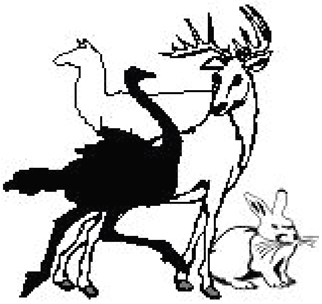

GB miscellaneous & exotic farmed species quarterly report

Disease surveillance and emerging threats

Volume 26: Q3 – July-September 2020

Highlights

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Editor: Alan Wight, APHA Starcross
Phone: + 44 (0)3000 600020
Email: Alan.Wight@apha.gov.uk

Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter, July-September 2020. 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 Small Ruminant Species 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

Diagnostic submissions in Quarter 3 (July-September) 2020, for alpacas, llamas and farmed deer (Table 1) – the APHA figures include submissions to partner post mortem providers (PPP). Other miscellaneous and exotic species may also be received in small numbers.

Jul - Sept	Non-carcase submissions APHA	Non-carcase submissions SAC	Total non-carcase submissions	Carcase submissions APHA	Carcase submissions SAC	Total carcase submissions	Grand total
2016	46	18	**64**	29	4	**33**	**97**
2017	26	19	**45**	24	3	**27**	**72**
2018	14	13	**27**	35	5	**40**	**67**
2019	24	16	**40**	28	4	**32**	**72**
2020	15	22	**37**	21	1	**22**	**59**

Table 1: Diagnostic submissions in Quarter 3 (July-September) 2020, for alpacas, llamas and farmed deer

There was a further reduction in total carcase submissions in Q3-2020 compared to the same period in previous years **(Figure 1)** whilst the total number of non-carcase submissions stayed more stable. However, total carcase submissions rose compared to Q2, 2020 (15) due a rise in carcase submissions to APHA, following what had been a 50% reduction in total carcase submissions between Q1 (30) and Q2 (15) 2020, possibly due to reduced veterinary consultations during Covid-19 lockkdown. Total non-carcase submissions in Q3-2020 more than doubled compared to Q2, 2020 due to a large rise in numbers to SAC.

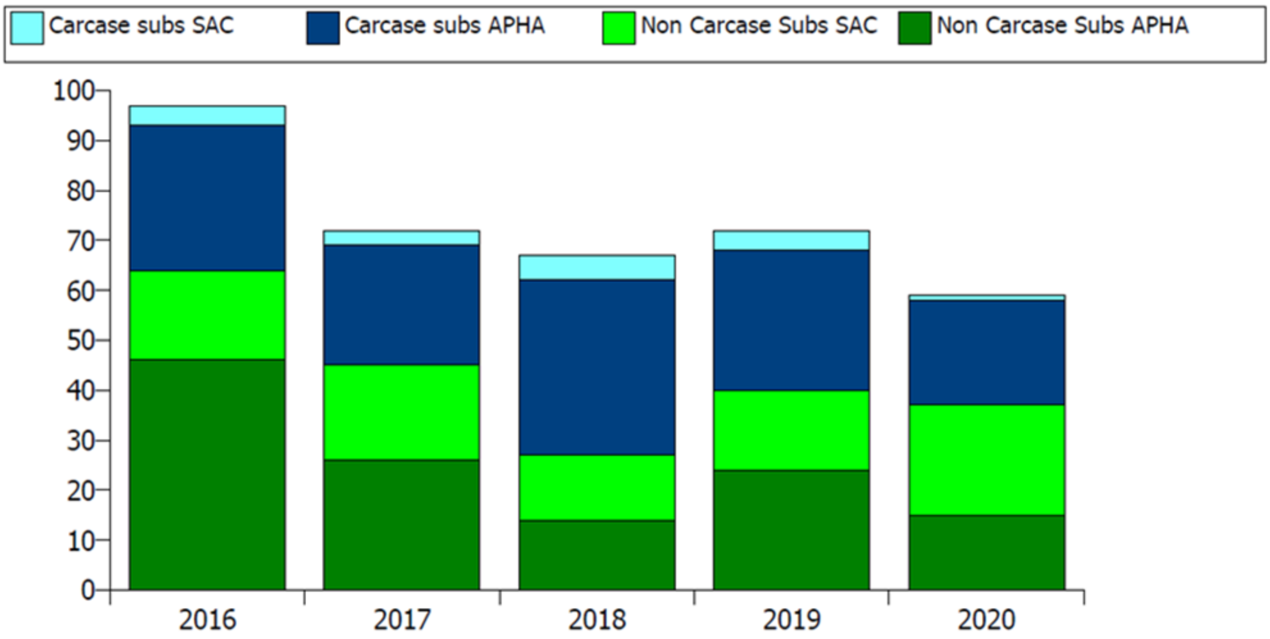

Figure 1 - Carcase and non-carcase submissions, Q3, 2016-2020

Total diagnostic submissions for Quarter 3 for all years (2016-2020) for each main species covered by this report and also for each main geographical area (Table 2)

All Years	Alpaca	Deer	Llama	Summary
Eastern England	58	21	8	87
Northern England	44	13	2	59
Scotland	25	22	9	56
Wales	24	2	1	27
Western England	65	16	8	89
Unknown	38	9	2	49
Summary	**254**	**83**	**30**	**367**

Table 2 - Total diagnostic submissions for Quarter 3 for all years (2016-2020)

Total diagnostic submissions were lower in Quarter 3 (2016-2020 combined), being 367 compared to 406 in Quarter 3 (2015-2019 combined), mainly due to fewer deer and alpaca submissions.

New and re-emerging diseases and threats

Nothing to report this quarter.

Diagnoses from the GB scanning surveillance network including unusual diagnoses

Farmed Deer

Lungworm, endoparasitism and hypocuprosis in red deer

One three-year-old red deer stag was submitted from an estate parkland to investigate malaise and respiratory signs. A deer had been submitted previously in March 2020 for malaise and ill-thrift and was found to have parasitic gastroenteritis and hypocuprosis. The group of 300 deer roam parkland of 100 acres and are supplemented with cereal feed. Over the few days prior to this submission, some of the deer had been coughing, and four had died suddenly. The deer were reported to have had diarrhoea a few weeks earlier, but this had not been reported more recently. One week prior to submission, two stags had appeared lethargic, one of which died the day before submission. The deer had been given anthelmintic mixed into feed followed by access to mineral lick buckets which also contained a benzimadazole wormer. The intake of these products (quantity per deer and number of deer) was uncertain.

Gross pathology included:

- Severe lungworm infestation (**Figure 2)**
- Enteropathy and typhlitis **(Figure 3)**
- Haemorrhagic lesions in skin (**Figure 4**) and caecum

Parasitological testing subsequently showed a high trichostrongyle-type worm egg count (3150 eggs per gram faeces) consistent with a high worm burden and parasitic gastroenteritis.

The haemorrhagic lesions in the skin **(Figure 4)** and caecum were investigated further; laboratory testing for tick borne fever and malignant catarrhal fever was negative and other findings, including histopathology, suggested that blood clotting was impaired. This, with the high parasite burdens, raised the possibility of immunosuppression and, interestingly, liver biochemistry revealed a low copper level, indicating a concurrent diagnosis of hypocuprosis. The challenges of effectively treating free-ranging deer are recognised; the administration of in-feed wormer alone could result some animals being under-dosed and lack of effective treatment and may predispose to the development of anthelmintic resistance.

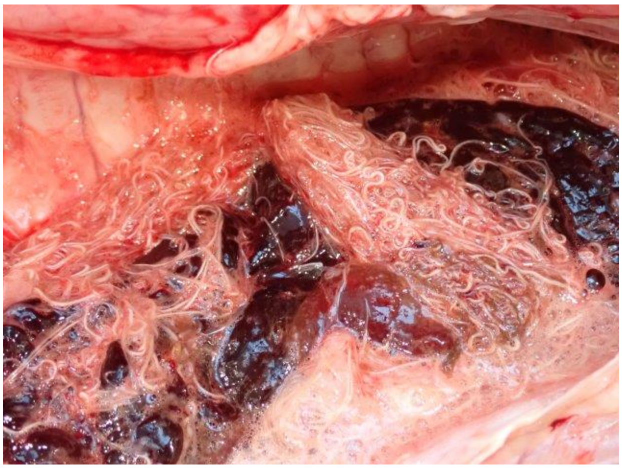

Figure 2 - Adult lungworm in situ in the trachea of a red deer

Figure 3 - Haemorrhagic lesions in the caecum of a red deer with endoparasitism and hypocuprosis

Figure 4 - Skin lesions in a red deer with parasitism and hypocuprosis

Pneumonia due to lungworm and parainfluenza 3 in a red deer

Lungworm was also diagnosed as a component of a more complex pneumonia in one five-month-old deer submitted to investigate condition loss and deaths. In the herd of 170 deer, five calves and three adult hinds had died over two weeks. The first affected deer was an older hind which had lost condition and was found dead two weeks prior to this submission. Around the same time the calves were weaned and brought indoors. They were on grass only prior to weaning, and had been fed silage since coming indoors. The calves were wormed with parenteral ivermectin three days prior to the submission, and weaker calves had been given a trace element bolus. One of the five calves which died had diarrhoea and the other four had been lethargic and standing away from the group for a few hours before they were found dead. The calves were in a shed with young cattle reported to be coughing, sharing the same airspace but without nose-to-nose contact. The gross pathology of the respiratory system suggested that acute and chronic pneumonia resulted first in the condition loss and then the death of this calf. There were lungworm in the trachea and bronchi which were likely to have been involved in the disease. In addition, the cranial lung pathology suggested a bacterial pneumonia, which may have been secondary to lungworm damage or a separate aetiology. Parasitology indicated a moderate enteric infestation with *Ostertagia* spp nematodes. The lung histopathology was interesting and indicated that, in addition to lungworm and bacterial infection being involved, it was likely that a virus of the paramyxovirus family such as Parainfluenza Virus -3 (PI3) or Respiratory Syncytial Virus (RSV) was also involved. Immunohistochemistry (IHC) for PI3 and RSV was undertaken on lung sections and was positive for PI3 antigen **(Figure 5).**

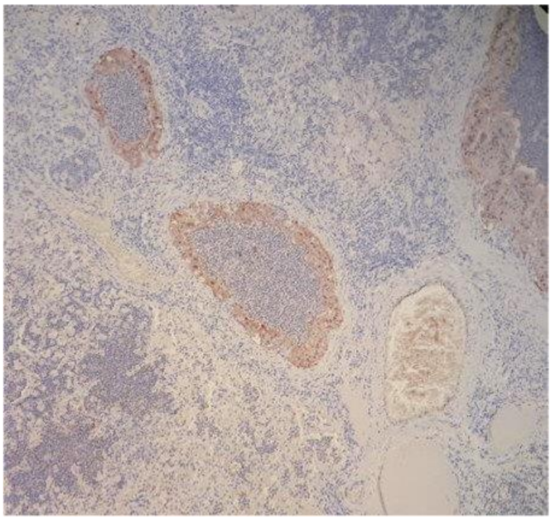

Figure 5 - Deer lung section showing positive (brown) labelling of PI3 antigen by IHC

Whilst PI3 antibodies have been detected in deer in this country, the detection of pathology associated with PI3 infection in deer is unusual.

Next-generation sequencing (NGS) was undertaken on the lung sample and the PI3 virus detected showed the highest nucleotide sequence similarity to those of bovine PI3 viruses, more than 98% similarity at 100% coverage.

Camelids

Fungal gastritis and dermatitis in an alpaca cria

One four-week-old alpaca cria was submitted to investigate diarrhoea, malaise and facial skin lesions. The diarrhoea started when the cria was two weeks old and affected five of the seven cria in the group. They were treated with toltrazuril for suspected coccidiosis and the majority improved. However, two cria, including the submitted one, continued to have diarrhoea. The submitted cria then developed skin lesions around the muzzle, conjunctivitis and corneal ulceration and failed to respond to antimicrobial treatment. Post-mortem examination revealed an enteropathy, gastritis (**Figure 6),** lip and eyelid dermatitis **(Figure 7**), keratitis and corneal ulceration. Histopathology revealed acute, severe, fungal gastritis of the C2 stomach compartment which was likely to be contributing to the diarrhoea and debility in the cria. There were also lesions indicating that the cria had a systemic fungal infection which would have contributed to the cria's general debilitation. The results of investigation, including, histopathology, showed that the facial lesions were due to a combination of fungal and bacterial infection, there was no evidence of parapox virus in the lesions.

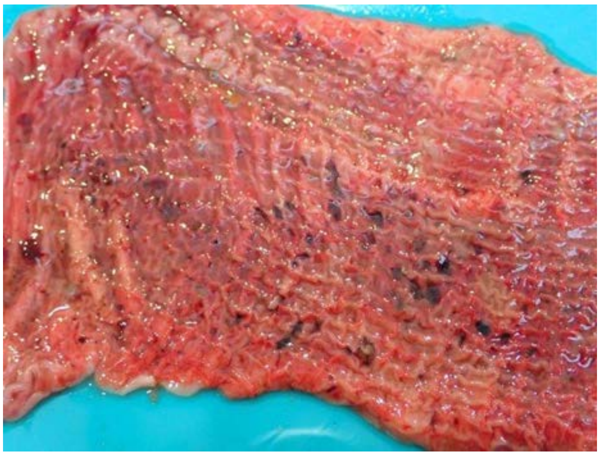

Figure 6 - Fungal gastritis of C2

Figure 7 - Dermatitis and keratitis due to combined fungal and bacterial infection

Omphaloarteritis in an alpaca cria

The death of an eleven-day-old alpaca was found to be due to a combination of malnutrition (associated with mastitis in the dam), dehydration and suppurative omphaloarteritis. One cria was affected within an alpaca herd comprising 40 breeding females and their young. The affected cria was reported to be healthy at birth, but its dam developed mastitis and had little milk.

On post-mortem examination, the cria was dehydrated with scant visceral fat and minimal alimentary tract contents. The remnants of the umbilical arteries were thickened and contained dark clotted blood. Autolysis compromised bacteriology however histopathological examination of the umbilical arteries revealed a severe diffuse subacute suppurative arteritis with intralesional bacteria, with infection likely to have ascended from the navel. As in other livestock species, good hygiene and early and adequate colostral antibody intake are important in preventing early neonatal infections such as navel-ill.

Cardiovascular disease

Congenital heart anomaly in an alpaca cria

A three-day-old alpaca cria died after showing lethargy, hypothermia and respiratory signs from birth. A heart murmur was found to be present and mucosae were cyanosed. Multiple abnormalities of the heart were found:

- conical in shape
- enlarged left atrium and ventricle
- small right atrium, ventricle (**Figure 8**) and atrioventricular valve
- large atrial septal defect ventro-caudal to the foramen ovale
- fenestrated foramen ovale
- aortic-dominant persistent truncus arteriosus (**Figure 9)**

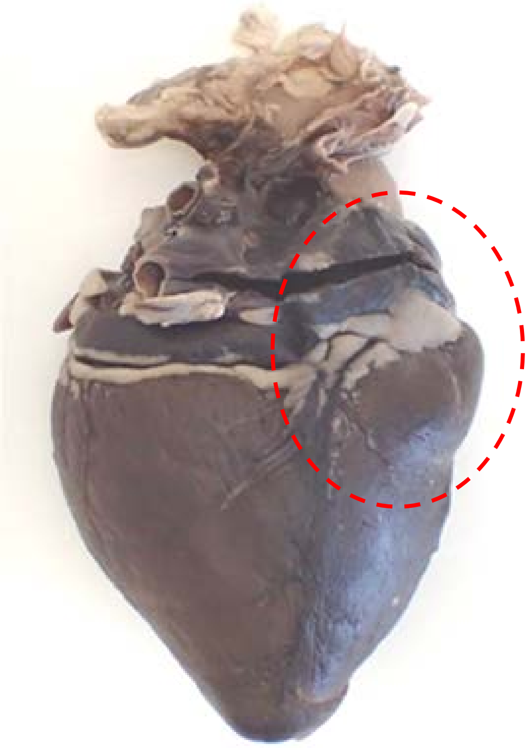

Figure 8 - Right lateral view of heart with the small right atrium and ventricle circled

Figure 9 - View of heart with left ventricle and the common arterial trunk open

This complex congenital developmental anomaly was not compatible with life. Persistent truncus arteriosus has been described previously in a cria (Kurosawa et al. 2016). The lesions could be spontaneous or hereditary and it was considered that this was likely to be an isolated case.

Horizon scanning

Covid-19 effects

As described in the previous two quarterly reports, the current Covid-19 crisis has continued to have an impact on the number of camelid and farmed deer carcase submissions to the GB scanning surveillance network during Q3-2020. This may impact our ability to monitor endemic disease trends as well as detecting new and re-emerging diseases through the surveillance network. The other livestock species submission numbers have not been adversely affected to the same degree by the current pandemic crisis. Communications have been sent to veterinary practices to indicate that the Veterinary Investigation Centres and PPP are continuing to function throughout and encouraged veterinary practitioners to make contact to discuss cases.

Adenovirus haemorrhagic disease of deer in California and British Colombia

The California Department of Fish and Wildlife (CDFW, 2020) has confirmed outbreaks of adenovirus hemorrhagic disease in deer in several northern California counties. Providing attractants for deer - food, salt licks or even water - is against the law there because this encourages animals to congregate which promotes the spread of disease, particularly during an outbreak.

From May 2020, CDFW received increased reports of mortality in deer, both free-ranging and at fawn rehabilitation facilities and investigation confirmed cervid adenovirus 1 (CdAdV -1) as the cause of hemorrhagic disease outbreaks in several Californian counties.

Cases have also been reported recently in British Colombia. The disease has never been recorded in the UK.

The disease is typically fatal to deer and can be spread by close contact with each other.

The virus is not known to affect people, pets or domestic livestock. The virus is closely related to bovine adenovirus-3, but the biologic properties of the two viruses are clearly distinct. There is no treatment or vaccine for the disease, and management strategies are based on tracking the occurrence of disease and measures to limit the spread. The public can play a role by removing food and other attractants, and reporting sightings of sick or dead deer through the CDFW's online mortality reporting system. Affected deer are often found dead without any obvious symptoms. Sick animals may show excessive salivation, diarrhoea, regurgitation or seizures.

CdAdV-1 was the cause of a 1993-1994 outbreak of hemorrhagic disease in black tailed deer and mule deer across at least 18 California counties. Since then, CdAdV-1 has been identified as the cause of sporadic, often widespread, outbreaks of hemorrhagic disease in California and other western states. Deer fawns are at greatest risk, with high rates of mortality following infection. Yearlings and adult deer are more resistant but mortalities in these age groups occur as well. Outbreaks can be widespread and have significant impact on affected deer populations.

Publications

A Foster; J Fletcher (2020)
More deer knowledge is needed (letter)
Veterinary Record 187 (8) 326

RM Southwell; K Sherlock; M Bayliss (2020)
Cross-sectional study of British wild deer for evidence of Schmallenberg virus infection
Veterinary Record 187 (8) e64

References

California Department of Fish and Wildlife News (2020). Disease Outbreak Strikes California Deer Herds August 3rd 2020: https://cdfgnews.wordpress.com/2020/08/03/disease-outbreak-strikes-california-deer-herds/

Kurosawa, TA., Gunasekaran, T., Sanders R., Carr, E., (2016). Common Arterial Trunk in a 3-Day-Old Alpaca Cria. Case Reports in Veterinary Medicine 2016: 4609126

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

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