



**Animal &
Plant Health
Agency**

Annual Review and Horizon Scanning Report 2021

October 2023

APHA Parasitology Group



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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment, and the economy.

Contents

Ruminant, Porcine, Avian & Miscellaneous species parasitic disease surveillance in GB in 2021	1
Small Ruminants.....	1
Cattle	3
Pigs	3
Avian.....	3
Miscellaneous, Exotic & Wildlife species	4
APHA Parasitology Surveillance Projects	4
Horizon scanning for new and re-emerging veterinary parasitological threats relevant for GB	5
Antimicrobial resistance	5
Anthelmintic resistance in ruminants	6
List of scientific parasitology papers published in peer review journals by APHA in 2021 (APHA authors in capitals).....	6
Parasitology surveillance publications (non-peer review) by the APHA Parasitology team in 2021 ..	8

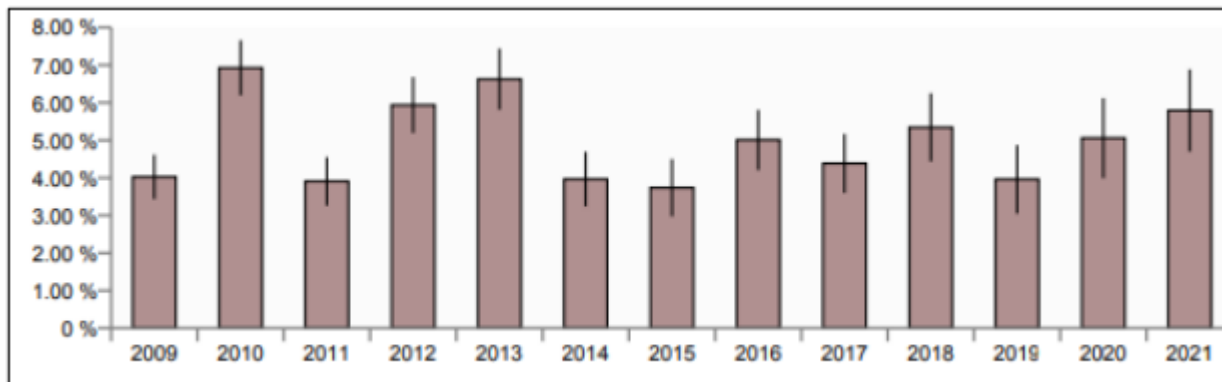
Ruminant, Porcine, Avian & Miscellaneous species parasitic disease surveillance in GB in 2021

The Veterinary Investigation Diagnosis Analysis database ([VIDA](#)) contains a record of every diagnostic submission from livestock and wildlife in Great Britain made to the Veterinary Investigation Centres of the Animal and Plant Health Agency (APHA), its partner Post Mortem Examination providers, and to Scotland's Rural College Veterinary Services (SRUC VS). VIDA represents only submissions of clinical diagnostic material.

Small Ruminants

According to the VIDA database, parasitic gastroenteritis (PGE) was the most common disease diagnosed in sheep in 2021 in GB. A total of 579 diagnoses of PGE were made in 2021, which includes haemonchosis (58 cases) and nematodirosis (106). Diarrhoea, wasting, and death were the main clinical signs associated with the diagnosis of PGE. PGE was detected throughout the year with a peak during the third quarter and most of the diagnoses were recorded in post-weaned lambs; however, 36% of diagnoses of *Haemonchus contortus* were in adult animals. Historically, haemonchosis was considered only to be a problem in the South of England, but, as in 2020, the geographic distribution of this parasite was across GB. Nematodirosis was diagnosed in 18% of PGE diagnoses (82% in pre/post weaned lambs; 4% in adults; 14% were unknown age). There were significantly more diagnoses, as a percentage of diagnoseable submissions, of nematodirosis in the second quarter (Q2, April-June) of 2021 compared to the similar period 2020. Overall, 58 incidents were recorded in Q2 of 2021 compared to 25 in 2020. This is likely to have been due to the warmer weather during June allowing infective larvae onto pasture to be ingested by susceptible lambs. The increase in number of diagnoses was more marked in Scotland (37 diagnoses), than that from England and Wales (19 diagnoses), but both showed an increase. The annual percentage of diagnosis of nematodirosis in 2021 is the highest detected since 2013 (Fig 1).

Fig 1: Annual incidents of nematodiosis in Great Britain, as a percentage of diagnosable submissions 2009 to 2021



In 2021 ovine toxoplasmosis remained the most common parasitic cause of ovine abortion (162 cases). The next two most frequently diagnosed parasitic diseases were chronic fasciolosis (100) and coccidiosis (90).

There were increasing diagnoses of chronic fasciolosis during 2021, when compared to the previous two years. This increase has been particularly noticeable in Scotland.

Clinical coccidiosis was the most common cause of diarrhoea diagnosed in preweaned lambs. Coccidiosis typically affects young lambs, three to nine weeks of age, resulting in signs of diarrhoea, ill thrift, and death. Fifteen species of *Eimeria* are recognised in sheep, of which two (*Eimeria ovinoidalis* and *Eimeria crandallis*) are significant pathogens. Thus, the presence of large numbers of oocysts in sheep is not necessarily indicative of disease, and oocyst speciation is necessary to differentiate between highly pathogenic and low pathogenic species present.

Tick-associated diseases were also notable during 2021. A mild winter followed by warm humid summer weather was conducive for high tick survival. Tick-borne fever is predominantly associated with increased susceptibility to other infections, so animals were often submitted to investigate death due to a wide range of concurrent infections, mostly bacterial in nature. Other tick-borne diseases included louping-ill and tick pyaemia. Cases of tick-borne disease were more typically associated with animals grazing moorland areas; however, cases were also detected in animals grazing lower, improved grassland. On these pastures, ticks are often found in higher numbers around hedgerow borders where climatic conditions are more suited to their survival.

Cattle

According to the VIDA database, cryptosporidiosis was the most common parasitic disease diagnosed (338 cases), followed by coccidiosis (177) and fasciolosis (112), in GB cattle in 2021.

The main clinical presentation of cryptosporidiosis was diarrhoea, sometimes with malaise, in calves of up to four weeks old. Cryptosporidiosis was diagnosed in 20% of the submissions for which it was tested, in Q1 (January-March) of 2021. This was a higher rate than for Q1 of the previous four years, which had been 16% of diagnosable submissions.

Pigs

Porcine coccidiosis continued to be the most common parasitic disease diagnosed through the GB scanning surveillance network in pigs in 2021, followed by helminthiasis and parasitic pneumonia.

Suckling piglets from around seven days of age were the main age group in which coccidiosis was diagnosed, which is expected as *Cystoisospora suis* is a pathogen of pre-weaned piglets. Affected pigs frequently show pasty to watery non-haemorrhagic diarrhoea and, if not treated, marked weight loss can follow. Morbidity can approach 100% of piglets within a litter while mortality is usually low unless other pathogens or environmental challenges are involved.

Clinical coccidiosis involving *Eimeria* species is uncommon in post-weaned pigs. Diagnoses in post-weaned pigs at APHA in the last decade have involved similar epidemiological scenarios with disease occurring in young replacement breeding gilts or boars born and reared indoors, then moved at around six to seven-months-old. In these incidents, disease usually occurred within two weeks of moving and it is assumed that they were exposed after moving to ground contaminated with coccidial oocysts. Cases were sometimes concurrent with salmonellosis and clinical signs included diarrhoea, wasting and deaths.

Avian

According to the VIDA database, coccidiosis was the most common parasitic disease diagnosed in poultry in 2021, followed by helminthosis and blackhead (histomonosis).

Miscellaneous, Exotic & Wildlife species

The top 3 diagnoses in exotic and wildlife species were PGE (alpaca, bison, deer, hare, llama), coccidiosis (alpaca, hare, hedgehog, otter, squirrel, swan, thrush) and fasciolosis (alpaca, deer).

In 2021 there were 12 cases of PGE diagnosed in alpacas, 6 in deer and 2 in llamas. Most of the diagnoses in alpacas were in adults showing clinical signs such as wasting, malaise and recumbency.

Ectoparasitism was diagnosed in alpacas: 3 cases of sarcoptic mange (*Sarcoptes scabiei*) and 2 of chorioptic mange (*Chorioptes bovis*).

APHA Parasitology Surveillance Projects

Sheep Scab testing in Wales – Examination of skin scrape samples from sheep showing suspect clinical signs of sheep scab was offered free of charge in Wales, between the beginning of November 2020 and the end of March 2021. This initiative was funded by the Welsh Government and is a priority of the Wales Animal Health and Welfare Framework.

<https://gov.wales/sites/default/files/publications/2019-07/animal-health-and-welfare-framework-implementation-plan-2019-2020.pdf>.

It followed a similar project which ran between December 2017 and March 2018 (<http://apha.defra.gov.uk/documents/surveillance/diseases/ectoparasite-report-1217-0318.pdf>).

Its aims were to support accurate diagnosis of pruritic sheep in order to promote correct treatment and successful control of sheep scab. A full report of the project is available here: [Surveillance report free sheep scab testing Nov'20-March '21 \(defra.gov.uk\)](#)

Tick-borne diseases – APHA offered free PCR testing for babesiosis during the 2021 grazing season. Samples were submitted from up to three cattle displaying clinical signs of babesiosis per farm during that grazing season. The information gathered contributed valuable surveillance data on babesiosis and other tick-borne pathogens in England and Wales. The submission pattern was different from previous years and the usual midsummer decline in submissions did not occur. A letter to the Veterinary Record in September 2021, by McFadzean and others, described that

babesiosis was detected in cattle on two farms in Northumberland, which is an unusual diagnosis in this region.

Horizon scanning for new and re-emerging veterinary parasitological threats relevant for GB

The first report of *Sarcocystis wobeseri*-like parasites in a white-tailed sea-eagle

This potential threat to wild bird health was published in 2021. In October 2019, a reintroduced white-tailed sea eagle (*Haliaeetus albicilla*), in moderate body condition, was found dead on the Isle of Wight and was submitted for post-mortem examination at the Institute of Zoology, Zoological Society of London. There were no signs of disease on gross pathological examination; however, histopathological examination of pectoral and cardiac muscle sections revealed the presence of encysted protozoan parasites. Genetic analysis confirmed the presence of *Sarcocystis* species in pectoral and cardiac muscle which appeared phylogenetically similar to *Sarcocystis wobeseri*. This was the first report of *Sarcocystis wobeseri*-like infection in a white-tailed sea eagle, revealing a new intermediate host species for this parasite. Although there was no evidence of disease associated with this infection, findings were considered of interest in understanding the host range of the parasite and results were published in [Parasitology Research](#).

Antimicrobial resistance

Suspected lack of antimicrobial efficacy should be reported to the Veterinary Medicines Directorate (VMD) under the Suspected Adverse Reaction Surveillance Scheme.

If you find that an antimicrobial is not working as well as it should, this is known as a “Suspected Lack of Efficacy” situation, and you should:

- i) Report the event to the VMD’s Suspected Adverse Reaction Surveillance Scheme (SARSS) team using a ‘yellow’ form (MLA252A) or online via the VMD website: <https://www.vmd.defra.gov.uk/adversereactionreporting/report-type>
- ii) Arrange investigations to determine if this is a resistance problem or a different cause of the lack of efficacy. The manufacturer of the anthelmintic used may be able to help with this investigation.

Anthelmintic resistance in ruminants

Anthelmintic resistance has been identified in worm populations in UK ruminants for decades and there are increasing trends for the presence of resistance to many of the commonly used anthelmintics.

Detection and investigation of anthelmintic resistance is an important part of APHA's surveillance activities. The APHA offers routine macrocyclic lactone (ML), benzimidazole (BZ), and levamisole (LEV) anthelmintic resistance testing. During 2021, two ML, two BZ and one LEV anthelmintic resistances were suspected or confirmed in post-weaned small ruminants.

Useful information regarding the sustainable control of parasites in ruminants are available from the website of these organisations:

- Sustainable Control of Parasites (SCOPS) <https://www.scops.org.uk/>
- Control of Worms Sustainably (COWS) groups <https://www.cattleparasites.org.uk/>

List of scientific parasitology papers published in peer review journals by APHA in 2021 (APHA authors in capitals)

1. Bailey NP; VELO-REGO E; Hirt RP (2021) Sporadic isolation of *Tetratrichomonas* species from the cattle urogenital tract. *Parasitology* 148 (11) 1339-1344. <https://doi.org/10.1017/S003118202100086X>
2. Bartley DJ; JEWELL NJ; Andrews LM; MITCHELL S; Morrison AA (2021) Molecular and phenotypic characterisation of fenbendazole resistance in a field-derived isolate of *Ostertagia ostertagi*. *Veterinary Parasitology* 289, 109319. <https://doi.org/10.1016/j.vetpar.2020.109319>
3. Bartley DJ; JEWELL NJ; Andrews LM; MITCHELL S; Morrison AA (2021) Confirmation and characterisation of fenbendazole resistance in *Ostertagia ostertagi* derived from clinically affected dairy calves at grass in the UK. *Cattle Practice* 29 (1) 9-11.
4. BRAY K; FENEMORE C (2021) Extensively managed livestock event focuses on tickborne diseases. *Veterinary Record* 188 (7) 259-260. <https://dx.doi.org/10.1002/vetr.370>

5. FENEMORE C; FLOYD T; MITCHELL S (2021) Rumen Fluke in Great Britain. *Journal of Comparative Pathology* 184, 31-36. <https://dx.doi.org/10.1016/j.icpa.2021.01.012>
6. GALIPO E; Dixon MA; Fronterre C; Cucunuba ZM; Basanez M-G; Stevens K; Sanchez ACF; Walker M (2021) Spatial distribution and risk factors for human cysticercosis in Colombia. *Parasites and Vectors* 14, Article number: 590. <https://doi.org/10.1186/s13071-021-05092-8>
7. Geddes E; Mohr S; MITCHELL ES; ROBERTSON S; BRZOZOWSKA AM; Burgess STG; Busin V (2021) Exploiting scanning surveillance data to inform future strategies for the control of endemic diseases: the example of sheep scab. *Frontiers in Veterinary Science* 8, article number 647711. <https://doi.org/10.3389/fvets.2021.647711>
8. Gomez-Morales MA; Pezzotti P; Ludovisi A; BOUFANA B; Dorny P; Kortbeek T; Blocher J; Schmidt V; Amati M; Gabriel S; Pozio E; Winkler AS; The Ring Trial Participants (2021) Collaborative studies for the detection of *Taenia* spp. infections in humans within CYSTINET, the European Network on Taeniosis/Cysticercosis. *Microorganisms* 9 (6) 1173. <https://doi.org/10.3390/microorganisms9061173>
9. JOHNSON N; GOLDING M; PHIPPS LP (2021) Detection of tick-borne pathogens in red deer (*Cervus elaphus*), United Kingdom. *Pathogens* 10 (6) 640. <https://doi.org/10.3390/pathogens10060640>
10. Jones, R. A., Williams, H. W., MITCHELL, S., ROBERTSON, S., MACRELLI, M. (2021). Exploration of factors associated with spatial-temporal veterinary surveillance diagnoses of rumen fluke (*Calicophoron daubneyi*) infections in ruminants using zero inflated mixed modelling. *Parasitology*: 1-30
11. Lemasson M; Caignard G; Unterfinger Y; Attoui H; Bell-Sakyi L; Hirchaud E; Moutailler S; JOHNSON N; Vitour D; Richardson J; Lacour SA (2021) Exploration of binary protein-protein interactions between tick-borne flaviviruses and *Ixodes ricinus*. *Parasites and Vectors* 14, Article number: 144. <https://dx.doi.org/10.1186/s13071-021-04651-3>
12. MCFADZEAN H; Strugnell B; Collins C; Jones A; PHIPPS LP; JOHNSON N (2021) Bovine babesiosis in Northumberland (letter). *Veterinary Record* 189 (5) 207-208. <https://doi.org/10.1002/vetr.910>
13. Melville LA; Innocent G; Van Dijk J; MITCHELL S; Bartley DJ (2021) Descriptive analysis of nematode management practices and *Nematodirus battus* control strategies on UK sheep farms. *Veterinary Record* 189 (9) e775. <https://doi.org/10.1002/vetr.775>

14. PHIPPS L; HERNANDEZ-TRIANA LM; JOHNSON N; Hansford K; Medlock J (2021) Importation of an exotic tick into the UK on a leopard tortoise (letter). *Veterinary Record* 189 (5) 208-209. <https://doi.org/10.1002/vetr.912>
15. PHIPPS LP; Cooper JE (2021) Identification of exotic ticks: Paul Phipps responds (letter). *Veterinary Record* 189 (9) 369-370. <https://doi.org/10.1002/vetr.1152>
16. SMITH RP; NEWTON K; RIMDAP E; WIGHT A; Robinson G; Chalmers RM (2021) Review of investigations of premises housing animals that were linked to human outbreaks of cryptosporidiosis in England and Wales between 2009 and 2019. *Veterinary Record* 189 (4) e246. <https://doi.org/10.1002/vetr.246>
17. Touloudi A; Valiakos G; CAWTHRAW S; Kostoulas P; Gortazar C; Boadella M; Giannakopoulos A; Birtsas P; Sofia M; Athanasiou LV; Satra M; Athanasakopoulou Z; Kantere M; Spyrou V; PETROVSKA L; Billinis C (2021) Development of a multiplex bead assay for simultaneous serodiagnosis of antibodies against *Mycobacterium bovis*, *Brucella suis*, and *Trichinella spiralis* in wild boar. *Microorganisms* 9 (5) 904. <https://doi.org/10.3390/microorganisms9050904>

Parasitology surveillance publications (non-peer review) by the APHA Parasitology team in 2021

1. [Surveillance report free sheep scab testing Nov'20-March '21](#)
2. [Extensively managed livestock event focuses on tickborne diseases – April 2021](#)
3. [Lungworm Disease Information Note – November 2021](#)
4. [Cryptosporidiosis Outbreak: A One Health approach - YouTube – December 2021](#)