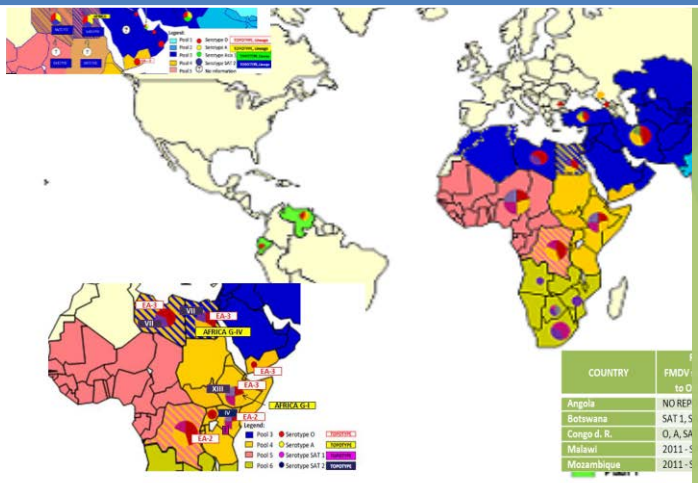
2016

Foot-and-Mouth Disease Situation
Monthly Report December 2016



EuFMD

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

December 2016

Guest Editor
Donald King – WRLFMD, Pirbright, UK

#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

I am pleased to write a few words to accompany this EuFMD Monthly Report. As we end 2016, two quotations attributed to the great Yogi Berra spring to mind "*It's like déjà vu all over again*" and "*You can observe a lot by just watching*". We have just published our monthly WRLFMD report for that last quarter of 2016 (http://www.wrlfmd.org/ref_labs/ref_lab_reports), and were pleased to catch up with colleagues at the Annual Meeting of the OIE/FAO FMD Laboratory Network in November/December at ANSES, in Paris (kindly hosted by Drs Labib Bakkali-Kassimi and Stephan Zientara). Data presented at the meeting, and in the WRLFMD report continue to recycle the idea that many FMD virus lineages are moving in a very unpredictable manner, and that we shouldn't necessarily be surprised when these strains emerge in unexpected geographical locations. In particular, during 2016 we have monitored the dramatic expansion of the O/ME-SA/Ind-2001d lineage. Recent sequence data presented by ARRIAH, Russia at the Network Meeting demonstrates that viruses from this lineage have now spread to Zabajkal`Skij Kray in the eastern part of the Russian Federation (see more details described later in this report). Reports to the OIE from November and December describe FMD cases on farms close to the borders with China and Mongolia and genetic analyses indicate that these viruses have sequences that are closely related to those previously detected in Southeast Asia. These findings raise questions about the regional distribution of what should now be considered a panzootic FMDV lineage (being the dominant viral lineage in the Indian sub-continent, also responsible for outbreaks in Gulf States of the Middle East, North Africa and the rapid spread during 2016 into Southeast Asia, as well as the cases reported earlier in 2016 in Mauritius (Islands of Mauritius and Rodrigues).

Elsewhere, a new serotype SAT 1 topotype (called topotype X) has been found in samples collected from Nigeria (by NVRI, CODA-CERVA and WRLFMD), the first time that this serotype has been detected anywhere in West Africa for >35 years. At the Network meeting, PANAFTOSA also reported retrospective analysis of samples collected in 2013 from FMD outbreaks in Venezuela. These were characterised as serotype A, genetically most closely related to earlier FMD viruses recovered from Venezuela [these results now represent the most recent FMD outbreaks anywhere in South America].

These data reinforce the importance of the work that is undertaken by FMD Reference Laboratories in different parts of world. We are working hard to improve the way in which data is shared and communicated between members of the FMD community, and our new website (http://www.foot-and-mouth.org/) contains links to reports and working groups of the OIE/FAO Laboratory Network. OIE and FAO Reference Laboratories also have an important role to play in developing capacity, and maintaining diagnostic standards. At Pirbright we are currently completing our 29th annual cycle of proficiency testing, that now involves >70 FMD Laboratories. We plan to report these results at the EU-RL Workshop that will be held in May, as well as other meetings (such as GFRA in South Korea) later in the year.

I wish you all the very best for 2017

Don King
Pirbright, January 2017

PS: you can now follow WRLFMD on Twitter ! – see @WRLFMD

I. GENERAL OVERVIEW

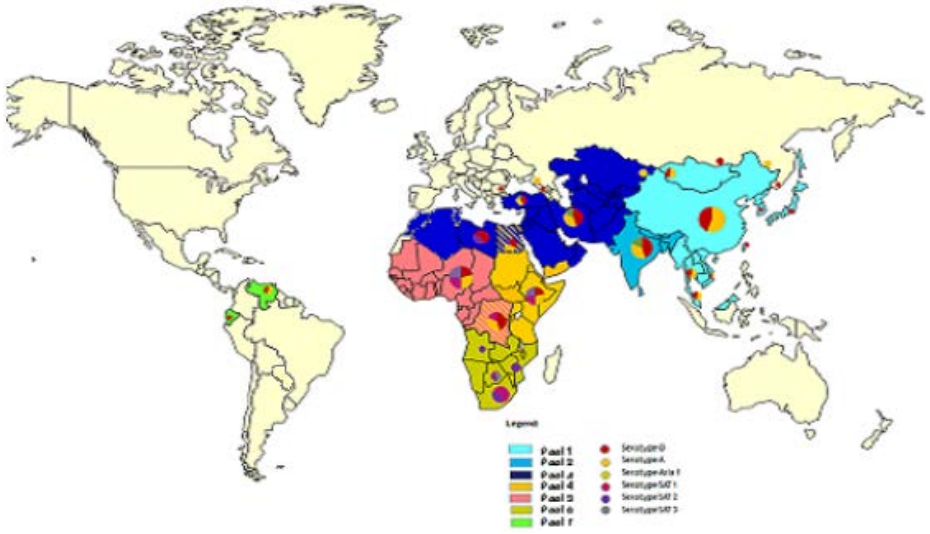
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below 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 – 2015

POOL	REGION/COUNTRIES – colour pools as in Map	SEROTYPES
1	**SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA** Cambodia, China (People's Rep. of), China (Hong Kong, SAR), China (Taiwan Province), Korea (DPR), Korea (Rep. of), Laos PDR, Malaysia, Mongolia, Myanmar, Russian Federation, Thailand, Viet Nam	**O, A and Asia 1**
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, 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, **Congo D. R.**, Djibouti, **Egypt**, Eritrea, Ethiopia, Kenya, **Libya**, Rwanda, Somalia, Sudan, South Sudan, Tanzania, Uganda, Yemen	**O, A, SAT 1, SAT 2 and SAT 3**
5	**WEST/CENTRAL AFRICA** Benin, Burkina Faso, Cameroon, Cape Verde, Central Afr. Rep., Chad, **Congo D. R.**, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea Biss., 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** Ecuador, Paraguay, Venezuela	**O and A**

Egypt, Libya and **Congo D. R.** (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



II. HEADLINE NEWS

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

Russian Federation [1, 2]- Two FMD outbreaks caused by serotype O, occurred on multispecies farms respectively on the 27th November and 14th December 2016 in Zabajkal`Skij Kray.
The Russian Federation Regional Reference Laboratory for FMD (ARRIAH, Russia) reported during December 2016 the detection of FMDV serotype O.

POOL 2 - SOUTH ASIA

India [3] – The Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India reported for the present month the detection of FMDV serotype O in bovine samples.

Nepal [4] – The National Foot and Mouth Disease and TADS Laboratory, Nepal reported that FMDV serotype O was detected for the reporting month in the country.

POOL 3 - WEST EURASIA & MIDDLE EAST

Aghanistan [5]**-** FMDV field isolates detected during 2016 belonging to FMDV serotypes A, ASIA 1 and O were subjected to vaccine matching strain differentiation (VMSD) tests with the identification for each serotype of at least one vaccine strain giving good matching results.
Details of the results of the cell culture/ELISA serotyping, genotyping of VP1 and VMSD tests carried out by the WRLFMD on FMDV field strains, which are cited in this report, will be available in the forthcoming issue of the 1st Quarterly (January-March 2017) WRLFMD Report.

Pakistan [6] - The Progressive Control of Foot and Mouth Disease Project reported 332 FMD outbreaks were registered in the country during December 2016 caused by FMDV serotypes A, ASIA 1 and O.

Saudi Arabia [1, 5] - The FMD events that occurred in Al Kharj province on the 14th of October 2016 were reported as resolved on the 28th November 2016.
VMSD tests carried out on field isolates collected during 2016 belonging to FMDV serotypes A and O gave good matching results just for the latter serotype.

POOL 4 - EASTERN AFRICA

Ethiopia [7]**-** The National Animal Health Diagnostic and Investigation Center (NAHDIC) reported for December 2016 the detection of FMDV serotypes A, O and SAT1 in bovine samples collected during FMD outbreaks.

Kenya [8] - The National FMD Reference Laboratory Embakasi, Kenya reported the detection during December 2016 FMDV serotypes O and SAT 1 in bovine samples.

POOL 5 - WEST/CENTRAL AFRICA

Cameroon [9]**-** The Laboratoire National Vétérinaire (LANAVET), Garoua detected for the reporting period FMDV among the 99 bovine samples tested.

Ghana [10] **–** The ACCRA Veterinary Laboratory, Ghana reported the detection of FMDV serotypes O and SAT 2 during December 2016.

Guinea Bissau [1] **–**FMD outbreaks in which multiples serotypes were involved were reported on the 2nd of December 2016 on two cattle farms located in BAFATA, Guinea Bissau.

Nigeria [5] **–** The FMDV serotype SAT 1 detected among the 22 bovine samples forwarded to the WRLFMD by the National Veterinary Research Institute Vom, Nigeria was genotyped as SAT 1/X. The serotype has not been reported in the country since 1981.

POOL 6 - SOUTHERN AFRICA

Republic of South Africa [11] **–** The ARC-Onderstepoort Veterinary Institute: Transboundary Animal Diseases Programme during December 2016 reported the detection of FMDV SAT 2 in samples collected in Mozambique.

POOL 7 - SOUTH AMERICA

Latin America [1] – No FMD outbreaks were reported for this Region during December 2016. During the OIE/FAO FMD Laboratory Meeting, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013, these now represent the most recent confirmed FMD cases in South America.

COUNTER

****** 37 MONTHS SINCE THE LAST OUTBREAK IN SOUTH AMERICA WAS REPORTED***

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

III. DETAILED POOL ANALYSIS

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

Russian Federation [1]

Further to the outbreak of the 22nd November 2016, two other FMD outbreaks involving different species were registered on the 27th November and 14th December 2016 in Zabajkal`Skij Kray, Russian Federation. FMD laboratory diagnosis for the two outbreaks was respectively confirmed on the 1st and 16th December 2016 and was carried out by FGBI-ARRIAH, the OIE Reference Laboratory using antigen detection ELISA, RT-PCR and complement fixation test. These events were caused by FMDV serotype O that was also responsible for the previous outbreak. A summary of the animals involved and location of the outbreaks are represented in Tables 2 and 3 and Map 2. Morbidity rates were particularly high for cattle as well as for pigs in the outbreak that occurred on the 27th of November. Infection source is unknown, while control measures adopted are: movement control inside the country, screening, vaccination in response to the outbreak with the vaccination of 6,042 cattle and 10,404 small ruminants, disinfection, quarantine, surveillance outside/inside containment and/or protection zone, zoning. No treatment of affected animals is being carried out while modified stamping out will be adopted.

Map 2: location of FMD outbreaks, which occurred on the 27th November and 14th December 2016 in Zabajkal`Skij Kray, Russian Federation.

Table 2: summary of the animals involved in the FMD outbreak that occurred on the 27th of November 2016 in Zabajkal`Skij Kray, Russian Federation.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	172	172	0		0	100.00%	0.00%	0.00%	**
Swine	150	82	0		0	54.67%	0.00%	0.00%	**
Totals	**322**	**254**	**0**	**0**	**0**	**78,88%**	**0.00%**	**0.00%**	**0.00%**

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

**Not calculated because of missing information

Table 3: summary of the animals involved in the FMD outbreak that occurred on the 14th December 2016 in Zabajkal`Skij Kray, Russian Federation.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	871	44	0	44	0	5.05%	0.00%	0.00%	5.05%
Sheep / goats	164	0	0	0	0	0.00%	0.00%	-	0.00%
Swine	235	0	0	0	0	0.00%	0.00%	-	0.00%
Total	**1270**	**44**	**0**	**44**	**0**	**3,46%**	**0.00%**		**3,46%**

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

The FGBI-ARRIAH reported for December 2016, the detection of FMDV serotype O in samples collected in Russia. The same laboratory also conducted genotyping of field isolates with the identification of O/ME-SA/Ind2001d lineage. Vaccine matching tests carried out on field isolates belonging FMDV serotype O provided good matching results with the following vaccine strains: O Manisa, O PanAsia/2012, O/SEA, O/Russia/2000 (PanAsia) and O/PanAsia2.
In addition, the laboratory carried out the testing of 2,000 sera for post-vaccination monitoring. The laboratory provided support in the epidemiological investigations of FMD outbreaks. The FGBI-ARRIAH continues to provide support to the Federal Service for Veterinary and Phytosanitary Surveillance of the Ministry of Agriculture of the Russian Federation and to the Veterinary Services of the Russian Federation Subjects by respectively supplying materials and technical advice.

Table 4: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 3 below.

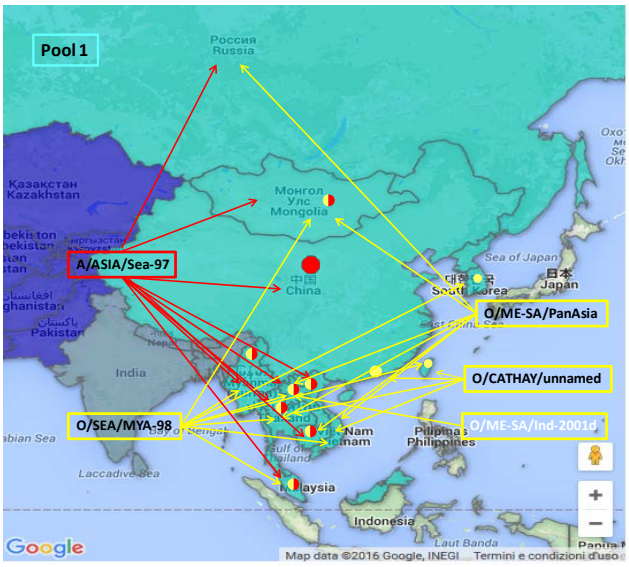
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	O, 2013-2015/NOT SAMPLED	July 2016/ not typed or not sampled, Sep 2015/O and A, Aug 2014/ not typed, June 2014/not typed	Follow-up needed
China (People's Rep. of)	2012-2013/O, 2013 & 2015/A 2012 - 2014/NOT TYPED**	May2016/O, May 2015/A	Follow-up needed
China (Hong Kong, SAR)	O**	Aug 2015/O	Follow-up needed
China (Taiwan Province)	2012-2013/O, A/2015**	Jun 2015/A	Follow-up needed
Korea (DPR)	2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Korea (Rep. of)	2012-2013/DISEASE ABSENT 2014/O, 2015/ NO DATA REPORTED	Mar 2016/O	Follow-up needed
Laos PDR	2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS 2015/ NO DATA REPORTED	Mar 2016/O Mar 2015/A,	Follow-up needed
Malaysia	2012 –2015/O	August 2016/A & O	Follow-up needed

	2013 & 2015/NOT TYPED		
Mongolia	2013/A & NOT TYPED, 2014 & 2015**/O	July 2016/O, Sept 2013/A,	Follow-up needed
Myanmar	2012-2014/O, 2015/A & NOT TYPED	Aug 2016/O, July 2016/ not typed, Oct 2015/A	Follow-up needed
Russian Federation	2012, 2014 & 2015/O, 2013 - 2015/A	Dec 2016/O, Oct 2016/Asia 1, Jan 2016/ A	See text
Thailand	O, A NOT SAMPLED & NOT TYPED	Sep 2016 /A, Aug 2016/O June – July 2016/not typed	Follow-up needed
Vietnam	O, NOT SAMPLED, NOT TYPED 2013, 2014 & 2015/A,	Mar 2016/O, Feb 2016/A and not typed	Follow-up needed

Map 3: FMD distribution by serotype and topotype in South East Asia, 2012 – 2016 –white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

Conjectured circulating FMD viral lineages in Pool 1 per 2016 [1, 14]:

- 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] sublineages
- Serotype Asia-1 has not been detected in the region since 2006 (Vietnam) and 2006 (China (People's Rep. of) and Vietnam)



B. POOL 2 – South Asia

India [2]

The ICAR-PDFMD, Mukteswar, India detected FMDV serotype O among the four bovine samples examined during December 2016 using FMDV antigen and/or RNA detection methods. Four field samples belonging to FMDV serotype O were genotyped and subjected to vaccine matching tests. In view of the ongoing epidemiological investigations, 4,493 serum samples were tested for FMDV antibodies. The FMD diagnostic kits used for these analyses were developed at ICAR-DFMD, Mukteswar.

The personnel of ICAR-PDFMD were as for the previous months also involved in the field investigation of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities. The institution is continuing its research studies and collaborations with international organisations.

Nepal [3]

The TADS Laboratory in Nepal reported for December 2016 the detection of FMD outbreaks due to serotype O. Serological analyses for FMD were also carried out. The laboratory personnel were involved in outbreak investigations and in the provision of expert advice to the Government and to the National and Local authorities.

FMD outbreaks detected in the country, between 2009 to 2016, were all due to serotype O, with the respective circulation of the following lineages: O/ME-SA/PanAsia-2 and O/ME-SA/Ind-2001d.

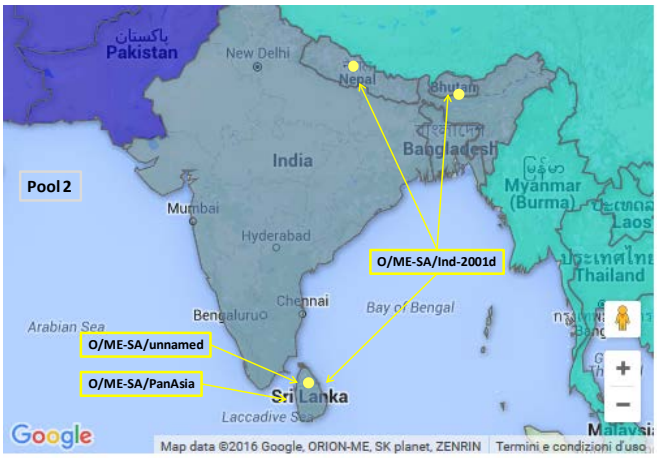
Table 5: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 4 below.

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

Map 4: FMD distribution by serotype and topotype in South Asia, 2012 – 2016 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [1, 14]:

- 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 O/ME-SA/Ind-2001d detected in Mauritius during 2016 (**not reported in Map**)
- O/ME-SA/PanAsia-2 (last detected in 2014 in Sri Lanka)
- A/ASIA/G-VII (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters)?



C. POOL 3 – <u>West Eurasia & Middle East</u>

Aghanistan [4]

The following FMDV field isolates A/AFG/5/2016, ASIA 1/AFG/6 and 10/2019 and O/AFG/4, 12, 15 and 16/2016, respectively belonging to the viral lineages, A/ASIA/Iran-05^{FAR-11}, ASIA 1/ASIA/Sindh-08 and O/ME-SA/PanAsia^{ANT-10} were subjected to VMSD tests obtaining the following result: A SAU 95, but not A Iran 2005 provided good matching results for serotype A; ASIA 1 Shamir provided good matching results for the relative serotype while O 3039, O Manisa and O Tur 5/09 provided good matching results for serotype O.

Pakistan [5]

The Progressive Control of Foot and Mouth Disease Project reported 332 FMD outbreaks occurring in Pakistan during December 2016 caused by FMDV serotypes A, Asia 1 and O. A summary of their distribution is reported in Table 6. The outbreaks were principally caused by FMDV serotype O (39.16 %), followed by Asia 1 (4.52%) and A

(3.61%) while 25 % and 25.6% of the outbreaks were respectively untyped or untested. Location of districts with reported FMD outbreaks is presented in Map 6.

Table 6: Province and district distribution of FMD outbreaks with relative serotypes that occurred in Pakistan during December 2016.

Location of outbreaks and n°()		Number (%) of Outbreaks due to FMD Virus Serotype(s)					
Province	**District**	**'O'**	**'A'**	**'Asia-1'**	**'Mixed'**	**Un-Typed**	**Not tested**
Sindh (54)	Karachi (15)	6	4	1	--	4	--
	Hyderabad (1)	1	--	--	--	--	--
	Sukkur (1)	--	--	--	--	1	--
	Dadu (3)	1	--	--	--	2	--
	Matiari (13)	8	--	--	--	5	--
	Nausheroferoz (10)	7	2	--	--	1	--
	Badin (2)	1	--	--	--	1	--
	Thatta (4)	1	--	--	--	3	--
	Tando Allahyar (3)	1	--	--	--	2	--
	Mirpurkhas (2)	--	--	--	--	2	--
Federally Administered Tribal Areas (1)	Orakzai (1)	--	--	--	--	1	--
Khyber Pakhtunkhwa (30)	Abbottabad (4)	--	--	2	--	2	--
	DI Khan (1)	--	--	--	--	1	--
	Lower Dir (4)	3	--	--	--	1	--
	Malakand (2)	1	--	--	--	1	--
	Mardan (1)	1	--	--	--	--	--
	Noshera (1)	--	--	--	1	--	--
	Peshawar (10)	7	--	--	--	3	--
	Swabi (3)	--	--	--	1	2	--
	Swat (4)	1	--	--	1	2	--
Azad Kashmir (23)	Mirpur (18)	11	--	1	--	6	--
	Kotli (3)	1	--	1	--	1	--
	Bhimber (2)	2	--	--	--	--	--
Punjab (204)	Gujrat (6)	2	--	--	--	1	3
	TT Singh (7)	4	--	1	--	--	2
	Faisalabad (22)	9	--	1	--	3	9
	Khanewal (51)	5	3	--	--	9	34
	Multan (19)	7	--	1	1	2	8
	Kasur (8)	4	--	--	--	4	--
	Okara (7)	--	--	--	--	--	7
	Attock (9)	1	--	--	--	--	8
	Rawalpindi (7)	--	--	--	--	--	7
	Sahiwal (3)	3	--	--	--	--	--
	Hafizabad (1)	1	--	--	--	--	--
	Muzaffargarh (1)	--	1	--	--	--	--
	Lahore (6)	3	1	1	--	1	--
	Sheikhupura (9)	9	--	--	--	--	--
	Layyah (1)	--	--	--	--	1	--
	Bhakkar (13)	9	--	--	--	4	--
	Vehari (1)	--	--	--	--	1	--
	Bhawalnagar (9)	4	--	--	--	5	--
	Chakwal (15)	10	--	--	--	5	--
	DG Khan (3)	--	--	--	--	3	--
	Mianwali (1)	1	--	--	--	--	--
	Pakpattan (3)	3	--	--	--	--	--
	Gujranwala (2)	--	--	--	--	--	2
Islamabad Capital Territory (16)	Islamabad (16)	--	1	6	3	1	5
Balochistan (4)	Quetta (1)	1	--	--	--	--	--
	Kachi (3)	1	--	--	--	2	--
Total (332)		**130 (39.16)**	**12 (3.61)**	**15 (4.52)**	**7 (2.11)**	**83 (25)**	**85 (25.6)**

Map 5: Location of the Districts where FMD outbreaks occurred in Pakistan during December 2016.

Ring vaccination and vaccination on cost sharing basis, involving a financial contribution from the farmers, were performed during December 2016 with the administration of 54,175 vaccine doses. A summary of the number of interventions carried out in the different Provinces is presented in Table 7.

Table 7: Vaccination activities carried out during December 2016 in the various Provinces of Pakistan.

	Number of vaccine doses administered		
Province	**Ring Vaccination**	**Cost sharing basis (Doses)**	
Sindh	4,550	2,750	
Balochistan	--	400	
Khyber Pakhtunkhwa	5,000	--	
Punjab	9,700	24,975	
Azad Kashmir	1,500	--	
Federally Administered Tribal Areas	3,250	--	
Islamabad Capital Territory	1,450	600	
Total	**25,450**	**28,725**	**54,175**

During the reporting month, Capacity Building training courses were organised by the PC-FMDP in Punjab, Khyber Pakhtunkhwa and Federally Administered Tribal Areas. These courses were attended by 113 Veterinary Officials who also received sample collection kits.

Saudi Arabia [1, 5]

Following the FMD events that occurred in AlKharj Province during October 2016 which was reported as resolved on 28th of November 2016, 2,553 cattle and 33,790 sheep of the same province were vaccinated.

Field isolates, A/SAU/19/2016 and O/SAU/18/2016 respectively belonging to A/ASIA/G-VII and O/ME-SA/Ind-2001d genotypes were subjected to VMSD tests obtaining the following results: for the serotype A isolate, none of the vaccines strain, represented by A Iran 2005, A SAU 95, A TUR 20/16 and A 22 IRQ, gave good matching results while for the serotype O isolate, O 3039, O Manisa and 0 Tur 5/09, provided good matching results.

Table 8: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 6 below.

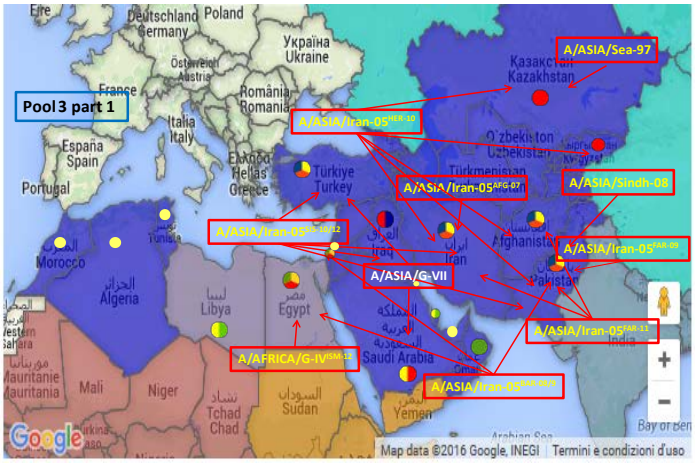
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2015**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	Jul 2016/O, Jun 2016/Asia 1 & May 2016/A,	See text
Algeria	2014 -2015**/O	Apr 2015/O	Follow –up needed
Armenia	2012-2014/DISEASE ABSENT 2015/A	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT**	2007/0	Follow –up needed
Bahrain	2012, 2014 &2015 /O	Oct 2014/O	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	May-Jun 2016/ O & Sat 2, March 2016/A	Follow –up needed
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran	2012-2014/A, Asia 1 & O 2015**/SEROTYPE NOT REPORTED	July 2016/A & O, 2013/Asia 1	Follow –up needed
Iraq	2012-2013/O, 2012-2014/A 2015/ SEROTYPE NOT REPORTED	Dec 2013/A, O	Follow –up needed
Israel	2012-2015**/O	December 2015/O	Follow –up needed
Jordan	DISEASE ABSENT**	2006/A	Follow –up needed
Kazakhstan	2012/O,2012 –2013/A 2014-2015**/ DISEASE ABSENT	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	2012/O 2013 – 2014/ DISEASE ABSENT	Jan-Feb 2016/O	Follow –up needed
Kyrgyzstan	2012-2014/O, A 2015/ NO DATA REPORTED	Aug 2014/not typed & Apr 2013 /O, A,	Follow –up needed
Lebanon	DISEASE ABSENT 2015/ NO DATA REPORTED	2010/not typed	Follow –up needed
Libya	NO DATA REPORTED	Oct 2013/O	Follow –up needed
Morocco	DISEASE ABSENT**	Oct 2015/O	
Oman	2012-2014/O 2015/ NO DATA REPORTED	May 2015/SAT 2	Follow –up needed
Pakistan	2012 & 2015/ NO DATA REPORTED 2013-2014/A, ASIA 1 & O	Dec 2016/A, Asia 1 & O	See text
Palestine	O, 2012-2013/SAT 2	Dec 2015/O & Mar 2013/Sat 2	Follow –up needed
Qatar	2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014/O 2015/ NO DATA REPORTED	Oct 2016/A & April 2016/O	See text
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2012- 2013/NOT TYPED 2014-2015**/DISEASE ABSENT	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2014/O 2015/ DISEASE ABSENT	Oct 2014/O	Follow –up needed
Turkey	Asia 1, A & O, NOT TYPED	Oct 2015/ A May & 2014-2015/ Asia 1 and O	Follow –up needed

Turkmenistan	2012/NO DATA REPORTED 2013-2015/DISEASE ABSENT	Not available	Follow –up needed
United Arab Emirates	2012, 2015/DISEASE ABSENT 2013-2014/O	Feb 2016/O	Follow –up needed
Uzbekistan	2012,2013 & 2015/NO DATA REPORTED 2014/DISEASE ABSENT	Not available	Follow –up needed

Map 6: FMD distribution by serotype and topotype for West Eurasia and Middle East, 2012 – 2016 (EuFMD) - white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

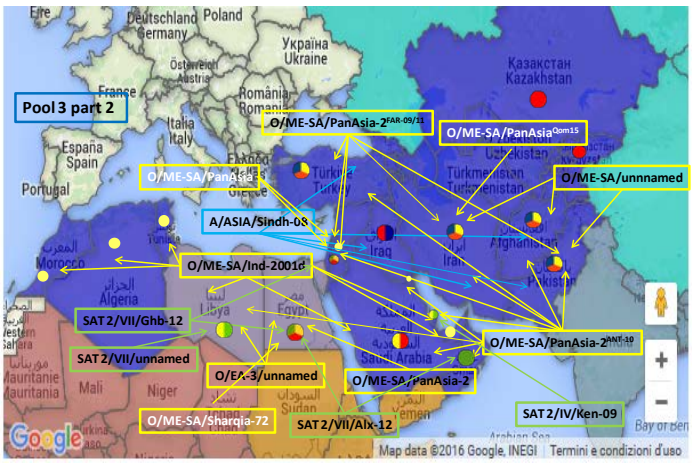
Conjectured circulating FMDV lineages in Pool 3 per 2016 [1, 14]:

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



Conjectured circulating FMDV 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
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa

Ethiopia [7]

The NAHDIC examined eight bovine tissue samples collected from outbreak of FMD which were detected as positive in FMDV antigen detection ELISA for serotypes A, O and SAT 1. The laboratory personnel were also involved in the investigation of outbreaks and in the provision of advice to field veterinarians and farmers on the type of vaccine to employ.

NAHDIC also participated n the FMD Proficiency Test organized by the WRLFMD using ELISA for antibody detection and ELISA, and RT-PCR for viral detection.

Most recent viral lineages identified, belonging to detected serotypes, are relative to samples collected during 2015 and these are respectively A/AFRICA/G-VII and O/EA -3/unnamed and O/EA-4/unnamed and SAT 1/IX/unnamed. VMSD tests conducted on these serotypes did not give good matching results with the vaccines strains employed represented by A22 IRQ, A IRN 05 and A/TUR/20/2006 for serotype A, while for serotype O, good vaccine matching results were obtained for O 3039 and 0/TUR/5/2009, but not with O Manisa. VMSD test results are unavailable for field isolates of the country belonging to FMDV serotype SAT 1 that was last reported in 2014.

Kenya [8]

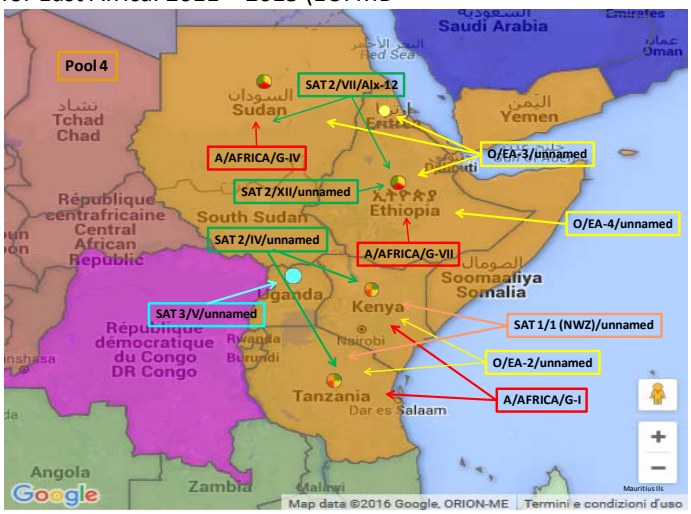
The National FMD Reference Laboratory Embakasi, Kenya respectively detected FMDV serotypes O and SAT 1 in the bovine samples examined. The laboratory personnel were involved in the epidemiological investigations of outbreaks and in the provision of advice to field veterinarians and farmers on the type of vaccine to employ.
The laboratory personnel will also be involved in the Real Time FMD Training organized by EuFMD, which will be held in February 2017 in, Kenya. Samples last forwarded by the country to the WRLFMD for genotyping was in 2013. The genotypes detected in relation to the serotypes reported this month were A/AFRICA/G-1 and SAT 2/IV/unnamed from samples respectively collected in 2013 and 2012.

Table 9: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 7 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(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
Congo d. R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Djibouti	DISEASE ABSENT**	Not available	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	March 2016/A, May-Jun 2016/ O & Sat 2	Follow –up needed
Eritrea	2012/O, 2013/ DISEASE ABSENT 2014/ DISEASE PRESENT 2015/ NO DATA REPORTED	Jan 2012/O	Follow –up needed
Ethiopia	O**, 2012/A, 2012 & 2105/SAT 2, 2015**/SAT 1	Dec 2016/ A, O & SAT 1 May 2016/SAT 2	See text
Kenya	A, O, SAT1, SAT2, 2012 – 2015 /NOT TYPED	Dec 2016/O & SAT 1, Oct 2016/ A, Oct 2015/ SAT 2	See text
Libya	NO DATA REPORTED	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Rwanda	2012-2013/A, O, SAT1, SAT 2	Nov 2012/not typed	Typing required
Somalia	2012-2014/NOT SAMPLED 2013 – 2014/ NO DATA AVAILABLE	2011	Follow –up needed
Sudan	2013/SAT 2, 2012-2014/O & NOT TYPED 2015**/A & NOT SAMPLED	Dec 2013/ O & A, Jan 2014/SAT 2	Follow –up needed
South Sudan	2014/A, O SAT 1, SAT 2, SAT 3, 2012-2013 & 2015/ NO DATA REPORTED	2011	Follow –up needed
Tanzania	2012-2015/A, O, SAT 1, SAT 2	May 2015/O Apr2013/ A, SAT 1, SAT2	Follow –up needed
Uganda	2012/ SAT 1,2012, 2014/O, 2013/NOT TYPED	May 2014/O Nov 2014/SAT1, Jan 2015/A and SAT 3, July	Follow –up needed

	2015/NO DATA REPORTED	2015/ SAT 2 and untyped	
Yemen	2012/O, 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA 2015/NO DATA REPORTED	2009/O	Follow –up needed

Map 7: FMD distribution by serotype and topotype for East Africa. 2011 – 2015 (EUFMD



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, 14]:

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

E. POOL 5 – West / Central Africa

Cameroon [9]

The LANAVET, Garoua detected FMDV in 11 of the 99 (11%) bovine samples tested using non-serotype specific real time PCR. Non-structural protein serological ELISA testing was used to examine 93 bovine sera, with 58 (62.4%) testing positive.
LANAVET continues its collaborative activities with the Ohio State University and Plum Island Laboratory, USA.
Last genotypes identified in the country were 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 [10]

The ACCRA Veterinary Laboratory, Ghana detected during December 2016 FMDV serotypes O and SAT 2 in field samples collected during suspected outbreaks using antigen detection ELISA. The detected viruses were sent for confirmation to the Botswana Vaccine Institute. FMDV was last detected in the country in 2015 without serotyping.
The laboratory personnel were involved in the epidemiological investigations of outbreaks within which samples were collected.

Guinea Bissau [1]

FMD outbreaks occurred on the 5th of October 2016 on two cattle farms located in Bafata, Guinea Bissau. The Senegalese Agricultural Research Institute, Dakar (Regional Reference Laboratory) confirmed the diagnosis on the 28th of October 2016. The laboratory examined 92 sera and a pool of six vesicular fluids coolected from the outbreaks. Antibodies against non-structural proteins were detected in 18 sera and their reactivity was against FMDV serotypes O and A (11 animals positive for A and O, 6 animals positive for O and 1 positive for A), while SAT1 and SAT2 antigens were detected in the pool of vesicular fluids and for this it was not possible to identity the number of animals positive for each serotype. Source of outbreak is unknown and the only sanitary measure to be applied is vaccination.

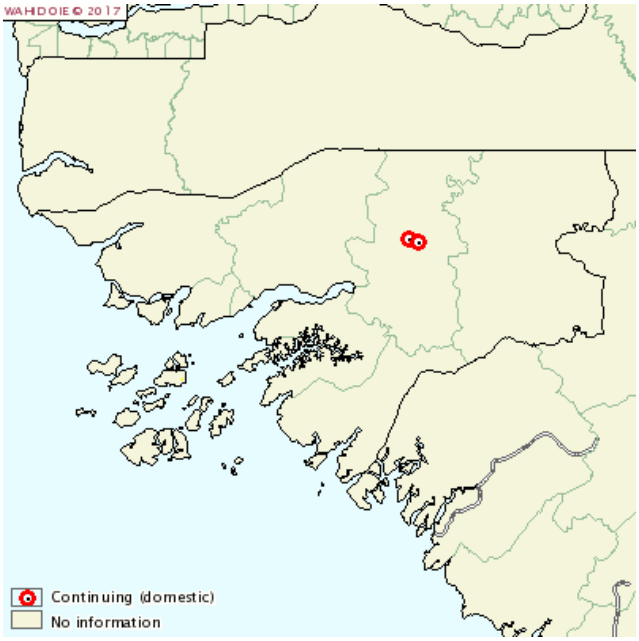
Summary of the animals involved and location of outbreaks are respectively reported in Table 10 and Map 8.
Scarce or no information is available relative the FMDV serotypes circulating in this country. Last outbreak reported in the country was in 2014 while the presence of the disease was still suspected in 2015.

Table 10: summary of the animals involved in the FMD outbreaks that occurred on the 5th of October 2016 in Bafata, Guinea Bissau.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	280	93	31	0	0	33.21%	11.07%	33.33%	11.07%

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

Map 8: Location of the FMD outbreaks that occurred in October 2016 in Bafata, Guinea Bissau.



Nigeria [5]

The FMDV serotype SAT 1 detected in three of the 22 bovine samples that were forwarded to the WRLFMD by the National Veterinary Research Institute Vom, Nigeria was genotyped as SAT 1/X. Location from where these samples were collected was not reported. The serotype has not been reported in the country since 1981.
The most recent genotypes isolated in the country are from samples collected between 2011 and 2014 and are represented by A/AFRICA/G-IV, O/EA-3/unnamed and SAT 2/VII/unnamed.
The VMSD tests conducted for each relative circulating serotype proveded good matching results with the following vaccine strains: A ERI/98 and A TUR/06, O 3039 and O TUR/5/09, and SAT 2 ERI and SAT 2 ZIM.
No FMD outbreaks and activities were reported for December 2016 by the FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria.

Senegal [12]

No FMD outbreaks and activities were reported for December 2016 by the Laboratoire National de l'Elevage et de Recherches Vétérinaires (ISRA/LNERV), Senegal. The laboratory provided technical advice to the National Veterinary Services for the next FMD vaccination campaign.

Table 11: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map.9 below.

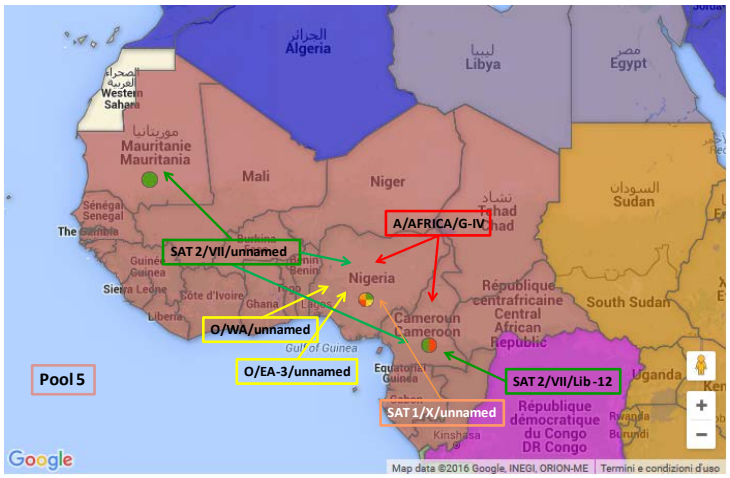
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT SEROTYPES NOT REPORTED	2013/ not available	Follow –up needed
Cameroon	DISEASE PRESENT SEROTYPES NOT REPORTED	Apr -Dec 2016/serotyping pending, Jun 2014, Jan 2015 and July-Aug 2015/untyped, Nov 2014/O, SAT 2, May 2014/SAT 1, Apr 2014/ A	See text Typing required
Cape Verde	NO DATA AVAILABLE	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Chad	2012 – 2013/SEROTYPES NOT REPORTED	Not available	Follow –up needed
Congo D. R.	2012 – 2015/A, O, SAT 1	Jun 2013/not typed	Typing required
Congo R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Cote D'Ívoire	2012, 2015/A, NOT SAMPLED 2013/ SEROTYPES NOT REPORTED	Jun 2013/not typed	Follow –up needed
Equatorial Guinea	2012 – 2013/DISEASE SUSPECTED 2014 – 2015/ NO DATA AVAILABLE	Not available	Follow –up needed
Gabon	NO DATA AVAILABLE	Not available	
Gambia	NO DATA AVAILABLE	2012/O	Follow –up needed
Ghana	2012 – 2015**/SEROTYPES NOT REPORTED	Dec 2016/ O & SAT 2 2014/not available	See text Follow –up needed
Guinea Biss.	2012-2013/DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED 2015/ Disease suspected	Dec 2016/SAT1 &SAT 2	See text Follow –up needed
Guinea	2012-2013, 2015/ DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED	2014/not available	Follow –up needed
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2012/ NO DATA AVAILABLE 2013/ SEROTYPES NOT REPORTED 2014-2015/SAT 2 2015/A, SAT 1	2011/2012, no precise data	
Mauritania	2012-2013/NO REPORTED OUTBREAKS 2014-2015**/SAT 2	Dec 2014/SAT 2	Follow –up needed
Niger	2012 – 2014/NOT SAMPLED	2014/not sampled, May	Follow –up needed

		2015/O	
Nigeria	2014-2015/O	Sept 2016/ O & SAT 1 Nov 2015/A, Sept 2014/ SAT 2	See text
Sao Tome Principe	2012/DISEASE ABSENT, 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Senegal	2013/NO DATA AVAILABLE 2012, 2014-2015**/ NOT SAMPLED	2014/ SAT 2, Feb 2015/ A and O	See text Follow –up needed
Sierra Leone	DISEASE ABSENT	Oct 1958	Follow –up needed
Togo	O, SAT 1	2012/O	Follow –up needed

Map 9: FMD distribution by serotype and topotypes for West Africa, 2012 – 2015(EuFMD) - white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

Conjectured circulating FMDV lineages in Pool 5 per 2016 [1, 14]

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



F. POOL 6 – Southern Africa

RSA [11]

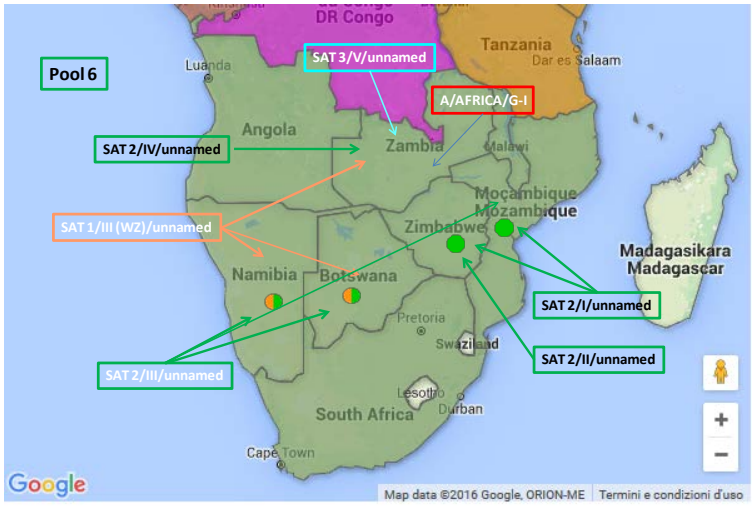
The ARC- Onderstepoort Veterinary Institute, detected of FMDV serotype SAT 2 among the samples collected in Mozambique that were examined using antigen ELISA and RT-PCR. The same virus was also sequenced Details on the origin of the samples is not available The laboratory also examined 3,547 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 247 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects. The FMD research group, lead by Dr Francois Maree is involved in two international research projects: the first is a collaborative research project between the USDA-ARS, ARC-OVI and Makerere University in support of the national FMD control program in Uganda while the other is on the persistence of a highly contagious pathogen: ecological and evolutionary mechanisms in foot-and-mouth disease virus. The laboratory also has collaborations within the Global FMD Research Alliance (GFRA) is member of the OIE/FAO FMD Network.

Table 12: Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map 10 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013-2014/ DISEASE ABSENT	July 2015/ SAT 2 April 2016/typing pending	Follow –up needed

	2015/ SEROTYPES NOT REPORTED		
Botswana	2012-2015/SAT 2 2014-2015/SAT 1	Jun 2015/typing pending July 2015/SAT 2, June 2015/SAT 1	Follow –up needed
Congo D. R.	2012 – 2015/A, O, SAT 1	Jun 2013/not typed	Follow –up needed
Malawi	2012/NO REPORTED OUTBREAKS 2013-2015/ NO DATA AVAILABLE	Oct 2011, Sep 2015/SAT 1	Follow –up needed
Mozambique	2012 -2013/DISEASE ABSENT, 2014/ SEROTYPES NOT REPORTED 2015/ NO DATA AVAILABLE	Dec 2016/SAT 2, Sep 2016/ Typing pending, May 2015/ SAT 1	See text Follow –up needed
Namibia	2012-2014/SAT 1 2014-2015/SAT 2	May 2015/SAT 1, Jun 2015/SAT 2, July/typing pending	Follow –up needed
South Africa	2012-2015/SAT 2 2013/SAT 1 2015/SAT 3	Dec 2015/SAT 3, Nov 2014/ SAT 2, Aug 2013/SAT 1	See text Follow –up needed
Zambia	2012/SAT 1, SAT 2 2013-2015/ NO DATA AVAILABLE	Jan 2013/SAT 1, SAT 2, Mar 2016/SAT 3	Follow –up needed
Zimbabwe	2012-2015**/SAT 2 2013/SAT 3 2014/SAT 1	Sep 2016/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	Follow –up needed

Map 10: FMD distribution by serotype and topotype for Southern Africa, 2012 – 2015 (EuFMD)



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, 14]:

- Serotype SAT 1 (topotypes I(?), I(?)I 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

South America [1, 15]

The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 11.

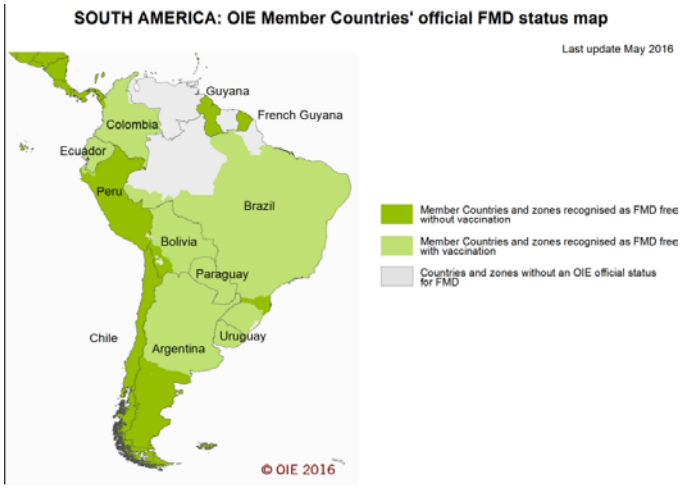
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the 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 11). The FMD history between 2012 –2015 is reported in Table 13. In fact, during the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013, these now represent the most recent confirmed FMD cases in South America.

Table 13: Summary of the history of FMD Pool 7, 2012 – 2015, for geographic distribution see Map 11 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2015**(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Paraguay	DISEASE ABSENT	Dec 2011/O	
Venezuela	DISEASE ABSENT**	2011/O, A 2013/ A	National situation needs verification

Map 0: FMD status for South America [1]



IV. OTHER NEWS:

[5]The 4th WRLFMD Quarterly Report for the period October – December 2016 published the table below (Table 14) that contains a list of recommended FMDV strains for antigen banks of FMD-Free countries. The discussion of this table is within the report.

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 14: Recommendations from WRLFMD® on FMD virus strains to be included in FMDV antigen banks (for FMD-free countries) - October 2016 - include on release of the 4th quarterly report.

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)* O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 *(or A TUR 06)* A22 Iraq SAT 2 Saudi Arabia *(or equivalent i.e. SAT 2 Eritrea)*
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 (or Thai equivalent such as A/Sakolnakom/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

V. REFERENCES - Superscripts

1. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
2. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana Fomina*.
3. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (Dr B. B. Dash) FAO.
4. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*.
5. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org.
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. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - Dr. Simon Dickmu Jumbo.
10. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni*
11. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr Francois -Maree*
12. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini*
13. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – Miss Mariame Diop and Dr. Moustapha Lô
14. OIE/FAO FMD Reference Laboratory Network, Annual Report 2015
15. 43a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa, Punta del Este, Uruguay, 7-8 April, 2016. http://www.panaftosa.org/cosalfa43/