TECHNICAL REPORT

"Schmallenberg" virus: analysis of the epidemiological data[1]

European Food Safety Authority[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

SUMMARY

Following a request from the European Commission, the European Food Safety Authority (EFSA) issued a technical report in February 2012 on likely epidemiological scenarios in Europe in relation to a recently detected virus provisionally named "Schmallenberg" virus (SBV) (Simbu serogroup, Bunyaviridae family, genus *Orthobunyavirus*), found in ruminants. The report also included guidance on data to be collected in Member States, including harmonised case definitions and reporting guidelines for a minimum dataset at herd/flock level and an extended dataset at animal level. Data from affected Member States from 1 August 2011 to 19 March 2012 (or date of transmission) were analysed. This report presents the analysis of the submitted data.

All Member States have reported the number of confirmed herds following viral detection by PCR or serological confirmation. In addition, France and Italy have also reported the number of suspect herds. The number of confirmed cases by PCR can constitute an underestimation of the number of infected herds, in particular for calves. The number of confirmed acute cases in adult cattle with viral detection by PCR is limited to eight cases in Germany, most likely corresponding to infection during the period of viral circulation in summer/autumn 2011.

Regarding temporal distribution of confirmed herds, an increase in the number of confirmed herds is observed up to the ninth week of the year 2012, followed by a steep decrease in the weeks 10 and 11. However, the latter should be interpreted with caution, given that the last reporting week might be incomplete. The observed pattern of case detection per species is in accordance with the hypothesis that infection may have occurred during a certain period of the gestation.

Maps representing the special distribution of cases are available.

For the purpose of this report, impact of the infection was defined as mortality and morbidity in the affected animal populations, estimated based on the proportion of cases in the populations. The total number of animals and herds of sheep, goats and cattle were compared with the numbers of animals in the confirmed herds and the number of confirmed herds. For all affected countries, the number of affected animals /herds is low in comparison with the total number of animals/herds. This figure

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should be interpreted cautiously since under-reporting or lack of diagnostic confirmation may affect the ratio. In order to estimate the disease impact, information was requested on the number of pregnant animals, arthrogryposis hydranencephaly syndrome (AHS) cases, abortions, live births, stillbirths, and cases of dystocia per herd during the reporting period. Unfortunately, most of the countries have not reported this data or provided information on more than one AHS case per herd yet.

Recommendations to improve data for further evaluation of the impact and magnitude of disease spread were provided.

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Key words

Schmallenberg virus (SBV), data collection, epidemiological analysis, impact

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BACKGROUND AS PROVIDED BY EUROPEAN COMMISSION

A recently detected virus circulated in the EU in the second semester of 2011 in domestic ruminants (cattle, sheep and goats) and in wild ruminants. The virus has been provisionally named "Schmallenberg" virus (SBV). The information available on the SBV virus genome suggests that this virus is part of the Simbu serogroup of the *Bunyaviridae* family, genus *Orthobunyavirus*, and that this virus causes non-specific clinical signs in cattle and congenital malformations, at the moment mainly in sheep and less frequently in goats.

The technical working group organised by the Commission services on 20 January 2012, in which EFSA participated, discussed the scientific assistance that the Commission and Member States may need in relation to this virus.

In particular, it was concluded that EFSA could assist the Commission and the Member States by means of the preparation of reports on the epidemiological situation based on the data gathered by the Member States.

Therefore, in the context of Article 31 of Regulation (EC) No 178/2002, EFSA has been asked to provide scientific assistance to the Commission.

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

EFSA is requested to deliver:

1. A preliminary analysis of the likely epidemiological scenarios that could be observed in the next months, based on the existing knowledge on viruses of the Simbu virus serogroup and other vector borne epidemics in the region. This preliminary analysis should be provided by 6 February 2012 to be able to share it with the Member States at the SCoFCAH meeting organised on 7 February 2012.

2. An analysis of the epidemiological data already available, taking also into account the expected seasonal pattern of virus circulation. This analysis should also include the information on the transmission routes for the virus. A first report should be produced by 31 March 2012, followed by regular updates on the epidemiological situation, every two months.

3. Guidance on data to be collected in Member States in order to optimise coordination to address this request. This may include the development of a case definition, datasets at both individual and herd level and minimum reporting guidance on epidemiological investigations to facilitate a future assessment of the impact of the infection and the risk of spread.

4. A report on the overall assessment of the impact of this infection on animal health, animal production and animal welfare together with a characterisation of the pathogen by 31 May 2012. This report will also need to be regularly updated but at a later stage.

The use of the EFSA Data Collection Framework (DCF) as a data exchange portal will be a valuable asset to collect information from Member States in a structured manner, with a view to its use for further risk assessment, but this will need to be coordinated with DG SANCO. This request should be kept under review with the aim of adapting it in the light of the evolution of the infection and the information that will become available in the coming weeks and months.

SCOPE

Guidance on data to be collected in Member States in order to optimise coordination was provided in a previous EFSA report (EFSA 2012[4]). The guidance included harmonised case definitions for both suspect and confirmed adult and newborn animals as well as a definition for an affected herd.

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[4] European Food Safety Authority; "Schmallenberg" virus: analysis of the epidemiological data. Supporting Publications 2012:EN-241. [31 pp.]. Available online: www.efsa.europa.eu/publications

Reporting guidelines for a minimum dataset at herd/flock level and an extended dataset at animal level were also provided. Such data is currently being collected within the affected member states.

In this report, an analysis of the epidemiological data already available is presented in response to term of reference number 2. The reporting period for the data collected was defined as from the 1 August 2011 to the date of accepted submission (Table 2). The mandate requested that the analysis should also include information on the transmission routes of the virus. However information currently available to EFSA is not sufficient to address the question yet.

Furthermore, reporting improvements are provided to achieve a more complete epidemiological description of the current situation and, in particular, a better understanding of the animal health and welfare impact of SBV infection in Europe. Regular updates on the epidemiological situation will be provided every two months.

ASSESSMENT

1. Introduction

At present eight Member States, Belgium, Germany, France, Italy, Luxemburg, The Netherlands, Spain, and the United Kingdom, have confirmed cases of SBV. The latest epidemiological information can be found on the relevant competent authority web sites (Table 1).

Table 1: URL links to SBV information in the MS

Belgium	in Dutch: http://www.favv.be/dierengezondheid/schmallenberg/ in French: http://www.favv.be/santeanimale/schmallenberg/ in German : http://www.favv.be/tiergesundheit/schmallenberg/
France	http://agriculture.gouv.fr/maladies-animales,11003
Germany	http://www.fli.bund.de/en/startseite/current-news/animal-disease-situation/new-orthobunyavirus-detected-in-cattle-in-germany.html
Italy	http://www.izs.it/IZS/Engine/RAServePG.php/P/357410010300/M/250010010303
Netherlands	http://www.vwa.nl/onderwerpen/dierziekten/dossier/schmallenbergvirus (see link for PDF - Aantallen meldingen per provincie)
Spain	http://rasve.mapa.es/Publica/InformacionGeneral/Enfermedades/enfermedades.asp
United Kingdom	http://www.defra.gov.uk/animal-diseases/a-z/schmallenberg-virus/

2. Data collection activities in Member States and reporting to EFSA

Chief Veterinary Officers (CVOs) of the EU Member States, Norway and Switzerland were requested to nominate an official reporting officer for their country.

All reporting officers appointed (21 Member States and two European Free Trade Association (EFTA) countries) were given access to the Data Collection Framework (DCF) EFSA system as well as detailed "SBV Data Reporting guidelines" (Appendix A), data entry templates and instructions for the use of Excel templates and DCF.

The deadline of 19 March 2012 was given for the first submission and reporting officers were asked to focus on the minimum dataset as an initial priority. A data submission summary report is presented in Table 2.

Table 2: Data submission by Member States

	Date of accepted submission	Submission of herd level data (Y/N)	Submission of animal level data (Y/N)	Submission of data on suspect cases (Y/N)	Submission of data on confirmed cases (Y/N)	Submission of data on number of tested offspring (Y/N)
Belgium	2012-03-21	Y	N	N	Y	N

France	2012-03-27	Y	N	Y	Y	unknown
Germany	2012-03-27	Y	N	N	Y	N
Italy	2012-03-20	Y	Y	Y	Y	Y
Luxembourg	2012-03-27	Y	N	N	Y	N
Netherlands	2012-03-28	Y	N	N	Y	N
Spain	2012-03-27	Y	Y	N	Y	N
United Kingdom	2012-03-26	Y	N	N	Y	N

3. Minimum dataset – herd level

The herd level dataset was based upon data currently being collected within the affected Member State. This dataset was designed with the specific purpose of case finding.

The dataset was used to obtain information on the spread of SBV in EU, both temporally (Date of first suspicious report) and spatially (Country/Region of affected herd/flock). The information, if available, can also be used to investigate possible impact of SBV in terms of observed birth outcomes and the proportion of Arthrogryposis Hydranencephaly Syndrome (AHS) cases observed in foetuses and newborns from 1 August 2011 to date of data transmission.

3.1. Number of affected herds

A summary of the number of suspect/confirmed herds for which SBV cases were reported in either adults and/or neonates is presented in Table 3 by species at country and EU level.

All Member States have reported the number of confirmed herds following viral detection by PCR or serological confirmation. In addition, France and Italy have also reported the number of suspect herds. The number of confirmed cases by PCR can constitute an underestimation of the number of infected herds, in particular for calves. Only Italy provided data on how many animal samples were tested and the number of positive/negative animals.

In order to maintain consistency, all data and graphs presented in this report refer to number of confirmed cases, but all countries are recommended to update their reports by providing the number of suspect cases observed in addition to the confirmed cases.

The number of confirmed acute cases in adults with viral RNA detection by PCR is limited to eight cases in Germany, most likely corresponding to infection during the period of viral circulation in summer/autumn 2011.

Table 3: Number of affected herds by species at country and EU level

	Country	Herds SBV		Herds /neonates		Herds /adults			
		Suspect	Confirmed	RT-PCR tested	RT-PCR confirmed	RT-PCR tested	RT-PCR confirmed	serological tested	serological test confirmed
Bison	Germany		1		1				
Bison			*1*		*1*				
Cattle	Belgium		74		74	0			
	France	447	62		62	0			
	Germany		155		146	8	8	1	1
	Italy	4	1	3	0	3	0	3	1
	Luxembourg		1		1	0		0	
	Netherlands		84		84			51	50
	United Kingdom		16		16	0			
Total Cattle		*451*	*393*	*3*	*383*	*11*	*8*	*55*	*52*
Goats	Belgium		2		2	0			
	France	35	7		7	0			
	Germany		41		41				
	Italy	1	1	1	1	1	0	1	
	Netherlands		5		5			4	4
	Spain								
Total Goats		*36*	*56*	*1*	*56*	*1*	*0*	*5*	*4*
Sheep	Belgium		155		155	0			
	France	1241	655		655	0			
	Germany		797		797				
	Italy	1		1	0	1	0	1	0
	Luxembourg		6		6	0		0	
	Netherlands		103		103			76	75
	Spain		1	8	1	0		0	
	United Kingdom		193		193	0			
Total Sheep		*1242*	*1910*	*9*	*1910*	*1*	*0*	*77*	*75*
Total		*1729*	*2360*	*13*	*2350*	*13*	*8*	*137*	*131*

3.2. Temporal spread

The time of the first herd report by week per country is shown in Figure 1. An increase in the number of confirmed herds is observed up to the ninth week of the year 2012 followed by a steep decrease in the weeks 10 and 11. However, the latter should be interpreted with caution, given that the information

from the last reporting week might be incomplete. A display of the cumulative numbers of confirmed herds over time per country is presented in Figure 2.
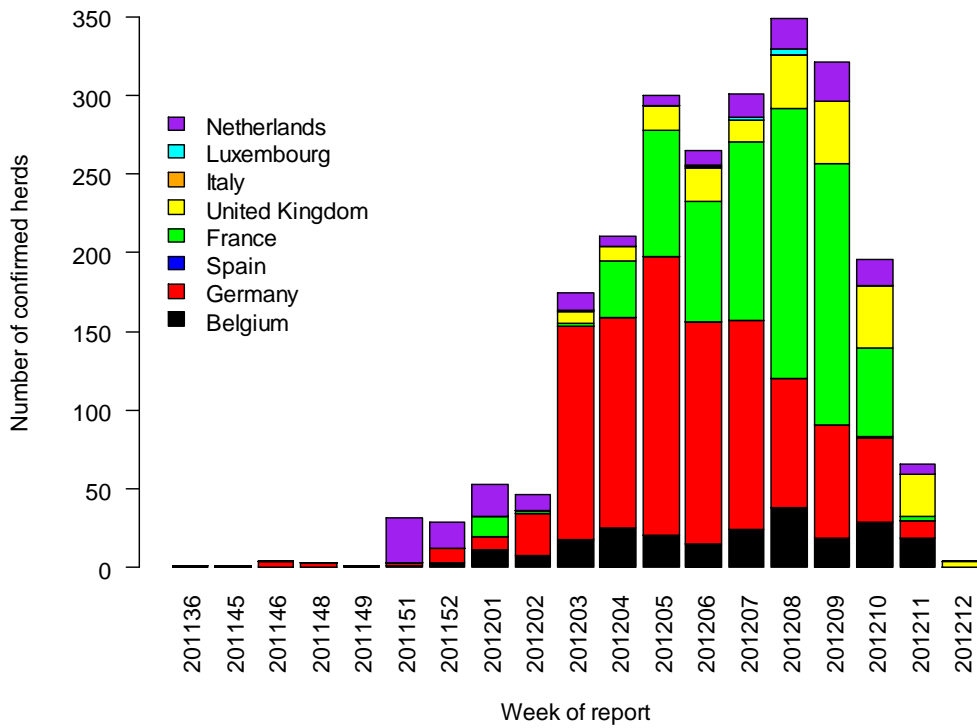
Figure 1: Confirmed herds by week of first report and country.
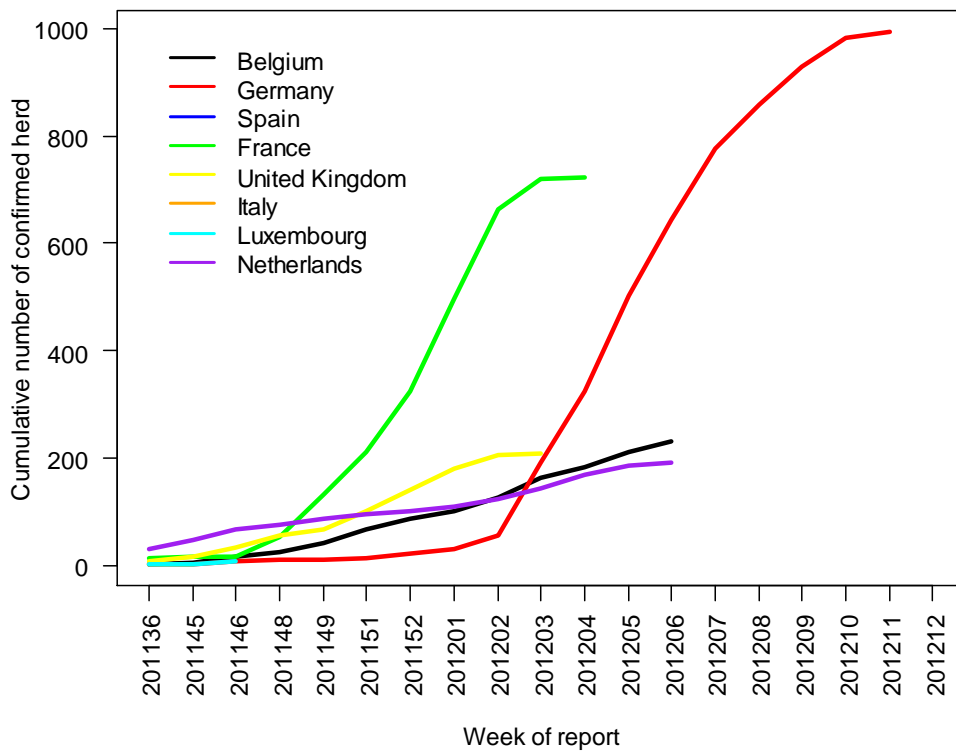

Figure 2: Cumulative confirmed herds over time per country.

The detection of clinical cases (AHS malformations, see case definition in appendix A) in foetuses and newborn animals varied according to species. The first cases were reported in lambs and calves during week 48 in 2011. A tendency for reduction in the number of cases in lambs is observed from week 9 in 2012 (Figure 3, lower panel).

Regarding the number of cases in calves, the data are for the moment insufficient to draw any conclusions on the plausible evolution over time (Figure 3, upper panel).

It is clear that there is a temporal distribution of herds with AHS cases, but the data are still insufficient to make a definitive assessment.
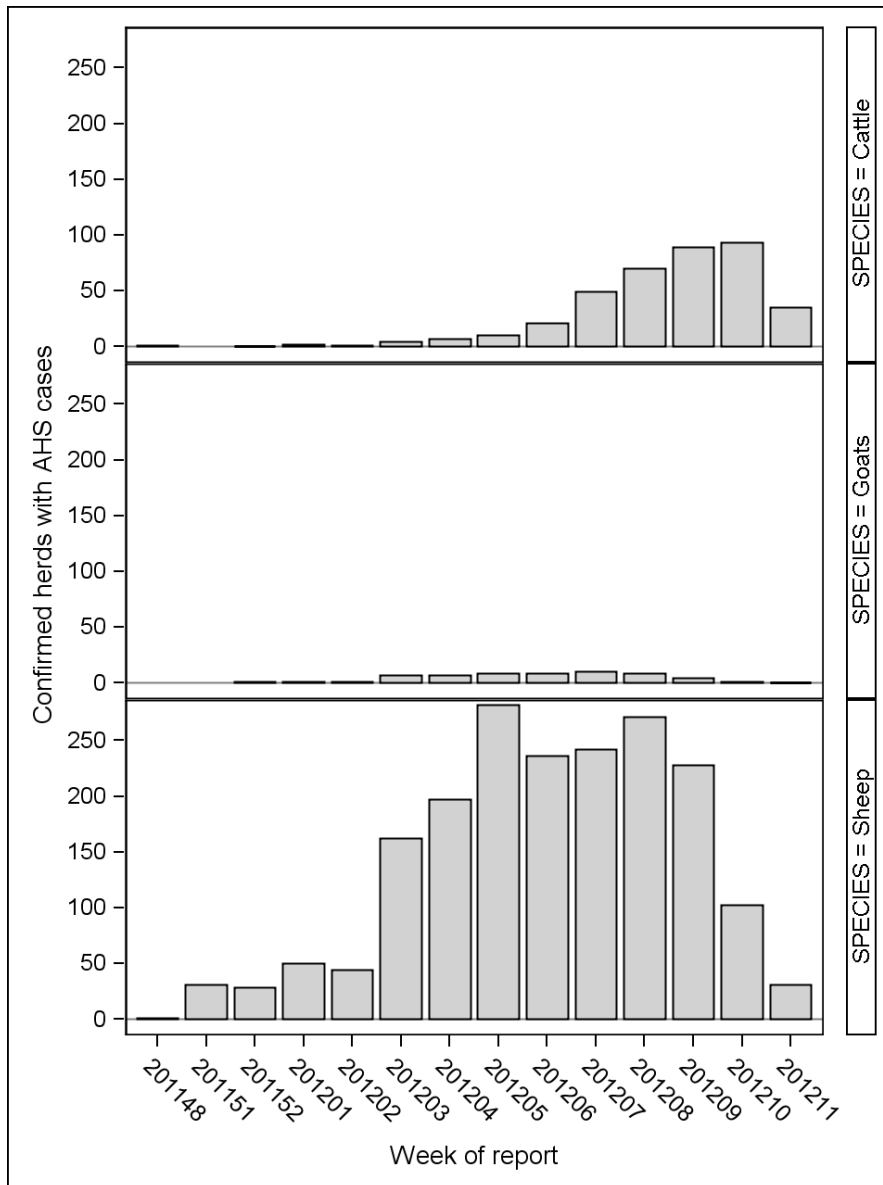
Figure 3:   Confirmed herds with AHS clinical signs by week of first report and species.

The observed pattern of case detection per species is in accordance with the hypothesis that infection may have occurred during a certain period of the gestation (EFSA 2012[5]). Figure 4 represents an estimation of the months of viral circulation at country level, assuming for sheep and goats a gestation

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[5] European Food Safety Authority; "Schmallenberg" virus: analysis of the epidemiological data. Supporting Publications 2012:EN-241. [31 pp.]. Available online: www.efsa.europa.eu/publications

period of 150 days and a vulnerable stage of 30 days, and for cattle a gestation period of 280 days and a vulnerable stage of 90 days. Figure 5 shows the data from all countries pooled. It is likely that virus circulation occurred between May and November 2011, with highest circulation of the virus in October 2011.

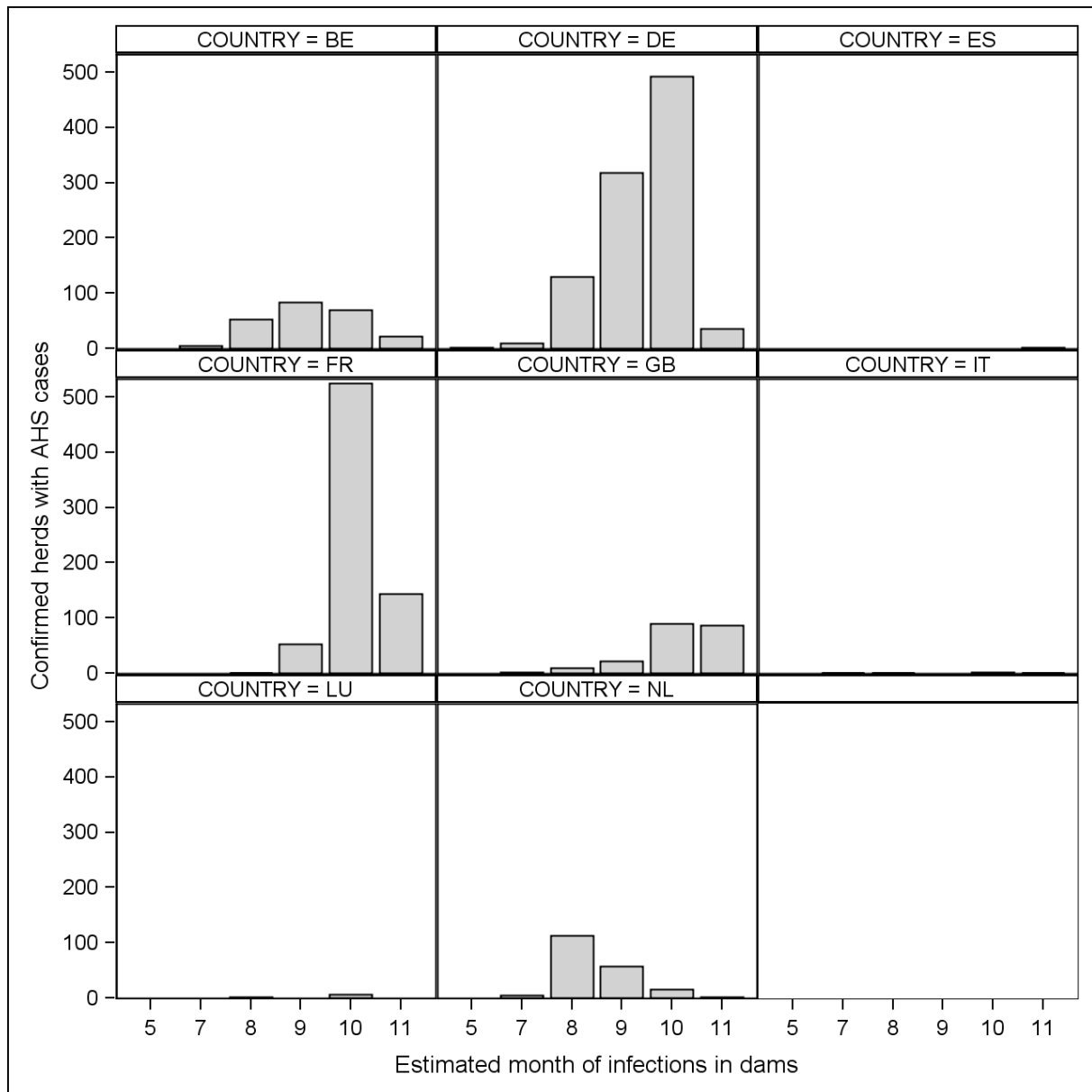**Figure 4:** Estimation of months of viral circulation considering for sheep and goats a gestation period of 150 days and a vulnerable stage of 30 days and for cattle a gestation period of 280 days and a vulnerable stage of 90 days.
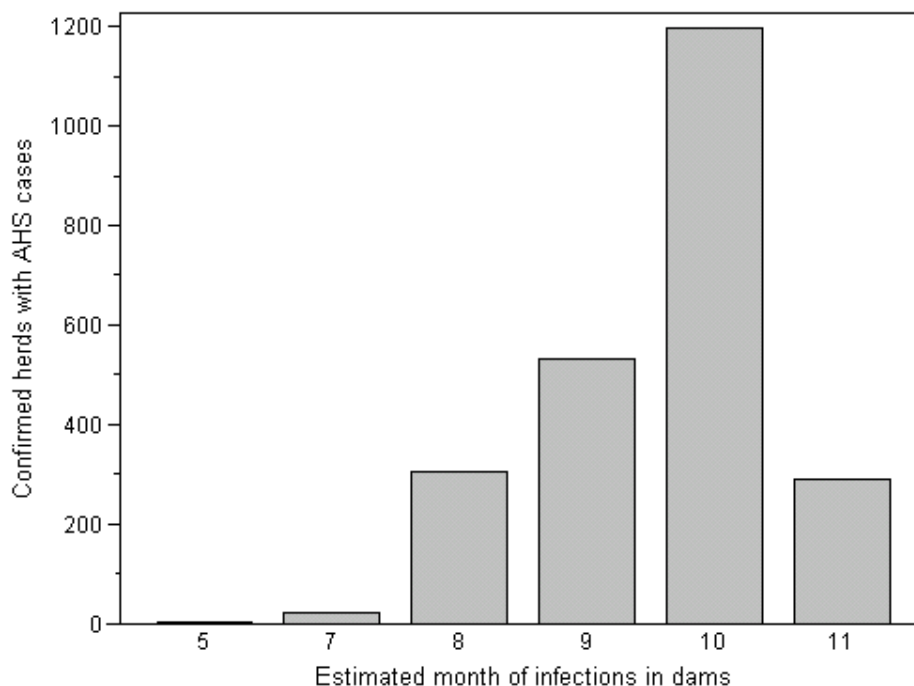
Figure 5: Estimation of months of viral circulation including all species and countries, with adjustment for gestation period and vulnerable stage

In Germany, there were eight confirmed acute cases in adults with viral RNA detection by RT-PCR, one reported in September, five in November and two in December. A lag between disease observation, sample collection and laboratory confirmation/reporting is likely.

3.3. Spatial spread

Member States have also reported the Nomenclature of territorial units for statistics (NUTS) codes of confirmed cases for cattle, sheep and goats but the spatial level of detail differs between countries. Data available per species is displayed in Figure 6 to 8. An analysis of the geographical / temporal distribution would not necessarily represent the spread of the infection since a lapse between infection, detection and confirmation is likely to occur. The number of affected regions with confirmed SBV cases is highest for sheep, while goats seem to be less affected.
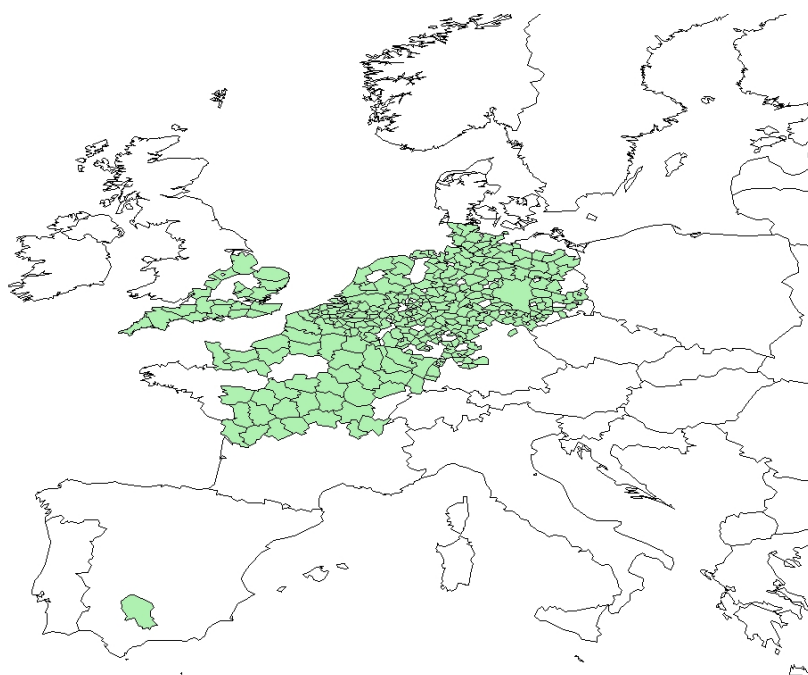
Figure 6: NUTS regions with at least one SBV confirmed herd - Sheep

Figure 7: NUTS regions with at least one SBV confirmed herd - Goats

Figure 8: NUTS regions with at least one SBV confirmed herd - Cattle

3.4. Characterization of affected herds

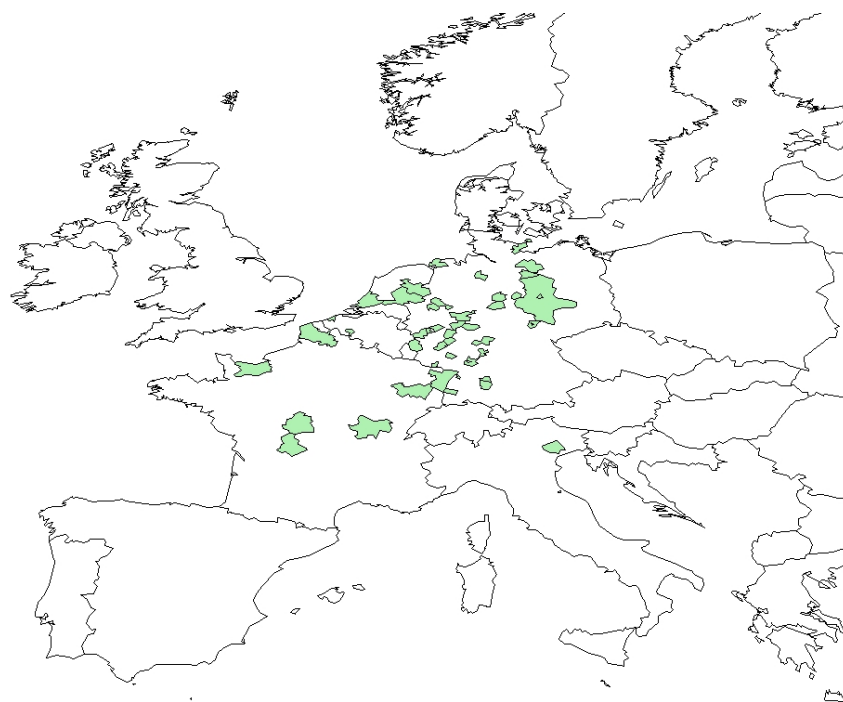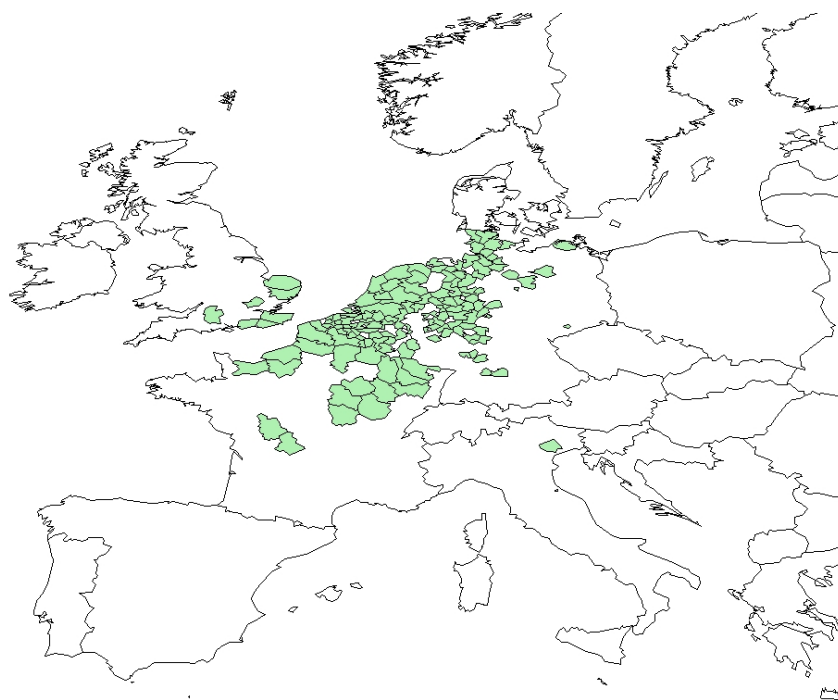The data collection also included variables for characterization of the affected herds, these were: species of animals, production type (incomplete data), number of animals per herd and animal movements during spring and summer 2011.

Table 4: Available data regarding suspect/confirmed herds

Country	Ruminant	Production type	Suspect /confirmed herds	Number of herds with animal movements in spring summer 2011	Minimum number of animals in a herd	Maximum number of animals in a herd	Median number of animals in a herd
Belgium	Cattle	Meat production	22	12	6	429	100
		Milk and meat production	31	16	53	571	171
		Milk production	21	12	79	202	144
	Goats	Meat production	1		6	6	6
		Milk production	1		34	34	34
	Sheep	Meat production	155		1	858	26
France	Cattle	Meat production	167		1	463	75
		Milk and meat production	1		95	95	95
		Milk production	85		2	500	63
		Not classified	194		30	326	61
	Goats	Meat production	3		36	100	68
		Milk and meat production	4		4	250	10
		Milk production	12		30	250	72
		Not classified	16		4	29	16.5
	Sheep	Meat production	581		1	880	170
		Milk and meat production	30		1	950	116
		Milk production	1		50	50	50
		Not classified	629		3	600	22
Germany	Bison	Not classified	1		56	56	56
	Cattle	Not classified	155		3	1185	133
	Goats	Not classified	41		4	280	22
	Sheep	Not classified	797		1	3500	45
Italy	Cattle	Meat production	1	0	1	1	1
		Milk and meat production	1	1	230	230	230
		Milk production	2	2	83	170	126.5
	Goats	Milk production	1	1	12	12	12
	Sheep	Meat production	1	0	1100	1100	1100
Luxembourg	Cattle	Milk production	1	0	92	92	92
	Sheep	Meat production	6	0	4	37	7.5
Netherlands	Cattle	Not classified	84		3	979	130

Country	Ruminant	Production type	Suspect /confirmed herds	Number of herds with animal movements in spring summer 2011	Minimum number of animals in a herd	Maximum number of animals in a herd	Median number of animals in a herd
	Goats	Not classified	5		6	433	53
	Sheep	Not classified	103		5	2289	145
Spain	Sheep	Meat production	1	0	533	533	533
United Kingdom	Cattle	Not classified	16	0	1	400	40.5
	Sheep	Meat production	193	0	1	4000	51

3.5. Impact analysis

For the purpose of this report, impact was defined as the measurement of mortality and morbidity in the affected animal populations. Measures of impact are the proportion of cases (see case definitions in Appendix A) in the animal population.

The total number of animals in SBV confirmed herds per species and country is presented in Figure 9. The number of confirmed herds per country and species is also shown in Figure 9. The total number of animals in the SBV confirmed herds can be considered as the worst case scenario where all animals are assumed to be affected.

Figure 9: Total number of animals in SBV confirmed herds (left panel) and SBV confirmed herds (right panel) by country and species.

The total number of animals and herds of sheep, goats and cattle in EU were obtained from Eurostat 2007 (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database) and compared with the numbers displayed in Figure 9 (worst case scenario). The comparative bar plots are presented in Figure 10 to 12. For all affected countries, the number of animals /SBV confirmed herds is low in comparison with the total number of animals /herds. Nevertheless, this figure should be interpreted cautiously since underreporting or lack of confirmation may affect the ratio.
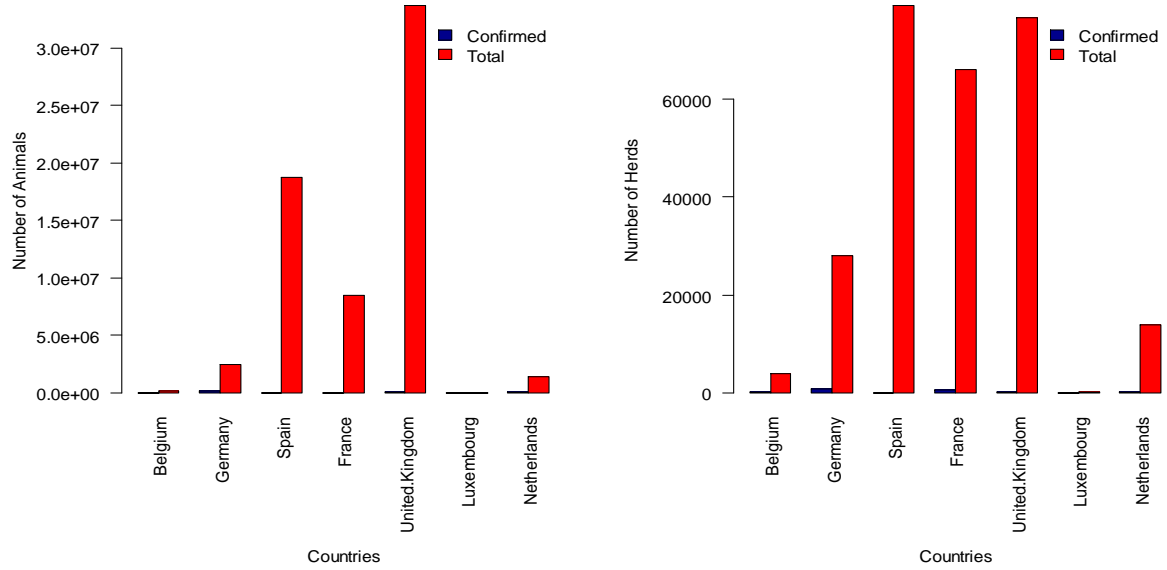
Figure 10: Total number of sheep in SBV confirmed herds (left panel) and SBV confirmed herds (right panel) by country versus total number of sheep and herds per country.
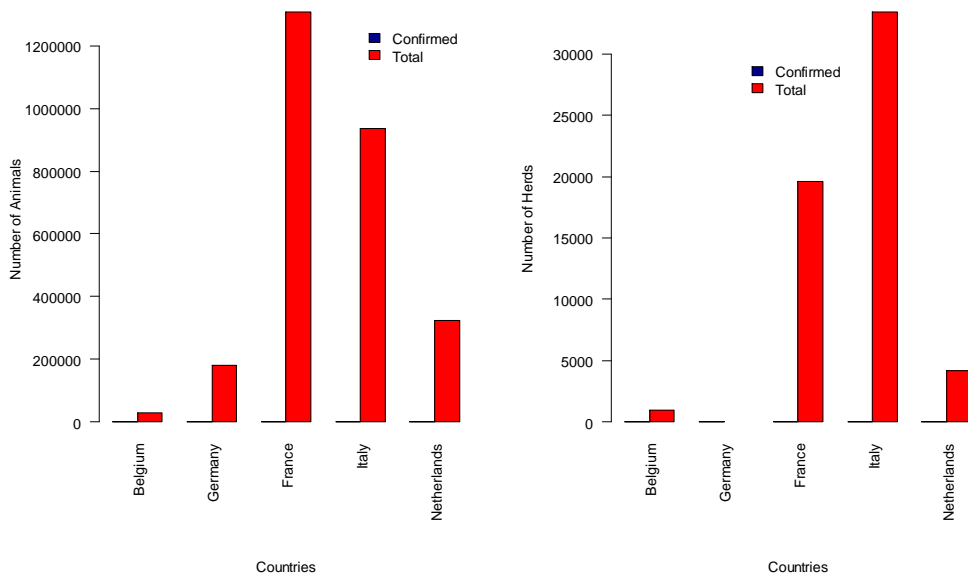
Figure 11: Total number of goats in SBV confirmed herds (left panel) and SBV confirmed herds (right panel) by country versus total number of goats and herds per country.
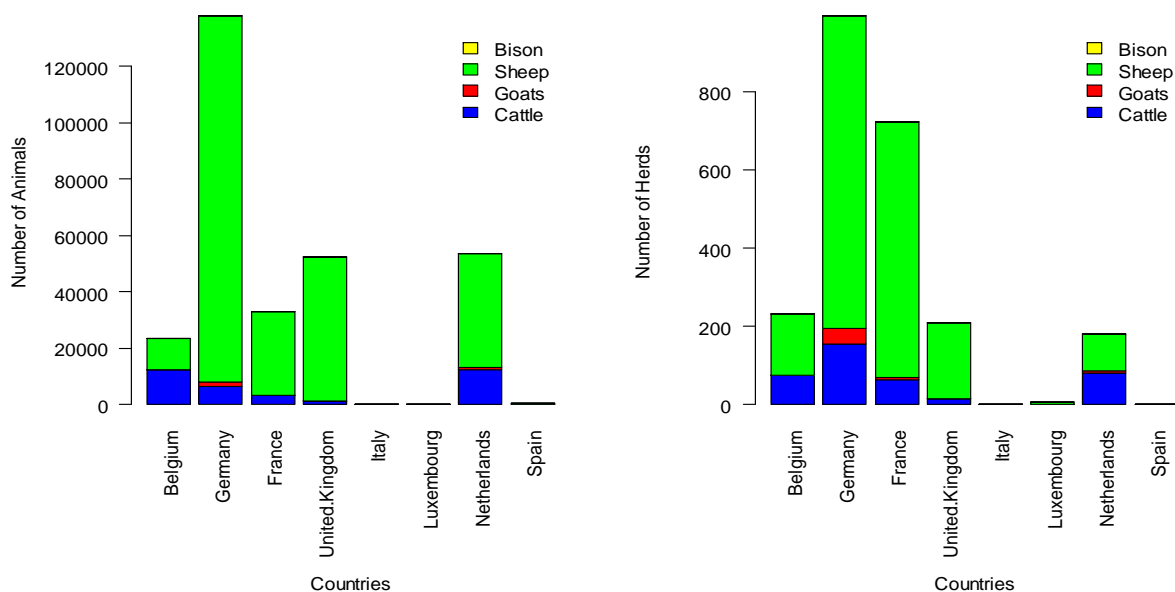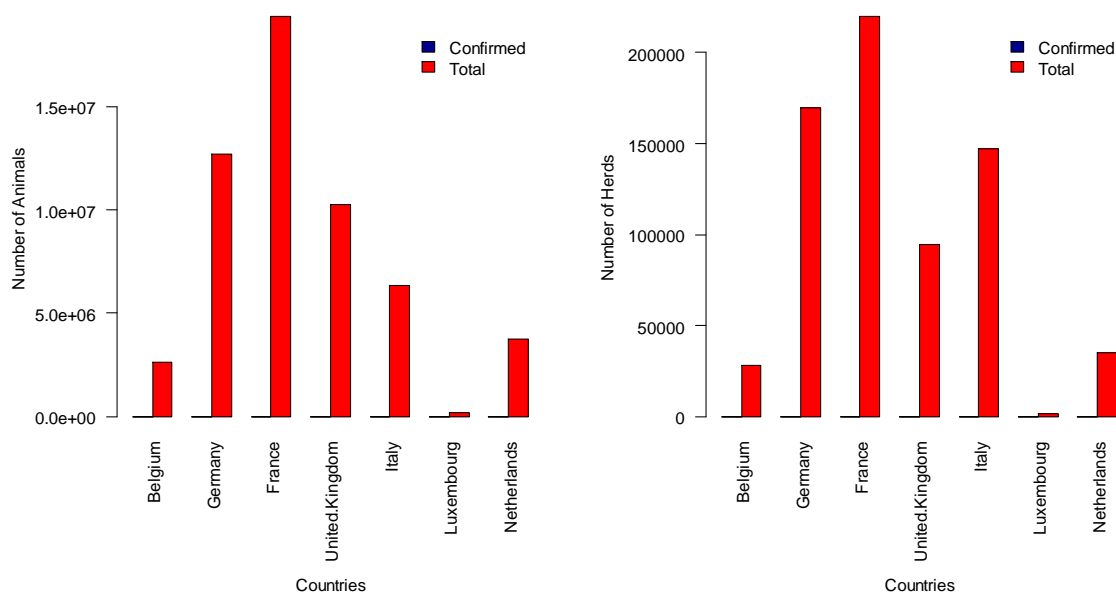

Figure 12: Total number of cattle in SBV confirmed herds (left panel) and SBV confirmed herds (right panel) by country versus total number of cattle and herds per country.

In order to estimate the disease impact, data were requested about the number of AHS cases, cases in adult animals, abortions, livebirths, pregnant animals, dystocia and stillbirths per herd during the reporting period.

A summary of the data available for impact analysis is presented in Table 5. All Member States reported data on AHS cases but only Spain, Luxemburg and Italy reported the number of AHS cases versus pregnant animals / females of breeding age by species. United Kingdom and Belgium provided some information regarding stillbirths and abortions respectively. Furthermore only Belgium, Luxemburg and the United Kingdom reported herds where more than 1 AHS case was found.

Table 5: Availability of impact measures

Country	Number reported herds*	Impact measure	% Herds no information	% Herds reporting more than 1 case
Belgium	231	ABORTIONS	0%	25%
		AHS	0%	2%
		DYSTOCIA	100%	0%
		LIVEBIRTHS	96%	4%
		PREGNANT	100%	0%
		STILLBIRTHS	98%	2%
France	1723	ABORTIONS	100%	0%
		AHS	0%	0%
		DYSTOCIA	100%	0%
		LIVEBIRTHS	100%	0%
		PREGNANT	100%	0%
		STILLBIRTHS	100%	0%
Germany	994	ABORTIONS	100%	0%
		AHS	1%	0%
		DYSTOCIA	100%	0%
		LIVEBIRTHS	100%	0%
		PREGNANT	100%	0%
		STILLBIRTHS	100%	0%
Italy	6	ABORTIONS	0%	17%
		AHS	0%	0%
		DYSTOCIA	0%	50%
		LIVEBIRTHS	0%	83%
		PREGNANT	0%	83%
		STILLBIRTHS	0%	33%
Luxembourg	7	ABORTIONS	0%	0%
		AHS	0%	57%
		DYSTOCIA	0%	29%
		LIVEBIRTHS	0%	71%
		PREGNANT	0%	86%
		STILLBIRTHS	0%	57%
Netherlands	192	ABORTIONS	100%	0%
		AHS	0%	0%
		DYSTOCIA	100%	0%
		LIVEBIRTHS	100%	0%
		PREGNANT	100%	0%

Country	Number reported herds*	Impact measure	% Herds no information	% Herds reporting more than 1 case
		STILLBIRTHS	100%	0%
Spain	1	ABORTIONS	0%	100%
		AHS	0%	0%
		DYSTOCIA	0%	100%
		LIVEBIRTHS	0%	100%
		PREGNANT	0%	100%
		STILLBIRTHS	0%	100%
United Kingdom	209	ABORTIONS	100%	0%
		AHS	0%	35%
		DYSTOCIA	100%	0%
		LIVEBIRTHS	100%	0%
		PREGNANT	100%	0%
		STILLBIRTHS	0%	35%

*Only France and Italy reported data on suspect herds

The last column of Table 5 regarding the percentage of herds reporting more than 1 case is most likely an indication of the difficulties of MS in following up confirmed herds once they have been detected.

4. Recommendations

In order to further assess spread and impact of SBV all fields in the minimum dataset should be provided.

The extended dataset is needed to provide a better understanding of the disease impact at animal level. An alternative option might be to design a survey to properly evaluate the impact and magnitude of disease spread.

APPENDIX

A. SBV DATA REPORTING GUIDELINES

Notification of "Schmallenberg" virus (SBV) at a European level is currently not obligatory but there is a need for harmonised case definitions and quantification of epidemiological parameters to allow for assessing impact and spread of this emerging disease in animals. The reporting guideline may be amended, as new epidemiological evidence and testing methods become available. Member States (MS) affected by SBV are kindly requested to enter the data required under the "MINIMUM DATASET" section of this document. The data in the "EXTENDED DATASET" section can be provided in order to facilitate the understanding of the epidemiology of this disease, but is not strictly necessary.

MINIMUM DATASET – HERD/FLOCK LEVEL

The herd/flock level dataset is based upon data currently being collected within the affected member state. This information should be reported every two weeks for all affected member states.

Objectives

This dataset will be used in the epidemiological updates published by EFSA. This dataset is designed for case finding. The dataset will be used to obtain information on the spread of SBV in Europe both temporally (Date of first suspicious report) and spatially (Country/Region of holding). The information will also be used to investigate the possible impact of SBV in terms of observed birth outcomes and proportion of Arthrogryposis Hydranencephaly Syndrome (AHS) cases observed in pregnant animals from 1 August 2011 to date of data transmission.

Plan of analysis

Descriptive statistics will be provided on the number of AHS cases, number of suspect / confirmed cases and other birth outcomes by species at country and EU level. Temporal evaluation of spread based on date of first suspicious report by species. Spatial evaluation of spread by region based on suspicious herds and confirmed herds. Within herd impact analysis considering reported AHS cases versus pregnant animals / females of breeding age by species, holding type and region.

Population: The virus has been detected in cattle, sheep, goats and bison. The data should be reported for cattle, sheep goats, other ruminant animals and closely related species.

Reporting period: First symptoms were reported in cattle in Germany in summer and early autumn 2011. The reporting period is therefore defined as 1 August 2011 to the date of transmission of data. A full epidemiological report with the total number of observations starting from 1 August 2011 should be included in each data transmission. When an updated report is received from a country, it replaces previously submitted reports by that country.

Epidemiological unit: is the herd/flock, all ruminants of one species on a holding are considered to represent a herd/flock.

Case definitions:

> Foetuses and neonates

Suspect case: Arthrogryposis hydranencephaly syndrome (AHS) in ruminants (stillbirths, premature births, mummified fetuses, and dysfunctions or deformities of foetuses or neonates with two or more of the following: arthrogryposis, hydranencephaly, ataxia, paralysed limbs, muscle atrophy, joint

malformations, torticollis, kyphosis, scoliosis, brachygnatia inferior, behavioural abnormalities and blindness).

Confirmed case: Following suspicion, a confirmation of viral infection by RT-PCR, virus isolation (or other method of pathogen direct or indirect detection when available).

Adult animals

Suspicious case: Ruminants with transient fever, diarrhoea, and reduced milk production (that is not attributed to a known cause)

Confirmed case: Confirmation of viral infection by RT-PCR, virus isolation, ELISA, VNT (or other method of pathogen or indirect detection when available).

Herd case definition

Any herd with one or more suspect or confirmed case.

Required information:

Unique herd identifier – Provide a code to uniquely identify the herd/flock within the reporting country. The code should be designed to ensure the individual holding remains anonymous and should be retained in each data submission (e.g IT000001, IT000002).

Location – report the geographical location of the holding
Countries should be encoded using the standard ISO-3166-1-alpha-2 coding system. Described in the COUNTRY catalogue.

Additional geographical detail about the region where the holding is located can be specified using the Nomenclature of territorial units for statistics (NUTS) code (as described in NUTS catalogue). http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction

The two catalogues (COUNTRY, NUTS) are published on the EFSA website http://www.efsa.europa.eu/en/efsajournal/pub/1457.htm in the standard sample description excel file for download.

Animal species – report the code and the text describing species of animal in the herd/flock selected from the catalogue below

Species catalogue

code	name
04421	Alpaca (*Vicugna pacos)*
9281	Alpine chamois (*Rupicapra* spp.)
11681	Barbary sheep (*Ammotragus lervia*)
1601	Bison (*Bison bison*)
14001	Buffalos (*Syncerus caffer*)
81	Camels (*Camelus* spp.*)*
6581	Cattle (*Bos taurus*)
1401	Deer (*Capreolus* spp.*, Cervus* spp.*, Dama* spp.*)*
6761	Goats (*Capra aegagrus*)
14081	Lamas (*Lama glama*)

11501	Mouflons (*Ovis musimon*)
22101	Mountain goats (*Oreamnos americanus*)
281	Reindeers (*Rangifer tarandus*)
10061	Sheep (*Ovis aries*)
2861	Solipeds, domestic (*Equidae*)
6821	Water buffalos (*Bubalus* spp.)
00000	Other

Purpose of reproduction – indicate whether the animals are reared for milk, meat, mixed or other production.

Animal Movements – indicate whether new animals were introduced to the holding in spring or summer of 2011 (March – September).

Date of first suspicious report – report the year, month and day of the first report to the veterinary services of a case according to the case definitions above within the herd/flock.

Herd statistics – report the number of animals in the herd/flock for each of the numerical elements in the table below. For each of the numerical elements where information has been collected and there are no animals within that category report 0, where no information has been collected report NULL.

Totals should be reported for the full reporting period from 1 August 2011 to the data transmission date, with the exception of "animals" and "females". For "animals" and "females" report the number of animals either on the date of the first suspicious report or at the end of 2011. The time point for reporting the denominator information should be based on the ease of obtaining this information and the time point used should be specified in the "denominator" element.

Herd catalogue

Element name	Definition	Data type	Mandatory	Catalogue
herdID	Unique identifier for herd/flock	String(50)	Y	
country	Country where the holding is located	String(2)	Y	COUNTRY
NUTScode	Code for region where holding is located using Nomenclature for Territorial Units for Statistics	String(5)	Y	NUTS
NUTSregion	Text for region where holding is located using	String(250)		
speciesCode	Code for species of animal in herd/flock	String(5)	Y	SPECIES
speciesText	Text to describe the species of animal in the herd/flock	String(250)		
reproduction	Reproduction for production of milk, meat, mixed or other	String(5)	Y	MEAT, MILK, MIXED, OTHER
animalMove	Indicate if new animals were introduced to the holding in spring or summer 2011	String(1)	Y	Y/N/U
firstReportY	Year of first suspicious report in herd/flock	integer (4)	Y	
firstReportM	Month of first suspicious report in herd/flock	integer (2)	Y	
firstReportD	Day of first suspicious report in herd/flock	integer (2)	Y	
denominator	Indicate if the number of animals and number of females is for the end of 2011 or the date of first suspicious report	String(4)	Y	ENDY, SUSP
animals	Number of adult animals in herd/flock (male	Integer(6)	Y	

	and female; greater than 12 months for cattle, greater than 6 months for sheep and goats)		
females	Number adult females in herd/flock (greater than 12 months for cattle, greater than 6 months for sheep and goats)	Integer(6)	Y
pregnant	Number of pregnant animals in herd/flock from 1 Aug 2011 to date of data transmission	Integer(6)	Y
liveBirths	Number of live births in herd/flock from 1 Aug 2011 to date of data transmission	Integer(6)	Y
stillBirths	Number of still births in herd/flock from 1 Aug 2011 to date of data transmission	Integer(6)	Y
abortions	Number of abortions in herd/flock from 1 Aug 2011 to date of data transmission	Integer(6)	Y
dystocia	Number of dystocic births in herd/flock from 1 Aug 2011 to date of data transmission	Integer(6)	
ahs	Number of pregnancies resulting in arthrogryposis hydranencephaly syndrome from 1 Aug 2011 to date of data transmission	Integer(6)	Y
offspringTestPD	Number of foetuses and neonates tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y
offspringTestPDPos	Number of positive foetuses and neonates tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y
offspringTestSero	Number of foetuses and neonates tested for SBV by indirect detection methods in herd/flock	Integer(6)	
offspringTestSeroPos	Number of positive foetuses and neonates tested for SBV by indirect detection methods in herd/flock	Integer(6)	
symptomatic	Number of symptomatic adult animals in herd/flock (fever, diarrhoea, anorexia, losses in milk production)	Integer(6)	
adultsTestPD	Number of adult animals tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y
adultsTestPDPos	Number of positive adult animals tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y
adultsTestSero	Number of adult animals tested for SBV by indirect detection methods in herd/flock	Integer(6)	
adultsTestSeroPos	Number of positive adult animals tested for SBV by indirect detection methods in herd/flock	Integer(6)	

EXTENDED DATASET

This dataset is designed for hypothesis generation and to facilitate future epidemiological research. It is expected that information at this level would only be obtained from a limited number of holdings, selected for specific epidemiological studies. Where these studies are carried out the collection of these data items are recommended to allow for a better understanding of the epidemiology of SBV in Europe. It is also recommended to collect the minimum dataset for years prior to 2011 in order to obtain baseline abortion, still birth and malformation rates.

Objectives
This dataset will be used in the final report published by EFSA. The dataset will be used to obtain information on within herd spread, morbidity, case fatality rate, risk period for infection during pregnancy, role of transplacental transmission and to generate hypothesises about plausible risk factors

Plan of analysis
Descriptive statistics will be provided in terms of number of AHS cases, number of confirmed cases and other birth outcomes within herd, by species and holding type. Temporal evaluation of within herd spread based on the date of birth of foetuses and neonates testing positive for SBV. Within herd impact analysis considering reported AHS symptoms, disease status of dams and offspring. The extended dataset will allow for exploration of the possible links between cases and, most likely, the period during pregnancy when infection occurred.

Epidemiological unit: Foetuses, neonates, dams and barren animals from a herd/flock meeting the case definition for the minimum level dataset.

Foetuses and neonates

Element name	Definition	Data Type	Priority data	Controlled terminology
herdID	Unique identifier for herd/flock for the reporting country	string (50)	Y	
country	Country where the holding is located	String(2)	Y	COUNTRY
NUTScode	Code for region where holding is located using Nomenclature for Territorial Units for Statistics	String(5)	Y	NUTS
NUTSregion	Code Text for region where holding is located using Nomenclature for Territorial Units for Statistics	String(250)		
speciesCode	Code for species of animal	String(5)	Y	SPECIES
speciesText	Text to describe the species of animal	String(250)		
animalMove	Indicate if new animals were introduced to the holding in spring or summer 2011	String(1)	Y	Y/N/U
animalID	Unique identifier for animal within the herd	string (50)	Y	
motherID	Unique identifier for the dam within the herd to link with the dams dataset	string (50)	Y	
birthY	Year of partus	integer (4)	Y	
birthM	Month of partus	integer (2)	Y	

birthD	Day of partus	integer (2)		
sex	Sex of animal	string (1)		M/F/U
ahs	Indicate if the animal has arthrogryposis hydranencephaly syndrome	string (1)	Y	Y/N/U
arthrogryposis	Indicate if the animal has arthrogryposis	string (1)	Y	Y/N/U
hydranencephaly	Indicate if the animal has hydranencephaly	string (1)	Y	Y/N/U
ataxia	Indicate if the animal has ataxia or paralysed limbs	string (1)	Y	Y/N/U
spinalDefect	Indicate if the animal has torticollis, kyphosis, scoliosis	string (1)	Y	Y/N/U
brachygnatia	Indicate if the animal has brachygnatia	string (1)	Y	Y/N/U
neuroSigns	Indicate if the animal has neurological signs including behavioural abnormalities and blindness	string (1)	Y	Y/N/U
hypoCerebrum	Indicate if the animal has hypoplasia cerebrum	string (1)	Y	Y/N/U
hypoCerebellar	Indicate if the animal has hypoplasia cerebellar	string (1)	Y	Y/N/U
hypoSpinal	Indicate if the animal has hypoplasia spinal cord	string (1)	Y	Y/N/U
died	Indicate if the animal died	string (1)	Y	Y/N/U
sampleID	Identifier used for sample in testing laboratory	string (50)	Y	
labID	Identifier for laboratory performing test	string (50)		
sampleY	Year of sample	integer (4)	Y	
sampleM	Month of sample	integer (2)	Y	
sampleD	Day of sample	integer (2)		
tissueType	Code for type of tissue sampled	string(5)		SMPRT
testType	Code for type of test	string(5)	Y	PCR/IFAT/ELISA/NT
result	Result of test	string(3)	Y	POS/NEG/EQU

Previously pregnant dams and barren animals

Element name	Definition	Data Type	Priority data	Controlled terminology
herdID	Unique identifier for herd for the holding	string (50)	Y	
country	Country where the holding is located	String(2)	Y	COUNTRY
NUTScode	Code for region where holding is located using Nomenclature for Territorial Units for Statistics	String(5)	Y	
NUTSregion	Text for region where holding is located using	String(250)		NUTS
speciesCode	Code for species of animal	String(5)	Y	SPECIES
speciesText	Text to describe the species of animal	String(250)		
reproduction	Reproduction for production of milk, meat, mixed or other	String(5)	Y	MEAT, MILK, MIXED, OTHER
animalMove	Indicate if new animals were introduced to the holding in spring or summer 2011	String(1)	Y	Y/N/U
animalID	Unique identifier for animal within the herd	string (50)	Y	

offspringID	Unique identifier for the offspring to link with the foetuses and neonates table	string (50)		
indoorDay	Indicate if the animal was kept indoors during the day during gestation	string(1)	Y	Y/N/U
indoorNight	Indicate if the animal was kept indoors during the night during gestation	string(1)	Y	Y/N/U
insecticide	Indicate is the animal was treated with "pour on" insecticides/repellents	string(1)	Y	Y/N/U
birthY	Year of birth	integer (4)	Y	
sex	Sex of animal	string (1)		M/F/U
fever	Indicate if the animal had fever	string (1)	Y	Y/N/U
diarrhoea	Indicate if the animal had diarrhoea	string (1)	Y	Y/N/U
neuroSigns	Indicate if the animal had neurological signs	string (1)	Y	Y/N/U
anorexia	Indicate if the animal had anorexia	string (1)	Y	Y/N/U
milkDrop	Indicate if the animal had a drop in milk production	string (1)	Y	Y/N/U
milkLoss	Percentage milk loss (if observed)	double		
durMilkLoss	Duration of milk loss (if observed) in days	integer (6)		
durSymptoms	Duration of symptoms (if observed) in days			
onsetY	Year of onset of symptoms (if observed)	integer (4)		
onsetM	Month of onset symptoms (if observed)	integer (2)		
onsetD	Day of onset symptoms (if observed)	integer (2)		
matedY	Year of mating/insemination	integer (4)	Y	
matedM	Month of mating/insemination	integer (2)	Y	
matedD	Day of mating/insemination	integer (2)		
ahs	Indicate if the animal had a pregnancy resulting in arthrogyrposis hydranencephaly syndrome	string (1)	Y	Y/N/U
stillBirth	Indicate if the animal had a still birth	string (1)	Y	Y/N/U
abortion	Indicate if the animal had an abortion	string (1)	Y	Y/N/U
returnToService	Indicate if the animal returned to service	string (1)	Y	Y/N/U
dystocia	Indicate if the animal had a dystocic birth	string (1)	Y	Y/N/U
liveBirth	Indicate if the animal had live offspring	string (1)	Y	Y/N/U
offspring	Number of offspring (where live birth occurred) from 1 August 2011	integer (6)		
gestation	Number of days gestation	integer (6)		
died	Indicate if the animal died on holding	string (1)	Y	Y/N/U

sampleID	Identifier used for sample in testing laboratory	string (50)	Y	
labID	Identifier for laboratory performing test	string (50)		
sampleY	Year of sample	integer (4)	Y	
sampleM	Month of sample	integer (2)	Y	
sampleD	Day of sample	integer (2)		
tissueType	Code for type of tissue sampled	string(5)		SMPRT
testType	Code for type of test	string(5)	Y	PCR/IFAT/ELISA/NT
result	Result of test	string(3)	Y	POS/NEG/EQU

Catalogue SMPRT

code	name
C0113	MILK OR MILK COMPONENT
C0185	BLOOD
C0199	BRAIN
CZ943	PERITONEAL FLUID
CZ801	FAECES
CZ861	FOETUS/STILL BIRTH
C0191	SPLEEN

Samples and Laboratory Methods

Pathogen detection: Pathogen detection is done by real-time RT-PCR or virus isolation.
Samples for pathogen detection in acute infection: serum or EDTA blood samples when clinical signs are observed (fever, drop in milk yield, diarrhoea).
Samples for pathogen detection in foetuses, abortions, stillbirths and malformed ruminants: brain plus supplementary samples of spleen and blood.

Indirect detection: Antibody detection by indirect immuno-fluorescence, virus neutralization test or other serological tests as they become available.
Samples for indirect detection: serum samples are recommended (EDTA blood samples are less suitable for the neutralization test).

GLOSSARY

arthrogryposis	also called multiple congenital contracture, characterized by bent limbs and joint contractures present at birth, fixing joints in abnormal positions and restricting their movement.
case definition	defines a case in surveillance. The case definition can be based on, for example, clinical signs, diagnostic testing, and animal or herd characteristics
herd	group of animals belonging to the same species
hydranencephaly	abnormal development of foetal nervous system, including loss of cerebral cortical tissue
sensitivity	the proportion of infected animals that are correctly identified as positive based on specified diagnostic criteria. The higher sensitivity of a diagnostic test, the lower the number of false negatives (infected animals incorrectly identified as negative for an infection).
serosurveillance	serological surveillance for presence of antibodies to a pathogen in a unit, can identify previous exposure of a population to a pathogen.
specificity	the proportion of non-infected animals that are correctly identified as negative based on specified diagnostic criteria. The higher specificity of a diagnostic test, the lower the number of false positives (non-infected animals incorrectly identified as positive for an infection).
torticollis	a lateral flexion of the neck (cervical spine)
vector	organism that carries and transmits an infectious pathogen from one host to another

ABBREVIATIONS

AHS	arthrogryposis hydranencephaly syndrome
DCF	Data Collection Framework
DG SANCO	Direction générale de la santé et des consommateurs (Directorate-General for Health and Consumers)
EFSA	European Food Safety Authority
EFTA	European Free Trade Association
EU	European Union
MS	Member State
NUTS	Nomenclature of territorial units for statistics
PCR	polymerase chain reaction

RT-PCR	reverse transcriptase PCR
SBV	Schmallenberg virus
SCoFCAH	Standing Committee on the Food Chain and Animal Health