Increase in tenosynovitis due to reovirus

In the previous Veekijker News, we reported a significant increase in the number of submissions for necropsy whereby tenosynovitis caused by reovirus was diagnosed (see Figure 1). Over the past three months, the number of submissions with this problem remained high. This disease has considerable impact and that's why in this edition we will discuss the current wave of outbreaks in more detail.

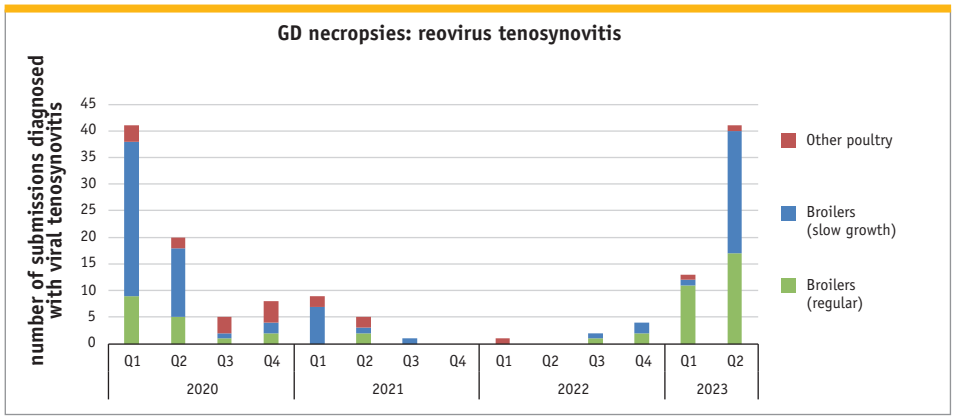

Figure 1. Number of submissions diagnosed with tenosynovitis caused by reovirus in regular broilers, slower growing broilers and other poultry, confirmed using PCR and histological testing (2020 through 2nd quarter of 2023) (Source: GD-LIMS)

The identified reoviruses were characterized by mapping out an important gene (the σC gene). This allowed for the classification of the viruses into five so-called geno-groups. In the first half of 2023, viruses from geno-groups 1, 2 and 4 were found in particular (Figure 2). Viruses from these geno-groups had also already been found during earlier outbreaks in the 2019-2020 period. The increase of tenosynovitis is therefore not a single new strain which is suddenly spreading rapidly this year. Furthermore, infections were caused by different breeds, and no association between a certain virus genotype and breed was found. Therefore, it is not likely that there is a common source of the infections. Some virus isolates belong to the same genetic cluster (the large spheres in the figure). In those cases, there may be spread between farms, or a common source may be present. However, this only concerns a few strains and therefore does not explain the current current increase in detections of tenosynovitis.

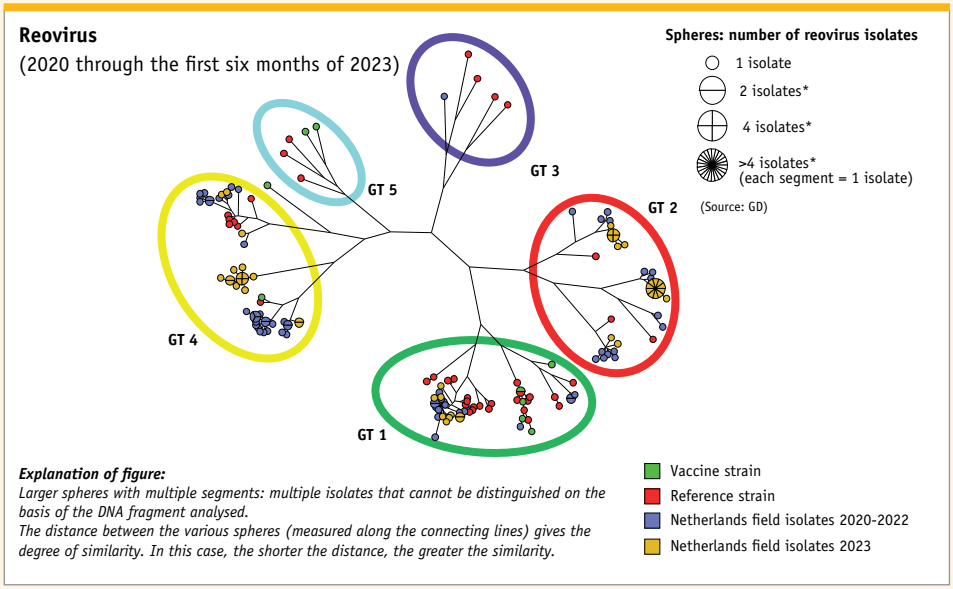

Figure 2. Phylogenetic tree of reoviruses diagnosed in 2020 through the 1st six months of 2023 (Source: GD)

Broiler breeders are vaccinated against reovirus, after which the antibodies transferred via the egg to the offspring protect the young chicks against clinical disease. Serology tests at the end of the rearing period can determine the level of antibodies in the blood of (prospective) broiler breeders, and therefore how much they can transfer to their offspring.

Based on the field study conducted by GD on behalf of Avined a recommendation was given to try and achieve a titre group of 7 in at least 75 percent of the animals. The titres in Dutch maternal broiler breeders at the start of production in 2023, are given in Figure 3. These results are comparable to those of previous years.

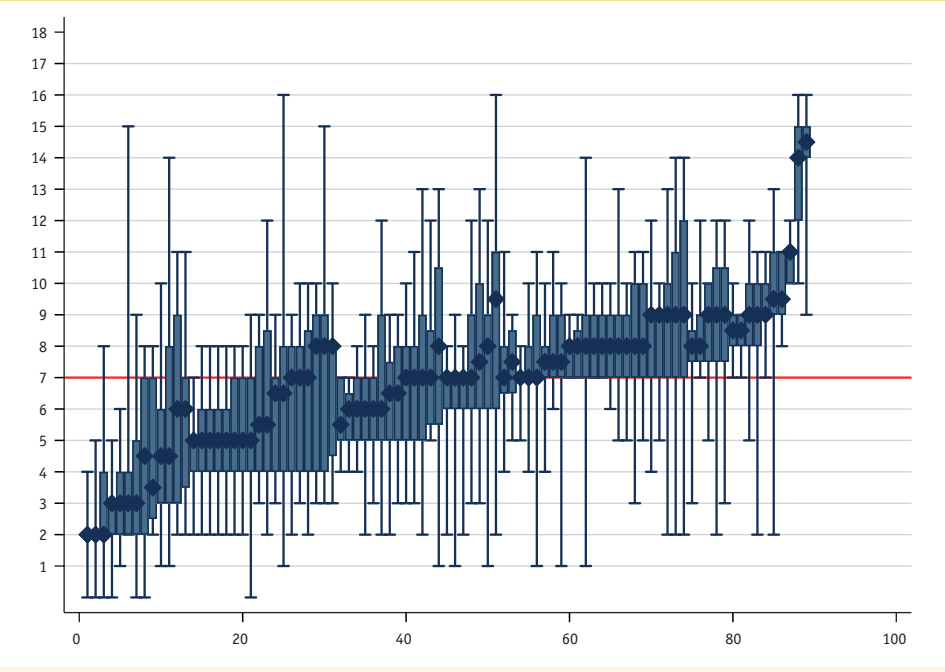

Figure 3. Reovirus titres in broiler breeders at the end of the rearing period (1st six months of 2023) (Source: GD-LIMS)

Explanation of Figure 3: *each vertical line (one submission of blood samples for reovirus testing) shows the variation in titres in a flock of broiler breeders. The lowest and highest titres form the ends, the middle titre is given as a rhombus and the thick bar gives the 25% lowest and 25% highest titre. The situation is comparable to previous years, with a large proportion of flocks failing to reach the vaccination recommendation of at least 75% of the samples (bottom of the thick blue bar) above 7.*

Brachyspira hyodysenteriae at a layer farm

Brachyspira bacteria can infect layers and breeding animals and can result in 'avian intestinal spirochetosis' (AIS), with the characteristic foamy cecal matter, paler yolks and contamination of eggs with faeces. Generally speaking, *Brachyspira intermedia* or *Brachyspira pilosicoli* cause AIS.

Animals at a commercial layer farm recently showed similar clinical signs, and not only *Brachyspira intermedia* but also *Brachyspira hyodysenteriae* was found there. This is the first time that an infection of *Brachyspira hyodysenteriae* has been detected in layers or breeding animals. However, it is a known pathogen of intestinal problems in pigs, whereby the infection is characterised by diarrhoea and inflammation of the large intestines.

The affected flock had an overly high water/feed ratio, wet faeces and wet feathers around the cloaca. There also was an excessive proportion of dirty eggs. Necropsy showed the contents of the small intestines to be overly watery, and multiple animals were shown to have striking pinpoint haemorrhaging in the ceca (photo 1).

Photo 1. *Pinpoint haemorrhaging in the ceca of a flock affected by* B. hyodysenteriae *(Source: GD)*

PCR testing detected a combined infection of *B. intermedia* and *B. hyodysenteriae*. Microscopic examination of the ceca of affected hens showed mild inflammation in the presence of large volumes of spiral bacteria (the shape of Brachyspira) (photo 2).

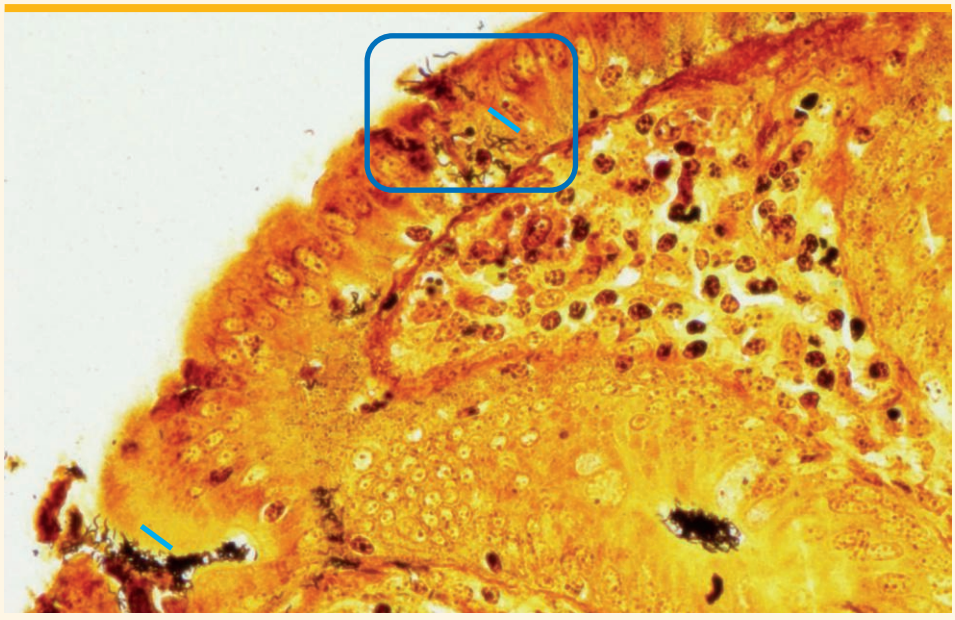

Photo 2. ***Microscopic image of the appendix (silver colouring):*** *the blue triangle shows the damaged area in which the black spiral bacteria penetrate. Large numbers of black spiral bacteria are also attached to the mucosa (spirochetes/*Brachyspira *sp.) (Source: GD)*

>> Read more on next page

The literature describes a few experimental infections with *B. hyodysenteriae* in young broilers and layer pullets. The bacterium was shown to be capable of damaging the cecum, comparable with the layer flock suffering the problems. It is therefore likely that the clinical symptoms in the barn and in the intestines are also related to the *Brachyspira hyodysenteriae* infection.

Monitoring of the flock showed that while the clinical symptoms of the infected animals reduced, the infection did spread to another barn at the farm, housing a younger flock.

Further investigation is currently underway into the relationship between this *B. hyodysenteriae* and known strains. This may allow us to determine whether there is a link to strains found in wild birds or whether there is a possible relationship to strains occurring in pigs.

Animal health barometer for poultry

Disease/disorder/health characteristic	Brief description (numbers at farm level)	1st quarter 2023	2nd quarter 2023	3rd quarter 2023	4th quarter 2023	Trend (OVER 2 YEARS)
Execution decree (EU) 2018/1882 of the Animal Health Regulation (AHR) (EU) 2016/429 (Category A disease)						
Avian influenza (AI) in the Netherlands (H5/H7) (Source: GD, WBVR, national government)	**Highly pathogenic AI (H5/H7)*:**	**H5(N1):**	**H5N1:**			
		Commercial: 3 farms	Not detected			↓
	** In commercial poultry and in backyard situations with >50 animals.*	Backyard poultry: 1x				
	Serological monitoring by GD: (first detection in flock) *(Antibodies for H5/H7)*	Not detected	Not detected			-
ND in the Netherlands (Source: GD, OIE)	Commercial poultry:	Not detected	Not detected			-
Execution decree (EU) 2018/1882 of the Animal Health Regulation (AHR) (EU) 2016/429 (Categories B through E)						
Campylobacteriosis	No data available	-	-			N/A
Avian influenza (AI) in the Netherlands (H5/H7) (Source: GD, WBVR, national government)	**Low pathogenic AI (H5/H7):**	Not detected	Not detected			-
Avian mycoplasmosis (Source: GD)						
M. gallisepticum[A]	**Serological monitoring by GD:**					
	Reproduction sector:	0 farms	0 farms			↓
	Layer pullets:	0 farms	0 farms			-
	Layers:					
	- not vaccinated and infected:	3 farms	1 farm			↓
	- vaccinated and infected:	1 farm	2 farms			↓
	Turkeys:	0 farms	0 farms			↓
	Reports in EWS[C] based on positive serology and/or voluntary PCR testing:					
	Reproduction sector:	-	-			↓
	Layers:	4 reports	3 reports			↓
	Turkeys:	-	-			↓
	Backyard poultry:	2 reports	3 reports			↓
M. meleagridis (Source: GD)		N/A	N/A			
Salmonellosis (non-zoonotic salmonella) (Source: GD)						
Salmonella arizonae		N/A	N/A			N/A
Salmonella Gallinarum (SG)	Commercial poultry:	-	-			↓
	Backyard poultry:	-	-			↓
Salmonella Pullorum (SP)	Commercial poultry:	-	-			-
	Backyard poultry:	-	1 case			↓
West Nile fever	Not monitored	N/A	N/A			N/A
Article 2.1 Designation of animal diseases 'Rules for Animal health' of the Dutch Animal Act						
Avian chlamydiosis (Source: GD)		Not detected by GD	Not detected by GD			-

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Table continuation

Disease/disorder/health characteristic	Brief description (numbers at farm level)	1st quarter 2023	2nd quarter 2023	3rd quarter 2023	4th quarter 2023	Trend (OVER 2 YEARS)
Article 2.2 Designation of zoonoses 'Rules for Animal health' of the Dutch Animal Act						
Salmonellosis (zoonotic salmonella) (at the flock level) (Source: NVWA)						
S. Enteritidis	Reproduction:	0 flocks	0 flocks			-
	Layer pullets:	0 flocks	0 flocks			-
	Layers:	3 flocks	25 flocks			↓
S. Typhimurium	Reproduction:	0 flocks	0 flocks			-
	Layer pullets:	0 flocks	0 flocks			-
	Layers:	1 flock	0 flocks			-
Other types of Salmonella *S.* Hadar, *S. Infantis, S. Java, S. Virchow)*	Reproduction:	0 flocks	0 flocks			-
Other WOAH-list poultry diseases in the Netherlands subject to compulsory notification						
Infectious laryngotracheitis (ILT) (Source: GD; EWS)	**Reported in EWS[C]:**					
	Layer breeders:	-	-			-
	Layer pullets:	-	-			-
	Layers:	1 report	1 report			-
	Broiler breeders:	-	-			-
	Broilers:	-	-			↓
	Backyard poultry:	2 reports	3 reports			↑
M. synoviae[B] (Source: GD)	**Serological monitoring and/or dPCR by GD:**		**% of positive farms versus farms tested**			
	Broiler grandparents replacement:	0%	0%			-
	Broiler grandparents:	0%	0%			-
	Broiler breeders replacement:	33%	11%			↑
	Broiler breeders:	40%	26%			-
	Layer grandparents pullets:	0%	0%			-
	Layer grandparents:	0%	0%			-
	Layer breeders pullets	0%	0%			-
	Layer breeders:	16%	17%			↑
	Layer pullets:	12%	22%			-
	Layers:	76%	72%			-
	Turkeys:	5%	0%			↓
Infectious bronchitis (IB) (Source: GD)	**Types most commonly detected by GD:**					
	Broilers:	QX(D388)	QX(D388)			
	Layers:	4/91-793B	4/91-793B			
Gumboro (IBD) (Source: GD; EWS)	**Reported in EWS[C]:**					
	Broilers:	11 reports	16 reports			↑
	Layer breeders pullets:	-	-			-
	Backyard poultry:	-	-			-
Turkey Rhinotracheitis (TRT) (Source: GD)	**Detected by GD:**					
	Reproduction-sector meat:	-	-			
	Broilers:	1 farm	3 farms			
	Layer pullets:	-	-			
	Layers:	-	-			
	Meat turkeys:	1 farm	-			

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Table continuation

Disease/disorder/health characteristic	Brief description (numbers at farm level)	1st quarter 2023	2nd quarter 2023	3rd quarter 2023	4th quarter 2023	Trend (OVER 2 YEARS)
Other poultry diseases						
Erysipelas	**Detected by GD:**					
(Erysipelothrix rhusiopathiae)	Layers:	1 farm	1 farm			↓
(Source: GD)						
Histomonosis	**Detected by GD:**					
(Source: GD)	Reproduction (meat sector):	2 farms	-			
	Reproduction (layer sector):	-	1 farm			
	Layer pullets:	-	-			
	Layers:	-	-			
	Meat turkeys:	-	-			
	Backyard poultry:	-	1 case			
Avibacterium	**Reported in EWS[C]:**					
paragallinarum	Layers:	4 reports	4 reports			-
(Source: GD; EWS)	Backyard poultry:	1 report	4 reports			↓
Pasteurella multocida	**Detected upon necropsy:**					
(Source: GD)	Broiler breeders replacement:	-	-			-
	Layer breeders:	-	-			-
	Layers:	3 farms	4 farms			-
	Ducks:	-	-			-
	Turkeys:	-	-			-

↑ Increase or strong increase
↗ Limited increase
\- Situation unchanged
↓ Limited decrease
↓ Decrease or strong decrease

A Based on serological monitoring
B Based on serological monitoring and/or the differentiating M.s.-PCR
C Early Warning System

Monitoring ANIMAL HEALTH

Animal health monitoring

Since 2002, Royal GD has been responsible for animal health monitoring in the Netherlands, in close collaboration with the veterinary sectors, the business community, the Ministry of Agriculture, Nature and Food Quality, vets 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 – the rapid identification of health problems on the one hand and the following of more general trends and developments on the other. Together, we team up for animal health, in the interests of animals, their owners and society at large.