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MONTHLY REPORT
FOOT-AND-MOUTH DISEASE SITUATION

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eufmd
european commission for the control of foot-and-mouth disease

Foot-and-Mouth Disease Situation
Food and Agriculture Organization of the United Nations
Monthly Report

September 2017

Guest Editor:
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#INFORMATION SOURCES USED:

Databases:
OIE WAHID World Animal Health Information Database
FAO World Reference Laboratory for FMD (WRLFMD)
FAO Global Animal Disease Information System (EMPRES-i)

Other sources:
FAO/EuFMD supported FMD networks
FAO/EuFMD projects and field officers

The sources for information are referenced by using superscripts.
The key to the superscripts is on the last page.

Please note that the use of information and boundaries of territories should not be considered to be the view of the U.N. Please, always refer to the OIE for official information on reported outbreaks and country status.

Contents

Guest Editor's comments:

Many thanks for reading this latest issue of the monthly "*Global Foot-and-Mouth disease Situation*" report, and I hope that you find the collated information useful.

During the past three months, we have continued to monitor the spread of the O/ME-SA/Ind-2001d lineage that has emerged from the Indian sub-continent (Pool 2), to cause field outbreaks in East and Southeast Asia (Pool 1) as well as Gulf States of the Middle East and North Africa. FMD virus sequences recently provided from the FMD Reference Laboratory in Russia (FGBI-ARRIAH) demonstrate that the range of this lineage has further expanded into Sukhbaatar Province in the eastern part of Mongolia. This information is in addition to the outbreaks due to O/ME-SA/Panasia (described later in this report). In view of the rapid spread of O/ME-SA/Ind-2001d lineage elsewhere in East Asia (reported during 2016/17 for the first time in Eastern Russia, China and South Korea), these latest reports are not completely unexpected. However, additional new FMDV sequence data from Bayan-Ulgii Province in the most westerly part of Mongolia (recently submitted by NIAH, Japan) indicates that this viral lineage has been present in the country since 2015 – prior to the reports of FMD cases in neighbouring countries. These observations raise obvious questions about the extent to which the O/ME-SA/Ind-2001d lineage is currently distributed in East Asia, and routes by which FMD is transmitted between countries in the region. During the past month, new FMD outbreaks in Bashkortostan, in central Russia located in the FMD-free (without vaccination zone) have been reported to the OIE. When I saw from initial reports that these cases were due to serotype O, my immediate conclusion was that these cases were also likely to have been caused by the further spread of the O/ME-SA/Ind-2001d lineage. However, VP1 sequence data provided from FGBI-ARRIAH indicate that the causative virus is in fact a member of a new lineage within the O/ME-SA topotype that has only previously been recognised in Iran and Pakistan. Surveillance (and testing) of cases in West Eurasia is now essential to determine whether this new lineage has (or will) spread more widely in the region.

The spread of the A/ASIA/G-VII lineage in West Eurasia has been widely discussed in previous monthly reports and I was very pleased to attend the RoadMap meeting in Tibilisi, Georgia during September to review recent FMD cases due to this, and other endemic viral lineages. In response to the earlier reports of poor performance of the A-Iran-05 vaccine against field isolates from the A/ASIA/G-VII lineage, and further to the pilot data that was described in previous reports, TPI has contributed to a new potency study that provides evidence that an alternative vaccine (A-May-97) generates good heterologous protection in cattle (>6 PD_{50}), and could be used in emergency vaccination scenarios. These experiments were performed at Lelystad, The Netherlands in collaboration with CSIRO, Australia and these data will be presented at the GFRA meeting held in Incheon, South Korea during 25-27 October. I apologise that I will not attend this meeting, but (based on previous meetings), I anticipate that there will be some very active discussion of these recent epidemiological events, and ideas to develop new tools for the detection and control of FMD!

Don King, Pirbright, October 2017.

I. GENERAL OVERVIEW

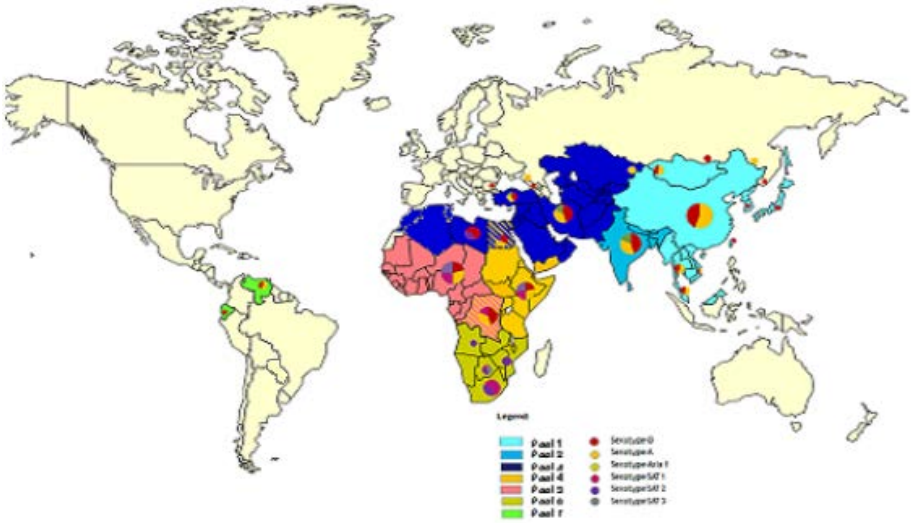
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below are continuously circulating in parts of the pool area and would be detected if sufficient surveillance was in place (Table 1).*

Table 1: List of countries representing each virus pool for the period 2011 – 2016 (source EuFMD)

POOL	REGION/COUNTRIES – colour pools as in Map	SEROTYPES
1	**SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA** Cambodia, China, China (Hong Kong, SAR), Taiwan Province of China, Democratic People's Republic of Korea, Republic of Korea, Laos People's Democratic Republic, Malaysia, Mongolia, Myanmar, Russian Federation, Thailand, Viet Nam	**O and A**
2	**SOUTH ASIA** Bangladesh, Bhutan, India, Mauritius, Nepal, Sri Lanka	**O, A and Asia 1**
3	**WEST EURASIA & MIDDLE EAST** Afghanistan, Algeria, Armenia, Azerbaijan, Bahrain, Bulgaria, **Egypt**, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, **Libya**, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Tajikistan, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan	**O, A and Asia 1**
4	**EASTERN AFRICA** Burundi, Comoros, **Democratic Republic of Congo**, Djibouti, **Egypt**, Eritrea, Ethiopia, Kenya, **Libya**, Rwanda, Somalia, Sudan, South Sudan, United Republic of Tanzania, Uganda, Yemen	**O, A, SAT 1, SAT 2 and SAT 3**
5	**WEST/CENTRAL AFRICA** Benin, Burkina Faso, Cameroon, Cabo Verde, Central Afr. Rep., Chad, **Democratic Republic of Congo**, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea-Bissau, Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome Principe, Senegal, Sierra Leone, Togo	**O, A, SAT 1 and SAT 2**
6	**SOUTHERN AFRICA** Angola, Botswana, **Congo D. R.,** Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe	**{O, A}*, SAT 1, SAT 2 and SAT 3**
7	**SOUTH AMERICA** Paraguay, Venezuela (Bolivarian Republic of)	**O and A**

Egypt, Libya and **Democratic Republic of Congo** (highlighted in bold) are indicated as being in multiple pools, since they have evidence of FMDV originating from 2 or more pools in the past four years. * ONLY IN NORTH ZAMBIA AS SPILL-OVER FROM POOL 4

MAP 1: Foot-and-mouth disease (FMD) virus pools: world distribution by serotype in 2011-2016 (source EUFMD)



II. HEADLINE NEWS

Dear Readers of the Global Foot and Mouth Disease Situation Report,

We want to make sure that the monthly report is meeting your needs. We are planning to update the format, and so would like to know if you find the report useful and what suggestions you have to improve it.

We would also like to know about the readership of the report - where are you based and in what kinds of settings do you work?

We have put together a short survey that should not take more than 5 to 10 minutes to complete. Please note that your answers are anonymous. To participate please link to the following:
https://www.surveymonkey.com/r/KVB8GVX

Thank you
EuFMD Team

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

Mongolia [1] – Further FMD outbreaks due to serotype O were reported between April and September 2017, in the eastern part of the country involving small and large ruminants.

Thailand [2] – FMDV field isolates belonging to serotypes A and O that were detected in samples collected in 2016 and 2017 were subjected to vaccine matching strain differentiation (VMSD) tests which identified various vaccine strains with good matching results.

POOL 2 - SOUTH ASIA

Bhutan [1, 2] - A FMD outbreak due to A/ASIA/G-VII occurred in cattle during March 2017 at Jongkhar.
A/ASIA/G-VII and O/ME-SA/Ind2001d were the genotypes identified in the set of samples collected in the country between March and July 2017.

India [3] **-** The Indian Council of Agricultural Research - Directorate of Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India reported the detection of FMDV serotype O in cattle samples.

Nepal [2, 4] **-** The National Foot and Mouth Disease and TADS Laboratory reported for this month, the circulation of FMDV serotype O. Field isolates belonging to FMDV serotype A and O were subjected to VMSD tests.

POOL 3 - WEST EURASIA & MIDDLE EAST

Afghanistan [2, 5] - The Central Veterinary Diagnostic and Research Laboratory *(*CVDRL) of Kabul Afghanistan detected FMDV serotypes A and O in the 78 samples examined during September 2017.
Genotypes detected in the 38 samples collected between January and May 2017 were represented by different sublineages of A/ASIA/Iran-05, ASIA 1/ASIA/Sindh-08 and by O/ME-SA/PanAsia2.

Pakistan [6] - 15 FMD outbreaks due to Asia 1 and O were notified during September 2017 in the two provinces of Azad Jammu and Kashmir and Punjab.

POOL 4 - EASTERN AFRICA

Ethiopia [7] – The National Animal Health Diagnostic and Investigation Center (NAHDIC) detected FMDV in samples collected from an outbreak.

Kenya [8] - FMDV serotypes O and SAT 1 were detected in the bovine samples examined by the FMD National Reference Laboratory, Embakasi.

POOL 5 - WEST/CENTRAL AFRICA

No FMD outbreaks were notified for this pool during the reporting month.

POOL 6 - SOUTHERN AFRICA

Botswana [1] – A FMD outbreak for which serotyping is pending occurred on September 19th 2017, in cattle at Ngamiland.

Malawi [1] – A FMD outbreak, for which, even in this case, serotyping was not confirmed, took place on August 24th, 2017 in cattle in communal grazing grounds at Chikwawa.

Namibia [1] – Four FMD outbreaks due to SAT 2 were reported in cattle, between July and September 2017 at Katima-Mulilo, Zambezi.

South Africa [1] – Two FMD outbreaks due to SAT 1 were reported in cattle, at the end of August 2017 at Limpopo.

Zimbabwe [1] – Thirty-five FMD outbreaks for which serotyping is still pending occurred between July and September 2017 in Masvingo, Midlands and Manicaland.

POOL 7 - SOUTH AMERICA

Colombia [1] – No new outbreaks were reported in the country during the reporting month, the country continues to adopt control measures to avoid the occurrence of outbreaks.

Rest of Latin America [2, 9, 10] **-** Last registered circulation of FMD in Latin America before the above-mentioned events was announced during the OIE/FAO FMD Laboratory Meeting held in November 2016, where PANAFTOSA reported sequence data for historical FMD outbreaks that occurred in Venezuela in 2013.

COUNTER

****** 157 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED***

III. DETAILED POOL ANALYSIS

A. POOL 1 – *SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA*

Mongolia [1]

Nine FMD outbreaks caused by serotype O, of which two were declared resolved, occurred, between April 28th and September 6th 2017 in small and large ruminants at the following localities: Dornogovi, Khentii and Sukhbaatar.
FMDV serotype O is still responsible for the current events that had started in January 2017. The genotype detected by the WRLFMD in a set of samples collected at the beginning of this year was represented by O/ME-SA/PanAsia.
The source of the outbreaks is unknown and control measures applied for their containment are the following: movement control inside the country, vaccination in response to the outbreaks as reported in Table 2, screening, quarantine, stamping out, zoning and disinfection. No treatment is being administered to the affected animals. Although details on the type of vaccine used are unavailable, a field isolate detected in the first outbreaks, O/MOG/10/2017 and genotyped, as stated above, as O/ME-SA/PanAsia, was subjected to the VMSD test obtaining good matching results with O/TUR/5/2009 but not with O 3039 and Manisa.
A summary of the animals involved in the outbreaks and location of these are reported in Table 3 and Map 2.

Table 2: summary of the vaccination activities carried out in Mongolia, in the Administrative Divisions with FMD episodes starting from the beginning of 2017.

Administrative division	Species	Total Vaccinated	Vaccine details
DORNOD	Cattle	166,526	Not availabe
	Goats	290,011	
	Sheep	478,584	
KHENTII	Cattle	177,056	
	Goats	483,809	
	Sheep	764,176	
SUKHBAATAR	Cattle	206,012	
	Goats	973,009	
	Sheep	1,523,375	
Total n° of animals vaccinated		**5,062,558**	

Table 3: summary of the animals involved in the FMD outbreaks that occurred between April and September 2017 at Dornogovi, Khentii and Sukhbaatar, Mongolia. (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	/	449	0	449	0	**	**	0.00%	**
Goats	/	167	0	167	0	**	**	0.00%	**
Sheep	/	80	0	80	0	**	**	0.00%	*
Totals	**/**	**696**	**0**	**696**	**0**	**	**	**0**	*

*Removed from the susceptible population through death, destruction and/or slaughter
**Not calculated because of missing information

Map 2: location of the four FMD outbreaks that occurred between April and September 2017 at Dornogovi, Khentii and Sukhbaatar, Mongolia (source - WAHIS)

Thailand [2]

Five FMDVs field isolates belonging to genotypes A/ASIA/Sea-97 (A/TAI/42017 and A/TAI/52 and 57/2016) and O/SEA/MYA-98 (O/TAI/40/2016 and O/TAI/1/2017) were subjected to VMSD tests with the following results:

- for the serotype A field isolates, good matching results were obtained with A Iran 2005, with just one of the isolates, and with A 22IRQ with two of the field isolates, while none of the isolates obtained good matching results with A TUR 20/06,
- for the serotype O field isolates, good matching results were obtained with O/TUR 5/09 while none of the field isolates obtained good matching results with O 3039 and O Manisa.

Table 4: Summary of the history of FMD Pool 1 between 2012 – 2017: for geographic distribution see Map 3 below. (Source – Wahis, EuFMD Global Monthly Report)

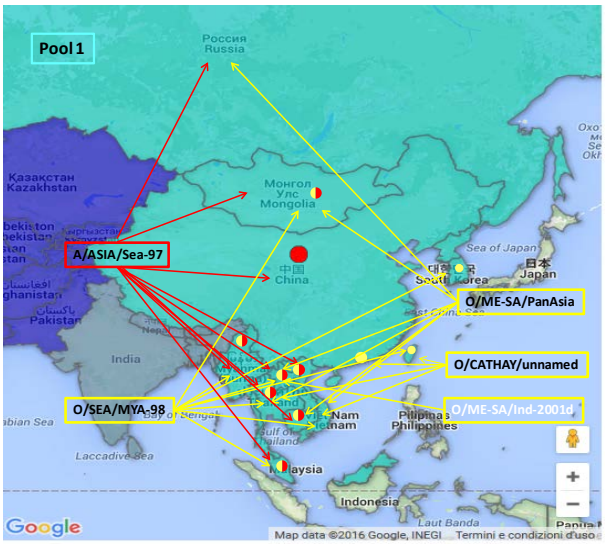
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2016 **(1st semester 2016)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	PENDING/2013-2016 O, A/2016, NOT SAMPLED, (ASIA /2016)	Dec 2016/ A & O	Follow-up needed
China	Data up to 1st semester 2015 2013 & 2015/A, 2012-2013/O, 2012 -2014/NOT TYPED	May 2017/A and O	Follow-up needed
China, Hong Kong, SAR	O	Aug 2016/O	Follow-up needed
Democratic People's Republic of Korea	O/2016 2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Lao People's Democratic Republic	Data up to 1st semester 2015) A, O/2015 2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT	Jan 2017/O Mar 2015/A,	Follow-up needed

	WITH AN UNKNOWN NUMBER OF OUTBREAKS		
Malaysia	A/2016, 2012 –2016/O, 2013 & 2015/NOT TYPED	August 2016/A & O	Follow-up needed
Mongolia	Disease Absent /2016**, 2014 & 2015/O, 2013/A & NOT TYPED	Sep 2017/O, Sept 2016/A,	**See text**
Myanmar	2012-2016/O, 2015/A & NOT TYPED	April 2017/Asia 1 & O, July 2016/ not typed, Oct 2015/A	Follow-up needed
Republic of Korea	Data up to 1st semester 2015 2014 -2015/O, 2012-2013/DISEASE ABSENT	Feb 2017/O & A	Follow-up needed
Russian Federation	2013 – 2016**/A, 2012, 2014 & 2015/O	Dec 2016/O, Oct 2016/Asia 1, Jan 2016/ A	Follow-up needed
Taiwan Province of China	2016/NO DISEASE PRESENT A/2015, 2012-2013/O	Jun 2015/A	Follow-up needed
Thailand	O, A NOT SAMPLED & NOT TYPED	Feb 2017 /A, Jan 2017/O June – July 2016/not typed	**See text**
Viet Nam	O, NOT SAMPLED, NOT TYPED 2013-2016/A	November 2016/A, Oct 2016/O and not typed	Follow-up needed

Map 3: FMD distribution between 2012 – 2016 by serotype and topotype in South East Asia – red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes and white script refers to new introduction of viral lineage in pool or country of the pool during 2016.
(source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMD viral lineages in Pool 1 per 2016 [1, 10]:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/CATHAY, O/ME-SA/Ind-2001d (new detection in Myanmar and Thailand during 2016)
- Serotype A: A/ASIA/Sea-97 and Iran-05[SIS10] sublineage
- Serotype Asia-1 – reappearance of this serotype in 2016 in Russia where the virus was closely related to a vaccine strain Shamir – previous detection in the region was in 2006 in Vietnam and in China (People's Rep. of)



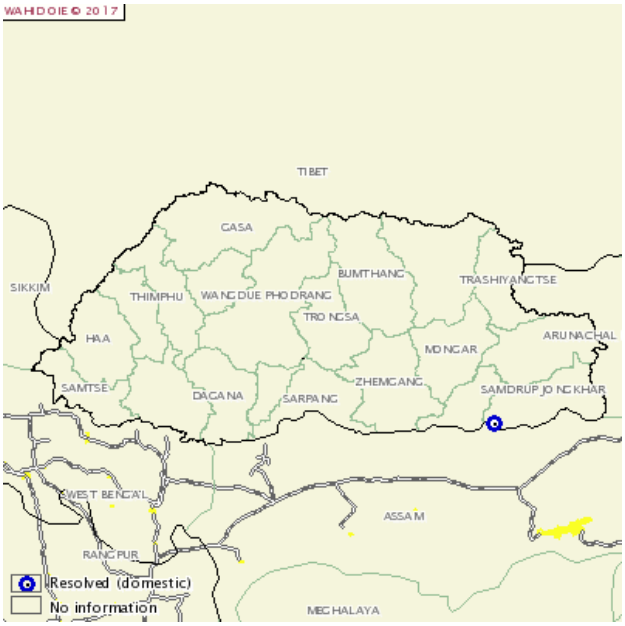
B. POOL 2 – South Asia

Bhutan [1, 2]

A FMD outbreak due to A/ASIA/G-VII occurred in cattle at Jongkhar, on March 31st 2017 that was diagnosed by the WRLFMD. This is the first report describing the detection of this genotype in the country. Location of the outbreak is shown in Map 4. The outbreak was reported as resolved on the October 3rd 2017.

The source of infection is due to the legal movement of animals in transit through the country. The group of affected animals was composed of 21 dairy cattle and 21 calves imported for breeding, however country of origin is not reported. Eleven of these animals succumbed to the disease. During the initial quarantine period, the animals received antibiotics and were released after fulfilment of the quarantine and clinical recovery from the infection as per national regulations.
Control measures adopted in the country are movement, control inside the country, screening, quarantine, disinfection, vaccination is permitted if appropriate vaccine is available.

Map 4: location of the FMD outbreak due to A/ASIA/G-VII occurred in cattle at Jongkhar, Bhutan on March 31st 2017 (source - WAHIS)



A/ASIA/G-VII and O/ME-SA/Ind2001d were the genotypes identified in the set of 22 samples collected in the country between March and July 2017, from one pig and 21 cattle. A summary of the genotyping results are reported in Table 5 and location of outbreaks is presented in Map 5.
The viruses detected at Samtse, which is on the border with Nepal, have a high sequence identity with isolates detected from the latter country during the same period that might be due to the exchange of animals or commodities between the two countries. On the other hand, those detected in Paro are all closely related to other viruses isolated in the country, denoting a common virus origin.

Table 5: summary of the genotyping results of the batch of samples collected in the Bhutan, between March and July 2017, from one pig and 21 cattle (Source – WRLFMD)

Sample Identification	Location origin of sample	Host species	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country - Seq id %	Host species
BHU/3/2017	Samdrupjongkha	cattle	01/04/2017	**A/ASIA/G-VII**	NEP/12/2017 (100%)	cattle
BHU/4/2017	Samtse		08/04/2017	**O/ME-SA/Ind2001d**	NEP/3/2017 (99.8)	
BHU/5/2017					NEP/3/2017 (99.7)	
BHU/8/2017	Paro		08/06/2017		/	
BHU/11/2017			14/07/2017			
BHU/12/2017			19/07/2017			
BHU/13/2017						
BHU/14/2017						
BHU/15/2017			21/07/2017			
BHU/16/2017						
BHU/17/2017						
BHU/18/2017						
BHU/19/2017						
BHU/20/2017						
BHU/21/2017			22/07/2017			
BHU/22/2017			22/07/2017			

Map 5: location origin of the samples collected in the Bhutan, between March and July 2017. (Source – WRLFMD and Google Fusion Maps)
Yellow dot – location of A/ASIA/G-VII detection
Green dots – location of O/ME-SA/Ind2001d detection.

India [3]

The ICAR-PDFMD, Mukteswar, India detected only FMDV serotype O among the 14 cattle samples tested using FMDV antigen and/or RNA detection methods. The laboratory submitted four field isolates belonging to serotype O, for genotyping and five isolates for vaccine matching tests. The FMD diagnostics kits employed are those developed at ICAR-PDFMD. The laboratory also conducted the analyses of 505 sera collected in the course of epidemiological studies for the detection of FMD antibodies.

The laboratory continues to be involved in the field investigations of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities. The institution also has ongoing research studies and collaborations with international organisations.

Nepal [2, 4]

The National Foot and Mouth Disease and TADS Laboratory reported for September 2017 the circulation of FMDV serotype O. The laboratory was involved in the field investigations of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities.

Three field isolates respectively belonging to A/ASIA/G-VII (A/NEP/13/2017) and O/ME-SA/Ind2001d (O/NEP/3 and 24/2017) were subjected to VMSD tests with the following results:

- none of the vaccine strains employed, i.e. A IRN/2005, A/May/97, A/TUR/20/2006 and A 22 IRQ/24/64 obtained good matching results with the serotype A field isolate,
- O 3039, O Manisa and O/TUR/5/09 obtained good matching results for the serotype O field isolates.

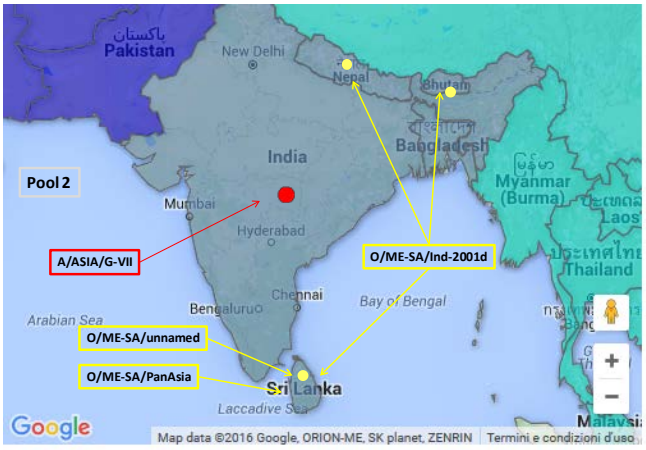
Table 6: Summary of the history of FMD Pool 2 between 2012 – 2017, for geographic distribution see Map 6 below. (Source – Wahis, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Bangladesh	NO DATA AVAILABLE/2016, DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Dec 2016/A, ASIA 1 and O	Follow-up needed
Bhutan	2013-2016/O, NOT TYPED or NOT REPORTED 2013 & 2014/NOT SAMPLED	July 2017/O, April 2017/A,	**See text**
India	NO DATA AVAILABLE/2016, O, A, NOT SAMPLED 2012-2014/Asia 1 2013/NOT TYPED	Sep 2017/O, Apr 2015/A Asia 1	**See text**
Mauritius	DISEASE ABSENT	Sep 2016/0	Follow-up needed
Nepal	O, 2012-2103/Asia 1	Sep 2017/O, April 2017/A	**See text**
Sri Lanka	2015 -16/NO DATA REPORTED, 2012 – 2014/O	2016/O	Follow-up needed

Map 6: FMD distribution between 2012 – 2016 by serotype and topotype in South Asia - red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes.
(source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [1, 10]:

- O/ME-SA/Ind-2001d predominates (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been recognized during 2012-15), outbreaks of this serotype detected in Mauritius during 2016 (**not reported in Map**)
- O/ME-SA/PanAsia-2 (last detected in 2011 in Sri Lanka)
- A/ASIA/G-VII (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters) – not reported in map



C. *POOL 3 – West Eurasia & Middle East*

Afghanistan [2, 5]

Of the 22 FMDV positive samples detected out of the 78 samples examined by the CVDRL of Kabul, Afghanistan, one sample was positive for FMDV serotype A (4.55%) and 10 samples for serotype O (45.45%) while in the remaining 11 FMDV positive samples (50%) serotyping was not achieved. The distribution of the serotypes among the samples examined is reported in Graph 1.
The laboratory personnel were involved in providing expert advice to Government services and national/local authorities.
The results obtained by the WRLFMD for the set of 38 samples forwarded for genotyping are reported in Table 7 and location of sample collection in Map 7.

Map 7: location origin of the bovine samples collected between January and May 2017 in Afghanistan. (Source – WRLFMD and Google Fusion Maps)

Graph 1: relative distribution of the FMDV serotypes among the samples collected in the different provinces of Afghanistan during September 2017. (Source – CVDRL, Afghanistan)

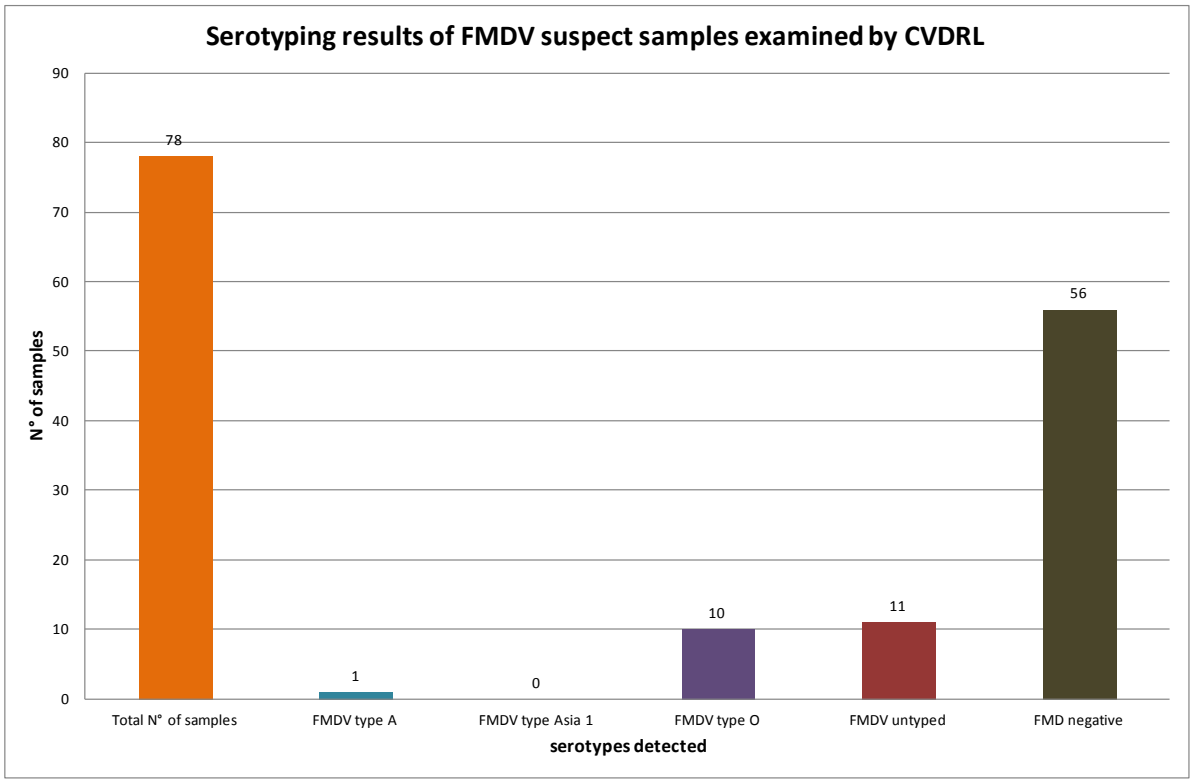


Table 7: summary of the genotyping results of the samples collected from cattle in the Afghanistan, between January and May 2017. (Source – WRLFMD)

Sample Identification	Location origin of sample	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country - Seq id %	Host species
AFG/2/2017	Paryan	10/01/2017	**A/ASIA/Iran-05^{FAR-11}**	PAK/20/2015 (97%)	cattle
AFG/3/2017	Bazarak	13/01/2017	**A/ASIA/Iran-05^{SIS-13}**	PAK/10/2014 (95.9%)	
AFG/4/2017	Wonabah	17/01/2017	**A/ASIA/Iran-05^{FAR-11}**	PAK/20/2015 (97%)	
AFG/6/2017	M.Agha	11/03/2017	**A/ASIA/Iran-05^{SIS-13}**	PAK/10/2014 (96.1%)	
AFG/10/2017	Koshta	21/03/2017		PAK/10/2014 (95.9%)	
AFG/11/2017	Wonabah	21/03/2017	**A/ASIA/Iran-05^{FAR-11}**	PAK/20/2015 (97%)	
AFG/13/2017	Paryan	25/03/2017		PAK/20/2015 (97%)	
AFG/14/2017	Wonabah	26/03/2017		PAK/20/2015 (97%)	
AFG/25/2017	Wonabah	27/04/2017	**A/ASIA/Iran-05^{SIS-13}**	PAK/10/2014 (95.9%)	
AFG/17/2017	Gozarah	14/04/2017	**Asia1/ASIA/Sindh-08**	PAK/39/2014 (96.3%)	
AFG/22/2017	Gozarah	23/04/2017		PAK/39/2014 (96.3%)	
AFG/15/2017	Qarabagh	30/03/2017	**O/ME-SA/PanAsia-2^{ANT-10}**	PAK/3/2014(97.9)	
AFG/16/2017	Khogyani	04/04/2017		IRN/36/2016 (98.6%)	sheep
AFG/23/2017	Noorgal	24/04/2017		IRN/36/2016 (98.4%)	cattle
AFG/34/2017	Jabalsaraj	25/05/2017		PAK/24/2014 (97.2%)	cattle
AFG/35/2017	Koja Dako	26/05/2017		IRN/36/2016 (99.1%)	sheep

Pakistan [6]

Fifteen FMD outbreaks due to serotypes Asia 1 and O were notified during September 2017, in the provinces of Azad Jammu and Kashmir and Punjab. The distribution of FMDV serotypes relative to the outbreaks and location of these in the different provinces is reported in Table 8 and Map 8.

Emergency and preventive vaccination was also carried out in different areas of the country as respectively reported in Tables 9 and 10.

The FMD control project is currently operated only Punjab and information relative to other areas of the country are provided on voluntarily basis.

Table 8: summary of the FMD outbreaks reported in Pakistan during September 2017. (source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

Province	District	N° of Outbreaks	N° of outbreaks due to FMDV Serotype(s)		
			'O'	'Asia-1'	Un-Typed
Azad Jammu & Kashmir	Mirpur	6	2	--	4
	Bhimber	1	--	--	1
Punjab	Toba Tek Singh	1	1	--	--
	Pakpattan	3	--	2	1
	Attock	2	2	--	--
	Sargodha	2	--	--	2
Total		**15**	**5**	**2**	**8**

Map 8: location of the FMD outbreaks reported in Pakistan during September 2017. (source – Google Fusion Maps, Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

Table 9: summary of the emergency vaccination activities conducted in some provinces of Pakistan during September 2017. (source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

Province	Ring Vaccination (Doses)
Punjab	500
ICT	125
AJK	700
Total	**1325**

Table 10: summary of the preventive vaccination activities conducted in the various districts of the Punjab province, Pakistan during September 2017. (source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

District	No. of Households	Animals Vaccinated (Primary Dose)			Animals Vaccinated (Booster Dose)		
		Cattles	Buffaloes	Total	Cattles	Buffaloes	Total
Pakpattan	28,860	110,299	144,954	255,253	-	-	-
Sahiwal	49,965	-	-	-	213,753	293,099	506,852
Sheikhupura	32,477	-	-	-	197,224	197,494	394,718
Okara	95,903	510,234	343,554	853,788	34,008	17,281	51,289
Vehari	59,211	119,001	109,026	230,027	196,395	116,783	313,178
Punjab	**266,416**	**739,534**	**597,534**	**1,339,068**	**641,380**	**624,657**	**1,266,037**

Table 11: Summary of the history of FMD Pool 3 between 2012 – 2017, for geographic distribution see Map 9 below. (Source – Wahis, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment

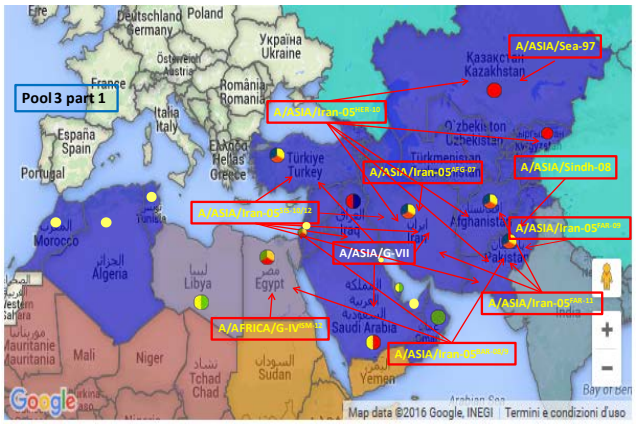
Afghanistan	2013-2016**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	Sep 2017/A & O, Aug 2017/Asia 1	**See text**
Algeria	Data available up to 1st semester 2015 2014 -2015/O	Apr 2017/A, Apr 2015/O	Follow –up needed
Armenia	2015 -2016**/A , 2012-2014/DISEASE ABSENT	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT	2007/0	Follow –up needed
Bahrain	DISEASE ABSENT/2016, 2012, 2014 &2015 /O	Mar 2015/O	Follow –up needed
Egypt	2012, 2014, 2016**/SAT 2 2012 – 2016**/O, A	April 2017/O, Nov 2016/A May-Jun 2016/Sat 2, Aug 2016/typing pending	Follow –up needed
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran (Islamic Republic of)	2012-2016/A, Asia 1 & O	Feb 2017/A & O, 2013/Asia 1	Follow –up needed
Iraq	2015-16/O, 2012-2016/A 2015/ SEROTYPE NOT REPORTED, 2012-13	Dec 2013/A, ASIA 1	Follow –up needed
Israel	2012-2015**/O	May 2017/A & O	Follow –up needed
Jordan	DISEASE ABSENT	Mar 2017/O, 2006/A	Follow –up needed
Kazakhstan	2014-2016**/ DISEASE ABSENT, 2012/O,2012 –2013/A	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	O/2016 2013 – 2014/ DISEASE ABSENT, 2012/O	April 2016/O	Follow –up needed
Kyrgyzstan	2015 -16/ DISEASE ABSENT, 2012-2014/O, A	Aug 2014/not typed & Apr 2013 /O, A,	Follow –up needed
Lebanon	DISEASE ABSENT/2016**, 2015/ NO DATA REPORTED	2010/not typed	Follow –up needed
Libya	NO DATA REPORTED	Oct 2013/O	Follow –up needed
Morocco	2012-14,2016**/DISEASE ABSENT, O/2015	Oct 2015/O	Follow –up needed
Oman	2016/ NO DATA REPORTED, 2012-2015/O	May 2015/SAT 2	Follow –up needed
Pakistan	2012 & 2015-16/ NO DATA REPORTED 2013-2014/A, ASIA 1 & O	Sep 2017/Asia 1 & O, Aug 2017/ A	**See text**
Palestine	O, 2012-2013/SAT 2	Jun 2017/serotying pending May 2017/O, Mar 2013/Sat 2	Follow –up needed
Qatar	NO DATA AVAILABLE/2016 2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014, 2016**/O A/2015	Oct 2016/A & April 2016/O	See text Follow –up needed
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2016/ NO DATA REPORTED 2014-2015**/DISEASE ABSENT 2012- 2013/NOT TYPED	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2015-16**/ DISEASE ABSENT,	April 2017/A, Oct 2014/O	Follow –up needed

	2014/O		
Turkey	A & O, NOT TYPED Asia 1/2012-15	Oct 2015/ A May, 2014-2015/ Asia 1 and O	Follow –up needed
Turkmenistan	2013-2016**/DISEASE ABSENT, 2012/NO DATA REPORTED	Not available	Follow –up needed
United Arab Emirates	O/2016 2012, 2015/DISEASE ABSENT 2013-2014/O	Sep 2016/O	Follow –up needed

Map 9: FMD distribution between 2012 – 2016 by serotype and topotype for West Eurasia and Middle East– red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes, green to serotype SAT 2 genotypes and white script to new introduction of viral lineage in pool or country of the pool during 2016.
(source – Google Fusion Maps, WRLFMD).

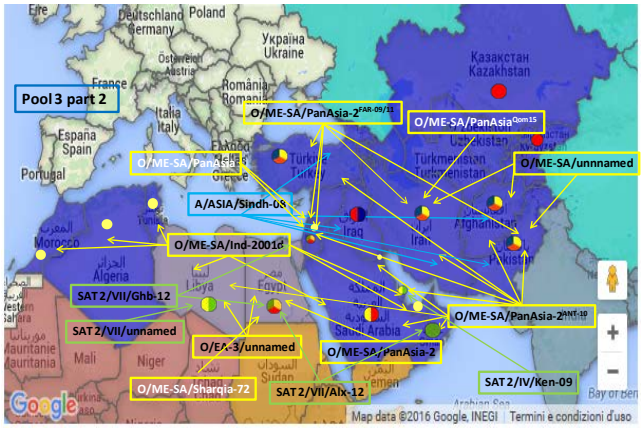
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [1, 10]:

- A/ASIA/Iran-05 (from AFG-07, HER 10, SIS-10/12, FAR-09/11 and BAR-08 sub-lineages)
- A/Asia/G-VII (recent incursion from South Asia - detected also in Iran in 2016)
- A/ASIA/Sea-97
- A/ASIA/Sindh-08
- A/AFRICA/G-IV
- Asia-1 (Sindh-08 lineage).



Conjectured circulating FMDV serotype O and SAT 2 lineages in Pool 3 **(cont'd)**

- O/ME-SA/PanAsia-2 (predominantly from ANT-10 and FAR-09 /11 sub-lineages)
- O/ME-SA/Ind-2001 (recent incursions per 2013/14 from the Indian sub-continent)
- New detection during 2016 of O/ME-SA/Sharqia-72 in Egypt and of O/ME-SA/PanAsia-2QOM-15 in Iran
- O/EA-3/unnamed in Egypt and Libya
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa

Ethiopia [7]

The National Animal Health Diagnostic and Investigation Center (NAHDIC) detected FMDV serotype O using ELISA antigen in ten bovine probang and tissue samples collected from an outbreak. The laboratory personnel provided instructions to the local community for the containment of the same outbreak.
Two NAHDIC experts are currently on training at the WRLFMD on FMD diagnosis through an OIE FMD twinning program.

Kenya [8]

FMDV serotypes A and O were respectively detected in one and three bovine samples examined by the FMD National Reference Laboratory, Embakasi.
The laboratory has ongoing collaborations with Sandia National Laboratories, USA.
The last samples last forwarded by the country to the WRLFMD for genotyping was in 2013. Past genotypes detected in relation to the serotypes reported this month were O/EA-1/unnamed, O/EA-2/unnamed and O/EA-4/unnamed collected between 2009 and 2011.

Table 12: Summary of the history of FMD Pool 4 between 2012 – 2017, for geographic distribution see Map 10 below. (Source – Wahis, EuFMD Global Monthly Report)

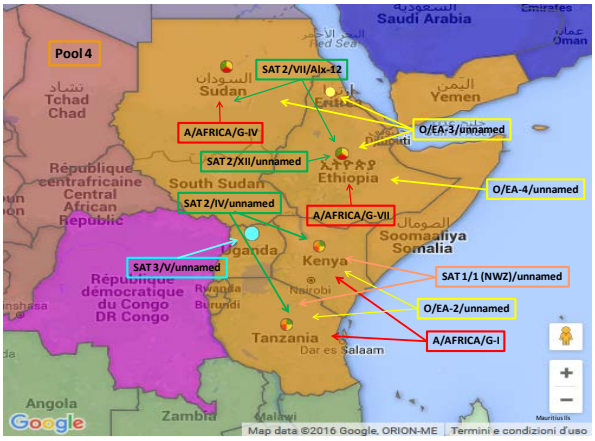
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Democratic Republic of Congo	2012 – 2016**/A, O, SAT 1	May 2017/not typed	Follow –up needed
Djibouti	DISEASE ABSENT	Not available	Follow –up needed
Egypt	2012, 2014, 2016**/SAT 2 2012 – 2016**/O, A	May-Jun 2016/ O & Sat 2, March 2016/A, Aug 2016/typing pending	Follow –up needed
Eritrea	2014, 16/ DISEASE PRESENT 2015/ NO DATA REPORTED 2013/ DISEASE ABSENT, 2012/O	Nov 2016/not reported, Jan 2012/O	Follow –up needed
Ethiopia	O, 2015-16/SAT 1 2012 & 2105/SAT 2, 2012/A	Sep 2017/O, Jun 2017/A, March 2017/SAT 1, May 2016/SAT 2	**See text**
Kenya	2012 – 2016 /NOT TYPED, A, O, SAT1, SAT2	Sep 2017/A & O, Aug 2017/SAT 2, Jun 2017/SAT 1	**See text**
Libya	NO DATA REPORTED	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Rwanda	2015-16/NO DATA AVAILABLE 2012-2013/A, O, SAT1, SAT 2	Nov 2012/not typed	Typing required
Somalia	2012-13, 2015-16/DISEASE PRESENT, 2014/PENDING	June 2016/not reported	Follow –up needed
Sudan	2015-16 -16/A, SAT 1 & NOT SAMPLED, 2012-2014/O & NOT TYPED 2013/SAT 2,	Dec 2016/ not sampled, Oct 2016/O, Dec 2013/A, Jan 2014/SAT 2	Follow –up needed
South Sudan	2015/DISEASE PRESENT 2014/A, O SAT 1, SAT 2, SAT 3 2012-2013 & 2016 NO DATA REPORTED	2011	Follow –up needed
United Republic of Tanzania	2012-2016/A, O, SAT 1, SAT 2	Oct 2016/SAT 1, Aug 2016/O & SAT 2, Jun 2016/ A	Follow –up needed

Uganda	2016/NO DATA REPORTED 2013-16/NOT TYPED or NOT SAMPLED, 2012, 2015/ SAT 1,2012, 2014-15/O	May 2014/O Nov 2014/SAT1, Jan 2015/A and SAT 3, July 2015/ SAT 2 and untyped	Follow –up needed
Yemen	2015-16/NO DATA REPORTED 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA, 2012/O	2009/O	Follow –up needed

Map 10: FMD distribution between 2011 – 2016, by serotype and topotype for East Africa - red boxes and circles refers to serotype A genotypes, yellow refers to serotype O genotypes, green refers to serotype SAT 2 genotypes and light blue refers to SAT 3 genotypes.
(source – Google Fusion Maps, WRLFMD).

East Africa is known to be endemic for FMD, but available data is at present limited.
Conjectured circulating FMDV lineages in Pool 4 per 2015 2 [1, 10]:

- O (topotypes EA-2 (Kenya, Tanzania, DR Congo & Uganda), EA-3 (Egypt, Ethiopia, Eritrea, Kenya & Sudan) and EA-4 (Ethiopia, Kenya, Uganda).
- A/AFRICA (genotypes I (Kenya, Tanzania, D.R. Congo), IV (Sudan, Eritrea & Egypt) and VII (Ethiopia & Egypt))
- A/ASIA/Iran-05 [BAR-08] sub-lineage (Egypt)
- SAT 1 (topotypes I (Kenya, Tanzania), IX (Ethiopia))
- SAT 2 (topotypes IV (Kenya, Tanzania), VII (Sudan, Egypt, Ethiopia), XII (Ethiopia, Sudan))
- SAT 3 (only detected in African buffalo in the south of the QENP, Uganda in 1970 & 1997 and recently in 2013)



E. POOL 5 – <u>West / Central Africa</u>

Cameroon [11]
The Laboratoire National Vétérinaire (LANAVET), Garoua, Cameroon detected FMDV antibodies in 19 (11.31%) of the 168 ovine and caprine serum samples examined by non-structural protein (NSP) ELISA. The laboratory is also continuing its collaborative research project with the Ohio State University and Plum Island of the USA.
Most recent genotypes identified in the country are represented by A/AFRICA/G-IV and SAT 2/VII/Lib-12 in samples collected in 2013 for which VMSD tests are not available.

Ghana [12], Nigeria [13] and Senegal [14]
The ACCRA Veterinary Laboratory, Ghana, the National Veterinary Research Institute Vom, Nigeria and the Laboratoire National de l'Elevage et de Recherches Vétérinaires of Senegal reported that there were no diagnostic confirmations of FMD outbreaks in their respective countries even if Nigeria is processing a set of FMD suspect epithelial samples..
The Laboratoire National de l'Elevage et de Recherches Vétérinaires of Senegal, in collaboration with ANSES (OIE FMD reference laboratory), will be examining historical suspect samples to strengthen their diagnostic capacity.

Within this respect, the National Veterinary Research Institute Vom, Nigeria continues its OIE twinning programme with CODA CERVA, Belgium.

Table 13: Summary of the history of FMD Pool 5 between 2012 – 2017, for geographic distribution see Map 11 below. (Source – Wahis, EuFMD Global Monthly Report)

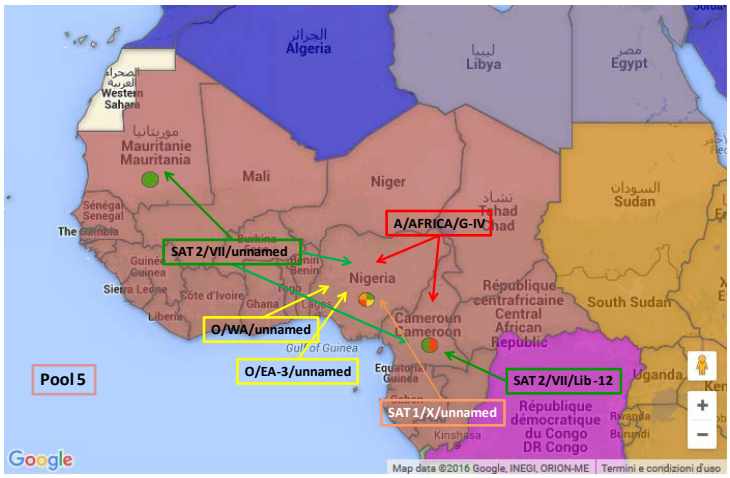
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	2016/NO DATA REPORTED A, O, SAT 1, SAT 2/2012-2015	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT	Dec 2016/ not available	Follow –up needed
Cameroon	2016/NO DATA REPORTED DISEASE PRESENT	April 2017/untyped, Nov 2014/O, SAT 2, May 2014/SAT 1, Apr 2014/ A	**See text**
Cabo Verde	DISEASE ABSENT	Not available	Follow –up needed
Central African Republic	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Chad	2016/DISEASE PRESENT 2014-15/ DISEASE ABSENT 2012 – 2013/ DISEASE PRESENT	Aug 2016/Not reported	Follow –up needed
Democratic Republic of the Congo	2012 – 2016/A, O, SAT 1	Dec 2016/A, O & Sat 1	Typing required
Congo	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Côte d'Ivoire	2013-16/ not sampled or not reported, 2012/A,	Jul 2016/not reported	Follow –up needed
Equatorial Guinea	2014 – 2016/ NO DATA AVAILABLE 2012 – 2013/DISEASE SUSPECTED	Not available	Follow –up needed
Gabon	2012, 2014-16/DISEASE ABSENT 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Gambia	NO DATA AVAILABLE	2012/O	Follow –up needed
Ghana	2016/NO DATA AVAILABLE 2012 – 2015/DISEASE PRESENT	Dec 2016/ O & SAT 2 2014/not available	**See text**
Guinea-Bissau	2015-16**/DISEASE SUSPECTED 2014/ DISEASE PRESENT 2012-2013/DISEASE ABSENT	Oct 2016/O Dec 2016/SAT1 & SAT 2	Follow –up needed
Guinea	2012-2013, 2015-16**/ DISEASE ABSENT 2014/ DISEASE PRESENT	2014/not available	Follow –up needed
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed

Mali	2013, 2016/DISEASE PRESENT 2015/A, SAT 1 2014-2015/SAT 2 2012/ NO DATA AVAILABLE	Oct 2016/not reported	Follow –up needed
Mauritania	2016/DISEASE SUSPECTED, 2014-2015**/SAT 2, 2012-2013/NO REPORTED OUTBREAKS	Dec 2014/SAT 2	Follow –up needed
Niger	2016**/DISEASE PRESENT BUT WITH NO QUALITATIVE DATA, 2015/O 2012 – 2014/NOT SAMPLED	2014/not sampled, May 2015/O	Follow –up needed
Nigeria	2015-16/DISEASE PRESENT 2012-2014/O	Feb 2017/not typed Sept 2016/ O & SAT 1 Nov 2015/A, Sept 2014/ SAT 2	**See text**
Sao Tome Principe	2013-16/NO DATA AVAILABLE 2012/DISEASE ABSENT	Not available	Follow –up needed
Senegal	2015-16/DISEASE PRESENT 2012, 2014/NOT SAMPLED 2013/NO DATA AVAILABLE	Feb 2015/ A and O, 2014/ SAT 2	**See text**
Sierra Leone	DISEASE ABSENT**	Oct 1958	Follow –up needed
Togo	O, SAT 1	2012/O	Follow –up needed

Map 11: FMD distribution between 2012 – 2016 by serotype and topotypes for West Africa - red boxes and circles refer to serotype A genotypes, yellow refers to serotype O genotypes, orange boxes to serotype SAT 1 genotypes, green refers to serotype SAT 2serotypes and white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.
(source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMDV lineages in Pool 5 per 2016 [1, 10]:

- Serotype O (topotypes WA, EA-3 (Nigeria))
- Serotype A (topotypes AFRICA IV & VI)
- Serotype SAT 1 - detection of a new viral lineage, SAT 1/X/unnamed in Nigeria
- Serotype SAT 2 (topotype VII/Lib-12 (Mauritania), and unnamed genotypes)



F. POOL 6 – Southern Africa

Botswana [1]

A FMD outbreak occurred on September 19th 2017 in grazing cattle at a communal area at Ngamiland, Botswana. Serotyping of the present outbreak is pending and the Botswana Vaccine Institute (OIE Reference Laboratory) is carrying out virus isolation. The source of the infection was attributed to contact with wild species. A farmer notified the suspect to a veterinary officer and samples were forwarded to the laboratory for confirmation.
Containment measures applied are movement, control inside the country, surveillance within containment and/or protection zone, traceability, zoning, vaccination permitted (if a vaccine exists), disinfection and ante and post-mortem inspections. No treatment is being administered to the affected animals.
A summary of the animals involved in the outbreak and its location are reported in Table 14 and Map 12.

Map 12: location of the FMD outbreak that occurred on September 19th 2017 occurred in cattle at grazing in a communal area at Ngamiland, Botswana. (source – WAHIS)

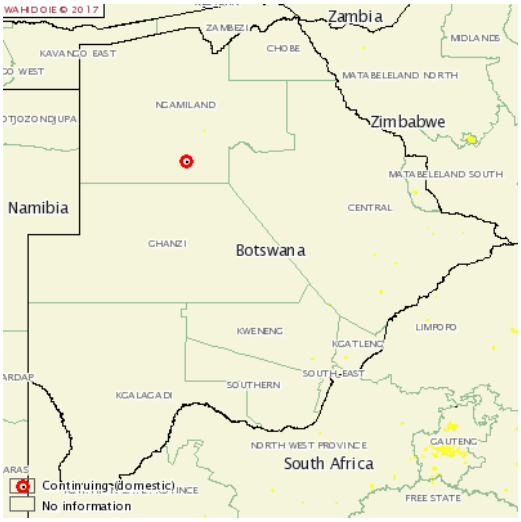


Table 14: summary of the animals involved in the FMD outbreak that occurred on September 19th 2017 occurred in cattle at grazing in a communal area at Ngamiland, Botswana (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	343	101	0	0	0	29.45%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

Malawi [1]

A FMD outbreak took place on August 24th 2017, in cattle at Chikwawa, Malawi. The Malawi Central Veterinary Laboratory is confirming serotyping. The affected herd is in a communal grazing system in close proximity with buffaloes that are in Lengwe National Park. Buffaloes occasionally stray out of the park and graze with cattle. The population is within the locality that is strategically vaccinated against FMD using a trivalent FMD vaccine containing SAT1, SAT2 and SAT3.
Control measures applied are movement control inside the country, surveillance outside containment and/or protection zone surveillance within containment and/or protection zone, quarantine, control of wildlife reservoirs disinfection process to inactivate the pathogenic agent in products or by-products, vaccination if a suitable vaccine exists, screening, traceability and official destruction of animal products.
No treatment is being administered to the affected animals.
A summary of the animals involved in the outbreak and its location are reported in Table 15 and Map 13.

Table 15: summary of the animals involved in the FMD outbreak that occurred on August 24th 2017, in cattle present in communal grazing grounds at Chikwawa, Malawi. (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	30,000	72	0	0	0	0.24%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

Map 13: location of the FMD outbreak that occurred on August 24th 2017 in cattle pasturing on communal grazing grounds at Chikwawa, Malawi. (source – WAHIS)

Namibia [1]

Four FMD outbreaks due to SAT 2 were reported in cattle, between July 24th and September 12th 2017 at Katima-Mulilo, Zambezi.

The Central Veterinary Laboratory of Namibia carried out diagnosis in the first instance on July 17th 2017 using NSP ELISA and real-time PCR while the Botswana Vaccine Institute (OIE Reference Laboratory) conducted virus isolation and sequencing results were issued on August 18th 2017even if these were not reported.

Outbreak origin is due to contact with wild animals and the control measures adopted are movement control inside the country, vaccination in response to the outbreaks, surveillance within containment and/or protection zone, traceability, quarantine and disinfection with no treatment being administered to the affected animals.

A summary of the animals involved in the outbreak and its location are reported in Table 16 and Maps 14 & 15.

Map 14 & 15: location of the FMD outbreaks reported in cattle, between July 24th and September 12th 2017 at Katima-Mulilo, Zambezi, Namibia. (source – WAHIS)

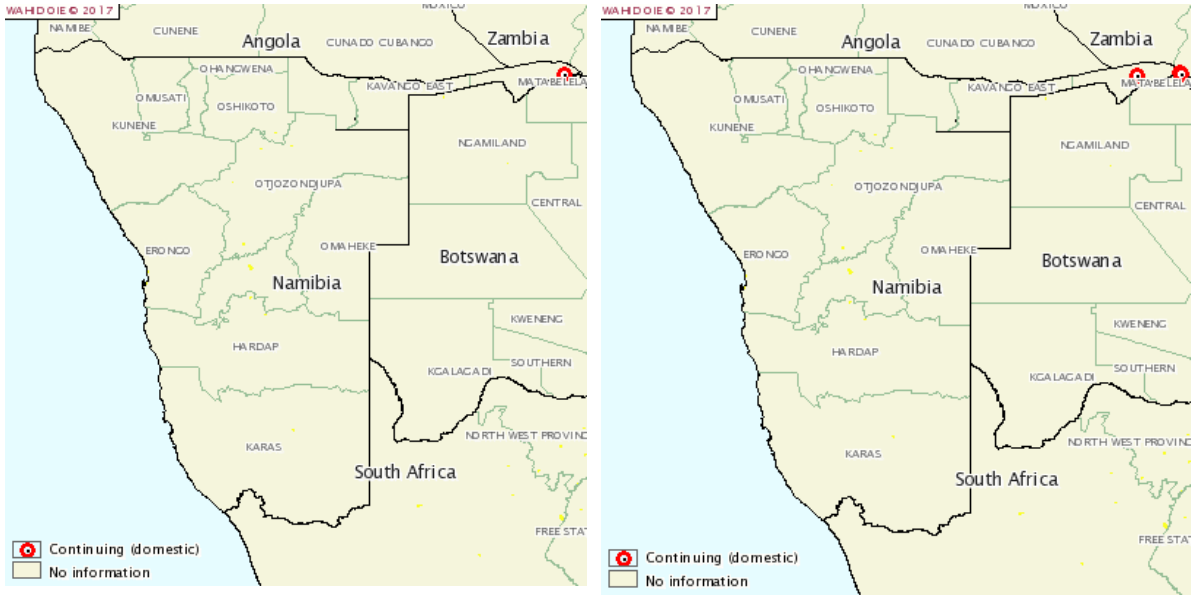


Table 16: summary of the animals involved in the FMD outbreaks reported in cattle, between July 24th and September 12th 2017 at Katima-Mulilo, Zambezi. (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	4,101	38	0	0	0	0.93%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

South Africa [1, 15]

Two FMD outbreaks due to SAT 1 were reported in cattle, on August 29th and 31st 2017 at Limpopo following the one reported the week before. The ARC-Onderstepoort Veterinary Institute using PCR confirmed diagnosis.

As the outbreaks are within South Africa's FMD protection zone, close to the Kruger National Park these do not affect the status of South Africa's FMD free zone. Coordinates of the farms involved were modified to protect their privacy as required by South African legislation.

As for Namibia, source of outbreaks was attributed to contact with wild animals. The control of the further spread of the virus will be based on the adoption of the following measures: movement control inside the country, surveillance within containment and/or protection zone, screening, quarantine, while vaccination is prohibited and no treatment is being administered to the affected animals.

A summary of the animals involved in the outbreak and its location are reported in Table 17 and Map 16.

Table 17: summary of the animals involved in the FMD outbreaks reported in cattle, on August 29th and 31st 2017 at Limpopo, South Africa. (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	1,310	10	0	0	0	0.76%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

Map 16: indicative location of the FMD outbreaks reported in cattle, on August 29th and 31st 2017 at Limpopo, South Africa. Coordinates of the farms involved were modified to protect their privacy as required by South African legislation. (source – WAHIS)

Further activities reported by the ARC-Onderstepoort Veterinary Institute are that the FMDV serotype SAT 1 virus is being sequenced and that the laboratory examined 3,510 serum samples using liquid-phase blocking ELISA for the serological detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 252 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects.

Zimbabwe [1]

Thirty-five FMD outbreaks for which serotyping is still pending occurred between July and September 2017 in Masvingo, Midlands and Manicaland.

As for Namibia and South Africa, the outbreaks were due to contact with wild animals at grazing and/or watering points.

The present episodes are a continuation of the first outbreak notified in July 2017 with the virus that continues to spread in the affected districts especially because the amount of vaccine to control the episodes is limited.

All the infected districts are under quarantine with veterinary check-points placed at strategic areas to prevent cattle movement. In addition, all illegally moved cattle are being destroyed. Other control measures adopted are movement control inside the country, vaccination in response to the outbreaks, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, traceability, quarantine, control of wildlife reservoirs and zoning.

FMD affected animals are not receiving treatment. Inspections and community education campaigns are currently on-going.

A summary of the animals involved in the outbreak and its location are reported in Table 18 and Map 17.

Table 18: summary of the animals involved in the 35 FMD outbreaks reported in cattle, occurred between July and September 2017 in Masvingo, Midlands and Manicaland, Zimbabwe. (source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	56,890	4,990	0	0	0	8.77%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

Map 17: location of the 35 FMD outbreaks reported in cattle, occurred between July and September 2017 in Masvingo, Midlands and Manicaland, Zimbabwe. (source – WAHIS)

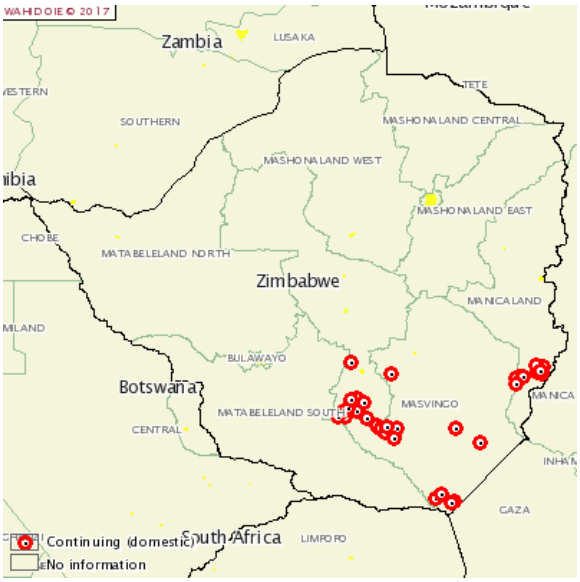


Table 19: Summary of the history of FMD Pool 6 between 2012 – 2017, for geographic distribution see Map 18 below. (Source – Wahis, EuFMD Global Monthly Report)

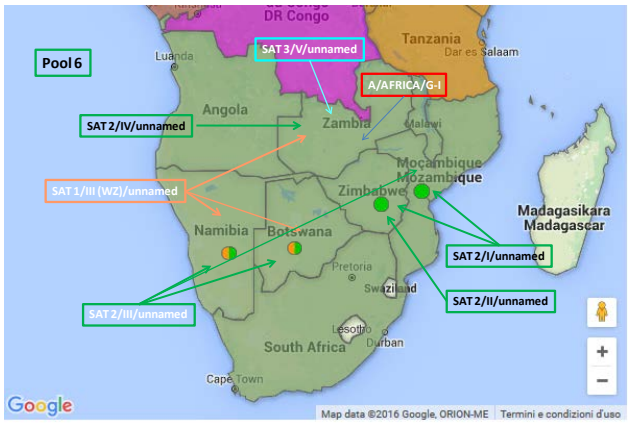
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2015-2016**/ DISEASE PRESENT 2013-2014/DISEASE ABSENT 2012/DISEASE SUSPECTED BUT NOT CONFIRMED	April 2016/SAT 2, July 2015/ SAT 2	Follow –up needed
Botswana	2012-2016**/SAT 2 2014-2015/SAT 1	Sep 2017/typing pending, July 2015/SAT 2, June 2015/SAT 1	**See text**
Democratic Republic of the Congo	2012 – 2016/A, O, SAT 1	Dec 2016/A, O & Sat 1	Typing required
Malawi	2012/NO OUTBREAKS REPORTED 2013-2015/ NO DATA AVAILABLE	Aug 2017/typing pending, Oct 2011,	**See text**
Mozambique	2016**/ NO DATA AVAILABLE 2012 -2015/DISEASE ABSENT	Dec 2016/SAT 2, Sep 2016/ Typing pending, May 2015/ SAT 1	Follow –up needed
Namibia	2014-2016**/SAT 22012-2014/SAT 1	Sep 2017/SAT 2, Aug 2017/typing pending,	**See text**

		May 2015/SAT 1, ,	
South Africa	2015-16**/SAT 3 2012-2015/SAT 2 2013/SAT 1	Aug 2017/SAT 1, May 2017/SAT 2 Dec 2015/SAT 3,	**See text**
Zambia	2016/SAT 3 & NOT TYPEC 2013-2014/ NO DATA AVAILABLE 2012/SAT 1, SAT 2	Mar 2017/SAT 2, Jan 2013/SAT 1, Feb 2015/A, Mar 2016/SAT 3	Follow –up needed
Zimbabwe	2012-2016/SAT 2 2014-15SAT 1 2013/SAT 3	Sep 2017/typing pending, May 2017/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	**See text**

Map 18: FMD distribution by serotype and topotype for Southern Africa, 2012 – 2016 - red refers to serotype A, orange refers to SAT 1, green refers to serotype SAT 2 and white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.
(source – Google Fusion Maps, WRLFMD).

Swaziland and Lesotho are free from FMD without vaccination. There is a zone in both Botswana and Namibia, which has been FMD free without vaccination, since 2010 and 1997 respectively.
Conjectured circulating FMDV lineages in pool 6 per 2015 [1, 11]:

- Serotype SAT 1 (topotypes I, II and III) – new detection of SAT 1/III (WZ)/unnamed in Botswana during 2016
- Serotype SAT 2 (topotypes I, II, III and IV) - new detection of SAT 2/III/unnamed in Namibia
- Serotype SAT 3 (?) (topotypes I, II and III) – new detection of SAT 3/V/unnamed in Zambia during 2016



G. POOL 7 – South America

Colombia [1]

No new FMD outbreaks were reported in the country during September 2017. The control activities still ongoing are at Cundinamarca and at Norte De Santander were episodes of the disease respectively commenced on June 1st and July 14th 2017.

Relative to the origin of the outbreaks at Cundinamarca, that of Yacopi was due to swill collected from the same zone that was fed to swine which amplified the infection before transmitting it to cattle, while for the outbreak in Tibacuy, the infection was transmitted through fomites. Stamping out in Yacopi was delayed as it is not easily accessible. In spite of this, burials pits were dug for the elimination of the carcasses. The control measures implemented since the start of the outbreaks were successful in stopping the spread of the virus. The events of Cundinamarca were reported as resolved as from August 15th 2017.

For the outbreak of Norte De Santander, virus introduction was attributed to illegal introduction of animals from Venezuela. Diseased animals and in contacts were killed and disposed of. Intensive epidemiological and serological surveillance was carried out, along with thorough controls at border level. The event was declared closed on September 4th 2017.

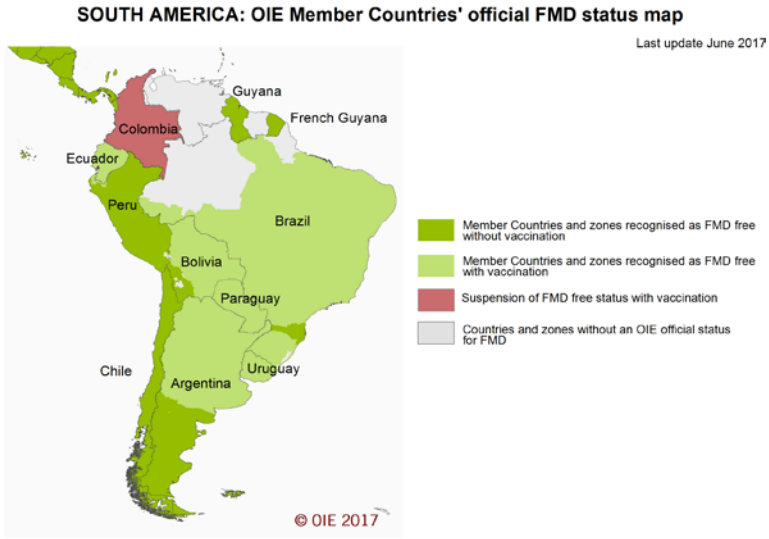
Rest of Latin America [1, 9 & 10]

The OIE FMD status of the countries in South America as reported in June 2017 is presented in Map 19.
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the OIE maps (see: http://www.oie.int/en/animal-health-in-the-world/official-disease-status/fmd/en-fmd-carte/).
Small areas of the continent may still be considered as endemic but clinical cases are rare (Map 19). In fact, before the outbreak reported in Columbia, during the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013. The FMD history relative to the Region for 2012 –2017 is reported in Table 20.

Table 20: Summary of the history of FMD Pool 16 between 2012 – 2017, for geographic distribution see Map 19 below. (Source – WAHIS, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2016**(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Colombia	DISEASE ABSENT	July 2017/O	**See text**
Paraguay	DISEASE ABSENT	Dec 2011/O	Follow –up needed
Venezuela (Bolivarian Republic of)	DISEASE ABSENT**	2011/O, 2013/ A	National situation needs verification

Map 19: FMD status for South America [2] (Source – OIE)



IV. OTHER NEWS:

[2]The 3rd WRLFMD Quarterly Report for the period July – September 2017 contains a list of recommended FMDV strains for antigen banks of FMD-Free countries. The discussion of this table is within the report. (Table 21)
The WRLFMD is at present working to adopt a risk-based approach for identifying circulating FMDV lineages and relate these to priority vaccines for use in Europe and other FMD-free settings.

Table 21: Recommendations from WRLFMD® on FMD virus strains to be included in FMDV antigen banks (for FMD-free countries).
Note: Virus strains are NOT listed in order of importance

High Priority	A/ASIA/G-VII(G-18)* O Manisa O PanAsia-2 *(or equivalent)* Asia 1 Shamir A Iran-05 *(or A TUR 06)* A22 Iraq A24 Cruzeiro O BFS or Campos SAT 2 Saudi Arabia *(or equivalent i.e. SAT 2 Eritrea)*
Medium Priority	A Eritrea-98 SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 *(or Thai equivalent such as A/Sakolnakorn/97)* A Argentina 2001 O Taiwan 97 *(pig-adapted strain or Philippine equivalent)*
Low Priority	A Iran '96 A Iran '99 A Iran 87 or A Saudi Arabia 23/86 *(or equivalent)* A15 Bangkok related strain A87 Argentina related strain C Noville SAT 2 Kenya SAT 1 Kenya SAT 3 Zimbabwe

Note: Discussions are currently underway to adopt a risk-based approach for different FMD viral lineages to identify priority vaccines for use in Europe and other FMD-free settings.

*Recent *in vitro* data from WRLFMD for serotype A viruses highlights an apparent gap in vaccines supplied by international manufacturers for this viral lineage.

V. REFERENCES - Superscripts

1. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
2. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org.
3. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India - *Dr. S. Saravanan*.
4. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*
5. Central Veterinary Diagnostic and Research Laboratory *(CVDRL)*, of Kabul Afghanistan – Dr. Nazem Shirazi.
6. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
7. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
8. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.
9. 44a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa - 6 – 8 March 2017, Rio de Janeiro, Brasil.
10. OIE/FAO FMD Reference Laboratory Network, Annual Report 2016
11. Laboratoire National Vétérinaire (LANAVET) - Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*.
12. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni.*
13. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini.*
14. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – *Miss Mariame Diop and Dr. Moustapha Lô.*
15. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Ms E. Kirkbride, Dr F. Maree, Dr L. E. Heath*.