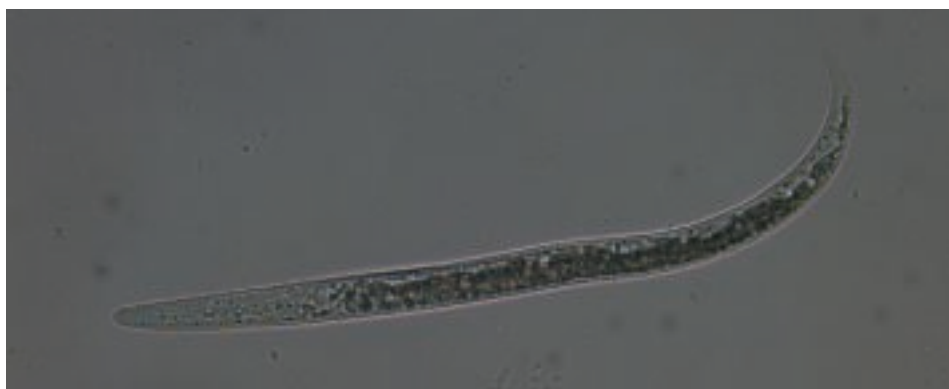




Dictyocaulus filaria

Under European conditions, lungworm infections are less clinically relevant in small ruminants versus cattle. In fact, most cases of lungworm infections are accidentally detected upon necropsy. In sheep and goats, we distinguish between the large lungworm *Dictyocaulus filaria* and the small lungworm *Muellerius capillaris*. The small lungworm is more common in the Netherlands. *M. capillaris* generally gives no clinical signs. Infections of *D. filaria* are sporadically diagnosed, and serious infections can result in respiratory problems and emaciation mainly in young lambs. Secondary bacterial infections often form a complication once lung damage has been caused by the

migration of lungworms. During pathological examination of a three-year-old sheep, a *D. filaria* infection was diagnosed in November. Lungworms were found in the deep bronchi on both sides in the diaphragmatic lobes. These worms measured between 0.3 and 1 cm in length and were therefore visible to the naked eye. There had been no symptoms of coughing or respiratory distress in the flock in question. The extent to which *D. filaria* is more widespread within the flock of sheep is currently being investigated. The advice is only to deworm sheep and goats according to clinical signs and faecal testing (Baermann method).



Lymphadenitis caused by actinobacillosis

In October, a sheep was submitted for pathological examination due to suspicion of caseous lymphadenitis (CL). CL is caused by the *Corynebacterium pseudotuberculosis* bacterium and is a non-compulsory reportable zoonosis.

The sheep suspected of CL was a Drenthe heath sheep with numerous lumps on the head and mandibles. The necropsy report also showed abscesses in the lymph glands in the animal's neck, shoulder and udder. Although this macroscopic picture is also very typical of CL, in this case *Actinobacillus* spp. was detected as the cause of the lymphadenitis.

Actinobacillosis is caused by *Actinobacillus lignieresii*, a gram negative aerobic bacterium which is part of the normal intestinal flora of ruminants. Actinobacillosis generally causes chronic granulomatous inflammation of the skin, underlying tissue and regional lymph nodes, particularly in the head and neck area. Infections result from minor wounds in the skin or oral mucosa. Animals used for natural grazing therefore run a greater risk of infection. Clinically speaking, it is often difficult to distinguish between actinobacillosis or CL. A serological test is available for CL. Bacteriological testing can identify the pathogen.

In 2021, CL was discovered in Drenthe heath sheep at a number of sheep farms. As a result, a project was initiated in collaboration with the Netherlands Breeding Association "The Drenthe heath sheep" and the Netherlands foundation for rare breeds. The purpose of this project was to conduct an inventory into the prevalence of CL at farms housing Drenthe heath sheep and Schoonebeker sheep, and to arrive at a risk inventory at the population level. The case described here shows the importance of engaging in further diagnostics for cases showing clinical signs in keeping with CL.

Ryegrass staggers

Ryegrass staggers is a temporary neurological disorder mainly found in ruminants and horses, caused by the ingestion of ryegrass (*Lolium perenne*) which contains an endophytic fungus (*Neotyphodium lolii*) which produces a tremorgenic lolitrem B toxin. This toxin, intended to protect the crop from insects, disrupts the signal to the neuromuscular junction, which can result in nervous behaviour, spasms, incoordination and paralysis. It is striking that the animals often seek cooling.

The symptoms of ryegrass staggers must not be mistaken for grass tetany, which demonstrates comparable symptoms in

grazing animals, but is caused by a feed ration deficient in magnesium or superfluous in elements which suppress magnesium, such as potassium and high nitrates. Whereas grass tetany is often associated with a lack of sunlight, and cool and wet conditions, ryegrass staggers is particularly associated with hot summer conditions.

Endophytes infect the lower parts and seeds of the plant. Selection of endophyte strains has resulted in production of varieties of endophyte-infected ryegrass with a reduced risk of toxicity, though these grasses are often less drought tolerant. Grass species for purposes other than animal fodder, including

those for lawns and playing fields, generally contain high levels of endophytes. Brief grazing of fields increases the risk of ingestion of endophytes, and fertilisation with nitrogen stimulates the growth of endophytes.

In September, the Veekijker was contacted regarding a flock of sheep showing acute neurological symptoms. The animals were skittish, unstable on their feet, and a few of them could no longer stand. The anamnesis showed that the sheep had been grazed on fertilised playing field grass. The entire flock recovered after being brought indoors and having their feed ration changed.

Acute mortality due to *Bibersteinia trehalosi*

There are two clinical forms of pasteurellosis in sheep: pneumonia and systemic infection. Pneumonia is caused by *Mannheimia haemolytica* and *Bibersteinia trehalosi* in sheep of all ages. Sepsis is generally caused by *B. trehalosi* in lambs aged 6 to 12 months and by *M. haemolytica* in lambs less than 3 months old. Both bacteria strains are facultative pathogens and are part of the normal nasal and pharynx flora of sheep and goats.

In the months of September and October, pathological examination found sepsis caused

by *B. trehalosi* in multiple animals. With a few exceptions, all the animals submitted were lambs aged 6 to 8 months. The animals were in good condition and the anamnesis reported acute mortality in all cases.

Sepsis, caused by *B. trehalosi*, is often related to various stress factors such as weaning, unfavourable climatological conditions, transport, vaccination, anti-parasite treatment and shearing. Even a change in diet, such as autumn grazing, or poor quality fodder, is

associated with this disorder.

Antibiotics have only a limited effect in treating affected breeding stock. We recommend preventing stressful circumstances wherever possible during summer and autumn, and preventatively vaccinating lambs in the future.

Alertness to CL

Caseous lymphadenitis (CL) is caused by the *Corynebacterium pseudotuberculosis* bacterium. A CL infection has been diagnosed at four dairy goat farms over the past months. The lengthy incubation period of this disorder means that the clinical picture of an infected flock does not correspond with the actual number of infected animals.

CL infections often result from minor wounds in the skin or oral mucosa. Following infection, CL causes lymphadenitis, resulting in the characteristic abscesses developing in locally draining lymph nodes. In most cases, the first visible symptoms are lumps in the head and neck area. However, lumps may

also be seen around the shoulders, flanks and udder.

Most goats develop clinical signs between two to six months following infection. At the point in time when clinical signs are detected, infection has actually taken place months earlier. In many cases, this relatively long incubation period of CL makes it complicated to trace the source of introduction.

The main risk factor for introduction of CL concerns incoming infected animals. Indirect transfer of CL bacteria is also a possibility, via equipment and persons from an infected environment.

Although there is growing awareness of the importance of a closed operational

management system, a data analysis of animal disease monitoring in 2021 showed that only 26% of the Dutch dairy goat farms had not purchased any animals in that year. Almost half of all farms (47%) had purchased animals from two or more farms within that year. The purchase of animals always entails a risk of introduction of animal diseases. Should a closed operational management system not be possible, GD advises quarantining incoming animals and conducting further diagnostics, even in the case of animals originating from certified farms! There has been a certification programme for CL since the 1990s. Alongside the annual blood tests at dairy goat farms, they are required to submit an annual

veterinary and ownership declaration. In doing so, it is important that the veterinarian and dairy goat farmer conduct a joint clinical inspection of the flock, with further diagnostics in the event of suspect

animals. GD also advises purchasers of animals to thoroughly question the health status of the farm from which purchases are made. Other examples of diseases often introduced to a flock via incoming animals include CAE,

salmonellosis and chlamydiosis. Once such disorders have been introduced to a farm, it is extremely difficult to eradicate them.

Animal health barometer Small Ruminants

Disease/disorder/health characteristic	Brief description	Category	Quiet ¹	Increased attention ²	Further investigation ³
Articles 2.1.a and 2.1.b Designation of animal diseases 'Rules for Animal Health'/Implementing Regulation (EU) 2018/1882 of the Animal Health Law (EU) 2016/429 (Category A disease)					
Infectious pleuropneumonia in goats (CCPP) (<i>Mycoplasma capricolum subs. capripneumoniae</i>)	Has never been present in NL.	A+D+E	*		
Foot and Mouth Disease (FMD)	No FMD in the Netherlands since 2001.	A+D+E	*		
Infection with ovine rinderpest (commonly known as PPR, peste des petits ruminants)	Has never been present in NL.	A+D+E	*		
Infection with Rift Valley fever virus (RVF)	Has never been present in NL.	A+D+E	*		
Sheep pox and goat pox	Multiple outbreaks detected at sheep farms in Spain in September 2022. All sheep at the affected farms were culled. Has never been present in NL.	A+D+E	*	*	
Articles 2.1.a and 2.1.b Designation of animal diseases 'Rules for Animal Health'/Implementing Regulation (EU) 2018/1882 of the Animal Health Law (EU) 2016/429 (Category B through E)					
Infection with <i>Brucella abortus</i> , <i>B. melitensis</i>	The numbers for the 2022 random samples have been achieved. All results were negative. The Netherlands therefore maintains its free status	B+D+E	*		
Infection with the rabies virus	Extremely rarely diagnosed in bats.	B+D+E			
Infection with the bluetongue virus (serotypes 1-29)	The Netherlands has been officially free from BT since 2012. There are multiple sources of BT within Europe. The Netherlands borders the monitored regions of Germany and Belgium. BTV-1, 3 and 4 outbreaks reported in the Mediterranean region.	C+D+E	*		
Epididymitis in sheep (<i>Brucella ovis</i>)	Examination of rams for export purposes.	D+E	*		
Infection with <i>Mycobacterium tuberculosis</i> - complex (<i>M. bovis</i> , <i>M. caprae</i> , <i>M. tuberculosis</i>)	The Netherlands has been officially free from Bovine tuberculosis since 1999.	D+E	*		
Anthrax (<i>Bacillus anthracis</i>)	Last registered outbreak in cattle in 1993. No infections registered since then.	D+E	*		
Paratuberculosis (<i>Mycobacterium avium subs. paratuberculosis</i>)	Regular cases especially in (dairy) goats and occasionally in sheep.	E	*		
Q fever (<i>Coxiella burnetii</i>)	In 2016, the final dairy goat farm was certified free from infection with <i>Coxiella burnetii</i> .	E	*		
Echinococcosis	No confirmed cases in recent years.		*		
Trichinellosis	No known cases of trichinellosis in sheep or goats.		*		

Disease/disorder/health characteristic	Brief description	Category	Quiet ¹	Increased attention ²	Further investigation ³
Article 2.1.c Designation of animal diseases 'Rules for Animal Health' of the Dutch Animal Act					
Transferable TSEs (scrapie, BSE)	Hardly any cases among sheep in the past ten years. A non-ARR/ARR genotype was recently found in sheep, whose blood lines would suggest otherwise. The case was examined in more detail, and seems to derive from a ram which does not appear to have the ARR/ARR genotype. In goats, the first case of scrapie was in 2000 and the last case in 2001.		*		
Article 3a.1 Reporting of zoonoses 'Rules for Animal Husbandry' of the Dutch Animal Act					
Campylobacteriosis (<i>Campylobacter</i> spp.)	A few cases each year. Particularly known as a cause of abortion in small ruminants.		*		
Leptospirosis (<i>Leptospira Hardjo</i>)	No cases in sheep or goats for many years.		*		
Listeriosis (<i>Listeria</i> spp.)	Encephalitis caused by <i>Listeria monocytogenes</i> is regularly found in sheep but especially in dairy goats. It is unknown how long listeria bacteria are excreted into the milk. Both <i>L. monocytogenes</i> and <i>L. ivanovii</i> can cause abortion in sheep and goats.		*		*Further investigation is required into the types found in people and animals.
Article 3a.1 Reporting of zoonoses 'Rules for Animal Husbandry' of the Dutch Animal Act (continuation)					
Salmonellosis (<i>Salmonella</i> spp.)	Since 2016, recurrent and large-scale losses of kids at multiple dairy goat farms caused by a multiresistant <i>S. Typhimurium</i> . Also multiple cases of illness in people caused by the same MLVA strain of the bacterium. The infection source is unknown; it is also unknown where the bacteria exist outside the kidding season. During the inventory into the prevalence of Salmonellosis in dairy goat farming, 52% of the farms have submitted samples for testing over the past two years. In 2023, a programme will possibly be tested at thirty farms.		*		* A further study of dairy goats is underway within the framework of public private collaboration on increased sustainability of dairy goat farming.
Yersiniosis (<i>Yersinia</i> spp.)	A few cases each year. Identified as the cause of diarrhoea, mortality and abortion.		*		
Toxoplasmosis (<i>Toxoplasma gondii</i>)	A few confirmed cases per year, but probably one of the most commonly occurring causes of abortion. High seroprevalence has previously been shown in sheep and goats.		*		
Other OIE list diseases					
Enzootic abortion (<i>Chlamydia abortus</i>)	One of the main causes of abortion in goats and sheep for years.		*		
Caprine arthritis encephalitis (CAE)	Commonly occurring disease whereby the pathogenic virus sometimes behaves differently depending on the size of the farm. Source of introduction not always clear.		*		
Maedi/visna virus (MVV)	(Most) significant infectious disease at large sheep farms.		*		
Tularemia (<i>Francisella tularensis</i>)	Since 2011, infected hares are regularly found, as well as a few human tularemia patients in the Netherlands.		*		
<i>Mycoplasma agalactiae</i>	Has never been present in NL.		*		

Table continuation

Disease/disorder/health characteristic	Brief description	Category	Quiet ¹	Increased attention ²	Further investigation ³
Other OIE list diseases (continuation)					
Nairobi sheep disease	Has never been present in NL.		*		
Heartwater (<i>Ehrlichia ruminantium</i>)	Has never been present in NL.		*		
Infections with the Schmallenberg virus (SBV)	Annual infections with the SBV since 2011, resulting in congenital abnormalities in lambs. Also various notifications of lambs showing congenital abnormalities caused by SBV, in early 2022. Exclusion of other possible causes of lambs with congenital abnormalities in keeping with SBV is important for early detection of introduction of other viruses from the Bunyaviridae group.			*	
From monitoring					
Distomatosis (liver fluke) (<i>Fasciola hepatica</i>)	Since the discontinuation of the liver fluke prognosis working group, there is no longer insight into the risk of infection and the prevalence of resistance. A few cases of liver fluke have been identified despite the dry summer.			*	
Photosensitivity due to sporidesmin	The current drought has produced ideal conditions for the growth of <i>Pithomyces chartarum</i> . Alertness is advised in the coming months.			*	
Caseous lymphadenitis (CL)	Outbreaks of CL at three dairy goat farms. The cause of these infections is unknown as yet.			*	

¹ Quiet: no action required or action is not expected to result in a clear improvement.

² Increased attention: alert to an anomaly.

³ Further investigation: further investigation is ongoing or required.



Animal health monitoring

Royal GD has been responsible for animal health monitoring in the Netherlands since 2002, in close collaboration with the veterinary sectors, the business community, the Ministry of Agriculture, Nature and Food Quality, veterinarians and farmers. The information used for the surveillance programme is gathered in various ways, whereby the initiative comes in part from vets and farmers, and partly from Royal GD. This information is fully interpreted to achieve the objectives of the surveillance programme – rapid identification of health issues on the one hand and monitoring trends and developments on the other. Together, we team up for animal health, in the interests of animals, their owners and society at large.