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HEALTH & CONSUMERS DIRECTORATE-GENERAL

Unit 04 - Veterinary Control Programmes

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*Programmes for the eradication, control and monitoring of certain
animal diseases and zoonoses*

**Survey programme for Avian Influenza in
poultry and wild birds**

Approved* for 2011 by Commission Decision 2010/712/EU

Sweden

* in accordance with Council Decision 2009/470/EC

Program for Eradication : ANNEX 4

Submission number	1281709621376-376
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Country Geographical English Name	Sweden

1. Identification of the programme	
Country Geographical English Name	Sweden
Disease	avian influenza in poultry and wild birds
Request co-financing from	2011
Request co-financing to	2011
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2. Description of the surveillance programme in poultry	
2.1 Objectives, general requirements and criteria	
<p>The objectives of the surveillance programme in poultry are (in accordance with Commission Decision 2010/367/EU):</p> <ol style="list-style-type: none"> 1. Detecting circulating low pathogenic avian influenza (LPAI) of subtypes H5 and H7 in gallinaceous birds thereby complementing other early detection systems. 2. Detecting infections of LPAI of subtypes H5 and H7 subtypes and highly pathogenic avian influenza (HPAI) in domestic waterfowl. <p>All laboratory testing will be performed at the National Veterinary Institute (SVA), Uppsala, Sweden. All virus isolates will be sent to the EU Reference Laboratory (EURL). The Swedish Board of Agriculture (SBA) will report to the Commission in accordance with Art 4. of Decision 2010/367/EU . The Commission will be informed of any major changes in the Swedish poultry population or production that will lead to consequences for the survey. Sweden will also provide additional information on request from the Commission.</p>	

2.2 Design and implementation	
<p>For the year 2011 Sweden has designed a surveillance programme based on the representative sampling method presented in Annex 1 to Decision 2010/367/EU. Blood samples will be taken according to point 5 of this annex. For detailed information please see Tables 2.2.1 and 2.2.2.</p> <p>Samples will always be accompanied by referrals specially designed for the AI-survey 2011. It is mandatory for the person taking the samples to fill in information on name and address of the animal owner and the farm, species sampled, identity of the flock, date of sampling, place of sampling and name of the person taking the samples. This information will be filed at SVA.</p> <p>All positive results will be followed up by further investigation at the holding and the Commission and the EURL will be informed of all results in accordance with Decision 2010/367/EU.</p> <p>Laying hens</p> <p>The number of laying hen holdings, incl. free-range, is 393 (April 2010). Laying hens are slaughtered at two slaughterhouses, one of these slaughtered 3.1 of the 3.2 million layers slaughtered in 2009. The first two flocks slaughtered each week will be sampled regardless of housing system and biosecurity level. In addition, all organic (free range) holdings sending their birds for slaughter will be sampled. This will result in sampling of 60 laying hen flocks and approximately 30 free range flocks, from</p>	

2.2 Design and implementation

different holdings (ten birds per flock).

Broilers

Birds from all holdings with small-scale or organic broiler production (approximately 25 holdings in 2011) sending their birds to small-scale slaughterhouses or the slaughterhouse for laying hens (organic broilers) will be included in the sampling programme. These broiler holdings have less developed biosecurity than large commercial broiler holdings. Blood samples will be taken from ten birds from each holding at slaughter.

Fattening turkeys

All holdings that send their birds for slaughter will be sampled. This will result in approximately 25 sampled holdings. Blood samples will be collected from ten birds per holding.

Fattening geese

In Sweden geese are mainly bred and slaughtered in the most southern parts of the country. The majority of these birds are slaughtered during October and early November. All Swedish holdings that send geese for slaughter will be sampled, approximately 25 holdings. Twenty samples per holding will be taken but when less than 20 birds are slaughtered all birds will be sampled.

Fattening ducks

In 2009, only 1049 ducks were slaughtered in Sweden. Should any producer slaughter ducks at a slaughterhouse in 2011 twenty samples per holding will be taken. If less than 20 birds are slaughtered all birds will be sampled.

Ratites

The number of ratite farms registered is 23 (April, 2010). Some of these are small holdings with only 5-10 birds. Ratites are slaughtered at two Swedish slaughterhouses (in 2009, 507 ostriches were slaughtered). All holdings that send birds to slaughter will be sampled, approximately 8 holdings. Ten blood samples will be collected from each holding, when less than 10 birds are slaughtered all birds will be sampled.

Breeders (chicken and turkeys)

Samples taken in parent flocks of laying hens, broilers and turkeys within the Poultry Health Control Programme will be used for the AI survey. Ten samples from one flock per holding taken from the last sampling occasion within the programme will be analyzed.

TINA: fundera på provtagning Duck breeders och Geese breeders

Farmed game birds

Mallards, pheasants and partridges are the most common farmed game birds in Sweden. All holdings with breeders of mallards or pheasants will be sampled at the holding. From mallards (6 holdings in April, 2010) 20 blood samples and from pheasants (23 holdings in April, 2010) ten blood samples per flock/holding will be taken. Partridges have been excluded from the sampling programme since they are a small population bred under conditions with low risk for an introduction of AIV.

2.2.1 Poultry holdings (except ducks and geese) to be sampled

Category	NUTS (2) (a)	Total number of holdings	Total number of holdings to be sampled	Number of samples per holding	Total number of tests to be performed per method	Method of laboratory analysis
broilers	SE11	0	0	0	0	NA
	SE12	1	1	10	10	ELISA test
	SE21	0	0	0	0	NA
	SE22	20	20	10	200	ELISA test
	SE23	4	4	10	40	ELISA test
	SE31	0	0	0	0	NA
	SE32	0	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	25	25	30	250	
fattening turkeys	SE11	0	0	0	0	NA
	SE12	3	3	10	30	ELISA test
	SE21	1	1	10	10	ELISA test
	SE22	16	16	10	160	ELISA test
	SE23	5	5	10	50	ELISA test
	SE31	0	0	0	0	NA
	SE32	0	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	25	25	40	250	
chicken breeders	SE11	0	0	0	0	NA
	SE12	12	12	10	120	ELISA test
	SE21	4	4	10	40	ELISA test
	SE22	17	17	10	170	ELISA test
	SE23	5	5	10	50	ELISA test
	SE31	0	0	0	0	NA
	SE32	0	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	38	38	40	380	
turkey breeders	SE11	0	0	0	0	NA
	SE12	0	0	0	0	NA
	SE21	0	0	0	0	NA
	SE22	0	0	0	0	NA
	SE23	2	2	10	20	ELISA test
	SE31	2	2	10	20	ELISA test
	SE32	0	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	4	4	20	40	
laying hens	SE11	9	3	10	30	ELISA test
	SE12	85	20	10	200	ELISA test
	SE21	42	5	10	50	ELISA test
	SE22	52	10	10	100	ELISA test

2.2.1 Poultry holdings (except ducks and geese) to be sampled						
Category	NUTS (2) (a)	Total number of holdings	Total number of holdings to be sampled	Number of samples per holding	Total number of tests to be performed per method	Method of laboratory analysis
laying hens	SE23	91	20	10	200	ELISA test
	SE31	9	2	10	20	ELISA test
	SE32	6	0	0	0	NA
	SE33	8	0	0	0	NA
	SE33	302	60	60	600	
free range laying hens	SE11	2	0	0	0	NA
	SE12	32	12	10	120	ELISA test
	SE21	18	6	10	60	ELISA test
	SE22	15	6	10	60	ELISA test
	SE23	13	5	10	50	ELISA test
	SE31	8	1	10	10	ELISA test
	SE32	3	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	91	30	50	300	
ratites	SE11	0	0	0	0	NA
	SE12	4	4	10	40	ELISA test
	SE21	1	1	10	10	ELISA test
	SE22	1	1	10	10	ELISA test
	SE23	1	1	10	10	ELISA test
	SE31	1	1	10	10	ELISA test
	SE32	0	0	0	0	NA
	SE33	0	0	0	0	NA
	SE33	8	8	50	80	
farmed feathered game	SE11	0	0	0	0	NA
	SE12	5	5	10	50	ELISA test
	SE12	2	2	20	40	ELISA test
	SE21	1	1	10	10	ELISA test
	SE22	13	13	10	130	ELISA test
	SE22	4	4	20	80	ELISA test
	SE23	3	3	10	30	ELISA test
	SE31	0	0	0	0	NA
	SE32	0	0	0	0	NA
	SE33	1	1	10	10	ELISA test
	SE33	29	29	90	350	
	Total	522	219	380	2,250	

2.2.2 Duck and geese holdings to be sampled according to point C of Annex I to Decision 2007/268/EC Serological investigation

NUTS (2) (a)	Total number of duck and geese holdings	Total number of duck and geese holdings to be sampled	Number of samples per holding	Total number of tests to be performed per method	Method of laboratory analysis
SE11	0	0	0	0	NA
SE12	2	2	20	40	ELISA test
SE21	1	1	20	20	ELISA test
SE22	23	23	20	460	ELISA test
SE23	1	1	20	20	ELISA test
SE31	0	0	0	0	NA
SE32	0	0	0	0	NA
SE33	0	0	0	0	NA
Total	27	27	80	540	

2.3 Laboratory testing: description of the laboratory tests used

All laboratory investigations will be carried out in accordance with the avian influenza diagnostic manual (Commission Decision 2006/437/EC) and point 9 of Annex I to Decision 2010/367/EU. An ELISA will be used for the serological analysis. (Reference: Terregino C. Evaluation of sensitivity and specificity of a commercial competitive avian influenza type A antibody ELISA kit (IDVETÀ® Screen Influenza A), Istituto Zooprofilattico Sperimentale delle Venezie, Legnaro (Padova), Italy, OIE-FAO and National Reference Laboratory for Newcastle Disease and Avian Influenza). Positive results will be confirmed with haemagglutination inhibition tests (for subtypes H5 and H7) in accordance with the guidelines.

If any sample turns out to be positive the holding is further investigated for any signs of ongoing avian influenza infection. Cloacal and oropharyngeal swabs from 60 birds (or all birds if less than 60) of each bird category in the holdings are then taken. The samples are analysed for the detection of avian influenza virus genome by using an M-gene realtime PCR (Spackman et al). Positive samples are further analysed for detection and identification of H5 and H7 viruses, including virus pathotyping by amplicon sequencing (Slomka et al, 2007) (Avian Diseases: Vol. 51, No. s1, pp. 227-234).

3. Description of the surveillance programme in wild birds

3.1 Objectives, general requirements and criteria

Sweden will continue a surveillance of different species of free-living migratory birds to identify the risk of spreading the low and high pathogenic AI viruses to domestic poultry. The surveillance programme will include testing of wild birds found dead or moribund in different parts of the country (passive surveillance). In the case that HPAI H5 or H7 is detected in wild birds, the surveillance in wild birds found dead or moribund will be enhanced to determine how spread the virus is. Testing of the samples will be carried out at the National Veterinary Institute. the Commission will be informed of any changes that will lead to consequences for the survey. Sweden will also provide additional information on request from the Commission.

3.2 Design and implementation

3.2.1 WILD BIRDS - Investigation according to the surveillance programme for avian influenza in wild birds set out in Annex II to Decision 2007/268/EC

NUTS (2) code/region (a)	Wild birds to be sampled	Total number of birds to be sampled	Estimated total number of samples to be taken for active surveillance	Estimated total number of samples to be taken for passive surveillance
SE 11-33 (whole territory of Sweden)	All species found diseased or dead	1,000	0	1,000
Total	#SYNTAX	1,000	0	1,000

3.3 Laboratory testing: description of the laboratory tests used

From dead birds, swab samples (mostly both cloacal and tracheal) are collected. The samples are analysed for the detection of avian influenza virus genome by using an M-gene realtime PCR (Spackman et al). positive samples are further analysed for detection and identification of H5 and H7 viruses, including virus pathotyping by amplicon sequencing (Slomka et al). If virus genome is detected virus isolation and further subtyping are performed. The viruses isolated are sent to CRL.

4. Description of the epidemiological situation of the disease in poultry during the last five years

Within the EU surveillance programme for AIV, the following numbers of holdings have been tested during the years 2005-2009:

	2005	2006	2007	2008	2009
Laying hens	60	60	60	65	61
Turkeys	35	26	23	23	17
Ducks	16	2	3	8	3
Geese	22	28	16	30	13
Broilers ^{A1}	0	7	17	28	27
Ratites	7	15	10	10	6
Breeding hens (parents)	40	40	40	42	33
Breeding turkeys (parents)	5	4	4	2	4
Game birds (mallards)	0	0	7	6	6
Game birds (pheasants)	0	0	23	23	2
Backyard flocks	0	0	0	0	6

(^{A1} Small-scale production)

Before 2006 AIV had never been detected in Swedish poultry. In March 2006 highly pathogenic avian influenza virus subtype H5 was isolated in samples, taken due to findings in the wild bird population, from a mallard on a Swedish game farm. There were no clinical signs in the flock. Since 2006 no findings of low pathogenic H5 or H7 or high pathogenic strains of AIV have been done in Swedish poultry flocks. Several investigations have been performed, though, due to positive serological findings within the surveillance programme.

In 2007, farmed game birds were included in the Swedish AI surveillance programme for the first time. Holdings with breeders of mallards and pheasants were sampled. Three holdings with mallard breeders were serologically positive against AIV subtype H5 and H7. Further investigations in these holdings, by PCR-analysis of cloacal and oropharyngeal swabs, were all negative (no AIV detected on the holding).

In 2008 antibodies against AIV subtype H5 were found in blood samples from two holdings with farmed mallard breeders and one holding with breeder geese. Cloacal and oropharyngeal swabs were taken for further investigations of these holdings:

- Swabs taken from mallards on one of the game bird farms were negative for AIV when these were analyzed by PCR (no AIV detected on the holding).
- From the other mallard flock AIV subtype H4N6 was isolated.
- Swabs from breeder geese were found to be PCR-positive for AIV but H5 and H7 negative. No virus could be isolated.

In 2009 one goose and two ducks on a 4H club farm were serologically positive against AIV subtype H5. Following-up investigations including PCR analyses of oropharyngeal and cloacal swabs taken out from 95 different birds at the farm were all negative. This year also mallard breeders from one holding were serologically positive against AIV/H5. PCR-analysis of oropharyngeal and cloacal swabs were all negative in following-up investigations.

4.1.1 Designation of the central authority in charge of supervising and coordinating the departments responsible for implementing the programme

The Swedish Board of Agriculture (SBA) is the authority under the Ministry of Agriculture with mandate to decide about sampling, disease surveillance, eradication of epizootic diseases etc. SBA also compensates the farmer for economic losses due to decisions taken in accordance with the act on epizootic diseases.

The National Veterinary Institute (SVA) is also an authority under the Ministry of Agriculture and the National Reference Laboratory for Avian Influenza. SVA has been appointed by SBA to organize and perform the surveillance programme for avian influenza in poultry since 2002. The Department of Animal Health and Antimicrobial Strategies is responsible for the programme at SVA and handles the planning of the programme, administration, giving instructions to veterinarians involved in the sampling, sending out sampling material etc. The Department of Virology, Immunobiology and Parasitology performs the analyses.

The National Food Administration (SLV, an authority under the Ministry of Agriculture) has official veterinarians employed regionally. These veterinarians are responsible for the sampling at the slaughterhouses.

4.1.2 System in place for the registration of holdings

The different Swedish poultry registers are briefly presented in the table below. All registers are administered by SBA.

Register	Population covered	EU-legislation	National legislation
The Swedish poultry register	All commercial poultry holdings (mandatory)	Council Dir. 2005/94/EC Council Dir. 92/66/EEC	Statens jordbruksverks föreskrifter (2006:11) om registrering av anläggningar med fjäderfå
The Swedish register of laying hens	All holdings with a capacity of 350 laying hen and sell eggs for consumption	Council Dir. 1999/74/EC Commission Dir. 2002/4/EC	Statens jordbruksverks föreskrifter (2003:20) om registrering av anläggningar med värphöns
Register of breeding establishments	All holdings with breeders for broiler laying hen and turkey	Council Dir. 2009/158/EC	Statens jordbruksverks föreskrifter (1994:45) om obligatorisk hälsöversvakning av fjäderfå
OMNIS	All poultry holdings approved within the voluntary and preventive salmonella control programme	NA	Statens jordbruksverks föreskrifter (2007:78) om frivillig och frivilligt frivillig och frivilligt frivillig kontroll avseende salmonella hos fjäderfå

4.1.3 Data on vaccination carried out

Vaccination of poultry against avian influenza is prohibited in Sweden. In 2006 vaccination with Nobilis® Influenza H5N2 (Intervet) was introduced in Swedish zoos after approval of the vaccination programme by the Commission (Com. Dec. 2006/474/EEC). In 2010 six Swedish zoos will continue with the vaccination programme.

5. Description of the epidemiological situation of the disease in wild birds during the last five years

5. Description of the epidemiological situation of the disease in wild birds during the last five years

Until spring 2006 highly pathogenic avian influenza virus (HPAI) has never been detected in wild birds in Sweden. Previous surveillance since autumn 2002 at the bird conservation station at Ottenby, Ålmland, has demonstrated that HPAI was not present during that period. Mallards are the species that most samples come from. At the National Veterinary Institute surveillance in all diseased or dead bird species is ongoing since a long period (exceeding the last six years). In birds found dead or diseased in the wild necropsy is performed and if changes are observed that lead to a suspicion concerning AI or ND further tests are performed. At the moment all birds found dead are tested for AI. HPAI has been detected in 65 wild birds during spring 2006. Low pathogenic avian influenza virus (LPAI) has been found in Mallards with a quite high prevalence but has also been found in several other species like for example Black headed gull, Mew gull, bean goose and Teal. During 2009 no case of HPAI has been detected in Sweden in wild birds. LPAI has been found mostly in Mallards and in a few Eurasian wigeons in the active surveillance during the autumn 2009. During the first six months of 2010 none of the sampled 678 wild birds are found positive for AI.

5.1 Measures included in the programme for surveillance in wild birds

5.1.1 Designation of the central authority in charge of supervising and coordinating the departments responsible for implementing the programme

The programme will be supervised of the Swedish Board of Agriculture in close cooperation with a working group on wild birds and the National Veterinary Institute. The working group on wild birds consists of ornithologists as well as epidemiologists.

5.1.2 Description and delimitation of the geographical and administrative areas in which the programme is to be applied

The passive surveillance will be carried out in the whole area of Sweden.

5.1.3 Estimation of the local and/or migratory wildlife population

The Swedish ornithologists work with a report system called Svaian where the movements of migratory birds can be followed each year. The Swedish Board of Agriculture and the National Veterinary Institute are using this reporting system to continuously update the wild birds situation.
<http://www.artportalen.se/birds/default.asp>

6. Measures in place as regards the notification of the disease

Avian influenza is included in the Swedish act on epizootic diseases (Epizootilagen, SFS 1999:657). According to this act both animal owners and veterinarians are obliged to report suspect cases of avian influenza. This applies to both clinical and laboratory suspicions. If AI is suspected or confirmed on a farm, measures will be taken according to Council Directive 2005/94/EC.

7. Costs

7.1.1 Poultry

Administration (planning, administration of the programme, information, reporting, follow up etc)		150 000 SEK
Sampling (collecting samples at slaughterhouses)		
61 545 SEK		
Sampling (collecting samples at holdings)		
72 500 SEK		
Sampling equipment (tubes, plastic bags, envelopes etc) and transport costs		4 800 SEK
Serology:		
Total number of tests:	2790	
Estimated number of samples to be confirmed with HI/H5; H7:	279	
ELISA cost per sample		75 SEK
Haemagglutination-inhibition (H5 and H7) cost per sample	150 SEK	
Total serology:		251 100 SEK

7. Costs

7.1.1 Poultry

PCR and Virusisolation:

Estimated no of seropositive holdings = 3

Holding no 1 with two poultry categories

Holdings no 2 and 3 with one poultry category of which holding no 3 analysed out of normal working hours (+ 50% cost/test)

Laboratory costs	No of samples	No of holdings	No of tests	Cost/test
M-gene PCR holding no. 1 58 800 SEK	240	1	120	490
M-gene PCR holding no. 2 29 400 SEK	120	1	60	490
M-gene PCR holding no. 3 44 100 SEK	120	1	60	735
H5-PCR 16 250 SEK	25	2	50	325
H7-PCR 16 250 SEK	25	2	50	325
Sequencing 12 000 SEK	5	2	10	1200
Virusisolation 6 500 SEK	5	2	10	650

Total PCR and virusisolation:
183 300 SEK

7.1.2 Wild birds

7.2 Summary of the costs

7.2.1 Poultry surveillance

Methods of laboratory analysis	Number of tests to perform per method	Unitary test cost (per method) in €	Total cost (€)
ELISA test	2,790	7.89	22,013.10
agar gel immune diffusion test	0	0.00	0.00
Haemagglutination-inhibition-test (HI) for H5 (specify number of tests for H5)	279	7.89	2,201.31
Haemagglutination-inhibition-test (HI) for H7 (specify number of tests for H7)	279	7.89	2,201.31
Virus isolation test	10	68.42	684.20
PCR test	340	51.02	17,346.80
Sampling at slaughterhouses	2,761	2.35	6,488.35
Sampling at holdings	29	263.16	7,631.64
Sampling equipment, transport costs	2,790	0.18	502.20
Administration	2,790	5.66	15,791.40
Sequencing	10	126.32	1,263.20
Total	12,078	540.78	76,123.51

7.2.2 Wild bird surveillance			
Methods of laboratory analysis	Number of tests to perform per method	Unitary test cost (per method) in €	Total cost (€)
Haemagglutination-inhibition-test (HI) for H5/H7	0	0.00	0.00
Virus isolation test	50	68.42	3,421.00
PCR test	1,000	34.21	34,210.00
H5/H7 PCR test (confirmatory tests)	200	34.21	6,842.00
Sampling	1,000	50.53	50,530.00
Sequencing	50	126.32	6,316.00
Total	2,300	313.69	101,319.00