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Animal diseases in Finland 2015

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Description

Publisher	Finnish Food Safety Authority Evira
Title	Animal Diseases in Finland 2015
Authors	Finnish Food Safety Authority Evira
Abstract	This publication contains information on the animal disease situation in Finland in 2015. It comprises a selection of current information on the incidence of combatible animal diseases and certain other infections in various animal species in the country. The publication also describes measures taken to prevent and combat animal diseases. The animal disease situation in Finland remained good in 2015. No easily spreading animal diseases were detected. New salmonella infections were found on 21 production farms. Finland remained free of strategically important animal diseases such as enzootic bovine leucosis, brucellosis and bovine tuberculosis, IBR and BVD infections, PRRS infections in swine and *Echinococcus multilocularis*. *Mycoplasma gallisepticum* was detected in several backyard poultry farms. Preparedness against the spread of animal diseases was continued with special focus on African swine fever and rabies.
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Julkaisun nimi	Eläintaudit Suomessa 2015
Tekijät	Elintarviketurvallisuusvirasto Evira
Tiivistelmä	Tämä julkaisu sisältää tietoa Suomen eläintautitilanteesta vuonna 2015. Julkaisuun on koottu ajankohtaista tietoa vastustettavien eläintautien ja eräiden muiden tartuntojen esiintymisestä eri eläinlajeilla maassamme. Julkaisussa kuvataan myös tehtyjä toimenpiteitä eläintautien ennaltaehkäisemiseksi ja torjumiseksi. Eläintautitilanne säilyi hyvänä Suomessa vuonna 2015. Helposti leviäviä eläintauteja ei todettu. Uusia salmonellatapauksia todettiin 21 tuotantotilalla. Suomi säilyi vapaana strategisesti tärkeiksi katsotuista eläintaudeista, kuten nautaleukoosista, luomistaudista ja nautatuberkuloosista, nautojen IBR- ja BVD-tartunnoista, sikojen PRRS:stä sekä *Echinococcus multilocularis* –tartunnoista. *Mycoplasma gallisepticum* levisi harrastesiipikarjatiloilla. Varautumista erityisesti afrikkalaiseen sikaruttoon ja raivotautiin jatkettiin.
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Beskrivning

Utgivare	Livsmedelssäkerhetsverket Evira
Publikationens titel	Djursjukdomen i Finland 2015
Författare	Livsmedelssäkerhetsverket Evira
Resumé	Denna publikation innehåller information om djursjukdomssituationen i Finland 2015. I publikationen har man samlat aktuell information om förekomsten av djursjukdomar som ska bekämpas samt vissa andra smittor hos olika djurarter i vårt land. I publikationen beskrivs också de åtgärder som vidtagits för att förebygga och bekämpa djursjukdomar. Djursjukdomssituationen i Finland har varit god under 2015. Djursjukdomar som sprider sig med lätthet konstaterades inte. Nya salmonellasmittor konstaterades på 21 gårdar. Finland är fortfarande fri av strategiskt viktiga djursjukdomar, såsom nötleukos, brucellos och nöttuberkulos, IBR- och BVD-smittor hos nötdjur, PRRS hos svin och *Echinococcus multilocularis* -smittor. *Mycoplasma gallisepticum* konstaterades i flera hobbyfjäderfäbesättningar. Förhöjd beredskap hölls fortsättningsvis speciellt för afrikansk svinpest och rabies.
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Contents

1 Animal diseases situation in Finland in 2015

The animal disease situation in Finland remained mainly good in 2015. Finland remained free from easily spreading animal diseases such as foot-and-mouth disease, swine fevers, avian influenza and Newcastle disease. The *Brucella suis* bacterium, which is classified as a dangerous animal disease, was found in wild boars living in the wild but the infections did not spread to domestic pigs. Finland remained free of strategically important animal diseases such as enzootic bovine leukosis, infectious bovine rhinotracheitis (IBR) and bovine viral diarrhoea (BVD) infections, PRRS infections in swine and *Echinococcus multilocularis*. A total of 236 immediate notifications of suspected animal disease cases were reported to Evira. In 2014, the number of similar reports was 141 and 128 in 2013. The main reason for the increase in the reports was the spread of *Mycoplasma gallisepticumin* in backyard poultry farms.

African swine fever continued to spread in the Baltic countries, and especially the large number of cases detected in Estonia caused worry in Finland. To prevent the spread of the disease to Finland, hunters headed to Estonia for hunting trips were provided with information about how to avoid the disease. The communication to regular tourist travelling to the Baltic countries was also intensified to minimise the risk caused by souvenirs. To help prepare for the possible spread of the disease, Evira and the Regional State Administrative Agency for Eastern Finland organised a joint exercise called 'Villi Itä 2015' (*Wild East 2015*) which emphasised the provision of regional disease control measures. Collection of samples from wild boars living in the wild was intensified in collaboration with hunters. The collaboration yielded a large number of samples, all of which tested negative for the disease. Distribution of vaccine baits to combat rabies, another viral disease threatening Finland, was continued in an expanded area along the eastern border.

In 2015, new salmonella cases were detected in a total of 12 cattle farms, five pig farms and four poultry farms. The incidence of salmonella remained well below the target level of 1%.

Bluetongue virus antibodies were detected in one suckler cow. The cow was imported from Sweden in 2011 and tested positive for the antibodies in the import tests. No cases of transmissible spongiform encephalopathies (TSEs) were detected. Schmallenberg virus was not detected in 2015. The majority of Schmallenberg virus and antibody tests were conducted on exports to Russia.

The situation of pig diseases remained good.

Several inspections and tests were made especially in the summer due to the the *Mycoplasma gallisepticum* bacterium spreading in backyard poultry. The bacterium was found in a total of 45 backyard poultry farms and in one small egg producing farm.

The disease situation of aquaculture animals remained good. The implementation of the viral haemorrhagic septicemia (VHS) eradication programme in Åland was continued. An outbreak of the disease was last detected there in 2012.

The number of animals imported into Finland continued to rise, as has been the trend in the past years. Evira and other authorities continued to pay attention to detecting and preventing unlawful import of animals as it is considered the greatest threat to the animal diseases situation in Finland. The unlawful import of companion animals in particular is rather common and recurring.

Finland's geographically isolated location and relatively small number of animal imports and exports help keep the animal disease situation good. On the other hand, the risks related to global movement of people and goods is difficult to control, which highlights the importance of shearing information. In Finland, domestic animals are usually kept in well-insulated shelters during harsh winters, which keeps the animals from coming into contact with wild animals. Cattle markets and common pastures are uncommon in Finland, which also partly prevents the spread of contagious animal diseases. However, disease prevention is often lax on backyard and non-commercial farms. The spreading potential of exotic animal diseases (in cattle, sheep, goat and pig farming) was found to be low in the final report of the 'The effect of structural change in agriculture on the spread of animal disease in Finland' project (*Eläintautiriskien hallinta kotieläintalouden rakennemuutoksessa*) published in 2015. Even though the structural change has led to increased farm sizes, this does not have a significant impact on the spreading potential of exotic animal diseases as the distances between the farms have increased and the logistics have improved.

The latest incidences of several severe animal diseases in Finland are listed in a table in Appendix A. Tables containing information about long-term monitoring have been collected in Appendix B, while the numbers of animals and farms can be found in Appendix C.

For information about zoonosis incidences in Finland and zoonosis monitoring programmes in animals and foodstuffs, please visit the website of Zoonosis Centre, a joint expert network of Evira and The National Institute for Health and Welfare, at www.zoonoosikeskus.fi (in Finnish and Swedish).

2 Cattle diseases

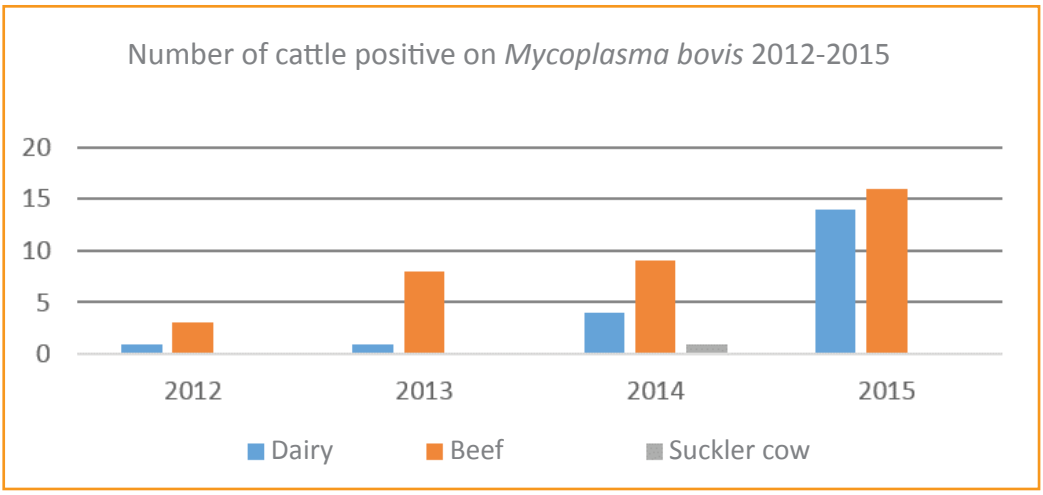
Schmallenberg virus was not detected in 2015

The first incidence of the previously unknown Schmallenberg virus (SBV) in Europe was detected in Germany in 2011, and it spread to Finland already in the summer of 2012. SBV is a bovine virus transmitted by midges and it is not contagious to humans. The first deformed lambs that tested positive for the virus were born full-term in late December in 2012. The first deformed calf that tested positive for the virus was born in February about 3 weeks prematurely. The tests performed on the calves sent for abortion diagnosis in 2013 revealed an incidence of the Schmallenberg virus on 19 farms (6.7% of the farms tested), while the tests on lambs revealed 14 farms (10% of the farms tested). All virus findings were made in areas where also antibodies were detected.

Schmallenberg virus was not detected at all in 2015, and SBV antibodies were only detected in 7% of the 324 tested cows. The antibodies were found in the blood samples taken from cows for abortion diagnosis, and based on the birth dates of these cows, they were most likely infected with SBV between 2012 and 2013. As such, the antibody findings could not be linked to the abortions that occurred on the farms. The antibodies were not detected in under two-year-old pregnant heifers kept in export quarantine. In terms of SBV, the situation continued to be similar to what it was in 2014; the virus was not detected and antibodies were only found in older cows. It seems that there have been no new Schmallenberg cases in 2014–2015. The Finnish cow population is becoming susceptible to SBV infections as the antibodies have only been found in older cows born before 2014.

Mycoplasma bovis infections increased

Mycoplasma bovis cases increased especially in late autumn in 2015. In dairy cattle, there is a possibility that the infection also spread via semen. In nearly all the cases detected in dairy cows, the infection manifested as mastitis and was first found in a milk sample.



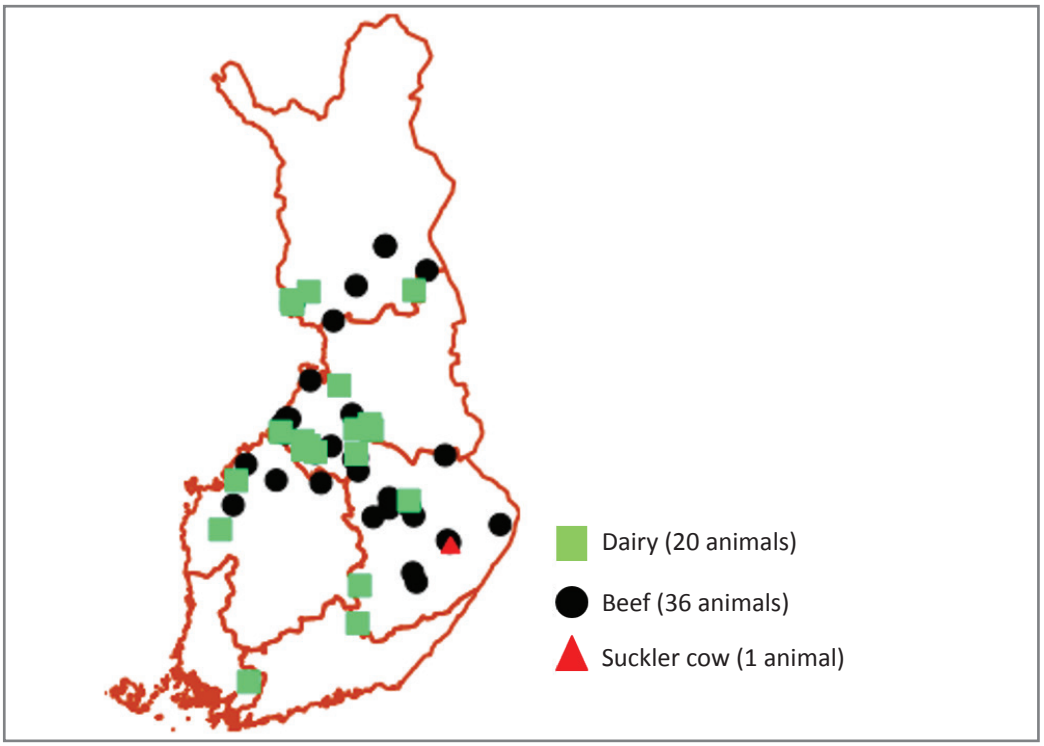


Figure 1. Geographical locations of Mycoplasma bovis infections detected between 2012 and 2015. © EVIRA, aerial photograph suppliers, National Land Survey of Finland (MML/VIR/MYY/333/08), Finnish Environment Institute

Diagnostics

A total of 428 whole carcasses or organ samples of cows were sent for pathological testing in 2015 (Table 1). A quarter of the samples were foetuses, full-term stillborn calves or calves that died within a day after the birth that were sent for abortion diagnosis. A total of 72 samples were tested in the context of meat inspections.

Like in the previous years, bacterial infections were the most common cause of abortions. The most common isolated bacteria were the same as the ones found in the previous years: *Trueperella pyogenes*, *Ureaplasma diversum*, *Listeria monocytogenes* and *Bacillus licheniformis*. No abortions caused by Schmallenberg virus were detected. *Neospora caninum* protozoan parasite infections were detected in aborted foetuses of two farms, and antibodies were found in blood samples collected from five farms and sent for abortion diagnosis. *Neospora caninum* is detected each year on a few new farms. A total of 191 blood samples were tested for Neospora using ELISA. Some of the samples were collected from farms that had already been found positive to determine the extent of the infection on these farms. A total of 133 blood samples collected from 24 farms were tested for Q fever and of these, 131 samples from 22 farms were collected for abortion diagnosis and two for export purposes. All of the samples were negative.

Table 1. The numbers of pathological samples taken from cows between 2009 and 2015 by reason for testing.

Reason for testing	2009	2010	2011	2012	2013	2014	2015
Cause of disease	243	239	255	257	362	253	250
Abortion diagnosis	88	89	78	257	368	98	106
Meat inspection	128	91	79	61	108	109	72
In total	**459**	**419**	**412**	**575**	**838**	**460**	**428**

As in the previous years, the majority of samples sent for determining the cause of a disease were collected from under 6-month-old calves (approx. 40% of the samples). Pathological testing of older beef cattle and cows has increased slightly. The most common findings were, as in the previous years, respiratory tract infections in calves, calf diarrhoea and other gastrointestinal diseases and systemic bacterial infections in young calves.

A total of 108 deep pharyngeal swab kits collected from calves were tested for respiratory tract infections (one kit contains four samples) and paired serum kits collected from 10 farms (one kit contains paired sera of five animals) as well as nasal mucus samples collected from six farms (one kit contains nasal mucus samples of five animals), (Table 2).

Table 2. Results of deep pharyngeal swabs collected from cows between 2009 and 2015. Numbers of positive samples.

	2009	2010	2011	2012	2013	2014	2015
Samples sent in total	23	21	26	39	93	66	108
Respiratory Syncytial Virus	5	9	8	8	24	13	33
Coronavirus	7	12	9	15	59	32	58
Mycoplasma bovis	0	0	0	3	7	8	18
Pasteurella multocida	11	15	18	30	74	52	96
Histophilus somni	3	2	3	2	16	9	18
Mannheimia haemolytica	3	2	4	3	33	12	36
Ureaplasma diversum	13	13	19	24	46	40	62

The most common findings in the respiratory tract infection samples (pathological and clinical samples) were bovine respiratory syncytial virus and coronavirus, *Histophilus somni*, *Pasteurella multocida*, *Mannheimia haemolytica* and *Trueperella pyogenes* bacteria and ureaplasma. *Mycoplasma bovis* bacteria were found in deep pharyngeal, lung, joint and ear infection samples. Antibiotic resistance was found in the *Pasteurella multocida* and *Mannheimia haemolytica* strains on several farms.

A total of 211 calf diarrhoea testing kits (one kit contains tools for testing five faecal samples) containing 546 samples were tested. The results of under six-moth-old calves are presented in Table 3. As in the previous years, the most common causes of diarrhoea (pathological and clinical samples) were rotavirus and *Eimeria* sp. coccidia. The zoonotic *Cryptosporidium parvum* protozoan that causes diarrhoea in calves was found in a total of 35 farms either in pathological tests or diarrhoea samples. People working with calves were also infected with cryptosporidiosis.

Table 3. Results of calf diarrhoea test kits collected from under 6-month-old calves between 2010 and 2015. Numbers of positive samples. Tests have been conducted according to the age of the calves.

	2010	2011	2012	2013	2014	2015
Samples sent in total	**153**	**203**	**191**	**229**	**178**	**211**
Salmonella	0	1	0	1	0	1
Rotavirus (ELISA)	61	83	78	83	76	74
Corona (ELISA)	2	0	3	6	4	1
E.coli F5	0	0	0	0	0	0
Eimeria, over 10,000 OPG	27	35	29	38	32	40
Cryptosporidium spp. (staining)	22	30	23	26	31	36
Cryptosporidium parvum	5	7	13	20	24	30
Strongylida	2	4	3	6	3	2

Salmonella

Monitoring cows for salmonella is a part of the national salmonella programme in Finland. In 2015, new salmonella cases were found in faecal and environmental samples collected from 12 cattle farms: four dairy farms, two heifer rearing farms, one combination herd, two suckler cow herds, one calf rearing farm, one finishing farm and one beef cattle herd. A total of ten of these samples contained serotype *S.* Typhimurium, one serotype *S.* Enteritidis and one serotype *S.* Coeln. In addition to serotype *S.* Typhimurium, serotype *S.* Konstanz was found on one farm. The salmonella cases were detected in the self-monitoring samples collected by the farms and in the tests of clinical cases of suspected salmonella. In addition, two lymph node samples collected from cows in slaughterhouses and one combined lymph node sample tested positive for *S.* Typhimurium but faecal samples collected from the farms tested negative for salmonella. Cattle brought to artificial insemination centres and their home farms as well as the quarantined bulls of the centres are also tested for salmonella, and in 2015 these tests yielded no positive salmonella results.

Cattle monitoring studies

The disease situation of cattle was monitored for bluetongue disease, leukosis, infectious bovine rhinotracheitis (IBR), bovine viral diarrhoea (BVD), bovine spongiform encephalopathy (BSE) and brucellosis with monitoring programmes organised by authorities. The bluetongue disease (BTV) situation remained calm in the areas surrounding Finland. The BTV-4 outbreak that began in 2014 continued in the eastern parts of the EU and a BTV-8 outbreak began in France in the autumn of 2015. Samples collected from slaughtered suckler cows were tested for bluetongue disease all over Finland throughout the year. BTV antibodies were found in the serum sample of one suckler cow. The animal in question had been imported from Sweden in 2011 and it had tested positive for BTV antibodies already in the tests performed when it was imported (Sweden implemented mass vaccinations against BTV in 2008). As such, there was no need for further investigations.

Dairy and suckler cow herds were monitored for BVD, IBR and leukosis. As BVD is considered completely eradicated from the Finnish cattle population, a nation-wide programme to monitor dairy cattle was discontinued already in 2011. The monitoring programme consisted of risk-based testing of dairy cattle for BVD, IBR, leukosis and brucellosis. The targeted cattle population was dairy cows that had experienced an exceptionally high number of abortions or who had undergone embryo transfer using embryos of foreign origin. In addition to bluetongue disease, samples collected from slaughtered suckler cows for monitoring purposes were tested for BVD and IBR. Samples were also tested in the context of artificial insemination operations, imports and exports.

A total of 142 serum samples collected from cattle were tested for leptospirosis. All the samples were collected from artificial insemination bulls for health monitoring purposes, and all of them tested negative for leptospira antibodies.

Table 4. Viral and bacterial infection samples collected from cattle in 2015 by reason for testing and test (serology, detection of virus). Number of positive samples in parentheses.

	BVD		IBR		Leukosis	Bluetongue disease		Brucellosis	Schmallenberg virus infection	
	Serology	Detection of virus	Serology	Detection of virus	Serology	Serology	Detection of virus	Serology	Serology	Detection of virus
Dairy cattle monitoring / bulk milk sample	989	0	989	0	989	0	0	813	0	0
Suckler cow monitoring / individual blood sample	8 141	0	8 141	0	0	8 141 (1)[a]	0	0	0	0
Artificial insemination operations	631[b]	289	631[b]	0	631[b]	0	0	631[b]	0	0
Pathological testing	187	110	186	112	150	22	8	156	120 (23)	6
Import (cattle, semen, embryos)	231[c]	84	62	9	0	0	0	0	0	0
Other (animal trade, export)	641	2	345	0	8	30	14	16	292 (1)	1 165
In total	**10 820**	**485**	**10 354**	**121**	**1 778**	**8 193 (1)**	**22**	**1 616**	**412 (24)[d]**	**1 171**

[a] BTV seropositive suckler cow imported from Sweden (tested seropositive already in import tests in 2011).
[b] Includes both milk and serum samples.
[c] 180 samples from cows implanted with imported embryos.
[d] Schmallenberg virus antibodies were identified in cows that most likely got the infection between 2012–2013 based on their date of birth.

BSE tests performed in 2015 are presented in Table 5 by reason for testing. The amount of BSE tests performed was of the same order as in 2014. In 2015, a total of 11,576 bovine animals were tested for BSE. The majority of the cows had died spontaneously or been put down. The testing age limit of emergency slaughtered animals that died spontaneously or were put down is still 48 months. However, animals of all ages will be tested if the animal is suspected to have BSE.

Table 5. BSE tests in 2015. All test results were negative.

Healthy slaughtered	Clinical suspicions on farms	Emergency slaughtered	Spontaneously died or killed on farms	Disease symptoms in ante-mortem inspections	In total
10	0	41	11 525	0	**11 576**

Information about the 2006–2015 dairy cattle monitoring programmes (Table B1), suckler cow herd monitoring programmes (Table B2), brucellosis tests of cattle, sheep, goats, pigs (Table B3) and monitoring programmes of BSE in cattle (Table B4) are presented in the summary tables in Appendix B.

3 Swine diseases

The disease situation of domestic pigs remained unchanged in 2015. No easily spreading or dangerous diseases were found in pigs.

Monitoring pigs for salmonella is a part of the national salmonella programme of Finland. Salmonella infections in pigs are considered animal diseases to be combated by law. Salmonella was detected on a total of five pig farms. *S.* Derby was identified on one combination pig farm whereas one imported boar kept in quarantine at a boar station tested positive for *S.* Typhimurium. Lymph node samples collected by slaughterhouses revealed *S.* Typhimurium in the samples collected from the sows of two farms. One of the farms was a breeding farm that tested positive for *S.* Typhimurium also in faecal samples. During renovation, the farm in question was given a special permission from the local Regional State Administrative Agency for transferring animals to three empty piggeries due to limited capacity. The same restrictive order as the original piggery were imposed on these piggeries. *S.* Typhimurium was identified in two of these piggeries in transferred pigs. All infections detected in 2015 were new.

Trichinellosis, which is one the diseases to be reported, was not identified in rearing pigs or farmed wild boars in 2015, so the situation was the same as in 2014. Incidence of trichinellosis is monitored in meat inspections of pigs and wild boars and the related sample collecting.

In 2015, influenza A virus was not found in the samples tested. Lung and nasal mucus samples collected received from a total of 38 farms were tested for influenza virus in 2015. Swine influenza virus was last detected in 2014 when pandemic (H1N1) 2009 virus was identified in samples collected from two farms and the common H1N1 swine influenza virus was found on one farm. The pandemic and the common types of the H1N1 virus were also detected in 2013, both on two farms.

In addition to other requirements, the national and special levels of health care system *Sikava* require pig farms to also be free from porcine enzootic pneumonia. In the context of disease-free status monitoring, a total of 1275 samples from 61 different farms were tested for porcine enzootic pneumonia antibodies in 2015. Porcine enzootic pneumonia was identified on one new farm. In the current situation, annual antibody monitoring is only mandatory for the *Sikava* special level breeding farms. The amount of tested samples was slightly smaller compared to the previous year when a total of 1439 samples were tested. Porcine enzootic pneumonia cases are rare; in 2014, it was not detected on any new farms.

A total of 419 pig samples were tested pathologic-anatomically in 2015 which is significantly more than in 2014 when 309 samples were tested. In 2015, a total of 1278 faecal samples from 70 different farms were tested for the swine dysentery dysentery causative agent *Brachyspira hyodysenteriae* and other pathogens that cause diarrhoea in pigs. The tested samples were all negative for swine dysentery. Like in the previous years, *Brachyspira*

pilosicoli, *Brachyspira intemedia*, toxigenic *Escherichia coli* and *Lawsonia intracellularis* that cause gastroenteritis were detected. The number of tested faecal samples was smaller than in 2014 when 2335 faecal samples were bacteriologically tested. The difference in the number of samples is explained by the fact that in 2014, swine dysentery was identified on five farms which resulted in a higher number of samples collected for the investigation of the cases.

Of the causes of respiratory tract infections, *Actinobacillus pleuropneumoniae* bacterium was the major cause of pneumonia in growing pigs, like in the previous years.

In 2015, no clinical post-weaning multi-systemic wasting syndrome (PMWS) diagnoses were reported, as was the case also in 2014. Based on the referral information of samples, on some farms pigs were vaccinated against circovirus type 2 (PCV2). Circovirus may cause problems for individual pigs, and like in the previous years, changes were identified in some isolated samples. Based on these changes, circovirus (PCV2) was suspected to have had a role in the development of the disease in some individual animals.

The disease situation of pigs was monitored for Aujeszky's disease, TGE, PRRS and classical swine fever with monitoring programmes organised by authorities. Blood samples for monitoring were collected from sows in slaughterhouses so that approximately 700 samples were collected in six slaughterhouses in proportion with the amount of slaughtered animals; a maximum of five samples were collected from one farm. Samples from farmed wild boars were collected during slaughtering. In addition to the diseases mentioned above, the samples collected from farmed wild boars were tested for African swine fever and brucellosis. All test results were negative. Significant swine diseases were also tested in the context of artificial insemination operations, sampling in relation to the special level of national health care, pathological testing and import. Samples were also collected from wild boars living in the wild for testing. Due to a change in legislation, artificial insemination hogs are no longer tested for leptospirosis as of early 2014.

The threat of African swine fever grew in the areas surrounding Finland in 2015 as the disease continued to spread in the Baltic countries. Hunters have participated actively in the research on swine diseases by sending blood and tissue samples collected from wild boars living in the wild to Evira. The disease has not, however, been identified in these samples.

Several African swine fewer cases in the Baltics in 2015

African swine fever (ASF) is an easily spreading haemorrhagic fever caused by a virus that targets domestic pigs and wild boars. The disease causes significant financial losses but does not transmit to humans. A total of 22 genotypes (gt) of the virus have been identified. There is no vaccination or cure for the ASF virus.

African swine fever is endemic in Africa. The disease was first described in Kenya in 1921. In 1957, ASF (gt I) spread for the first time out of Africa when it was reported in Portugal. ASF was detected in Portugal again in 1960 when it also spread to Spain. The countries were not declared free from the disease until 1995. African swine fever has been present on the island of Sardinia since 1978 (gt I).

In 2007, the disease (gt II virus) spread to Georgia most likely from the food waste of a ship en route from Africa. After this, ASF has spread to European countries including Russia, Ukraine, Belarus, and in 2014 to EU member states Poland, Lithuania, Latvia and Estonia. ASF was first identified in rearing pigs in Estonia in the summer of 2015.

ASF virus is extremely resistant and survives well in organic material, such as undercooked meat and blood. The main way it is transmitted from country to country is through food waste that contains pig meat or meat products infected with the virus. It is also possible that the virus spreads to new areas through live pigs and sperm as well as transport vehicles, humans and wild boars. The disease is also maintained and transmitted by soft ticks of the *Ornithodoros* genus which has not been found in Finland.

Table 6. Numbers of tests performed using pig blood samples for significant viral diseases in 2015 by testing reason. No cases of the tested diseases were detected.

Pigs	Aujeszky's disease		TGE		PRRS		Swine fever		ASF	
	Sero-logy	Detec-tion of virus	Sero-logy	Detec-tion of virus ***	Sero-logy	Detec-tion of virus	Sero-logy	Detec-tion of virus	Sero-logy	Detec-tion of virus
Surveillance	730		731		766	35	731			
Artificial insemination operations*	1 103		788		1 112	110	831			
Farms with special health care level			449		523					
Pathological testing**	57	61	31	30	75	88	47	91	42	91
Export										
Import	185		196		308		193			
Farmed wild boars (Surveillance)	138	13	137		125	13	139	29	107	130
Wild boars living in the wild	107	166					109	171	31	171
In total	**2 320**	**240**	**2 332**	**30**	**2 909**	**246**	**2 050**	**291**	**180**	**392**

* Including farms of origin
** Rearing pigs; miniature, micro and mangalitza pigs and farmed wild boars
*** Also for PED virus

Summaries of the brucellosis surveillance of cattle, sheep, goats and pigs (Table B3) and viral disease and leptospirosis tests of pigs (Table B7) conducted between 2006 and 2015 are presented in Appendix B.

4 Poultry diseases

There have been major changes in the production structure of the poultry sector. The end of importing grandparents of broiler chickens and the switch to only importing parent animals has resulted in an exponential increase in the import of poultry in the past few years. There were issues in the availability of AE, CAA and coccidiosis vaccines.

The health situation of poultry was good in 2015; no cases of serious poultry diseases, such as avian influenza or Newcastle disease, were detected.

Samples collected from a total of 293 farms were analysed at Evira through pathologic-anatomical testing as well as in the framework of health monitoring and import operations.

Mycoplasma infections in poultry kept for non-commercial purposes

The first case of *Mycoplasma gallisepticum* was identified in a backyard poultry flock in June 2015 after which a total of 99 backyard farms were inspected based on symptoms and as primary contacts of positive farms. There are approximately 6000 registered backyard poultry farms in Finland.

The infections were tested by antibody analysis and PCR analysis of pharyngeal swab samples collected from symptomatic birds. *Mycoplasma synoviae* infection was found by real-time PCR test that detects both species of mycoplasma.

The mycoplasma situation in backyard poultry flocks has not been previously studied in Finland. Based on retrospective studies, the first incidence of *M. gallisepticum* infection on backyard poultry farms dates at least back to 2011.

M. gallisepticum causes nasal discharge, coughing and decrease in egg production in chickens and swelling of paranasal sinuses, nasal discharge, airsacculitis and coughing in turkeys. The mortality rate, however, is not significant. A flock may have an asymptomatic *M. synoviae* infection but it may cause arthritis, tenosynovitis and limping in addition to upper respiratory tract symptoms.

Antimicrobial therapy will not eradicate the infection from the flock as majority of the birds will continue to carry the disease and secrete the disease-causing bacteria at least occasionally.

Mycoplasma infections spread from bird to bird and from parent birds to the offspring via eggs. Backyard poultry farmers exchange birds and hatching eggs actively, making it especially challenging to prevent the disease from spreading. Mycoplasma infections in backyard flocks are not considered to pose a disease risk for productive poultry assuming the poultry farm is protected against diseases in accordance with the industry recommendations.

A total of 5116 poultry were tested, which is more than in the previous year (3791 in 2014). Majority of the samples were broilers (4608). A total of 274 turkeys as well as 229 laying hens, around twenty of which were kept on backyard poultry farms, were tested. Evira also tested a few pheasants, one duck and four ostriches. The increase in the overall number of samples was above all caused by colibacillosis in broilers.

Mycoplasma gallisepticum infections were identified on 45 backyard poultry farms in different parts of Finland and on one laying hen farm. Infections were identified in both chickens and turkeys. *M. gallisepticum* tests also revealed *Mycoplasma synoviae* infections on 63 backyard poultry farms and on one small laying hen farm. Apart from the laying hen farm mentioned above, no cases of *Mycoplasma synoviae*, *M. gallisepticum* or *M. meleagridis* infections were identified in productive poultry.

Infections caused by *Eschericia coli* bacterium (colibacillosis) increased mortality in broilers also in 2015. The reason for the increase is the APEC bacteria strains of *E. coli* that primarily affect poultry and that can be transmitted from parents to the productive poultry. However, broiler mortality decreased significantly towards to the end of the year.

Histomoniasis (blackhead disease) caused by the *Histomonas meleagridis* parasite was detected on two small turkey farms. The infected turkeys had displayed signs of anorexia and apathy and suffered from yellow diarrhoea. The birds died soon after the onset of the symptoms. Gangrenous inflammations were found in the caecum, liver and kidneys of the inspected turkeys. The diagnosis was confirmed histologically using a special staining process. Histomoniasis in productive poultry is not an issue in Finland. Captive birds, such as pheasants, partridges and peacocks, on the other hand, sometimes test positive for the disease.

Necrotic enteritis caused by *Clostridium perfringens* bacterium was found in a few flocks on several commercial turkey farms. Isolated cases of airsacculitis caused either by *E.coli* bacterium or fungi of the *Aspergillus* sp. were also detected on some farms. The primary cause of airsacculitis is insufficient ventilation in the breeding facilities. Chicken mite (*Dermanyssus gallinae*) has caused issues on some egg production farms. Swine erysipelas killed a large amount of chickens in consecutive flocks on a large organic chicken farm, so the next batches of animals will be vaccinated against it. Roundworms were found in eggs in isolated cases. Due to this, Evira and local laboratories have received several faecal samples from indoor chicken farming facilities.

No cases of clinical (symptomatic) infectious bursal disease (Gumboro disease) were identified in 2015. A few cases of Marek's disease were identified in chickens kept on non-commercial farms. No cases of Marek's disease was identified in commercial poultry. Laying hens and parent flock are vaccinated against Marek's disease.

Symptoms of infectious bronchitis (IB) were not found in poultry. The scheme launched in the spring of 2012 to vaccine parental generation of laying hens against IB with inactivated vaccine was continued in 2015.

The disease situation in poultry is monitored for avian influenza (AI), Newcastle disease (PMV-1) and salmonella with surveillance programmes maintained by authorities. Appendix B contains a summary of serological tests performed to detect avian influenza, Newcastle disease and avian pneumovirus (APV) in poultry between 2006 and 2015 (Table B8).

Collection of samples for avian influenza testing was directed at different species of poultry in accordance with the EU Commission Decision 2010/367/EC. Samples were collected from all farms rearing parent and grandparent flocks for Newcastle disease. Monitoring of avian pneumovirus (APV, FKA ART) was discontinued in the beginning of 2015. Approved poultry

export facilities follow the programme defined in the Ministry of Agriculture and Forestry decree no. 1036/2013 for the monitoring of incidence of the following pathogens: *Salmonella* Gallinarum/Pullorum, *Salmonella arizonae*, *Mycoplasma gallisepticum* and *Mycoplasma meleagridis*.

Table 7. Test results of the EU avian influenza control programme in 2015.

	Parent flocks [1]	Layer farms	Organic and free range farms	Organic broilers	Geese and ducks[2]	Turkey parent flocks	Turkeys production flocks	Captive wildfowl	Ostriches	In total
Samples	525	503	315	20	80	40	420	195	4	**2 102**
Flocks	42	50	32	2	4	3	42	15	2	**192**

[1] Includes parent flocks of both laying hens and broilers.
[2] Includes both parent and productive poultry.
In 2015, avian influenza H5 antibodies were detected on one farm but no active outbreaks were found. Avian influenza H7 antibodies were not detected.

A sample collected from one farm tested positive for avian influenza antibodies but not the virus itself, and as the animals of the farm displayed no clinical symptoms either, the farm was declared free from active infection. PMV-1 antibodies were identified in one farm sample. The farm animals displayed no clinical symptoms and the virus was not detected.

Table 8. Viral disease test results in poultry[1] in 2015 by reason for testing.

Reason for testing	Avian influenza		Newcastle disease		APV[4]
	Serology (Pos. farms / pos. samples)	Virus detection (Pos. farms / pos. samples)	Serology (Pos. farms / pos. samples)	Virus detection (Pos. farms / pos. samples)	Serology (Pos. farms / pos. samples)
EU surveillance	2 102 (1/1[2])	26 (0/0)	7 589 (1/5[2])	12 (0/0)	0[5]
Imports	2 230 (0/0)	0 (0/0)	2 475 (1/9[3])	0	2 330 (2/41[3])
Pathological testing	913 (0/0)	635 (0/0)	549 (0/0)	633 (0/0)	262 (0/0)
In total	**5 245 (1/1[2])**	**661 (0/0)**	**10,613 (2/14[2] [3])**	**645 (0/0)**	**2 592 (2/41[3])**

[1]) Poultry refers to all birds that are raised or kept in captivity for the production of meat or eggs and other products for consumption, introduction of wildfowl or the breeding programmes of the previously mentioned birds.
[2] Serologically positive, negative virus detection, no symptoms of disease.
[3]) Maternal (transferred from mother to offspring) antibodies in imported birds.
[4] Virus detection is not in use at Evira.
[5] EU monitoring programme for APV ended in 2015.

The statutory salmonella monitoring programme covers all generations of broilers, turkeys and laying hens. Salmonella was found in a total of four poultry holdings. One flock of laying hens tested positive for *S.* Enteritidis which was last detected in Finland on a commercial egg production farm in 1999. In 2011, one case of *S.* Enteritidis was found on a backyard poultry farm. Salmonella was also identified in two flocks of productive broilers (*S.* Cerro and *S.* Livingstone) and in one small-scale holding with egg-layers engaged in direct sales to consumers (*S.* Typhimurium).

Information about the disease situation in poultry is also collected through voluntary health monitoring: Disease situation in parent flocks is monitored by testing blood samples for the antibodies of infectious bronchitis (IB), infectious laryngotracheitis (ILT), avian pneumovirus (APV) as well as *Mycoplasma gallisepticum* and *M. synoviae* infections. Chickens are also tested for the antibodies of vaccines against infectious bursal disease (IBD, also known as Gumboro disease), avian encephalomyelitis (AE) and blue wing disease caused by chicken anaemia virus (CAV). APV disease is not present in Finland.

Table 9. Health monitoring samples of chickens and broilers between 2008 and 2015.

Year	AE	CAV	IB	IBD	APV	ILT	*M. gallisepticum*	*M. synoviae*
2008	1 306	1 563	2 358	3 151		893	4 077	3 936
2009	1 061	3 096	1 764	3 078		661	4 194	3 930
2010	994	2 532	2 054	2 492	1 260	794	4 542	3 762
2011	1 137	3 096	3 654	3 056	1 056	1 120	4 672	4 453
2012	1 187	2 746	2 899	2 716	1 100	1 032	4 250	4 150
2013	980	2 717	2 020	2 717	980	739	3 600	3 600
2014	1 020	2 320	2 206	2 440	938	940	3 458	3 458
2015	840	1 759	1 682	1 759	920	702	2 460	2 481

In the health monitoring programme of turkeys, blood samples are tested for the antibodies of PMV-3 infection and avian pneumovirus (APV) as well as *M. gallisepticum*, *M. synoviae* and *M. meleagridis* infections. In the programme, PMV-3 antibodies were found in an asymptomatic flock of one breeding turkey farm. Antibodies of this disease have been identified for years in some breeding turkey flocks.

Table 10. Health monitoring samples of turkeys between 2008 and 2015.

Year	APV	PMV-3	*M. gallisepticum*	*M. synoviae*	*M. meleagridis*
2008	514	573	514	514	514
2009	577	580	565	573	567
2010	700	719[1)]	559	559	599
2011	382	382[2)]	400	400	400
2012	418	418[3)]	438	438	438
2013	653	613[4)]	595	595	595
2014	480	480[5)]	480	480	480
2015	459	459[6)]	459	459	459

[1)] A total of 114 positive samples on five farms.
[2)] A total of 25 positive samples on two farms.
[3)] A total of 81 positive samples on three farms.
[4)] A total of 38 positive samples on three farms.
[5)] A total of 55 positive samples on two farms.
[6)] A total of 11 positive samples on one farm.

5 Sheep and goat diseases

In 2015, a total of 133 samples from sheep and five samples from goats were tested pathologic-anatomically. The amount of samples is of the same order as in last year (146 samples). A total of 26 samples were tested for meat inspection purposes.

A total of eight samples collected from five sheep farms were tested for abortion diagnosis pathologic-anatomically. Infectious causes of abortions were *Toxoplasma gondii* parasite infection detected on one farm and a bacterial infection caused by *Escherichia coli* on one farm.

Majority of the samples sent for pathological testing were whole animals, mostly young lambs and kids. A common finding was a parasite infection in abomasum or intestines (*Strongylida* suborder roundworms or *Eimeria* sp. coccidia) and subsequent diarrhoea or emaciation. *Haemonchus contortus* roundworms were found on four farms. Lancet liver fluke (*Dicrocoelium dendriticum*) was found in one sample taken for meat inspection. Cysts caused by *Cysticercus tenuicollis* were found in samples collected from sheep of three farms for meat inspection.

Listeriosis of the central nervous system caused by *Listeria monocytogenes* bacteria was detected on ten sheep farms. Pneumonia caused by *Mannheimia haemolytica* bacteria was detected on three farms. *Bibersteinia trehalosi* was also isolated from the lungs of the sheep of one of these three farms. *Clostridium perfringens* type D enterotoxemia was identified on seven sheep farms and one goat farm.

Eggs of intestinal roundworms (*Strongylida* ja *Strongyloides* sp.) and *Eimeria* sp.coccidia were the most common findings in the diarrhoea test kits of nine sheep farms and in the parasite test kits of 41 farms. A serological test kit was used on one farm for abortion diagnosis.

Orf virus was identified on 27 sheep farms over the year. Samples from a total of 42 sheep farms were tested for orf virus.

The disease situation of classical scrapie and lentivirus infections in small ruminants (Maedi Visna in sheep and CAE in goats) in sheep and goats is monitored with a voluntary health control programme. Spontaneously died or destroyed sheep and goats are tested for classical scrapie. Slaughterhouses also collect samples from sheep and goats aged 18 months and above if they show signs of emaciation or nervous symptoms or if they have been emergency slaughtered. All sheep and goats above 18 months of age, which have died or been killed on the farm, are tested for scrapie, when the farm is located in the carcass collection area or belongs to the health control programme. In 2015, no cases of classical or atypical scrapie were detected. The research into sheep genotypes was continued in accordance with Regulation

(EC) No 999/2001, and a total of 100 genotype analyses were performed as required in the regulation. The results of the scrapie monitoring programme between 2006 and 2015 are presented in Appendix B (Table B5).

A total of 4566 samples collected from 112 different farms were tested for Maedi Visna and CAEV in sheep and goats (Table 11). No Maedi Visna/CAEV infections were detected in the tests. The monitoring of brucellosis (caused by *Brucella melitensis*) was done for example by testing samples collected in the voluntary health control programme of small ruminants. All samples were negative.

Table 11. Results of sheep and goat health control programmes in 2015. All Maedi Visna/CAEV and scrapie tests were negative.

	Maedi Visna/CAEV				Scrapie	
	Serology		Virus detection/isolation			
Animal	Samples	Farms	Samples	Farms	Samples	Farms
Sheep	4 558	111	98	3	1 325	454
Goat	8	4*	1	1	149	59
In total	**4 566**	**112**	**99**	**4**	**1 474**	**513**

* Including three farms with both sheep and goats.

Table 12. Monitoring programmes and pathological tests of vector-borne viral diseases in sheep and goats in 2015. Bluetongue disease and Schmallenberg virus were not detected.

	Bluetongue disease				Schmallenberg virus			
	Serology		Virus detection/ isolation		Serology (pos.)		Virus detection/ isolation	
Animal	Samples	Farms	Samples	Farms	Samples	Farms	Samples	Farms
Sheep	7	2	0	0	22 (4)	6 (1)	2	1
Goat	0	0	0	0	0	0	0	0
In total	**7**	**2**	**0**	**0**	**22 (4)***	**6 (1)**	**2**	**1**

* Schmallenberg virus antibodies were identified in ewes that most likely contracted the virus in 2012 or 2013 based on their dates of birth.

Summaries of the brucellosis surveillance of cattle, sheep, goats and pigs (Table B3) and Maedi Visna/CAEV and scrapie tests of sheep and goats (Table B9) conducted between 2006 and 2015 are presented in Appendix B.

6 Fish and crustacean diseases

Statutory control of fish and crayfish diseases

The health situation of aquaculture animals was good in 2015 and no serious infectious diseases were detected. Regular inspections by authorities and collection of samples were targeted at finding potential incidences of VHS, IHN, ISA, SAV, IPN, BKD and *Gyrodactylus salaris* (salmon fluke). Koi herpesvirus (KHV), spring viremia of carp (SVC) and white spot disease (WSD) in crustaceans were monitored through spot checks. VHS/IHN/IPN samples were tested from 107 farms, SAV samples from 45 farms and BKD from 60 farms.

The restricted area of Åland to prevent the spread of viral haemorrhagic septicaemia (VHS) is still in force. No cases of the disease have been detected since the summer of 2012. The operations to eradicate VHS are planned to be completed at the latest by the end of 2017. A four-year monitoring period will begin after the eradication process to prove that VHS has been eradicated. Other areas in Finland are free from VHS.

In early 2016, inland water areas of Finland were declared free from salmonid alfavirus infections (SAV). Salmonid alfavirus infections are an OIE-listed fish disease. SAV infections are screened with annual tests and targeted sample collections from farms that are considered to be at a high risk of contracting the disease.

In 2013 only the infections caused by infectious pancreatic necrosis (IPN) in genogroup 5 in inland water areas were included in the diseases to be combated. Infections caused by genogroup 5 have not been detected in inland water areas in Finland.

The programme to eradicate bacterial kidney disease (BKD) was discontinued and BKD was added to the list of diseases to be reported in late 2014. The efforts to combat BKD were based on a voluntary health control programme launched in 2012. In 2015, BKD was detected in one farm participating in the health control programme, and in one farm that was in the process of being sanitised from the disease. Operations of both farms were adapted after the diagnoses and they are no longer part of the health control programme.

Infectious haematopoietic necrosis (IHN), infectious salmon anaemia (ISA), SAV, SVC, KHV or WSD has never been detected in Finland. *Gyrodactylus salaris* (salmon fluke) has not been found in the protected zone in Northern Lapland since 1995 when an infection was detected in a now defunct farm located in the buffer zone

Summaries of the tests performed between 2006 and 2015 for the diagnosis of viral diseases in fish (Table B10), BKD (Table B11) and *Gyrodactylus salaris* (Table B12) are presented in Appendix B. In addition to the tests mentioned above, a total of 671 wild fish were tested

for VHSV, IHNV and IPNV infections, 611 for BKD and 290 for SAV, mostly in the context of capturing broodfish.

Other harmful fish diseases

Finland saw yet another unusual summer in terms of weather conditions in 2015. The weather stayed cool long into the summer which was ideal for fish farming, which was especially evident in the low incidence of bacterial diseases. In August, however, the temperatures started to raise which balanced the situation – the long period of warm weather in the autumn exposed fish in particular to lesions caused by water mould.

In 2015, fish were given less antibiotics than ever before in the 21st century. The most common indication for antibiotic medication continued to be flavobacterial infections, especially cold water disease caused by *Flavobacterium psychrophilum*. In 2015, *Edwardsiella piscicida* infections were diagnosed in common whitefish for the first time since the turn of the century. However, all in all fish farms were affected by bacterial diseases in 2015 less than in the previous years.

The incidence of genogroup 2 of infectious pancreatic necrosis (IPN) in saltwater fish was considerably more common than before. This is likely due to the use of disease-carrying juvenile rainbow trout in farming of fish for consumption after the regulatory combat against the disease ended in 2012.

Exceptionally high mortality rates were observed in the salmon running up the Tornio river for a second year in a row. Dead salmon and salmon with skin lesions started to appear in mid-June and by the end of the summer, at least as many dead salmon hens had been observed as in the previous year, even though the total amount of salmon was significantly smaller than in 2014, the record salmon run year. Even higher mortality rates of hens were observed in the spawning season in October. Two salmon migrating upstream the Tornio river were diagnosed with UDN (*Ulcerative Dermal Necrosis*) in Swedish tests but the results of Finnish tests were negative. It is apparent that there are other factors in addition to UDN that cause mortality in the Tornio River salmon population migrating to the sea. In Finland, UDN was found in salmon on their way to the Simo River caught in the summer. The disease was found in the autumn when the salmon were kept in a fish farm for egg collection. In the Tornio River, the salmon eventually died of water mould but it is considered a secondary infection. Like in the previous years, exceptionally difficult cases of water mould were also observed in fish farms. It is not known what is causing the disease to become more common.

Other harmful crustacean diseases

Crayfish plague caused by the Aphanomyces astaci water mould is the most significant crayfish disease observed in Finland. Crayfish plague originates from North America where the endemic species of crayfish, such as signal crayfish, are natural carriers of the disease. The acute type of crayfish plague is usually observed in the species susceptible to it, such as European crayfish (*Astacus astacus*). Recent studies have shown that crayfish plague might also be assymptomatic in European crayfish populations. As such, in addition to crayfish deaths, crayfish plague might occur assymptomatic in bodies of water inhabited by European or signal crayfish populations. In 2015, an acute case of crayfish plague was only observed in one European crayfish population in one body of water. In addition to this case, crayfish plague was found in one lake and one river in tests conducted before reintroducing European crayfish. No signal crayfish samples were tested in 2015.

7 Equine diseases

In horse diseases, test were most commonly carried out to diagnose diseases, to determinate cause of abortions and death, test studs before breeding as well as examinations for import and export of horses and sperm. Horses imported from the EU were tested for covering sickness (dourine), glanders (malleus) and equine infectious anaemia (EIA) if the horse and its documentation did not completely fulfil import requirements. Testing for contagious equine metritis (CEM) in stud farms and artificial insemination facilities as well as regulatory testing for equine viral arteritis (EVA) and equine infectious anaemia (EIA) are based on monitoring programmes organised by authorities. A decree of the Ministry of Agriculture and Forestry on health requirements for sperm collected for use in Finland entered into force in 2015. In accordance with the decree, EVA testing of studs used for breeding on stud farms is now mandatory in Finland. This was seen in the amount of EVA tests performed in 2015.

A total of 57 horses were tested at Evira pathologic-anatomically in 2015 (53 in 2014). Of these, 30 were tested to diagnose abortions or diseases in young foals. Equine herpesvirus 1 (EHV-1) was found in one aborted foal tested in 2015. In recent years there have been few abortions caused by herpesvirus each year. Arteritis virus was last determined as a cause of abortion in 2011.

Equine infectious anaemia (EIA) is an equine disease classified as a dangerous animal disease to be combated under the Finnish Animal Diseases Act (441/2013). The disease has been observed in several European countries in the past few years. In 2015, the majority of EIA tests were performed in the context of import and export of horses and gametes. A total of 54 horses were tested due to incomplete fulfilment of import requirements. Of these, ten horses that had been in Finland for less than three months were tested twice. In 2015, a total of 118 samples collected from 103 horses were tested for EIA, all of which came back negative.

Equine viral arteritis (EVA) or its carriers were not found in the tests conducted in 2015. EVA antibodies were tested from 234 serum samples collected from 221 horses. In addition, 68 foetus, nasal mucus and sperm samples from a total of 68 horses were tested for the virus. The expansion of the testing of studs for the disease to also cover all studs used on stud farms in the autumn of 2014 has provided important additional information about the incidence of the disease in Finland. Based on the results, it can be said that the disease situation has been stable in Finland. Studs infected with the virus and excreting it have not been detected in Finland since 2010, and there have only been sporadic cases of other horses infected with the virus, last detected between 2013 and 2014. EVA was identified as a cause of abortion in Finland last in 2011.

In 2015, the cause of abortion of one aborted foal was ‘virus abortion’ caused by EHV-1 virus. A total of 29 foetuses or dead foals were tested for herpesvirus. Nasal mucus samples of ten

horses were tested for EHV-1 and EHV-4 to determine the causes of their diseases and all tests came back negative for these viruses. A total of 26 horses (43 serum samples) were tested for EHV-1 and EHV-4 antibodies for rhinopneumonitis or because of nervous system symptoms. No infections caused by EHV-1 were found in the tests. Based on the tested samples, EHV-4 was suspected as a cause for the symptoms in one stable. Based on previous antibody tests, infections caused by EHV-4 are common as its antibodies are present in nearly all adult horses. EHV-4 virus is rarely the cause of outbreaks of serious diseases. Due to herpesvirus vaccines, interpreting the results of antibody tests can sometimes be challenging. Estimates of the actual prevalence of the disease in Finland in 2015 cannot be made due to the small amount of tests performed.

No cases of equine influenza were identified in 2015. A total of eight nasal mucus samples (eight horses) and 32 serum samples (21 horses) were tested for the disease. In general, horses in Finland are vaccinated against influenza. Of the horses tested in 2015, a total of 18 (86%) tested positive for equine influenza antibodies.

Studs used for breeding and a couple of mares, or a total of 327 horses, were tested for *Taylorella equigenitalis* bacteria that causes contagious equine metritis (CEM) as required by Decree 780/2014 on requirements for equine animals used for breeding. All tests came back negative.

The bacterium *Streptococcus equi sp. equi* that causes strangles was isolated from three horses in 2015.

With the exception of testing of studs, the amount of tests conducted for the diagnosis of horse diseases was rather low in 2015, which in part affects the estimation of the prevalence of certain important horse diseases observed in Finland.

8 Reindeer diseases

The amount of reindeer samples annually tested at Evira has been around 50 for the past few years. In 2015, Evira analysed a total of 46 samples, seven of which where complete reindeer carcasses and the remaining 39 organ samples or parts of reindeer. Blood samples of 112 reindeer were serologically tested for brucellosis in export testing, and all tests came back negative. Based on the amount of samples and findings, the health situation of reindeer was good in Finland in 2015, like in the previous years. No outbreaks of diseases occurred based on the samples submitted to Evira.

The majority of reindeer samples are submitted by veterinarians inspecting reindeer meat in slaughterhouses. Of the organ samples submitted to Evira, a total of 35 were collected for meat inspection. Like in the previous years, abnormalities caused by parasites were the most common finding. Reindeer living in the wild are susceptible to parasitic infections. Parasites are rarely the cause of diseases in reindeer but lesions caused by them often result in rejection in meat inspections. The majority of reindeer not slaughtered in the autumn are medicated against parasites each year when the reindeer are gathered in an enclosure for selection for slaughtering.

Echinococcus canadensis G10 was identified in the lungs of three reindeer – in 2014, lesions caused by the parasite were found in five reindeer. The infections occurred in the eastern parts of the reindeer management area. Cysts considered as abnormalities or neoplasms were found in the bile duct of one reindeer. Because of their appearance, the cysts can be confused with cysts caused by echinococcosis. As such, all suspicious cyst findings must be submitted to Evira for testing. *Elaphostrongylus rangiferi* nematodes, also known as reindeer brain worms, were found in the fascia between the muscles in meat samples collected from three reindeer. Sporadic findings included inflammatory changes in peritoneum, organs and subcutaneous tissue caused by *Setaria tundra* and *Onchocerca tarsicola* nematodes. Sand grain-like tissue cysts caused by *Besnoitia tarandi* protozoan parasites were found in fascia in one sample. Tissue cysts caused by parasites of the *Sarcocystis* genus were a common incidental finding in microscopic tissue examinations of cardiac and skeletal muscles.

Signs of acute ischemic myopathy (muscular dystrophy, capture myopathy) were identified in one muscle sample. It has been observed in wild animals and reindeer as a result of chase and capture, as well as stress and vascular problems caused by transport. The affected meat is of poor quality; it is dry and has a dark colour.

Findings in the reindeer examined to determine cause of death or diagnosis of illness were similar to the findings of previous years. Individual necrobacillosis cases (*Fusobacterium necrophorum* infection) and aphthous stomatitis (mouth ulcers) were observed early in the year. A total of six samples were collected from reindeer suffering from aphthous stomatitis and tested for parapoxvirus with negative results. A few cases of eye infections, enteritis and peritonitis were detected. These were often accompanied by emaciation of the reindeer. The amount of parasites in faecal and blood samples tested for parasites were low, as in the previous years.

Samples collected from full-grown reindeer and tested for TSE diseases (chronic wasting disease, CWD) where possible, were negative (Table B6).

9 Fur animal diseases

A total of 285 samples collected from fur animals were tested pathologic-anatomically in 2015. The amount was significantly smaller compared to the previous year when 535 samples were tested. In terms of both minks and foxes, the amount of samples decreased by half compared to the previous year. A total of 146 minks, 111 farmed foxes, most of which were blue foxes, and 28 raccoon dogs were examined. A total of 235 faecal samples were tested to determine the cause of diarrhoea.

The most common findings in the foxes examined at Evira were enteritis and systemic infection. In minks, the most common findings were enteritis, pneumonitis and systemic infection. In farmed raccoon dogs, the most common findings were enteritis and pneumonitis.

A major disease affecting minks is plasmacytosis, which is serologically diagnosed by a private laboratory. Pathological and anatomical changes indicative of plasmacytosis are identified in the minks examined at Evira each year. In 2015, only one such case was identified.

There were no major outbreaks or epidemics affecting fur animals in 2015. The disease situation was calm.

Transmissible mink encephalopathy (TME) is an extremely rare slowly progressing central nervous system disorder that affects farmed minks. Evira has examined brain samples of fur animals for TME annually since 2006. No cases of the disease have been detected in the tests, as was the case also in 2015 (Appendix B, Table B6).

Major viral pathogens in fur animals are parvovirus and canine distemper virus. Parvovirus infections were detected on 48 fox farms, mostly between August and November. Parvovirus was also found in the samples of seven raccoon dog farms.

10 Honey bee diseases

The major diseases affecting honey bees are *Varroa Destructor* mites and viral diseases spread by them, as well as American foulbrood caused by the *Paenibacillus larvae* bacterium. Most of the bee samples are submitted to Evira for American foulbrood examination. A total of 1942 honey samples submitted by 206 beekeepers were examined at Evira in 2015, while the equivalent numbers in 2014 were 4303 samples and 320 beekeepers. The year 2014 was a transition period caused by the Decree of the Ministry of Agriculture and Forestry on American foulbrood (MMMa 11/2015), so in 2015 the amount of beekeepers who submitted samples for testing returned to the level of 2013 (196 beekeepers). *P. larvae* was identified in 11% of the samples (17% of beekeepers) submitted to Evira in 2015. No cases of clinical American foulbrood were detected. Compared to previous years, the proportion of positive samples was small. Of the samples tested between 2006 and 2014, 10–30% were positive and 20–50% of the beekeepers who submitted samples had positive hives.

In 2015, 17 honey bee farms on the Åland Islands were examined for *Varroa destructor* mites. Based on the tests, the Åland Islands were declared to be still free from *Varroa*. The mites are common in mainland Finland but samples are usually not tested for them in laboratories.

Honey bee tracheal mites (*Acarapis woodi*) have become less common thanks to the efforts to combat *Varroa destructor* mites and is now only observed on a couple of farms each year. In 2015, honey bee tracheal mite were found on two farms in western Finland.

No samples were tested for European foulbrood caused by the *Melissococcus plutonius* bacterium in 2015. European foulbrood infections have previously been identified on a few farms each year.

No samples were tested for nosema disease in 2015. *Nosema apis* and *N. ceranae* parasites are common in Finland but cause symptomatic diseases only rarely.

11 Companion animal diseases

11.1 Dogs

Dogs are most often examined at Evira to diagnose hereditary diseases, to determine the cause of death of newborn puppies, to diagnose new contagious diseases and to investigate animal welfare issues. Forensic autopsies form a major share of the examinations performed at Evira, and some of them are done in investigations of suspected animal welfare crimes. Determining the cause of contagious diseases is a major reason for testing, especially when it comes to young puppies. Thanks to regular vaccinations, distemper and infectious canine hepatitis rarely occur nowadays in Finland. However, the increased movement of dogs from country to country increases the risk of new contagious diseases spreading to Finland.

Contagious diseases commonly affecting dogs at the moment are either caused by microbes causing respiratory tract infections or viruses causing gastroenteritis. There are no efficient vaccines against these infections, apart from diarrhoea caused by parvovirus.

Parvovirus diarrhoea is regularly seen in young dogs with insufficient immunisation against parvovirus. So called herd-immunity cannot develop against parvo-virus and the virus occurs in the environment all the time. An infection either strengthens the protection provided by the vaccine or causes the disease when antibodies provided by the dam perish and the protection provided by the vaccine is not yet strong enough to fight the infection.

Vomiting and diarrhoea caused by coronavirus occurs every year as do bacterial pneumonitis and viral and bacterial infections that cause 'kennel cough'.

Canine herpesvirus is a relatively rare cause of mortality in newborn puppies. Herpesvirus infections are detected each year in a few litters and there has not been an increase in the amount of cases in the past few years. Issues caused by herpervirus mostly occur when a bitch gets the infection for the first time while pregnant and transmits the virus to the puppies when they pass through the birth canal.

Mortal infections caused by *Toxoplasma gondii* protozoans are detected every year. Infections caused by the *Neospora caninum* parasites, on the other hand, are rare. Enteritis caused by *Giardia* sp. or *Cryptosporidium* sp. protozoans are diagnosed regularly. Dogs are susceptible to these infections if they roam freely in nature or are kept in an outside enclosure. The infection is usually asymptomatic but for young puppies and dogs with an immune system disorder, it may cause long-term diarrhoea.

In 2015, a total of 18 dogs, ten of which had been illegally imported, were examined for rabies. Dogs were also tested for rabies in situations where, based on the symptoms, the possibility of rabies could not be ruled out. No cases of rabies were detected in dogs (Table 13, page 34).

In 2015, a total of 13 dogs were tested for *Brucella canis* antibodies using serological methods. Of these dogs, nine were tested before export and four to determine the cause of a disease. Samples collected from ten dogs were also bacteriologically tested for brucellosis. *Brucella* bacterium was isolated from the sample of one dog. The sample was sent to the EU reference laboratory where it was identified as *B. canis* bacterium. Bacterial infections caused by *Brucella canis* occur every now and then in imported dogs and Finnish dogs taken abroad for breeding purposes.

11. 2 Cats

Viral diseases are more common in cats than dogs. At the moment, feline infectious peritonitis (FIP) caused by coronavirus is the most important individual cause of death in cats, and coronavirus is most likely the most common viral infection in cats in Finland. Feline panleukopenia virus (FPV), also known as cat plague, occurs in young cats with insufficient immunisation. Viruses causing respiratory tract infections and infections caused by them also occur constantly. There is no detailed information about the prevalence of feline leukaemia virus (FeLV) and FIV infections in Finland.

Generalised infections caused by the *Toxoplasma gondii* protozoans occur in young cats each year and the infection causing the disease is significantly more common in cats than dogs.

In addition to contagious diseases, major reasons for testing in cats are determinations of hereditary diseases and causes of death of newborn kittens.

In 2015, a total of ten cats were tested for rabies mainly due to violent behaviour. No cases of rabies were detected in cats (Table 13, page 34).

12 Wildlife diseases

The study of wildlife diseases emphasises diseases that can be spread between animals and humans, or zoonotic diseases (zoonoses). Evira also monitors the incidence of other animal diseases and outbreaks of new epidemics through animal samples submitted by members of the public. For the disease situation of wild fish and crustacean populations, please refer to Chapter 6 Fish and crustacean diseases.

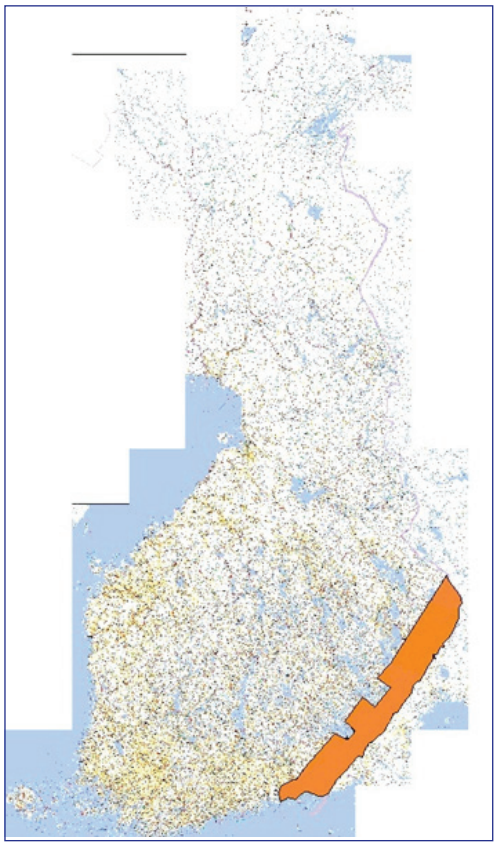


Figure 2. Drop zone of rabies vaccine baits.

Vaccine baits are distributed in nature to prevent the spread of rabies through small predators into Finland. In 2015, the vaccine baits (180,000 vaccines) were dropped from aircraft in September and October. The incidence of rabies and consumption of the baits are constantly monitored through examinations of hunted animals and animals that were found dead. Hunters collecting the samples play a key role in the success of the disease monitoring programme. The samples are mostly collected in south-east Finland and North Karelia where the baits are distributed to. The collection campaign in 2015 went well even though the target amount of samples was not reached. Evira's goal was to receive 360 samples from the distribution area of the baits. Samples were submitted from all the municipalities in the distribution area. A total of 334 foxes and raccoon dogs and 297 blood samples were submitted.

A total of 523 wild animals from all over Finland were submitted to the rabies monitoring programme. The majority of these were raccoon dogs (262) followed by foxes (105). The numbers of examined animals of the mustelidae family were as follows: five European pine martens, three minks, seven badgers, 38 Eurasian otters and four European polecats. In addition, 73 large predators and 26 bats were tested for rabies. No rabies cases were found in wild animals in 2015.

Table 13. Animals tested for rabies for different reasons in 2015.

	Put down due to aggressiveness	Traffic accident	Neurological symptoms	Put down due to illness	Found dead	Put down due to illegal import	Suspected animals in total	Total number of animals examined
Wolverine		4					4	4
Horse				1			1	1
Polecat					1		1	4
Lynx		22		3	8		33	45
Bear	1	2		3			6	9
Fox	1	3		1	7		12	104
Cat	7		1	1			9	9
Dog	4		1	1	2	10	18	18
Bat	1			1	14		16	26
Weasel					1		1	1
Badger		1					1	7
Pine marten								5
Otter		10			10		20	38
Blue fox					1		1	1
Raccoon dog	1	5		4	8		18	262
Wolf		3		2	4		9	16
Wild mink					1		1	3
In total	**15**	**50**	**2**	**17**	**57**	**10**	**151**	**553**

The threat of African swine fever grew in the areas surrounding Finland in 2015 as the disease continued to spread in the Baltic countries. Hunters have participated actively in the research of swine diseases by sending blood and tissue samples collected from wild boars living in the wild to Evira (Table 14). Wild boars living in the wild have been tested for African swine fever in Finland since 2010, and between 2010 and 2013, Evira examined an average of ten samples each year. In 2014, samples collected from 138 wild boars were submitted to Evira, and in 2015, active hunters submitted samples from 171 wild boars. More than half of the samples were submitted from south-east Finland. The municipality with most samples was Lappeenranta, where the samples of 33 animals were submitted from in 2015.

In addition to African swine fever, samples of wild boars living in the wild were tested for classical swine fever, Aujeszky's disease and brucellosis. None of the tested viral diseases were found in the samples.

A total of 171 blood and/or organ samples collected from hunted wild boars were tested for brucellosis. Bacteria of the *Brucella* genus were isolated from the samples of three animals. Further inspection showed that the bacterium in question was *B. suis* biovar 2 which is relatively common in wild boars and brown hares in Europe. In addition to this, brucella antibodies were found in the blood samples of four wild boars. All the wild boars that tested positive were hunted in south-east Finland in the area surrounding Lappeenranta.

Table 14. Numbers of samples collected from wild boars living in the wild and tested for African swine fever by municipality. African swine fever was not found in any of the samples.

Municipality	Number of wild boars	Municipality	Number of wild boars
Hammarland	1	Kuhmoinen	1
Lapua	1	Kangasala	1
Hirvensalmi	1	Orivesi	1
Mäntyharju	1	Pälkäne	1
Rantasalmi	2	Tampere	5
Savonlinna	1	Ilomantsi	3
Hämeenlinna	1	Joensuu	6
Janakkala	1	Kitee	1
Imatra	2	Liperi	6
Hamina	2	Nurmes	1
Kotka	1	Tohmajärvi	3
Kouvola	11	Kuusamo	1
Lappeenranta	33	Taivalkoski	1
Luumäki	6	Kuopio	1
Miehikkälä	1	Leppävirta	1
Parikkala	5	Rautavaara	2
Pyhtää	8	Ulvila	1
Rautjärvi	4	Lapinjärvi	13
Ruokolahti	6	Loviisa	5
Savitaipale	1	Porvoo	1
Virolahti	12	Raasepori	1
Kuhmo	2	Sipoo	5
Paltamo	1	Vantaa	2
Sotkamo	1	Salo	1
Vaala	1	Turku	1
		In total	**171**

Canines or foxes and raccoon dogs are tested for *Echinococcus multilocularis*. Echinococcus multilocularis infections have never been detected in Finland, and Finland is considered a country free from *Echinococcus multilocularis* in the EU. In 2015, a total of 273 foxes and 338 raccoon dogs were tested for this parasite with negative results. The monitoring of *Echinococcus multilocularis* infections was strengthened in southern and south-west Finland in cooperation with regional offices of the Finnish Wildlife Agency. *Echinococcus canadensis*, whose intermediate hosts are animals of the family Cervidae (deer) and definitive hosts are wolves, occurs in eastern Finland (eastern Lapland, Kuusamo, Kainuu, North Karelia). In 2015, this parasite was wound in ten wolves out of the 41 examined. No cases of *Echinococcus canadensis* have been detected in western Finland. Three *Echinococcus canadensis* infections were found in reindeer (cf. also Chapter 8 Reindeer diseases and infections) but none in the submitted elk samples.

Small predators are tested for the parasitic roundworms (*Trichinella* spp.) living in the muscle tissue. *Trichinella* worms are fairly common in small predators: In 2015, 39% of raccoon dogs and 34% of foxes were infected with the parasite. There has not been any drastic changes in the prevalence of *Trichinella* in these animals in previous years. *Trichinella* infections were also found in animals of the mustelidae family. All of the tested wolverines (four) were positive, as were 29% of European pine martens and 6.4% of Eurasian otters. In wolves and Eurasian lynx, the prevalence of *Trichinella* decreased slightly from the previous year. In 2015, 21% of lynx (compared to 40% in 2014) and 36% of wolves (compared to 44% in 2014) were positive. Of the brown bears examined at Evira, three were found positive. These samples were also tested to determine the species, which in each case was *Trichinella nativa*, the most common species of *Trichinella* in Finland. Bear samples are also tested for Trichinella in other approved laboratories, but the positive samples are confirmed at Evira. Wild boars living in the wild were also diagnosed with *Trichinella* infections in 2015. *T. nativa* was found in one wild boar and a *T. pseudospiralis* infection in another one. The latter is the only species of *Trichinella* that can be transmitted to birds.

Scabies (*Sarcoptes scabiei* mite) occurred in 2015 in different parts of Finland and at all times apart from the summer months. There seems to have been no changes in its area of distribution compared to the previous year. Nearly all of the infections were found in foxes (14) and raccoon dogs (29). Only one infected wolf was found and there were no scabies infections in other animals in 2015.

The carcasses of four wolverines, 52 lynx, 19 wolves and nine bears were submitted to the cause of death and disease monitoring programme of large predators. Traffic accidents were once again the main cause of death of the examined large predators. A total of four wolverines, one bear, six wolves and 41 lynx had been hit by a car. Two lynx and one bear had been hit by a train. Of the examined wolves, exceptionally many had been shot dead with consent of police because they had been near human settlements. No special diseases or injuries were found in these wolves (13 in total). Of these wolves, three were young and still growing while the remaining ten were full-grown adults. Majority if them (11) were from eastern Finland (Northern Savonia and North Karelia). In addition, a total of five wolves with old movement-restricting leg injuries (fractures, infections) were put down with the consent of police or the consent to put down animals causing harm or nuisance. A total of three wolves were found dead as a result of different injuries, and of these at least one seemed to have been killed by other wolves. One wolf had been illegally shot dead and signs of old shooting-related injuries were found in two wolves. Of the bears, two had been put down with consent of police because they had stayed near human settlement, and two had been put down due to aggressive behaviour. No diseases were found in these four bears. Two bear cubs were bitten dead apparently by a male bear. Of the lynx, two had been shot dead without appropriate hunting licenses. Signs of wasting and different injuries were found in lynx. The most unusual case was that of a lynx that had been put down due to convulsions caused by encephalitis resulting from a small skull fracture.

A tularemia epidemic occurred in 2015 after a short disease-free period. In 2013 and 2014, no cases of tularemia were found in the wildlife monitoring programme of Evira. A total of five infections were confirmed in blue hares and 11 in brown hares. Majority of the cases were centred in the Oulu region but isolated cases were also found in Ostrobothnia (Isokyrö) and central Finland (Äänekoski). Over the year, a total of 54 blue hares and 76 brown hares were submitted for examination from all over Finland. Tularemia also affects small rodents, so it is likely that variations in the European mole population plays a role in the prevalence of the disease in other animals.

Interesting parasite findings were made in the animals of the family Cervidae. The cause of the severe infections in the skin of roe deer hooves turned out to be a parasite of the *Besnoitia* genus. This protozoan parasite is known as a parasite of reindeer, in which it is usually rather asymptomatic. Unsurprisingly, the infected roe deer was found in Ylikiiminki in the reindeer herding area. A severe infection of the bile duct caused by worms in the liver was found in the liver of an elk killed in Ruokolahti. The parasites were small flukes of the *Parafasciolopsis fasciolaemorpha* species. Prior to this case, this species has only been found in eastern Europe and Russia. Neither of these parasites are dangerous to humans.

A new disease caused by *Riemerella anatipestifer* bacterium was found in whooper swans in the autumn of 2015. This was the first time this bacterium was found in a wild bird in Finland, and it is in fact better known as a pathogen of poultry. The disease manifested in adult birds as severe nervous system symptoms, including balance problems while swimming, inability to fly and bending of neck. Young swans died of systemic infection. Confirmed infections were reported in the Oulu region, North Karelia, Päijänne Tavastia and Uusimaa. One bacterial finding was made in a barnacle goose. Observations of affected birds were made in different parts of Finland. As far as is known, the disease did not cause mass deaths but mainly infection in individual animals.

A total of 133 wild birds that had either been shot or found dead were examined in the avian influenza surveillance programme. A low pathogenic avian influenza virus that was not a type H5 or H7 virus was found in one bird. No cases of paramyxovirus-1 that causes the easily spreading Newcastle disease in poultry was found in wild birds in 2015. More detailed information about avian influenza surveillance programmes of wild birds from previous years is presented in Table B13 in Appendix B.

Salmonellosis is prevalent in small birds in practice everywhere in Finland. In 2015, salmonellosis was fairly common in winter feeding spots, especially right at the end of the feeding period in April and May. Cases reported at the end of winter and beginning of spring occurred in northern Finland. Infected species were Eurasian bullfinch, common redpoll, Eurasian siskin and European greenfinch. Salmonella infections were also found in black-headed gulls (two cases), Eurasian crane (one case), European hedgehogs (eight cases), Eurasian lynx (one case) and Eurasian otter (one case).

Of the diseases affecting small birds, the prevalence of trichomonosis, that is, an infection of the crop, caused by *Trichomonas gallinae* parasites was fairly low. The disease was reported in greenfinches in four places in southern Finland in summer and autumn, and in yellowhammers in one place in eastern Finland in March.

Sick or dead wild animals can be reported on the Evira website. In 2015, a total of 115 reports were submitted through the website, which is slightly more than in the previous year (98 reports). As in the previous year, the majority of reports were about hares. A total of 45 cases of brown and blue hares found dead were reported to Evira, which is twice as many as in the previous year. This increase in observations is most likely caused by the prevalence of tularemia. Hare reports were submitted from all over Finland, mostly from the municipalities in the Oulu region (19 reports). Swans were the second most reported species with 10 reports. For other animals, the amount of reports ranged from one to five per species. Reports were submitted of at least about 37 different species, albeit some of them were identified as groups (e.g. bat or gull).

Appendix A: Incidence of selected animal diseases in Finland in 2015

Table A1. Incidence of selected multiple species diseases in Finland.

Animal disease	Primary target animals	Zoonosis*	Last detected
Aujeszky's disease (pseudorabies)	Pig, ruminants, dog, cat		Never detected
Bluetongue disease	Ruminants		Never detected
Brucellosis		x	
• *B. abortus*	Ruminants		1960
• *B. melitensis*	Small ruminants		Never detected
• *B. suis* bv.2	Wild boar		2015[1)]
Echinococcosis			
• *E. multilocularis*	Fox, raccoon dog, rodents	x	Never detected
• *E. canadensis*	Ruminants, pig, horse, dog, wolf	x	2015
Heartwater	Ruminants		Never detected
Tularemia	Blue and brown hare, rodents, birds	x	2015
Rinderpest (cattle plague)	Ruminants		1877
Leptospirosis	Cattle, pig, horse, dog	x	2014[2)]
Cochliomyia (New World screwworm fly)	Mammals	x	Never detected
Chrysomya bezziana (Old world screwworm fly)	Mammals	x	Never detected
Paratuberculosis	Ruminants		2008[3)]
Anthrax	Ruminants, pig, horse	x	2008
Q fever	Ruminants	x	2012[2)]
Rabies	Mammals	x	2009[4)]
Rift Valley fever (RVF)	Ruminants	x	Never detected
Salmonella infections	Several different species	x	2015
Foot-and-mouth disease	Cloven-hoofed animals		1959
Trichinellosis	Pig, horse, bear, lynx, small predators	x	2015
Vesicular stomatitis	Ruminants, horse, swine	x	Never detected
West Nile fever	Birds, horse	x	Never detected

*Zoonosis = disease that can be transmitted from animals to humans

[1)] In wild boars living in the wild [2)] No clinical disease [3)] In a zoo animal [4)] Bat rabies in a Daubenton's bat

Table A2. Incidence of selected cattle diseases in Finland.	
Name of disease	**Last detected**
Haemorrhagic septicaemia	Never detected
IBR/IPV	1994
Lumpy skin disease	Never detected
Malignant catarrhal fever (wildebeest)	Never detected
Mycoplasma bovis	2015
Bovine anaplasmosis	Never detected
Bovine genital campylobacteriosis (vibriosis)	Never detected
Bovine spongiform encephalopathy (BSE)	2001
Bovine viral diarrhoea (BVD)	2010
Enzootic bovine leukosis (EBL)	2008[1)]
Bovine tuberculosis	1982
Bovine babesiosis	2015
Theileriosis	Never detected
Contagious bovine pleuropneumonia (CBPP)	1920
Trichomonosis	1952
Trypanosomiasis (transmitted by the tsetse fly)	Never detected

[1)] Antibodies found in one artificial insemination bull in 2008 but no confirmed viral infection.

Table A3. Incidence of selected swine diseases in Finland.	
Name of disease	**Last detected**
African swine fever	Never detected
Atrophic rhinitis	2001
Nipah virus encephalitis	Never detected
Porcine cysticercosis	Never detected
Swine influenza (H1N1)	2014
Pandemic (H1N1) 2009 influenza	2014
Swine fever	1917
Swine vesicular disease (SVD)	Never detected
Postweaning multisystemic wasting syndrome (PMWS)[1)]	2008[1)]
Porcine reproductive and respiratory syndrome (PRRS)	Never detected
Transmissible gastroenteritis (TGE)	1980

[1)] Clinical symptoms diagnosed on one farm

Table A4. Incidence of selected poultry diseases in Finland.	
Name of disease	**Last detected**
Duck virus hepatitis	Never detected
Avian/turkey rhinotracheitis/swollen head syndrome (ART/TRT/SHS)	1999
Infectious bursal disease (IBD, also called Gumboro disease)	2014
Fowl cholera (*Pasteurella multocida*)	1993
Fowl tyhpoid (*S. Gallinarum*)	Never detected
Avian influenza	Never detected
Marek's disease	2015[1)]
Mycoplasma gallisepticum infection (avian mycoplasmosis)	2015
Mycoplasma synoviae infection (avian mycoplasmosis)	2015
Newcastle disease	2014[2)]
Psittacosis, also known as parrot fever and ornithosis (avian chlamydiosis)	2014[1)]
Avian infectious laryngotracheitis (ILT)	2013[1)]
Avian infectious bronchitis (IB)	2015
Pullorum disease (*S. Pullorum*)	1961

[1)] No clinical disease
[2)] Only in hobby pigeons and wild pigeons (PMV-1 infection)

Table A5. Incidence of selected sheep and goat diseases in Finland.	
Name of disease	**Last detected**
Sheep and goat pox	Never detected
Ram epididymitis (*Brucella ovis*)	Never detected
Maedi Visna (MV)	2006
Nairobi sheep disease	Never detected
Peste des petits ruminants, PPR	Never detected
Salmonella abortus ovis	Never detected
Scrapie	2014*
Contagious agalactia	Never detected
Enzootic abortion in ewes (EAE), ovine chlamydiosis	Never detected
Caprine arthritis encephalitis (CAE)	Never detected
Contagious caprine pleuropneumonia	Never detected

* Atypical scrapie in sheep.

Table A6. Incidence of selected fish diseases in Finland.	
Name of disease	**Last detected**
Epizootic haematopoietic necrosis (EHN)	Never detected
Infectious salmon anaemia (ISA)	Never detected
Infectious haematopoietic necrosis (IHN)	Never detected
Viral haemorrhagic septicemia (VHS)	2012[1)]
Koi herpesvirus (KHV)	Never detected
Bacterial kidney disease (BKD) in inland water area	2014
Salmon fluke infection (*Gyrodactulus salaris*) in the conservation area of northern Lapland	1996
Infectious pancreatic necrosis (IPN) in inland water area	2014[2)]
Salmonid alphaviruses (SAV)	Never detected
Spring viraemia of carp (SVC)	Never detected
White spot disease in crustaceans (WSD)	Never detected
Crayfish plague	2015[3)]
Marteiliosis in molluscs	Never detected

[1)] VHS restriction area of Åland
[2)] Genogroup 2
[3)] In wild crayfish

Table A7. Incidence of selected horse diseases in Finland.	
Name of disease	**Last detected**
African horse sickness	Never detected
Dourine	Never detected
Equine encephalitis virus (WEE, EEE, VEE)	Never detected
Contagious equine metritis (CEM)	2014
Equine influenza (type A)	2012
Equine infectious anaemia (EIA)	1943
Equine piroplasmosis (EP)	1998[1)]
Equine rhinopneumonitis / equine viral abortion	2015
Glanders (malleus)	1942
Surra (*Trypanosoma evansi*)	Never detected
Equine viral arteritis (EVA)	2014[2)]

[1)] Imported horse
[2)] Increased antibody load in a clinically ill horse; not used for breeding

Table A8. Incidence of selected honey bee diseases in Finland.	
Name of disease	**Last detected**
American foulbrood	2015
European foulbrood	2014
Varroatosis	2015
Nosemosis	2014
Acarapis woodi (honey bee tracheal mite, acarapisosis)	2015
Small hive beetle (*Aethina tumida*)	Never detected
Tropilaelaps mites	Never detected

Appendix B: Tables of animal disease surveillance programmes

Information collected from animal disease surveillance programmes conducted between 2006 and 2015 are presented in this appendix by animal species.

Cattle

Results of cattle surveillance programmes consist of results of antibody-based monitoring programmes covering both dairy and suckler herds. All dairy cows in Finland were tested for IBR and leukosis until 2006 and for BVD until 2010. The programme to monitor Schmallenberg virus antibodies was launched during 2012 by testing blood samples collected from suckler cows, and in 2013 and 2014, by testing bulk milk samples to determine the prevalence of the virus in Finland. The programme to monitor bluetongue disease was launched in 2007 and 2008. The testing of milk samples collected from tanks for bluetongue disease was discontinued in 2015 but testing of suckler cow samples was continued.

Table B1. Serological monitoring studies of dairy cattle between 2006 and 2015.

Year	BVD		IBR		Leukosis		Bluetongue disease		Schmallenberg	
	Number of samples	Positive (%)	Number of samples	Number of pos. results	Number of samples	Number of pos. results	Number of samples	Number of pos. results	Number of samples	Number of pos. results
2006	15 088	0.15	15 088	0	15 088	0				
2007	13 483	0.11	13 483	0	1 887	0				
2008	12 637	0.06	2 885	0	2 885	0	748	0		
2009	11 763	0.06	3 440	0	3 440	0	7 527	0		
2010	11 112	0.04	3 277	0	3 277	0	2 708	0		
2011	3 302	0.09[a)]	1 449	0	1 449	0	860	0		
2012	2 963	0.10[a)]	1 312	0	1 312	0	0[b)]	0		
2013	1 800	0.05[a)]	1 292	0	1 292	0	795	0	991	374
2014	1 277	0	1 277	0	1 277	0	849	0	615	108
2015	989	0	989	0	989	0	0	0	0	0

[a)] BBVD seropositive sample, old infection.
[b)] The monitoring of bluetongue disease in dairy cattle was rescheduled to be done using samples collected in 2013.

Table B2. Serological monitoring tests of suckler cow herd between 2006 and 2015.

Year	BVD		IBR		Leukosis		Bluetongue disease		Schmallenberg virus	
	Number of samples	Number of positive samples	Number of samples	Number of positive samples	Number of samples	Number of positive samples	Number of samples	Number of positive samples	Number of samples	Number of positive samples
2006	4 997	4	4 997	0	4 997	0				
2007	2 432	2	2 432	0	2 432	0	1 677	0		
2008	3 507	1	3 507	0	0	0	2 624	0		
2009	3 524	0	3 524	0	0	0	2 337	0		
2010	4 108	0	4 108	0	0	0	2 626	0		
2011	4 661	1 [a)]	4 661	0	0	0	4 661	0		
2012	5 096	1 [a)]	5 096	0	0	0	5 096	0	1 093	93
2013	2 485	1 [a)]	2 485	0	0	0	2 485	1 [b)]	97	8
2014	7 915	1 [c)]	7 915	0	0	0	7 915	1 [d)]	0	0
2015	8 141	0	8 141	0	0	0	8 141	1 [d)]	0	0

[a)] BBVD seropositive sample, old infection.
[b)] BTV-14 seropositive Finnish suckler cow.
[c)] BVD seropositive suckler cow imported from Denmark (seropositive already in the import tests in 1999).
[d)] BTV seropositive suckler cow imported from Sweden (seropositive already in the import tests in 2011).

Brucellosis on different animals

Table B3. Surveillance and health monitoring tests for brucellosis between 2006 and 2015. All test results were negative.

Year	Sheep	Goat	Cattle		Swine
	Number of samples	Number of samples	Number of bulk milk samples	Number of blood samples	Number of samples
2006	3 546	1 186	2 755	4 570	12 858
2007	3 069	1 508	2044	3 200	3 428[2)]
2008	3 474	1 459	0[1)]	1 294	2 578
2009	1 961	1 541	0[1)]	1 411	2 395
2010	1 443	967	0[1)]	1 307	2 816
2011	3 036	1 868	0[1)]	823	2 079
2012	3 183	1 853	88[3)]	1 245	2 126
2013	2 709	534	130	1 072	2 079
2014	4 156	160	869[4)]	715	2 076
2015	4 501	6	929	681	1 297

[1)] After long-term monitoring, it was decided to discontinue the testing of bulk milk samples to substantiate freedom from disease and to concentrate on the testing of clinical brucellosis cases.
[2)] The number of cases tested for brucellosis in swine was reduced 2008 when a shift was made to risk-based monitoring by focusing primarily on breeding animals instead of production animals in the collection of samples.
[3)] Bulk milk samples of dairy cattle were tested in the context of artificial insemination operations.
[4)] In 2014, the monitoring tests of bulk milk samples was re-implemented in addition to the testing of bulk milk samples in the context of artificial insemination operations.

Transmissible spongiform encephalopathies (TSEs)

The only BSE case in Finland was diagnosed in December 2001. The case was found in the monitoring of a cattle group at risk. As a result, the testing was extended to also cover healthy cows. In accordance with the extended testing programme, all emergency slaughtered, spontaneously died or killed cows over 24 months of age and all slaughtered healthy cows over 30 months of age were tested until 31 December 2008. The age limit of the animals to be tested was raised between 2009 and 2011 after the risk of BSE had decreased. The testing of healthy cows ended entirely on 1 March 2013.

Table B4. BSE monitoring samples collected from cows between 2006 and 2015.

Year	Number of tested samples*	Number of positive samples
2006	124 579	0
2007	119 338	0
2008	110 094	0
2009[a)]	72 145	0
2010	73 715	0
2011[b)]	56 187	0
2012	38 718	0
2013[c)]	15 911	0
2014	10 778	0
2014	10 778	0
2015	11 576	0

* The numbers also include animals not covered in the mandatory testing programme.
[a)] The age limit of cows to be tested was raised to 48 months at the beginning of the year.
[b)] The age limit of slaughtered cows to be tested was raised to 72 months on 1 July 2011.
[c)] BSE testing of healthy cows ended on 1 March 2014.

Table B5. Monitoring programmes of scrapie in sheep and goats between 2006 and 2015.

	Sheep		Goat	
Year	Number of samples	Number of pos. farms/samples	Number of samples	Number of pos. farms/samples
2006	3 834	2/2[1)]	516	0/0
2007	3 030	1/1[1)]	431	0/0
2008	1 164	0/0	274	0/0
2009	1 143	0/0	350	1/1[1)]
2010	949	3/3[1)]	270	0/0
2011	1 251	0/0	217	0/0
2012	1 387	1/1[1)]	200	0/0
2013	1 431	1/1[1)]	276	0/0
2014	1 305	1/1[1)]	156	0/0
2015	1 325	0/0	149	0/0

[1)] Atypical scrapie (Nor98)

Table B6. TSE testing of other animals. TSE diseases were not found in any of the tested samples.	
Animal	**Number of animals**
Companion animals	
Cat	63
Fur animals	
Mink	51
Fox	37
Raccoon dog	10
Captive animals	
Captive reindeer	3
Zoo animals	
Roe deer (*Capreolus capreolus*)	1
Wild animals	
Elk (*Alces alces*)	6
White-tailed deer *(Odocoileus virginianus)*	4
In total	**175**

Swine

Table B7 contains results of surveillance and health monitoring programmes, determinations of disease causes and import tests. All samples were negative in 2015. Clinical leptospirosis has never been diagnosed in production animals in Finland. The results of the brucellosis monitoring programme are presented separately (Table B3).

Table B7. Results of serological tests of viral diseases and leptospirosis in swine between 2006 and 2015.

Year	Aujeszky's disease	TGE	Swine fever	Leptospirosis (pos. results in parentheses)	Swine influenza (pos. results in parentheses)	SVD	PRRS	ASF
2006	13 365	13 193	4 738	214 (2)	2 759	4 449	3 341	
2007	13 822	13 393	4 709	249 (1)	1 791	4 064	3 217	
2008	2 479	2 952	2 481	161(2)	2 085	984	3 294	
2009	3 040	4 124	3 035	281 (0)	3 086 (484)	1 549	4 672	
2010	3 171	3 899	3 172	35 (0)	-	1 738	4 150	14
2011	2 599	2 883	2 818	100 (0)	-	1 264	3 754	128
2012	2 769	3 361	2 678	97 (0)	-	699	3 815	1 137
2013	2 649	2 986	2 429	39 (0)	-	26	4 058	1 178
2014	2 725	2 740	2 437	2 (0)	-	-	3 515	1 227
2015	2 320	2 332	2 050	0	-	-	2 909	180

Poultry

Table B8. Serological tests of viral diseases in poultry[1] between 2006 and 2015. The table contains results of surveillance and health monitoring programmes, determinations of disease causes and import tests.

Year	Avian influenza		Newcastle disease		APV	
	Number of samples	Number of pos. farms/samples	Number of samples	Number of pos. farms/samples	Number of samples	Number of pos. farms/samples
2006	1 989	2/41[4]	5 443	2/29[2]	5 387	5/5[3]
2007	1 865	1/4[4]	5 101	0/0	5101	0/0
2008	2 035	1/2[4]	8 317	1/40[3]	8 317	0/0
2009	3 204	0/0	8 117	2/43[3]	8 393	3/55[5]
2010	3 175	0/0	8 325	3/61[2] [3]	8 416	4/21[9]
2011	3 011	1/11[4]	9 289	2/48[2] [3]	9 521	1/63[9]
2012	3 223	2/8	10 423	3/42[2] [3]	10 078	1/60[9]
2013	2 712	1/3[4]	10 686	4/910[2] [3] [7] [8]	9 921	1/53[9]
2014	4 318	2/12[4]	11 606	6/249[2] [3]	5 933	3/17[9]
2015	5 245	1/1[4]	10 613	2/14[2] [3]	2 592[6]	2/41[9]

[1] Poultry refers to all birds that are raised or kept in captivity for the production of meat or eggs and other products for consumption, introduction of wildfowl or the breeding programmes of the previously mentioned birds.
[2] Maternal (transferred from mother to offspring) antibodies in imported birds. In turkeys only
[3] Serology positive, RT-PCR negative. No symptoms.
[4] H5-antibodies found. RT-PCR negative. No symptoms. Samples are from the same birds from a small-holding/backyard holding with ducks only.
[5] Serologically positive in preliminary tests. Confirmation tests did not provide further clarification.
[6] Surveillance programme for APV ended in 2015, hence smaller sample size.
[7] Vaccination antibodies in imported chicks.
[8] Serologically positive, low pathogenic PMV-1 virus detected, no symptoms of disease.
[9] No clinical disease

Sheep and goat

Table B9. Samples collected in the health control programme for Maedi Visna in sheep and CAE in goats between 2006 and 2015.

Year	Sheep			Goat			Total number of samples
	Number of tested farms	Number of positive farms	Number of positive samples	Number of tested farms	Number of positive farms	Number of positive samples	
2006	292	1	14	37*	1	1	**19 149**
2007	253	0	0	32*	0	0	**16 771**
2008	274	0	0	32*	0	0	**19 904**
2009	270	0	0	34*	0	0	**18 472**
2010	266	0	0	24	0	0	**16 155**
2011	287	0	0	30*	0	0	**23 828**
2012	324	0	0	39*	0	0	**24 548**
2013	317	0	0	35*	0	0	**20 140**
2014	111	0	0	9*	0	0	**4 716**
2015	111	0	0	4*	0	0	**4 566**

* Includes farms that keep sheep in addition to goats

Fish and crustaceans

Table B10. Surveillance studies of viral diseases in fish between 2006 and 2015.

Year	IHN, IPN, VHS		ISA		SAV	KHV	SVC	Number of fish farms where the virus was isolated from						
	Inland farm / tests[1]	Marine area farm / tests[1]	Inland farm / tests	Marine area farm / tests	Inland farm / tests	Inland farm / tests	Inland farm / tests[1]	IHN	IPN	VHS	ISA	SAV	KHV	SVC
2006	73/471	55/205					2/5	0	7	10	0	0	0	0
2007	81/450	83/288					1/3	0	9[2]	2[3]	0	0	0	0
2008	69/440	43/154					2/20	0	1[2]	4[4]	0	0	0	0
2009	73/318	51/177					3/5	0	3[2]	6[3]	0	0	0	0
2010	65/3 726	53/2 890					2/33	0	9[2]	1[3]	0	0	0	0
2011	44/2 588	38/1 256					1/12	0	6[2]	2[3]	0	0	0	0
2012	68/5 406	49/1 332	2/320	4/95			0	0	10[5]	1[3]	0	0	0	0
2013	55/3 740	46/1 870		1/20	35/1 050		0	0	18[6]	0	0	0	0	0
2014	54/2 480	41/1 347	9/603		25/750		0	0	16[7]	0	0	0	0	0
2015	62/2 570	45/1 382	1/60		45/1 179	0	0	0	23[8]	0	0	0	0	0

[1] Between 2006 and 2009 number of pools. Number of fish from 2010 onwards. One pool contains the samples of approximately ten fish.
[2] IPN was only found in marine area farms.
[3] VHS was found in marine area farms in the restricted area of Åland.
[4] VHS was found in marine area farms in the restricted area of Åland, Uusikaupunki, Pyhäranta and Rauma.
[5] IPN was found in a total of ten farms, six (genogroup 2) of which were in inland water areas.
[6] IPN was found in a total of 18 farms, six (genogroup 2) of which were in inland water areas.
[7] IPN was found in a total of 16 farms, six (genogroup 2) of which were in inland water areas.
[8] IPN was found in a total of 23 farms, four (genogroup 2) of which were in inland water areas.

Table B11. Monitoring of bacterial kidney disease (BKD) between 2006 and 2015.		
	Laboratory sample	**BKD cases**
Year	Farms/fish	Inland water area
2006	110/7 778	7
2007	84/7 299	2
2008	80/4 375	7
2009	102/9 625	6
2010	80/5 164	4
2011	84/6 748	4
2012	79/5 830	3
2013	64/5 128	3
2014[1)]	73/4 627	2
2015	60/3 617	3

[1)] The programme to combat BKD switched to voluntary health monitoring on 1 December 2014.

Table B12. Monitoring of *Gyrodactylus salaris* between 2006 and 2015.						
	Teno River[1)]	**Näätämö River**[1)]	**Paatsjoki River**[1)]	**Paatsjoki river, farmed fish**		**Tuuloma River**[1)]
Year	Salmon	Salmon	Grayling	Salmon	Fish of the *Salvelinus* genus	Grayling
2006	163	155	8	150	60	25
2007	197	161	14	150	60	
2008	100	120	15	150	60	30
2009	100	122	15	150	60	53
2010	102	173	15		120	30
2011	65	156	15		120	30
2012	100	120	15		100	
2013	100	120	15		120	30
2014	100	120	15		120	30
2015	100	120	15		120	

[1)] Samples collected from wild-caught fish.

Studies on wild birds

Table B13. Results of avian influenza monitoring programme of wild birds between 2006 and 2015.		
Year	**Number of birds tested**	**Positive samples (PCR / virus isolation)**
2006	535	13/7
2007	777	14/13
2008	437	21/15
2009	384	23/18
2010	354	16/16
2011	86[1)]	0/0
2012	141	1/1
2013	133	0/0
2014	181[2)]	9/9[3)]
2015	133[4)]	1/0

[1)] Collection of samples from healthy birds ended in 2011.
[2)] Includes 70 healthy birds tested.
[3)] Of the positive samples, eight were collected from healthy birds and one from a bird found dead.
[4)] Includes two healthy birds tested.

Appendix C: Numbers of animal farms and animals in Finland in 2015

Table C1. Numbers of animals and farms.		
Terrestrial animals	**Animals**	**Farms**
Cattle	914 886	12 731
Pigs	1 257 847	1 433
Sheep	142 978	3 693
Goats	6 507	924
Poultry	11 800 000	1 250
Poultry on backyard farms		5 957
Bison	202	7
Deer (reindeer)	194 652	4 384
Camelids		99
Horses	74 600	16 000
Dogs	650 000	

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