GB cattle quarterly report
Disease surveillance and emerging threats
Volume 23: Q1 – January-March 2019

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the first quarter of 2019, January-March. 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 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

Weather

Fig 1: Rainfall (left) and mean temperature (right) expressed as % and degree difference from the 1981-2010 average, respectively (Met Office)

The first part of the quarter was drier than average and in March was average or wetter in parts. This combined with a warmer spring has meant that turnout was not delayed, which has helped to minimise the potential impact of lower forage stocks from last year
Dairy

UK milk production is currently above 2018-19 levels. Production for 2019/20 is estimated at 12,590m litres, which is the highest it has been since 1990/91 and 0.7% above 2018/2109 (AHDB Dairy). The mild winter and early turnout has meant that forage supplies were perhaps not as tight as predicted last summer and increased levels of concentrate feeding have kept production levels up. The spring flush is very much influenced by weather and if conditions are normal, the high yields will likely continue. However, concerns are starting to emerge about levels of rainfall, particularly in the south which could affect grazing platforms and re-growth for second cut silage. In general the maize crop has been sown on time and in good soil conditions and first cut silages have been made on time and in good weather conditions. Milk prices have either been static or are falling back slightly.

Beef

Beef prices (prime and commodity) typically drop during quarter one, and this trend was seen again at the start of 2019, though the price started lower than both the five year average and both 2017 and 2018 levels.

Prime prices stabilised until mid-February, but then began to fall sharply in late February and this drop continued throughout March, finishing the quarter 10-15ppKg (~3-4%) below the five year averages. Processors had generally filled stores to capacity, and so reduced demand likely caused by uncertainty about the export market post-Brexit led directly to the sharp farm-gate price dropping.

Commodity beef (cull cows / bull beef) fared slightly better over the quarter, generally rising slightly, but also remained below last year and 5 year averages.

An AHDB report in mid-January stated that 2018 saw the highest UK beef production since 2011, driven by an increase in both cow and heifer slaughterings (approximately 5% each) and this is likely to reduce the national breeding herd. Predictions for lower total supply for 2019 and 2020 remain in place.

New and re-emerging diseases and threats

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

Analysis of Diagnosis Not Reached (DNR)*

No significant changes in Diagnoses Not Reached were detected during Q1 2019.
Unusual diagnoses

Nitrate toxicity in dairy heifers

Nitrate toxicity was diagnosed in a group of 100 dairy heifers at the beginning of February. The group was outdoors on stubble turnips, and they also had access to straw. Over a period of less than 24 hours five of the in-calf dairy heifers were found dead. Four others were reported to be unsteady on their feet and had brown mucous membranes. A postmortem examination was undertaken by the practitioner (PVS) on one of the heifers which was found dead. This confirmed a distinct dark brown discolouration of the blood. The postmortem and clinical findings of the PVS were consistent with nitrate/nitrite toxicity, which was further supported by the identification of nitrites using a ‘urine dipstick’ on aqueous humour which had been taken from the animal examined postmortem. A high nitrate content was subsequently also confirmed in the turnips.

For the two days prior to the outbreak there had been snow cover, and there had been a hard frost on the day the heifers were found dead. Excess concentration of nitrates can accumulate when brassicas, such as stubble turnips, are ‘stressed’, particularly if the plants are still maturing, and snow or frost can impair photosynthesis, resulting in excess nitrates building up in the leaves and stems. The nitrate content can return to normal several days after a frost or snow, as long as the plant has not died or been harvested. In this case the affected heifers fully recovered after moving off the stubble turnips onto a grass pasture. The farmer and vet were then working with an agronomist to determine when and how to graze the crop safely again, by using plant testing and allowing the animals very gradual access. Unfortunately, sometimes abortion storms or the birth of weak poorly-viable calves can be a sequel for pregnant cattle which have been exposed to high concentrations of nitrates.

Post-parturient haemoglobinuria

Post-parturient haemoglobinuria (PPH) was diagnosed in a Lancashire dairy herd. Three recent deaths had occurred in the herd of 180 milking cows with another seven cows unwell. The herd comprised high yielding Holstein-Friesian cows which are milked via a robotic system. The cows were reported to calve normally and were well for the first week of lactation, but at approximately seven days after calving a sudden drop in rumination and reduced milk yields occurred. The passing of dark red urine was observed for three of the affected cows which all died. Blood samples were collected from six freshly calved cows. These indicated ketosis in 4 of the 6 cows, very high NEFA concentrations in 3 cows and low inorganic phosphate concentrations in 3 cows.

An affected 3½ year-old Holstein cow was examined postmortem. The carcase was jaundiced and the liver was enlarged, diffusely pale orange, firm though not fatty, and friable. The right renal cortex was dark red to black and the medulla of both kidneys was
reddened. The bladder was filled with very dark red urine which was confirmed positive for haemoglobin. A blood sample had been collected from the animal before she died and this had very low inorganic phosphate, and elevated urea, BHB and NEFA concentrations.

Although phosphate concentrations can fall in inappetant cows, the identification of hypophosphataemia in several animals outside of peak lactation is usually indicative of low dietary phosphorus intake. In the past PPH was associated with the feeding of a substantial amount of beets, turnips, or sugar beet by-products. Although low phosphorus diets are incriminated as the cause of PPH, an additional component, for example a haemolytic factor(s) present in the feed, has also been suggested. In the affected herd the dry cows were fed on straw, a reduced silage ration, and a special cake (which contained a zeolite binder; zeolite is a volcanic mineral).

Following the identification of hypophosphataemia, the dry cow ration was changed to chopped straw, with an increased amount of silage, and a dry cow mineral. The milking cows were fed at the robot and were supplementary fed. The diet included whole crop silage and sugar beet. The cows were also injected with a parenteral phosphorus intramuscularly soon after calving. There were no further losses reported.

**Histophilus somni infection**

In England and Wales, pneumonia associated with *Histophilus somni* infection is not uncommonly diagnosed by APHA and its partner postmortem providers, although *Mannheimia haemolytica, Pasteurella multocida* and *Mycoplasma bovis* are the most prevalent bacterial causes (fig 3).
Fig 3: Diagnoses of six of the common bacterial causes of pneumonia in cattle, 2013-2018, as % of total pneumonia diagnoses (VIDA)

APHA Thirsk Veterinary Investigation Centre (VIC) reported two outbreaks of *H. somni* pneumonia. Both were in fattening calves which had been bought in, in one case four months previously, and in the second herd the calves had been on the farm for six weeks. Postmortem examination of one calf from each herd, aged between four and five months, confirmed antero-ventral pulmonary consolidation. *H. somni* was the only pathogen identified in one herd, while *Mycoplasma bovis* infection was also detected in the other.

*H. somni* can cause several other manifestations of disease. APHA Starcross VIC investigated the death of a five-month-old Friesian bull calf which was reported to have shown acute respiratory signs and then died. It was the only animal affected in a group of 30 on a bull beef unit that had a total of 500 animals which were vaccinated against viral pathogens. At postmortem examination, septicaemia was suspected on finding both fibrinous peritonitis and pleuritis, with petechiation of the thymus and congestion of the lungs. In addition, a focal 5 cm area of pallor with a haemorrhagic rim was found within the liver, and infection by *Clostridium novyi* (‘Black disease’) was initially suspected, but was not confirmed by fluorescent antibody testing. Histopathology was undertaken and revealed a necrosuppurative hepatitis and a suppurative meningoencephalitis with
leukocytoclastic vasculitis, suggesting *H. somni* septicaemia as the most likely cause of disease. However, a definitive diagnosis could not be made in this case as bacterial cultures of the liver and lung were sterile, consistent with prior antibiotic treatment.

In addition to causing pneumonia and septicaemia, thromboembolic meningoencephalitis (TEME), polyarthritis, otitis media, mastitis, reproductive disorders and myocarditis have been reported as manifestations of *H. somni* infection (Wessels and Wessels 2005, van der Burgt and others 2007). Prevention of infection by *H. somni* can be problematic, especially on units where cattle are purchased from mixed sources, and vaccination may be used to assist disease control. Consideration must be given to all aspects of the management of the cattle, and a useful check-list to discuss with farmers is available at [http://beefandlamb.ahdb.org.uk/wp-content/uploads/2018/07/Pneumonia-MOT.pdf](http://beefandlamb.ahdb.org.uk/wp-content/uploads/2018/07/Pneumonia-MOT.pdf).

**Lymphoma in a dairy cow**

The carcase of a euthanased four-year-old Holstein-Friesian cow was submitted to APHA Starcross VIC for postmortem examination from a Dorset dairy herd of 270 cows. In the preceding weeks the animal had reduced milk production and lost body condition. The private veterinary surgeon (PVS) had examined the cow, finding prominent enlargement of the prescapular, mammary, internal pelvic and lumbar spinal lymph nodes. Postmortem examination confirmed that the majority of the carcase lymph nodes were enlarged, reddened and had focally extensive areas of firm cream-coloured infiltrating tissue. Similar lesions were present in the liver (fig 4).

The generalised lymphadenopathy and suspected infiltration of the liver were suggestive of neoplasia, with lymphoma considered the most likely cause. Because of the possibility of enzootic bovine leukosis (EBL), which is a notifiable disease, these findings were reported to the APHA Field Services. EBL is caused by a retroviral infection and testing on carcasses is currently performed by PCR for the virus on the affected lymphoid tissue. A negative PCR test on this cow ruled out EBL. Subsequent histopathological examination of the liver and affected lymph nodes confirmed that the tissues were infiltrated by neoplastic round cells with morphology of a lymphoma.

The findings in this case were consistent with the sporadic form of bovine lymphoma. Lymphomas in cattle which are not associated with bovine leukemia virus are classified into different forms (Grimshaw and others 1979). A juvenile multicentric form affects animals less than six months old, and may be present at birth, usually featuring symmetrical lymph node enlargement and often leukaemia. There is a thymic form which typically affects cattle six to 24 months of age. A cutaneous form of lymphoma, occurring from around 12 months old and in young adults, features multiple raised skin nodules and plaques, and is described having a protracted clinical progression. The multicentric form of lymphoma, as in this recent case, is recognised in adult animals. Atypical forms have
also been described. It is essential that all suspected cases of lymphoma are reported as suspected notifiable disease in order to be able to exclude the possibility of EBL occurring in the national herd. The UK is EBL free, and it is important both to maintain freedom from disease and continue to provide evidence of that freedom.

Fig 4: Multiple lymphomas in the carcase of a dairy cow

**Border disease virus infection in cattle**

Disease associated with infection by border disease virus (BDV) was confirmed in two VICs. At APHA Penrith VIC the virus was identified in a second trimester aborted calf which was submitted from a suckler herd of 150 animals. It was the second abortion reported in a group of eight in-calf heifers which were purchased in 2018. The vaccination history of the animals was not known.

The fetus showed advanced mummification. In addition to the identification of BDV by PCR on the spleen, a *Streptococcus* sp. was isolated in pure growth from the fetal stomach content.

As the animals were bought-in it was not known whether they had been in contact with sheep prior to purchase. Follow-up testing was carried out on 8 animals using the bovine viral diarrhoea (BVD) antibody ELISA. Five of the animals had strongly seroconverted, while one was weakly seropositive and two were seronegative. PCR testing did not detect pestivirus in any of the 8 animals.
In a second case, APHA Shrewsbury VIC diagnosed suspected mucosal disease in an 8 month old suckler calf which was reported to have been small from birth. It developed watery, bloody, foul-smelling diarrhoea and was tested negative for salmonellae, worm eggs and coccidia. A pestivirus was detected by antigen ELISA on a blood sample from the calf. The APHA’s BVD PCR contains primers to differentiate BVD types 1 and 2 and Border disease virus, and further PCR analysis confirmed that the pestivirus was border disease virus.

Past cases of Border disease infection have been identified by the APHA. It is uncertain whether the origin of BDV infections is through transfer from sheep or whether the virus is maintained in some cattle herds (Cranwell and others 2007), although anecdotal evidence from recent cases suggest disease spread within cattle herds is limited.

Changes in disease patterns and risk factors

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

Enteric system

Fasciolosis

There was a statistically significant decrease in diagnostic rate for Fasciolosis in Q1 of 2019 as compared to the same quarter of 2018; particularly from submissions to SRUC VS (fig 5). This likely to be a result of the hot, dry summer of 2018 producing less favourable conditions for the parasite and its mud snail host.

![GB incidents of Fasciolosis in Cattle as % of diagnosable submissions](image)

Fig 5: GB incidents of fasciolosis in cattle, as a % of diagnosable submissions, Q1, 2007-2019
Respiratory system

RSV

An increase in number of RSV diagnoses was noted in Q1 of 2019 especially for England and Wales (fig. 6). A significant difference in percentage of submissions tested and subsequently diagnosed was noted during this quarter, going from 4.98% in 2018 to 9.43% in 2019. This coincides with the housing period where typically we see most cases of pneumonia, especially in the latter half of the period.

Fig 6: Incidents of RSV in cattle as % of diagnosable submissions, Q1 2015-2019
**Streptococcus suis pneumonia**

An unusual case of *Streptococcus suis* type 1 pneumonia secondary to *Mycoplasma bovis* infection was diagnosed in a group of seven 18 to 24 week-old calves. These were bought-in calves which had received intranasal pneumonia vaccine approximately 12 weeks prior to submission. One of the calves (the smallest) became inappetent for two days and, despite treatment, died. Three of the six remaining calves were pyrexic and two were coughing at the time of submission. The PVS carried out post-mortem examination on farm and submitted fresh and fixed lung samples, tracheal swabs and blood from the thorax. *Streptococcus suis* was isolated in heavy pure growth from the submitted lung. Histological examination found bronchointerstitial pneumonia with abscessation and sequestra, consistent with chronic bovine respiratory disease complex. There were also lesions highly suggestive of infection with *Mycoplasma bovis* and IHC confirmed the presence of *Mycoplasma bovis* in association with the caseonecrotic lesions in the lung. The damage to the small airways (bronchiolitis obliterans) was suggestive of previous viral or lungworm challenge but PCRs for respiratory pathogens were negative. The damage would have predisposed the animal to secondary bacterial infection. *Streptococcus suis* is infrequently isolated from cattle samples including consolidated lung. There was no evidence of any contact with pigs.
Horizon scanning
Bluetongue (BTV) update

Further outbreaks of bluetongue (BTV) serotype 8 in cattle were reported in Germany and Belgium in January and February. This is in addition to BTV 8 known to be present in France and Switzerland. The most recent assessment for Bluetongue (BTV) in Germany can be found at [https://www.gov.uk/government/publications/bluetongue-virus-in-europe](https://www.gov.uk/government/publications/bluetongue-virus-in-europe)

**Fig 8: BTV 8 outbreaks in Europe since October 2018**

**Suspected transplacental infection by Bluetongue serotype 8 (BTV-8)**

Since mid December 2018, France has reported calves that were born small, blind and which have died at a few days of age. The number reported has increased considerably since January 2019. These animals have been positive by PCR test on blood and spleen for BTV-8, and negative for Schmallenberg virus, and this detection in calves of about a week of age during the *Culicoides* vector-free period suggests transplacental BTV-8 infection. Since the first reports of cases, 418 samples from such calves have been reported as testing positive by PCR for BTV-8. Between 2-15% of newborn calves have been infected on some farms (Zientara et al 2019). Transplacental infection was described during the 2006-2009 BTV-8 outbreak (Vercauteren et al 2008, Batten et al 2009) but at notably lower rates than currently reported in France. This observation, and further studies using experimental midge infection, suggest that the current BTV-8 strain in France has
reduced Culicoides vector competence (Flannery et al 2019), which reflects phenotypic changes in the re-emerging strain.

A study in France was published of estimates of vertical transmission in French cattle in 2016 for infections occurring late in gestation and allowing the birth of viable calves (Courtejoie and others 2019). The high probability of 56% highlights that this transmission route may be more widespread than expected, though its true epidemiological impact remains to be assessed.

Livestock owners and field vets in the UK should note that the re-emerging BTV-8 strain in northern Europe may cause transplacental transmission and infection of fetuses in cattle, and they should consider BTV-8 as a possible cause of abortion or malformed calves, in addition to Schmallenberg and other viruses such as BVD. The advice on how to spot the disease has been updated (see https://www.gov.uk/guidance/bluetongue)

References


Flannery et al. (2019) Evidence of reduced viremia, pathogenicity and vector competence in a re-emerging European strain of bluetongue virus serotype 8 in sheep. Transboundary and Emerging Diseases 1-9.


Annexe

VIDA diagnoses are recorded on the APHA FarmFile database and SRUC Veterinary Services LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both APHA and SRUC Veterinary Services are widely acknowledged, and unusual disease
problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

APHA VICs have UKAS Accreditation and comply with ISO 17025 standard. SRUC Veterinary Services has UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Perth, Ayr, Dumfries, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.

From September 2014 APHA contracted the services of partner post-mortem providers. From April 2015, these services were provided by the Royal Veterinary College, the University of Bristol, University of Surrey and SRUC Veterinary Services. These providers contribute to the VIDA diagnoses recorded on the APHA FarmFile database and comply with agreed diagnostic criteria. To achieve a VIDA diagnosis, all testing must be carried out by a laboratory with ISO 17025 accreditation.

This report contains analysis of disease data from APHA, SRUC Veterinary Services division of Scotland’s Rural College (SRUC) and partner post-mortem providers (SRUC Veterinary Services, University of Bristol Veterinary School, Royal Veterinary College, University of Surrey, Wales Veterinary Science Centre) from samples submitted in the first quarter of 2018 compared to the equivalent quarter of previous years. It aims to identify emerging small ruminant disease related threats. The production of the report is underpinned by a large quantity of surveillance data and information, compiled as part of the Defra Plant and Animal Health and Animal Health and Policy Implementation Directorates. Further information can be found at http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm.

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

Monitoring the trends in diagnoses of known diseases cannot, by definition, detect either new diseases or changes in endemic diseases that would prevent a diagnosis from being reached (for example a change in the pathogen that compromised the usual diagnostic test). Such new or emerging diseases would probably first be detected by observation of increased numbers of submissions for clinical and/or pathological syndromes for which a diagnosis could not be reached in the normal way. Submissions for which no diagnosis is reached (DNR) despite testing deemed to allow reasonable potential for a diagnosis to be reached are regularly analysed to look for increases in undiagnosed disease which could indicate the presence of a new or emerging disease. Undiagnosed disease submissions are summarised broadly by the clinical presentation of disease and, once this has been determined by further investigation, the body system affected. Both groups are investigated and trends in the levels are compared over time.
Data recording by APHA and SRUC Veterinary Services was harmonised from 2007. The Species Expert Group reviews trends in VIDA DNR data each quarter with the aim of providing information on potential new or emerging diseases or syndromes. ‘Prior years’ refers to pooled data for 2008 - 2016 for GB VIDA data.

Supplementary analysis of APHA DNR data is also undertaken using an early detection system (EDS). This uses a statistical algorithm to estimate an expected number of DNR reports and a threshold value. If the current number of DNR reports exceeds the threshold (i.e. exceedance score>1), this indicates that the number of reports is statistically higher than expected. When this EDS identifies categories of submissions where the threshold DNR has been exceeded, the Species Expert Group reviews the data to investigate further. This review may involve assessment of individual DNR submissions. Where this DNR analysis finds no evidence of a new and emerging threat or other issue, the detail of these reviews in response to thresholds being exceeded may not be reported here.

**Changes in disease patterns and risk factors**

This section of the report gives information on occurrence of selected diseases. The data originate from submissions and are summarised and presented according to the diagnosis reached and assigned as a VIDA code. Our charts show the number of diagnoses (numerator) as a proportion of the number of submissions in which that diagnosis was possible (denominator), for all of GB, England & Wales and for Scotland. The bars indicate the 95% confidence limits. Note that the y-axis of the charts varies and therefore care must be taken when comparing individual charts.
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