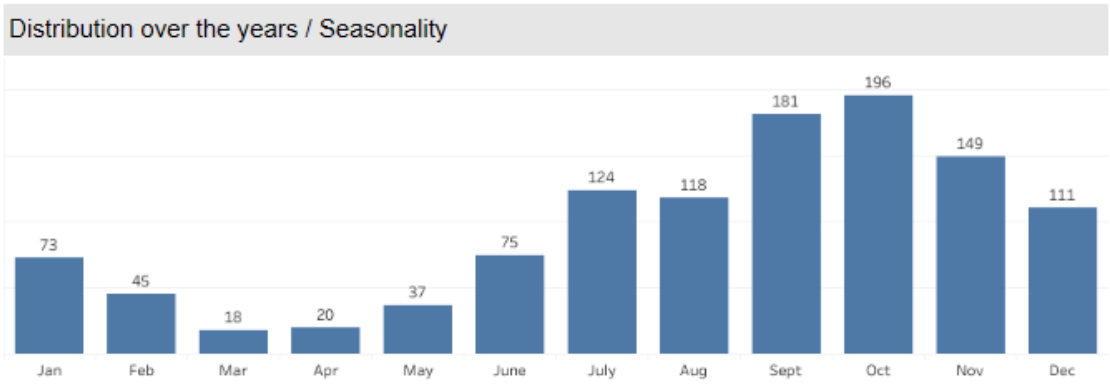

Figure 6 - Seasonality of Salmonella Dublin abortions in cattle in England and Wales 2002-2021

Ureaplasma diversum

A 14.9kg aborted calf was presented from a dairy herd of 450 cows. Two heifers in a group of 150 had aborted while at grass. The heifers were vaccinated against BVD, leptospirosis and *Salmonellae* and were not otherwise unwell. Mycoplasma infection was diagnosed in the herd in March, at which time cows developed pneumonia, mastitis, and in one, arthritis, with seven animals being culled. Calves had developed pneumonia. No placenta was received and there was no definitive pathology in the fetus. In view of the herd history, mycoplasmal testing was undertaken. *Ureaplasma diversum* was identified in the stomach content using DGGE/PCR testing. Tests for other bacterial abortifacients, pestiviruses and *Neospora* proved negative. Histopathology was undertaken to find out whether the *Ureaplasma* infection was associated with an inflammatory response, however none was identified, and the significance was uncertain. *U. diversum* has been reported to be a commensal of the reproductive tract, but is also considered to cause vulvitis, endometritis, infertility and abortion.

Leptospirosis

Leptospirosis was the cause of abortion in a group of 25 heifers and dry cows at pasture, where four had aborted. There was a mix of homebred and purchased animals in the group. A leptospirosis vaccine was used in the milking cows, but not in the maiden heifers. Natural service was used. Similar problems had been seen the previous year. One third trimester foetus was submitted. There was generalised yellowing of the tissues which prompted Leptospira PCR testing. Pathogenic Leptospira DNA was detected from a kidney sample. Dam MAT serology for *Leptospira hardjo bovis* was also positive, with a titre of 1/400. It was recommended that the leptospirosis vaccine was also used in the maiden heifers.

Abortion due to Yersinia pseudotuberculosis

Thirteen cows in the group of 260 had aborted. Mild inflammation of the placental cotyledons was noted grossly. A fetus was submitted for investigation. Aerobic culture of stomach content revealed a pure growth of *Yersinia pseudotuberculosis* and, in the

absence of any other infectious aetiology being identified, was deemed to be the cause of this abortion. This bacterium is a commensal of the gastrointestinal tract, and is a recognised, but rare, cause of opportunistic bovine abortion. It was unknown whether (but deemed unlikely that) previous abortions had been due to the same cause.

Congenital disease

Bovine neonatal pancytopenia (BNP)

One two-week-old calf was submitted to APHA Shrewsbury VIC for PME. It had been euthanased after developing haemorrhages on its gums, conjunctivae, and in the skin. It was the only calf affected in a dairy herd of 160 cows. The calf had also scoured for a few days before being euthanased. Multiple subcutaneous haemorrhages were identified, including a large blood clot over the sternum. There were also muscular, periarticular, serosal (stomachs, intestine, bladder), epicardial and splenic haemorrhages. The disseminated haemorrhages were indicative of a bleeding disorder, and the pathology was indistinguishable from bovine neonatal pancytopenia (BNP) or ‘bleeding calf syndrome’. Histopathology of the sternal bone marrow identified trilineage hypoplasia, consistent with the pathology which was found in calves with BNP and accounted for the widespread haemorrhages and the systemic infection. BNP was a feature of calves born to cows which were vaccinated with ‘Pregsure’, however, the cows in this herd had not received this BVD vaccine. Other possible causes of disseminated bleeding include toxic plants (bracken), mycotoxin (tricothecenes) ingestion, chemical treatment (furazolidone) and BVDv infection. A PCR for pestiviruses on the calf’s spleen proved negative, and there was no history of exposure to any of the other potential toxic causes. A few similarly affected calves born to cows which were not Pregsure vaccinated have previously been examined by APHA, and the cause, as in this case, was unknown.

Cranial deformities in an aborted calf

Two severely deformed calves were born in a herd of 18 pedigree Welsh Black cows. Both dams were from the same breeding line, and the sire was a Black Limousine bull. It was the first time this bull had been bred with this group of cows. The first affected calf was born alive. It had two heads. One month later a second deformed calf was born and was submitted to APHA Carmarthen VIC for PME. A range of abnormalities were identified including anencephaly (a severe congenital condition in which a large part of the skull is absent along with the cerebral hemispheres of the brain), craniosynostosis (a birth defect in which the bones of the skull fuse prematurely before the brain is fully formed), cleft palate (Figure 7) and a skin extension containing a meningocele (a cerebrospinal fluid-filled sac which protrudes from the spinal column; the sac does not contain neural tissue see Figure 8). PCR testing for Schmallenberg virus and pestiviruses was negative. Anencephaly arises due to a primary neural tube defect, involving non-closure of the cranial portion of the neural tube, which leads to a failure in development of the encephalon (the ‘higher centres’ of the brain) during the first term of gestation. Craniomeningocele can be hereditary, but environmental factors have also been linked with this kind of abnormality, including malnutrition, toxins, and chemicals, including

griseofulvin. BVD virus infection can also cause this defect. Cleft palate is recognised to be inherited in some cattle breeds. The range of pathology in the calves was rare and it was not possible to definitively determine whether there was an inherited association.

Figure 7 - Cleft palate in a stillborn calf

Figure 8 - Skin extension from head and ears containing likely meningocoele

Congenital Alpha Mannosidosis in a Belted Galloway

A two-day-old Belted Galloway calf was submitted to APHA Thirsk VIC. The calf had brachygnathia and had failed to stand or feed following an unremarkable birth. It had enlargement of its liver, thyroid, and kidneys, in addition to dilation of the lateral ventricles of the brain. An inherited genetic abnormality was suspected. Gross pathology was also indicative of septicaemic infection and *E.coli* was cultured in pure growths. There was no

evidence of Schmallenberg virus or BVD viruses by PCR testing. Histopathological examination confirmed brain lesions which were consistent with alpha mannosidosis, a lysosomal storage disease. The condition is associated with defective glycogen metabolism. Alpha mannosidosis is a recognised recessive inherited condition in Galloway, Aberdeen Angus and Murray Grey breeds. Affected calves may be aborted or are born, as in this case, very weak, or affected animals may be born alive with less profound deformities and subsequently fail to thrive. The farmer was advised to contact the Belted Galloway Society to pursue possible genetic testing of the herd.

Congenital cataracts in a dairy herd

SRUC investigations are ongoing into a problem with congenital cataracts in a 135-cow dairy herd. Three calves were euthanased, and there were no significant findings other than cataract at PME. At the time of presentation, 15 affected calves had been born over an eight-month period, and both Holstein and beef cross calves were represented. Only calves born to cows were affected, which is typical of outbreaks of idiopathic congenital cataract in dairy herds. Histopathology confirmed extensive liquefaction of lens fibres with Morgagnian globule and bladder cell formation and a central to posterior location. The aetiology of idiopathic congenital cataract in dairy herds can be difficult to determine, but is likely to be multifactorial with nutritional, genetic and environmental factors playing a role.

Cerebellar cortical abiotrophy

A four-month-old Holstein Friesian calf was euthanased and submitted to APHA Starcross VIC. Shortly after weaning, it had developed forelimb weakness and a “leant back” stance. The calf also intermittently became laterally recumbent, and whilst recumbent it exhibited rigid neck and leg extension, yet reportedly fully recovered again a few hours later. There was no improvement following the administration of anti-inflammatory medication. PME identified no significant gross pathology. Histopathological examination of the brain revealed Purkinje cell loss and degeneration in the cerebellar cortex, with ‘torpedo’ formation. Cerebellar Cortical Abiotrophy (CCA) was considered the most likely cause. This condition is associated with an intrinsic metabolic defect which causes premature brain degeneration by altering glutamic acid neurotransmitters, resulting in ‘excitotoxicity’. The underlying aetiology is uncertain and is considered to be multifactorial. One form of CCA, Bovine Familial Convulsions and Ataxia (BFCA), is an autosomal recessive heritable disease which has previously been described in Holstein Friesians.

Centre of Expertise for Extensively Managed Livestock

The COEEML was developed by APHA to address potential surveillance gaps for extensively managed animals. Extensive management of livestock potentially makes regular or close inspection for disease detection more challenging. The Centre is based at the APHA Veterinary Investigation Centre in Carmarthen; however, it is a Great Britain-wide resource and forms part of the wider veterinary surveillance system operated by APHA.

Veterinary Investigation Officers from APHA VIC Carmarthen will be attending the Winter Fair at Royal Welsh Showground on the 29th and 30th November 2021 to promote the work of the COEEML.

Planning is underway for a COEEML conference to be held in Wales in 2022.

Tick-borne disease

A four-year-old stabiliser cow was submitted to an SRUC centre for PME, after it became the third to die in five days, from a group of 35 cows with calves at foot. It was noted to be dull, lethargic, hypothermic and slightly unsteady the previous day; and had been treated with B vitamins, NSAIDs and antibiotics. A number of ticks were found on the carcase which was pale and yellow-tinged. The bladder was empty, but red-stained urine had pooled in one of the kidneys. Organisms suspicious of Babesia sp were detected on a blood smear and PCR testing carried out on blood and spleen proved positive for Babesia divergens, confirming the diagnosis. The cattle were grazing a field containing a lot of bracken, in an area where babesiosis had been diagnosed in previous years. Moving to a field with less tick habitat was advised. Hypocuprosis was also diagnosed, based on a liver copper result of 162 umol/kg dry matter (DM) (reference range 314 to 7850 umol/kg DM). It has previously been suggested, but not proved, that concurrent copper deficiency may reduce the therapeutic value of imidocarb.

As discussed in the previous quarterly report, APHA has been running a project on bovine babesiosis, during the 2021 grazing season, and had offered free of charge testing. The results of this project are being collated and studied; with the results due to be shared during 2022.

Antimicrobial use and resistance

The Veterinary Antibiotic Resistance Sales and Surveillance (UK-VARRS) report 2020 has been published by the Veterinary Medicines Directorate (VMD)

Veterinary Antimicrobial Resistance and Sales Surveillance 2020 - GOV.UK (www.gov.uk)

This shows that sales of veterinary antibiotics for use in food-producing animals, adjusted for animal population, have shown a 52% decrease since 2014, and sales of Highest Priority Critically Important Antibiotics (HP-CIAs) have decreased 79% since 2014.

While usage data for ruminants is not currently available, there is an ambition that the Medicine Hub (which was launched in January 2021) will provide an independent, central repository to collate, report, and compare antibiotic use at farm level for both cattle and sheep. Furthermore, the ‘Farm Vet Champions’ initiative, with a training and engagement programme delivered by RCVS Knowledge, has the potential to embed antimicrobial stewardship into practices across the country.

Chemical food safety

There were nine potential food safety incidents reported in cattle for July to September 2021. The latest chemical food safety report can be found on Gov.uk.

Seven of these incidents were related to lead toxicity; with the likely sources being batteries in four cases and water pipes, lead flashing and scrap metal in the other three.

One of our partner PME providers, Liverpool University, reported a case of ragwort toxicity.

The other incident reported related to the 'Haematuria in organic dairy cows', as discussed in the Quarter 2 2021 report and summarised below.

Organic rape meal

Through scanning surveillance, APHA have become increasingly aware of outbreaks of haematuria in cattle being fed organic rape meal. APHA received five recent enquiries from private vets and, via questionnaires, collated further information in order to reach this conclusion. This condition has not been reported frequently until this year. APHA believe that the cause of the clinical signs may be due to erucic acid and/or glucosinolates in the organic rapeseed meal. APHA's main aim has been to raise awareness of the issue across Government, the feed industry, and other interested parties. The clinical signs appear to relate to the total amount fed; and the histories suggest that dropping the level of rape meal intake to less than 2kg daily per head results in resolution of signs.

Three other plant toxicities diagnosed in this quarter were:

Yew poisoning in a Highland cow

A 12-year-old Highland cow was submitted to investigate sudden death in four animals in a small suckler herd of 10 breeding cows. Affected animals were of varying ages and were found dead having shown no previous clinical signs. An anthrax test carried out by the private vet on two of the animals was negative. The herd had been grazing silage aftermath for two weeks and were co-grazing with 200 sheep that had not been affected.

Yew leaves and fronds were detected in the rumen and abomasum. These findings, along with the clinical history, confirmed the cause of death as yew poisoning. It was likely that this was the cause of death in the other three animals. It was urgently advised to move the animals until the source of yew had been identified and access prevented. If not a yew tree/hedge/bush, then the possibility of access to dumped clippings or dropped branches should be investigated. Yew contains a mixture of alkaloids including highly toxic taxines which are present in all parts of the plant except the flesh of the red fruit. The alkaloids are cardiotoxic and lead to arrhythmias and cardiac arrest. In subacute toxicity, ataxia, bradycardia, diarrhoea, tremors and collapse followed by death may be seen. Death can occur with hours of ingestion. Historically yew was only permitted to be grown in church yards, part of the reason being that this guaranteed no livestock access to them.

Hemlock water dropwort toxicity

Symptoms of acute ataxia, collapse, paddling, teeth grinding and opisthotonos were reported in a twenty-month-old beef animal which died at pasture. Within the rumen, along with a large volume of forage there was approximately 143g of root tubers resembling “dead man’s fingers” indicative of hemlock water dropwort toxicity. Interestingly, the boggy ground this group of animals were grazing, was likely to have had deaths due to the same cause at a similar time the year before, with the plant seen to be growing at the site of an old river. Cases of poisoning are generally seen when other feed sources are scarce, or when work is carried out to clear ditches which uncovers the plants roots or, following flooding and heavy rain.

Ragwort toxicity

Three yearling bullocks were found dead over a 10-day period, three weeks after turnout at the end of May. Seven of the remaining nine animals then developed signs of weakness, with an unsteady gait, anorexia, and diarrhoea and three went on to die. A fourth animal was euthanased and an on-farm postmortem examination was carried out assisted by an SRUC vet over a video call. Significant findings included photosensitisation, rectal prolapse, ventral subcutaneous oedema, ascites and marked oedema of the abomasal mucosa. Bacteriology failed to identify any infectious agents. Histopathology detected a subacute to chronic hepatopathy, characterised by megalocytosis, bile duct hyperplasia, and portal and perivenous fibrosis, consistent with pyrrolizidine alkaloid toxicity. Further history confirmed that silage fed over the housing period had contained ragwort, and this was considered to be the likely cause.

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 the weekly outbreak summary data published by the new EU Animal Diseases Information System (ADIS). The current BTV restricted zones are shown on the map in Figure 9.

The most recent outbreaks reported in October were all in sheep.

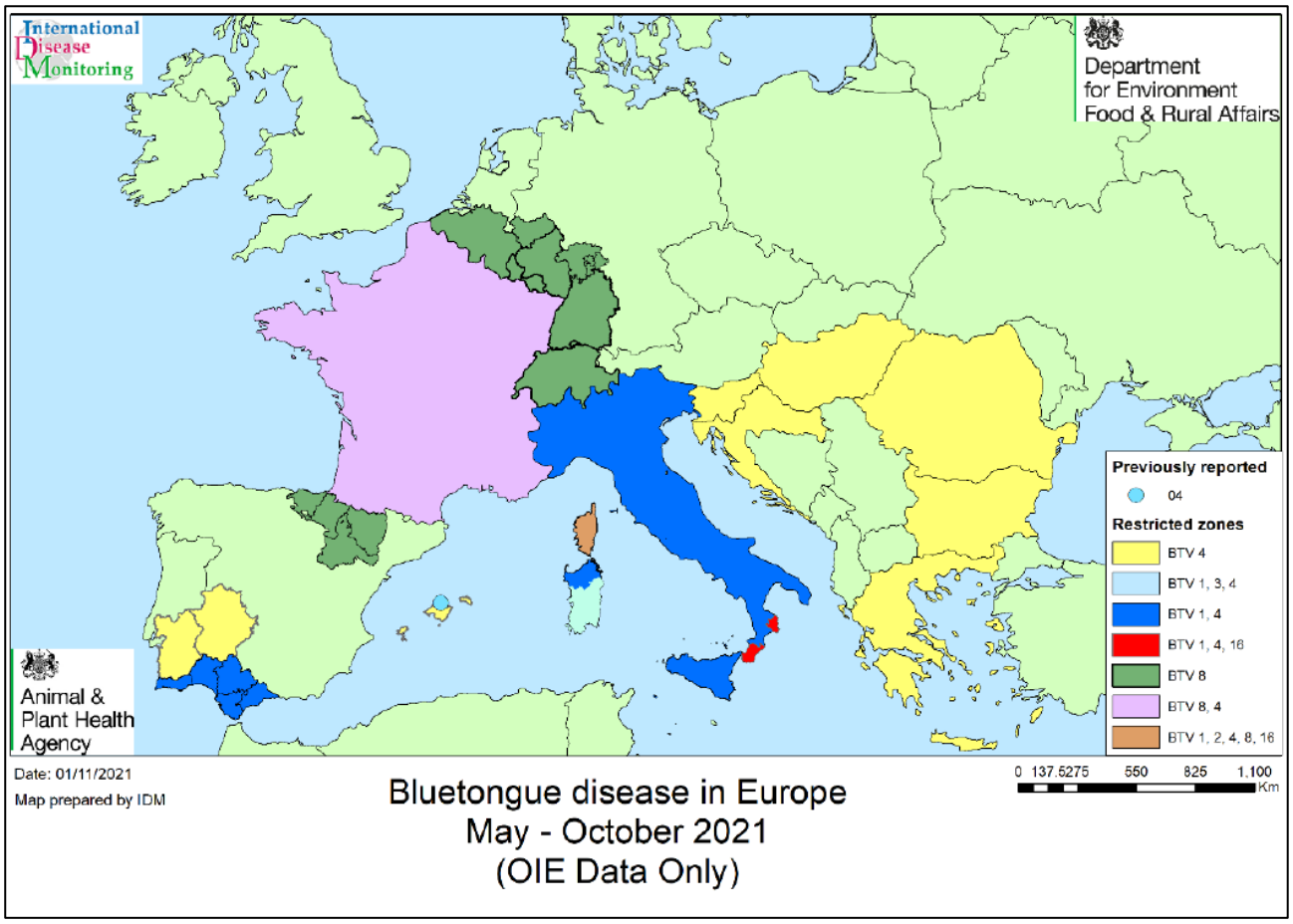

Figure 9 - Bluetongue disease in Europe May to October 2021.

For more information, see our BTV Outbreak Assessment on GOV.UK

APHA have released a series of animations on Facebook and Twitter to inform keepers of BTV. https://www.facebook.com/APHAGov/

Publications

APHA Staff

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Other publications of interest

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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 also works on behalf of the Scottish Government and Welsh Government.