GB Emerging Threats
Quarterly Report
Cattle Diseases

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Highlights

- Schmallenberg update
- Diseases associated with poor forage
- *Mycoplasma bovis*
- Centre of Expertise for Extensively Managed Livestock

VIDA diagnoses are recorded on the APHA FarmFile database and SAC Consultancy: 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 SAC C VS 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. SAC C VS have 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, Wales Veterinary Science Centre and SACCVS. 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.
INTRODUCTION

This report contains analysis of disease data from APHA, SAC Consulting: Veterinary Services (SAC CVS) division of Scotland’s Rural College (SRUC) and partner post mortem providers (SAC CVS, 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 cattle 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://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm.

OVERVIEW

Issues and Trends

Meteorology

![Map of mean temperature and rainfall in March 2018 compared with 1981-2010 (Met Office)]

Fig 1: (L) mean temperature and (R) rainfall in March 2018 compared with 1981-2010 (Met Office)

The March weather had the most significant impact on livestock, with low temperatures and two spells of lying snow. This directly affected lambing flocks, and had an indirect impact in some areas on cattle, by delaying turnout and exacerbating the forage issues highlighted in the previous Report.
Dairy

During the first quarter of 2018 farm gate milk prices have either remained unchanged or decreased slightly depending on contract. Over the same time period UK total milk production has decreased compared to 2017. The late spring has impacted on feed supplies with forage stocks running low on many farms and an associated late turn of milking cows. This will have resulted in digestive upsets and an increased incidence of transition cow disease on some units. Feed prices have remained largely stable but are expected to increase over the summer as a result of increased demand because of the late spring and extra feeding required. These combined factors have imposed a squeeze on farm income.

Beef

Prime beef prices typically drop during first the quarter of the year, and stayed to form in January, exactly in line with the 5 year average initially. There was some concern that straw shortages may have depressed store cattle prices in mid-January. When the prime cattle price lift came in early March (earlier than the last two years, and coinciding with extremely bad winter weather) averages were 2p above the 5 year average and 8p above year on year. Prices held steady for March, before starting to gain more rapidly in late March.

Production is forecast to be higher in 2018 than any other year from 2016-2020, and this is consistent with recent BCMS data showing that we have similar numbers of cattle in the UK in January 2018, but with reduced dairy cattle and increased beef cows and young-stock. In particular there is a noted increase in dairy-cross beef calves on the ground that will come to market in the coming 12-24 months.

Diagnostic submission trends

![Diagnostic submission trends graph]

a) Carcase
Fig 2: A) Carcase, b) fetus and c) other submission throughput for Q1 2013-2018, GB

Fig 3 shows the trends in submissions for throughputs of three categories of submission in Q1 from 2013-2018 in GB. Over GB as a whole, carcase submissions have improved slightly after a period of similar throughput, which is encouraging; it is too early to tell whether this will be sustained. Fetal submissions remain static but the decline of ‘other’ submissions (i.e. samples) is continuing.

Fig 3: England, Wales and Scotland throughput figures for Q1 2018 compared with the prior two and five years (VIDA)

The table in fig 3 shows carcase, fetus and ‘other’ (i.e. samples) for Q1 2018 compared with the mean for the preceding two or five years for Q1, allowing comparison between countries over time. On this basis it is apparent that there are country differences. For example, carcase
throughput in England and Wales has improved compared with recent years, whereas Scotland’s has declined slightly. This parameter will be monitored. Likewise, fetus throughput in England has declined significantly, but Wales has improved, likely as a consequence of the effectiveness of partner post-mortem provision. What is of concern, however, is the fall in ‘other’ submissions, which is across all three countries, which may reflect the increasing use by practitioners of other veterinary laboratories.

Fig 4: Map showing the surveillance rate - the proportion of holdings submitting a diagnostic alert, Q1 2018
The map in fig 4 shows the ‘surveillance rate’, i.e. the proportion of cattle holdings submitting a diagnostic alert (i.e. a diagnostic submission, notifiable disease suspicion, abortion or welfare issue), expressed as 16km hexagons to give anonymity, to give a visual indication of the spatial distribution of alerts across England and Wales. These data are not yet available for Scotland. Please note that the denominator values are calculated for the date of the map, and will differ for previous years/quarters. Thus, maps are not directly comparable.

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 SACCVS 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 2010-2016 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 infection 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.

Analysis of Diagnosis Not Reached (DNR)*

Analysis of DNR by syndrome and presenting sign

There was an alert for raised DNR rates for the syndrome ‘Reproductive’ raised in Q1 2018 (87/146 submissions; 56%). This occurred in multiple areas but predominantly northern England (48/70; 69%). The CEG is investigating potential causes.

* When a VIDA diagnostic code is assigned to a specific submission, the decision has to be made if it meets the stated diagnostic criteria. If the criteria are not met, it is marked as “Diagnosis Not Reached” or DNR. If it is a DNR, the next step is then to decide if this was due to limited testing or if reasonable testing had been done. If it is deemed that reasonable testing had been done, there may be reasons why a diagnosis could not be reached and this should be recorded and can include inappropriate disease phase, treatment, inconclusive results, or other reasons. Typical examples of such submissions include: coccidiosis cases where speciation was not done and Johne’s cases in live sheep where the test results may be inconclusive. However, in some cases there is no apparent reason to explain why a diagnosis could not be reached and these are the submissions, if present in significant numbers, which may indicate new and emerging disease.
ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS

Schmallenberg virus

No cases of congenital disease caused by Schmallenberg virus (SBV) have been reported in cattle in the first quarter of 2018. The CEG considers that SBV is an endemic disease in most areas of England, Wales and southern Scotland. Notwithstanding, the CEG is supporting investigations into suspected cases of acute SBV disease, following discussion with a Veterinary Investigation Officer and where reasonable attempts to rule out potential differential diagnoses have been made. Clinical signs of acute SBV disease include milk drop, fever and diarrhoea. Please contact your local Veterinary Investigation Centre or partner PME provider at http://apha.defra.gov.uk/vet-gateway/surveillance/diagnostic/national-network.htm

Vets and farmers should be aware that stocks of vaccine are very limited, and are short-dated (towards the end of July 2018).

UNUSUAL DIAGNOSES

Botulism outbreak in dairy cows

An outbreak of suspected botulism occurred in a dairy herd of 70 cows, where nearly all of the group of 48 high yielders died, while no cows in the low yielder group, and no dry cows, were affected. The cows developed typical signs of botulism, with weakness and flaccid paralysis leading to recumbency and death, in some cases within six hours of the onset of signs. Initially, caustic soda-treated grain, which was mixed with brewer’s grains, silage and a mineral/vitamin mix, was considered a possible source of botulinum toxin as it was fed only to the high yielding group. A separate feed mix was given to the low yielders and dry cows. Given the nature of the caustic soda-treated grain, this appeared an unlikely source and further investigation included questioning the silage contractor, who recalled ensiling a chicken when gathering the silage, and didn’t think more of it at the time. Postmortem examinations on two cows identified no significant pathology and subsequent testing of faeces, intestinal content and rumenal content confirmed the isolation of Clostridium botulinum bacteria type D/C from one animal and C. botulinum toxin type C & D from the second. This case is a reminder of the scale of the losses that can occur in some outbreaks and that the source of botulinum toxin in most outbreaks is carcase material which is inadvertently eaten by ruminants.

Closantel toxicity

Closantel toxicity was diagnosed postmortem in a 17-month-old Angus heifer which had relatively quickly developed malaise, anorexia and blindness over 24 hours. It was one of two affected in a group of 35 heifers which had been treated one week earlier with a pour-on combination product containing ivermectin and closantel. There were no significant gross pathological lesions and biochemistry ruled out lead toxicity. Histopathology identified a severe widespread subacute vacuolar leukoencephalopathy with astrocyte swelling, lesions which have been identified
associated with closantel toxicity in cattle. Closantel is a salicylanilide. Salicylanilides are hydrogen ionophores, and are referred to as oxidative phosphorylase uncouplers. They are extensively bound to plasma proteins which reduces incorporation of the drug into host tissues and theoretically accounts for selective parasite toxicity. Unfortunately, the safety index is not as high as for many other anthelmintics. Looseness of faeces and slight loss of appetite are reported in some animals after treatment at recommended dose rates. There may also be increased frequency defaecation and decreased vision. High doses may cause blindness and signs of uncoupled oxidative phosphorylation i.e. generalized weakness, hyperventilation, hyperthermia, convulsions, tachycardia and ultimately death. Several cases have been identified in the last 7 to 8 years in cattle similarly treated using the combination pour-on product and the Veterinary Medicines Directorate have been informed. Clostantel toxicity has also been identified in sheep in the UK (Barlow and others 2002).

Diseases associated with poor forage

The likelihood of forage shortages, and anticipation that the silage which was gathered would be of poor quality, were first reported by the APHA Cattle Expert Group in the late autumn, firstly relating to Scotland and subsequently to north west England and Northern Ireland. Further, there were also reports of reduced straw being available, and the price of that which was being sold rapidly increased from around £95 per tonne in December, to in excess of £140 per tonne early in the new year. These issues and the potential diseases which could arise on farms in affected areas were raised at the UK Veterinary Risk Group; veterinary advice was published and widely circulated to farmers, veterinary surgeons and other stakeholders (http://dx.doi.org/10.1136/vr.k38). Further advice on some of the diseases and feed-related problems which could arise was published in a surveillance focus article (http://veterinaryrecord.bmj.com/content/182/9/252), and was published on the Vet Gateway at http://apha.defra.gov.uk/documents/surveillance/diseases/bedding-shortage-info-jan18.pdf for bedding issues, and http://apha.defra.gov.uk/documents/surveillance/diseases/winter17-forage-shortage.pdf for forage shortages.

Outbreaks of listeriosis were subsequently identified in England, Wales and Scotland, with abortion the most common manifestation of disease. Meningoencephalitis and occasionally systemic disease were also diagnosed. The majority of cases of listeriosis in livestock are associated with feeding poor quality silage, as the bacteria can survive, and proliferate, if optimised anaerobic fermentation conditions are not achieved. This is most likely if the silage is made when wet, where excess soil is incorporated, and if air is not excluded from beneath a clamp cover or perforations occur in bale wrappings. Systemic infection is relatively uncommon and usually seen in very young animals. One case described in a south Wales herd was diagnosed in a five day old suckler calf. It had omphalitis and fibrinous polyarthritis, but most noteworthy was the hepatitis featuring numerous small necrotic foci, pathology which has been described as 'sawdust liver' (Fig 4). A second case was seen in a 300 cow Somerset dairy herd where three calves died over a short period, with scouring and pyrexia reported. Navel inflammation and polyarthritis were again identified postmortem, in addition to a fibrinous
meningitis, and there was also a necrotising inflammation of the caecal mucosa. In both outbreaks the portal of bacterial infection was considered to be the navel, and an urgent review of the management of newborn calves, including navel dressing and improving hygiene in the housed areas, was recommended. Listeriosis is considered to be a zoonotic disease and it is hence important to maintain good personal hygiene, although most human cases are considered to arise due to eating contaminated foods.

![Fig 4: Miliary foci associated with systemic listeriosis in the liver of a 5-day-old calf ('sawdust liver')](image)

**Cold cow syndrome**

Cold cow syndrome is an uncommonly reported disease manifestation of unknown aetiology, which occurs in dairy cows. A report of a suspected outbreak in a 300 cow south Wales dairy herd was received in mid-March. The affected cattle had been turned onto a mixed ryegrass and clover pasture. Around 40 cows developed signs which included being cold to the touch although having a normal rectal temperature, ataxia (appearing drunk), a severe milk drop, vulval swelling and profuse diarrhoea. Two of the cows died. The cows were removed from the pasture and housed for 24 hours and the others recovered. Cold cow syndrome occurs only sporadically, being in lactating cows on ryegrass pastures in early spring. There is no specific treatment recommended other than removing them from the pasture. The affected pastures should be safe to graze later in the season.
Non-suppurative encephalitis

An acute necrotising non suppurative encephalitis was diagnosed postmortem in a 36-month-old Holstein. It was the only affected animal in a herd of 920 animals. The affected cow had only been on the farm for 3 weeks, having been imported from Germany. It was initially reported to be ‘off colour’ for three days and continued to be milked, with a much reduced yield. The cow then collapsed when it was leaving the parlour and was moved to a paddock where it was treated with a non-steroidal anti-inflammatory drug, fluids and propylene glycol by stomach tube. The practitioner who examined the animal reported that it had an ‘S’ shaped neck, sunken eyes, a low temperature and bilateral dilated pupils. It failed to respond to treatments with calcium and magnesium in addition to B vitamins, and was euthanased. Postmortem examination did not reveal any specific gross pathology and no infectious agents were identified. Biochemistry undertaken on a blood sample which was collected before euthanasia, was also unremarkable, and testing for the toxins of *Clostridium perfringens* was negative. The diagnosis of acute necrotising non suppurative encephalitis was reached by histopathological examination of the brain. Immunohistochemistry for bovine herpesvirus 1, the cause of infectious bovine rhinotracheitis (IBR) was negative, PCR testing ruled out malignant catarrh and astrovirus infections, and louping ill was excluded by serology. A viral infection is considered the most likely cause of a non suppurative encephalitis but in this animal no definitive diagnosis was reached. The APHA CEG is keen to investigate cases of non-suppurative encephalitis.

**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.

*Mycoplasma bovis*

![Graph](image)

Fig 5: GB incidents on *Mycoplasma bovis* as a % of diagnosable submissions, Q1 2018 (VIDA)

There has been a steady increase in VIDA diagnoses of *Mycoplasma bovis* pneumonia in Q1 over the past few years, expressed as % of diagnosable submissions (Fig 5), despite falling submission numbers (53/376 tested in 2018 vs 26/1020 in 2006 for example). This is statistically significant over the six year period since 2013.
a) Age

b) Purpose
The graphs above show the breakdown of distribution of *Mycoplasma bovis* VIDA diagnoses for Q1 2018 (brown) compared with the mean for the preceding five years (2013-2017). These suggest that the distribution in terms of age is predominantly in postweaned animals, in beef animals, and with the spatial distribution towards Scotland, and western England. The APHA CEG is investigating this and other manifestations of *Mycoplasma bovis*- associated disease.

**Salmonella investigations**

Three Salmonella advisory (‘ZO4’) visits were made in Q1. They illustrate the range of types and issues that may occur. The first visit occurred in dairy cattle in response to the isolation of *S. Typhimurium* DT104 from a dead calf presenting with scour. A total of three calves died within the same group, which were all diagnosed with pneumonia associated with a poorly ventilated building in which they were housed. The most likely source of infection was thought to be wild birds, specifically starlings, attracted to the area by a local sewage and rubbish plant. Appropriate advice on good hygiene, disinfection and biosecurity was given, and the farmer agreed that calves would be reared in improved accommodation hereafter.

The second visit occurred following isolation of *Salmonella O_rough:z10:e,n,z15* from a faecal sample originating from a scouring bull. The *Salmonella* isolated was likely to be a rough form of *S. Mbandaka*, a strain that causes regular cases in humans, although it is not considered highly virulent. The visit was organised to advise on the prevention of zoonotic transmission and to enhance biosecurity and disinfection processes. The source of infection may have originated from bought in livestock, starlings which are frequently observed on the premises, or the purchase of contaminated ‘straight’ feeds. Upon discussing these potential sources of infection, it became clear interventions had already been established to reduce future infection risk.

The final dairy cattle ZO4 visit occurred following isolation of *S. Agama* from a faecal sample collected from a deceased calf which had presented with scour. *Salmonella* Agama is frequently isolated from badgers and has limited infectivity for both cattle and humans. The small dairy premises, which sells raw milk products to a large number of customers, frequently sends samples to a private laboratory for bacteriology testing. Further samples taken during the visit tested negative for *Salmonella*. Advice was given on improving biosecurity and zoonosis, and the farmer was encouraged to review calf management to reduce bacterial loads in livestock.
Centre of Expertise for Extensively Managed Livestock

APHA Carmarthen Veterinary Investigation Centre is being developed as a Centre of Expertise for surveillance in extensively managed livestock. Whilst based in Wales, the Centre is a Great Britain-wide resource. This Centre of Expertise is being set up to:

- Develop efficient ways of sourcing surveillance data and information on extensively managed livestock to improve surveillance
- Investigate and develop how data and information can be translated into actionable intelligence and disseminated to farmers and vets
- Develop a virtual hub of expertise in surveillance in extensively managed livestock to complement the Species Expert Groups
- A second APHA conference on Surveillance in Extensively Managed Livestock took place at the Newton Rigg College, Penrith on 23 November 2017. A full report has been published on the Extensively Managed Livestock webpages of the APHA’s Vet Gateway: http://apha.defra.gov.uk/vet-gateway/surveillance/experts/exten-man-livestock.htm

HORIZON SCANNING

Bluetongue

Fig 7: BTV cases in Europe since January 2018, showing Current restriction Zones

France reported continuing cases of BTV-8 and 4 in the central and eastern regions (see fig 7).

**REFERENCES**