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MONTHLY REPORT
FOOT-AND-MOUTH DISEASE SITUATION

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

October 2017

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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.

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Guest Editor's comments:

I am very delighted to contribute to the introduction of this month's FMD update prepared by EUFMD that describes the situation and status of FMD situation worldwide and a state of patterns of FMD virus distribution. FMD still is an important threat affecting livestock production and trade for the close attention of governments, private sector and livestock farmers. FMD transmission and spread between continents has continued in this period with FMD jumping geographically over the recent months between countries and regions of the globe. In the Russian Federation FMD type O was reported from Buzdyaksky, Republic of Bashkortostan near the border with Kazakhstan. Following the reports of FMD in Republic of Bashkortostan, OIE suspended on 30th September the status of the "*country having an FMD free zone where vaccination is not practiced".*

FMD types continue to circulate in South Asia in Bhutan and India (Type O). In West Eurasia and Middle East during the past three months FMD continue to be reported in Afghanistan (A and O); Pakistan (A, Asia 1 and O) and Egypt (A and O). China reported one outbreak of FMD serotype O on September 2017 in South West Gizhou Autonomous Prefecture.

East Africa region is considered an endemic region where FMD types A, O and SAT 1 and 2 are circulating actively in livestock populations in Ethiopia and Kenya. During this reporting period there are no outbreaks reported from the Southern Africa region and West and Central Africa regions where FMD is expected to be reported but surveillance is very limited and FMD epidemiology is poorly understood. This can be attributed to several factors including lack of incentives for farmers to report timely FMD, diagnostic capacities in those regions are limited and FMD is not seen as a priority compared with other disease such as CBPP, LSD and RVF.

The situation in the South America region still is uncertain at the borders between Venezuela and Colombia despite that the last outbreak of FMD serotype O that was reported in Colombia in July 2017. This FMD type O strain is part of the same cluster of FMD viruses isolated previously in Colombia in 2008 and Venezuela between 2005 and 2009. This demonstrates that there was no incursion of an exotic FMD virus into the American region and FMD virus is still circulating in livestock populations. These EuFMD monthly updates provide an excellent source of information from countries implementing FMD surveillance and identifying types and genotypes of FMD viruses circulating in livestock populations. This current issue also contains information from the activities of the West Eurasia Epidemiology and Laboratory Network, which is a step forward on information sharing and regional efforts to understand the situation and drivers of FMD spread and to assess the effectiveness of FMD surveillance in endemic and free areas. West Eurasia is a good example of how an effective FMD surveillance program provides evidence to countries to move through the FMD progressive Control Pathway (PCP). Turkey is implementing a very aggressive plan to eradicate FMD by 2023 in the Anatolia region. This FMD risk based plan requires to control and eliminate the disease from hotspots and to have a very effective system in place to respond to outbreaks and new incursions.

When considering the global burden of FMD, one relevant finding of this FMD report is that so far there has not been any reported outbreak of FMD type C in the last 158 months (13 years). Perhaps it is time now to self-declare the world free from FMD type C.

The FMD report also provides relevant information on vaccine matching results for field isolates for decisions on the update of vaccination plans and FMD control activities in India, Egypt and Pakistan and effective vaccines available. One of the challenges of FMD control is the different perception and priorities that different regions and stakeholders give to FMD. This provides an indication on how to define the most-likely and truly distribution of FMD in countries where the disease is not reported and there is lack of surveillance. In the absence of reliable notification and reporting of FMD, the analysis of WRLFMD on conjectured circulating FMD lineages is an important contribution to understand and fill the gaps on the understanding of the circulation of FMD viruses in the different virus pools.

Julio Pinto, FAO AGAH/Global Early Warning System, November 2017

I. GENERAL OVERVIEW

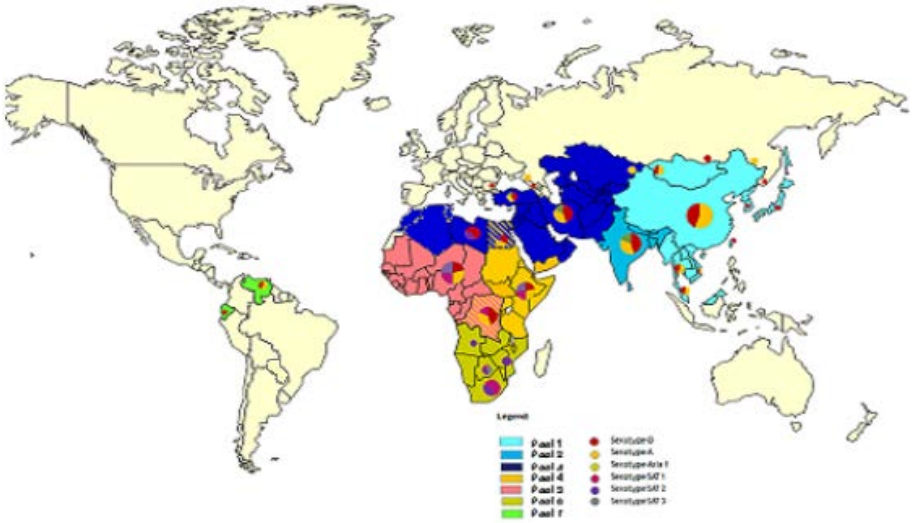
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below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

China[1] **–** A FMD outbreak due to serotype O started on September 24th 2017 affecting different susceptible domestic species of a village present in the Southwest Guizhou Autonomous Prefecture.

China, Hong Kong, SAR[2] **–** Pig samples collected on September 11th 2017 at Sheung Shui, were genotyped as FMDV O Cathay.

Mongolia [2] **–** The FMDV VP1 sequence detected in a sample collected in the country during March 2015 was genotyped as O/ME-SA/ind-2001d.

Russia [1, 2 & 3] **–** FMD outbreaks in five different epidemiological units due to serotype O were notified, between September 30th and October 9th 2017 at Buzdyaksky, Republic of Bashkortostan, involving small and large domestic ruminants. All the outbreaks were reported as resolved as from November 7th 2017.
The FMDV VP1 sequence of a sample collected from these outbreaks was typed as O/ME-SA.

POOL 2 - SOUTH ASIA

Bhutan [2, 4] **–** Further to the FMD outbreak reported in March 2017 at Jongkhar in the southeast part of the country, other episodes of the disease were notified in the western part of the country i.e. at Chukha Dzongkhag and at Thimphu Dzongkhag.
In the vaccine matching strain differentiation (VMSD) tests carried out for field samples belonging to FMDV serotypes A and O, the vaccine strains that obtained good matching results were only for the latter serotype.

India [5] **-** The Indian Council of Agricultural Research - Directorate of Foot and Mouth Disease (ICAR-PDFMD) detected FMDV serotype O in the samples tested during October 2017.

POOL 3 - WEST EURASIA & MIDDLE EAST

Afghanistan [2, 6] **-** The Central Veterinary Diagnostic and Research Laboratory *(*CVDRL) of Kabul Afghanistan detected FMDV serotypes A and O in the 84 samples tested.
In the VMSD tests carried out on field samples belonging to FMDV serotypes A and O, the vaccine strains that that obtained good matching results were only those for serotype O.

Egypt [2] **–** As for Afghanistan, in the VMSD tests carried out on field samples belonging to FMDV serotypes A and O, only vaccine strains for the latter serotype obtained good matching results.

Pakistan [1 & 7] **-** 15 FMD outbreaks due to FMDV serotypes A, Asia 1 and O were notified during October 2017. FMDV serotypes A, ASIA 1 and O were detected in a set of 45 bovine and buffalo samples collected in the country between January 2016 and September 2017**.**

[8]**1ST WEST EURASIA FMD EPIDEMIOLOGY & LABORATORY NETWORKS MEETING** was held in Tibilisi, Georgia on September 18th -20th 2017. A summary of the presentation of each country is reported below.

POOL 4 - EASTERN AFRICA

Ethiopia [9] - The National Animal Health Diagnostic and Investigation Center (NAHDIC) reported during October 2017 the detection of FMDV serotype O.

Kenya [10] – The FMD National Reference Laboratory, Embakasi, Kenya reported during October 2017, the detection of FMDV serotypes A, O, SAT 1 and SAT 2.

POOL 5 - WEST/CENTRAL AFRICA

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

POOL 6 - SOUTHERN AFRICA

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

POOL 7 - SOUTH AMERICA [1, 11 & 12]

No FMD outbreaks were notified for this pool during the reporting month.
Last registered circulation of FMD in Latin America was FMDV serotype O in Colombia in July 2017, while for serotype A, PANAFTOSA reported sequence data of historical outbreaks that occurred in Venezuela during 2013.

COUNTER
****** 158 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED***

III. DETAILED POOL ANALYSIS

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

China [1]

A FMD outbreak due to serotype O occurred on September 24th 2017 in a village of the Southwest Guizhou Autonomous Prefecture. The species involved were cattle, goats and pigs with cases and deaths registered in the first two. The remaining animals were killed and disposed of..

The Lanzhou National Reference Laboratory for Foot and Mouth Disease (OIE Reference Laboratory) diagnosed the outbreak on September 28th 2017 by testing goat samples using reverse transcription - polymerase chain reaction (RT-PCR).

A summary of the animals involved and the location of the outbreak are respectively reported in Table 2 and Map 2.

Source of outbreak is unknown while the containment measures applied are movement control inside the country, surveillance within containment and/or protection zone, quarantine, official disposal of carcasses, by-products and waste, stamping out, disinfection and vaccination if available. No treatment is administered to the affected animals.

Table 2: summary of the animals involved in the FMD outbreak that occurred on September 24th 2017 at the Southwest Guizhou Autonomous Prefecture, China. (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	47	23	2	24	/	48.94%	4.26%	8.70%	**
Goats	637	121	41	516		19.00%	6.44%	33.88%	**
Swine	49	0	0	49	0	0.00%	0.00%	/	100.00%
Total	**733**	**144**	**43**	**589**	**/**	**19.65%**	**5.67%**	**29.86%**	**

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

**Not calculated because of missing information

Map 2: location of the FMD outbreak that occurred on September 24th 2017 at the Southwest Guizhou Autonomous Prefecture, China. (Source – WAHIS)

China, Hong Kong, SAR [2]

The FMD virus strain detected in three of the four epithelial samples of the foot coronary band collected from pigs at a private meat trader of Sheung Shui, New Territories, on September 11th 2017 was genotyped as O/Cathay. The

most closely related sequences to the present field viruses belong to those isolated in the same country in 2016, with a percentage identity (% id) > 98.7%.

Mongolia [2]

The FMDV VP1 sequence of a bovine sample submitted by the FGBI-ARRIAH that was collected during March 2015 in Bayan-Ulgii, Mongolia was genotyped as O/ME-SA/ind-2001d. The two viruses with the closest sequence identity are Zabaikalskiy/3/RUS/2016 and MOG 13/2017 (99.4% id).
This is the first report of the circulation of this genotype in the country.

Russian Federation [1, 2 & 3]

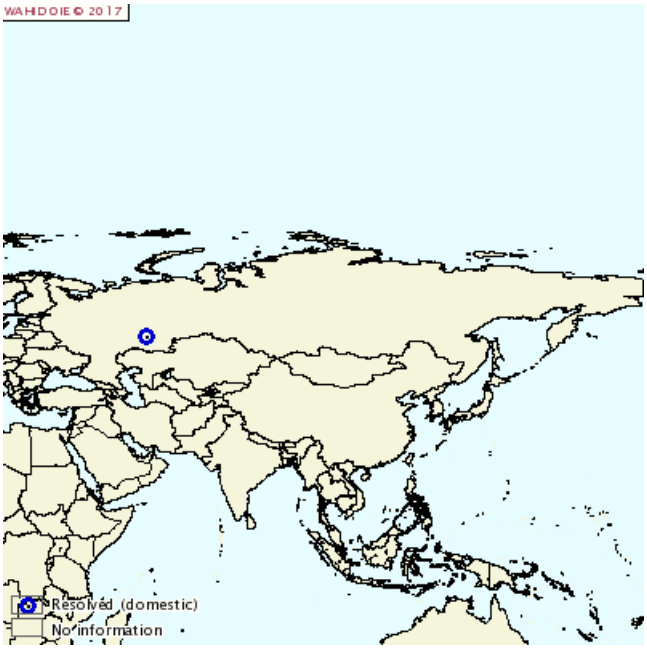
FMD outbreaks due to serotype O were notified between September 30th and October 9th 2017 in five different epidemiological units, involving small and large domestic ruminants at Buzdyaksky, Republic of Bashkortostan. All the outbreaks were reported as resolved as from November 7th 2017. All the animals present in the outbreaks were destroyed. The FGBI-ARRIAH confirmed the diagnosis on October 5th 2017 by conducting PCR on samples taken from the affected species.
A summary of the animals involved and location of the outbreaks are respectively reported in Table 3 and Map 3.
Of note is the particularly high morbidity in the small ruminants, in which the disease is not usually clinically evident.
In none of the cases is the origin of the outbreak known and the containment measures adopted are as following: movement control inside the country, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, quarantine, official destruction of animal products, zoning, disinfection, vaccination in case of suitable one and stamping out. No treatment is being administered to the affected animals.
Following an immediate notification received from the OIE Delegate of Russia the "country having an FMD free zone where vaccination is not practised" status for Russia, as recognised by the OIE World Assembly of Delegates in terms of Resolution No. 22 in May 2017, is suspended with effect from September 30th 2017.

Table 3: summary of the animals involved in the FMD outbreaks that occurred between September 30th and October 9th in five different epidemiological units, involving small and large domestic ruminants at Buzdyaksky, Republic of Bashkortostan (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	160	15	0	160	0	9.38%	0.00%	0.00%	100.00%
Sheep / goats	81	79	0	81	0	97.53%	0.00%	0.00%	100.00%
Totals	**241**	**94**	**0**	**241**	**0**	**39.00%**	**0.00%**	**0.00%**	**100.00%**

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

Map 3: location of the FMD outbreaks September 30th and October 9th in five different epidemiological units, involving small and large domestic ruminants at Buzdyaksky, Republic of Bashkortostan (Source – WAHIS)



The FMDV VP1 sequence of a bovine sample collected from one of the aforementioned outbreaks, submitted by the FGBI-ARRIAH (OIE Reference Laboratory) to the WRLFMD, was typed as O/ME-SA and the most closely related sequence belongs to the field virus PAK/41/2012 detected in cattle, with relatively low seq id of 95.9%.
Further to the diagnostic activities carried out in the above-mentioned outbreaks, FGBI-ARRIAH examined for FMDV antibodies 10,406 and 7276 serum blood samples, respectively collected from vaccinated and non vaccinated animals.
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 by respectively supplying materials and technical advice.

Table 4: Summary of the history of FMD Pool 1 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016 see Map 4 below. (Source – Wahis, EuFMD Global Monthly Report)

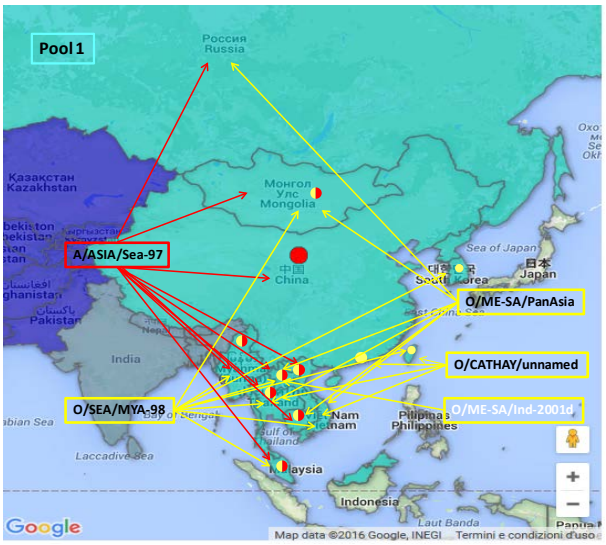
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2016 **(1st semester 2016)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	PENDING/2013-2016 O, A/2016, NOT SAMPLED, (ASIA /2016)	Dec 2016/ A & O	Follow-up needed
China	Data up to 1st semester 2015 2013 & 2015/A, 2012-2013/O, 2012 -2014/NOT TYPED	Sep 2017/O, May 2017/A	**See text**
China, Hong Kong, SAR	O	Sep 2017/O	**See text**
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	Jan 2017/O Mar 2015/A,	Follow-up needed

	2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT 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	Oct 2017/O, Oct 2016/Asia 1, Jan 2016/ A	**See text**
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	Follow-up needed
Viet Nam	O, NOT SAMPLED, NOT TYPED 2013-2016/A	November 2016/A, Oct 2016/O and not typed	Follow-up needed

Map 4: 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, 11]:

- 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 – <u>South Asia</u>

Bhutan [2, 4]

Further to the FMD outbreak reported in March 2017 at Jongkhar in the southeast part of the country due to A/ASIA/G-VII, other episodes of the disease were notified in the western part of the country.

The first episode was reported at Thimphu Dzongkhag in two herds on September 2nd 2017 at Jeba village under Genekha geog, Thimphu Dzongkha. Seven animals were affected and the source of infection is from contact with an infected herd of Paro Dzongkhag. Detailed epidemiological investigations and control measures are ongoing.

The second episode was reported on September 4th 2017at Bangteygang village (Chungkha) under Bongo geog, Chukha Dzongkhag, affecting only one herd. Control measures including public awareness, movement control of live animal and animal products, ring vaccination and surveillance are being conducted by the Dzongkhag Livestock sectors and Regional Livestock Disease Centre, Tsimasham.

The FMDV serotype/s causing the outbreaks was not reported. Location of areas affected by the outbreaks is represented in Map 5.

The results of the VMSD tests carried out on the following field samples are summarized as following:

- for A/BHU/3/2017, belonging to genotype A/ASIA/G-VII, none of the vaccine strains, that are A IRN/2005, A/TUR/20/2006 and A22 IRQ/24/64, obtained good matching results,
- for O/BHU/5 and 14/2017, belonging to genotype O/ME-SA/Ind2001d, both vaccines strains used i.e. O 3039, O Manisa and O TUR 5/09, obtained good matching results.

Map 5 location of the FMD outbreaks at Chukha and Thimphu, Bhutan during September 2017 (Source – Google maps)

India [5 & 13]

The ICAR-PDFMD, Mukteswar, India, detected FMDV serotype O among the eight cattle and three buffalo samples tested during October 2017 using FMDV antigen and/or RNA detection methods. The laboratory submitted five field isolates belonging to serotype O for genotyping and five isolates for vaccine matching tests. The laboratory also conducted the analyses of 603 sera collected in the course of epidemiological studies for the detection of FMD antibodies. The FMD diagnostics kits employed are those developed at ICAR-PDFMD.

The laboratory is 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 has ongoing research studies and collaborations with international organisations.

The FMD situation for the country relative to 2016-17 is described in the Annual Report of the ICAR-PDFMD. In brief, 150 serotype FMD confirmed incidences were reported in India, all due to FMDV serotype O. In fact, this is the first period in which outbreaks due to serotypes A and ASIA 1, previously circulating in the county, were not detected.

The highest incidences of FMD outbreaks were in the North East (38%) and South (32.67%) of the country, followed by the East (14.67), North (7.33%), West (4%), and Central (3.33%) areas of the country.

The phylogenetic analysis of the circulating serotype revealed the exclusive presence of lineage 'Ind2001' strains.

In the vaccine matching exercise carried out to evaluate antigenic relationship of field isolates with currently used vaccine strains, vaccine strain INDR2/1975 provided an optimal coverage of 91% of the currently circulating field

isolates. The FMD vaccination control programme is currently implemented in all the states of the southern peninsula, including 460 districts.

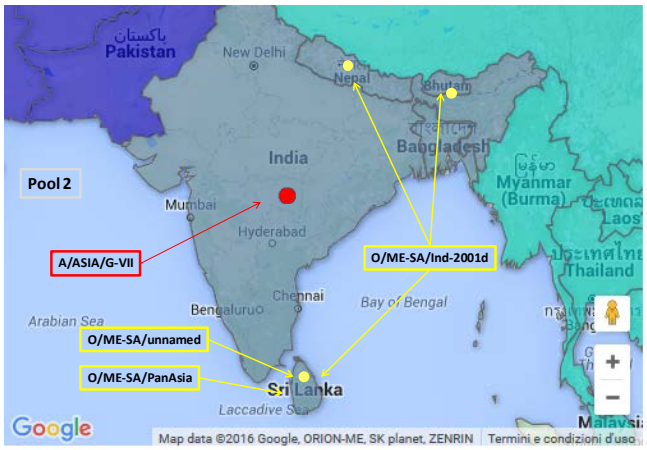
Table 5: Summary of the history of FMD Pool 2 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 6 below. (Source – Wahis, EuFMD Global Monthly Report)

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	Sep 2017/untyped, July 2017/O, April 2017/A	**See text**
India	NO DATA AVAILABLE/2016, O, A, NOT SAMPLED 2012-2014/Asia 1 2013/NOT TYPED	Oct 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	Follow-up needed
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, 11]:

- 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

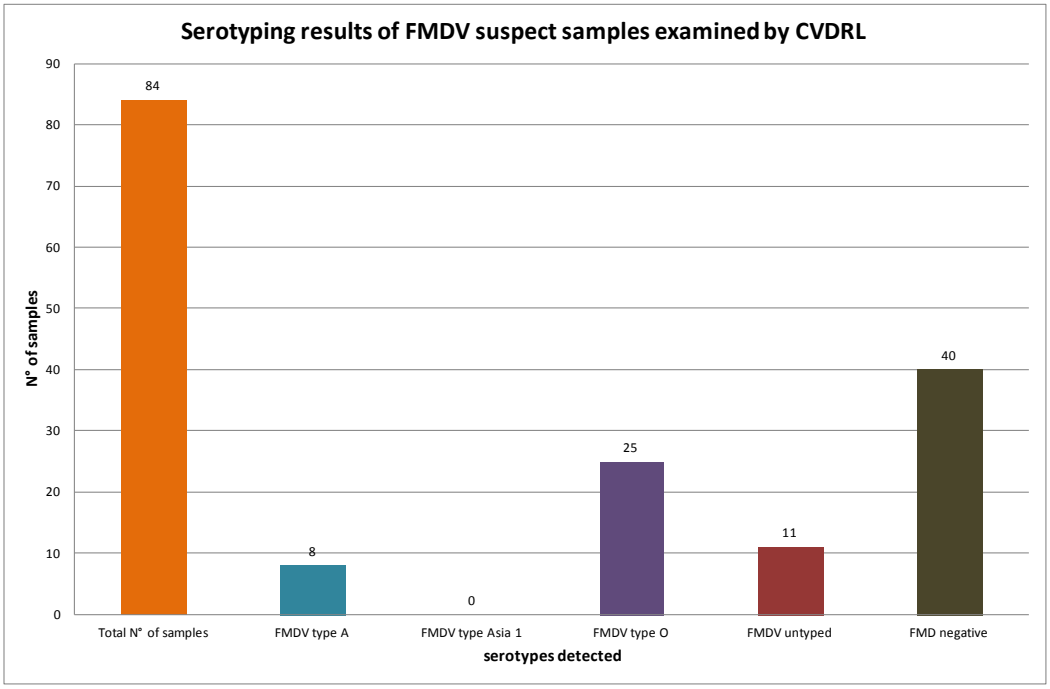
Afghanistan [6]

The CVDRL of Kabul Afghanistan examined 84 samples during October of which 44 resulted positive for FMDV. Distribution of the serotypes is reported in Graph 1.

The laboratory personnel were involved in providing expert advice to Government services and national/local authorities and in collaborations with international organizations.
The results of the VMSD tests carried out on the following field samples are summarized as following:

- for field samples A/AFG/11 & 25/2017, respectively belonging to genotypes A/ASIA/Iran-05^{FAR-11} and A/ASIA/Iran-05^{SIS-13}, none of the vaccine strains employed, represented by A IRN/2005 and A/TUR/20/2006, obtained good matching results apart from A22 IRQ/24/64 with sample A/AFG/25/2017,
- for field sample ASIA 1/AFG/22/2017, belonging to ASIA 1/ASIA/Sindh-08, good matching results were obtained with Asia1 Shamir,
- for field samples O/AFG/23 & 34/2017, belonging to O/ME-SA/PanAsia-2^{ANT-10}, all vaccines strains employed, i.e. O 3039, O Manisa and O TUR 5/09 obtained good matching results.

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



Egypt [2]

The results of the VMSD tests carried out on the following field samples collected in the country are summarized as following:

- for field sample A/EGY/19/2016, belonging to genotype A/AFRICA/G-IV, none of the vaccine strains employed, i.e. by A IRN/2005, A/ERI/3/98, A/TUR/20/2006 and A22 IRQ/24/64, obtained good matching results,
- for field samples O/EGY/10/2017 and 26/2017, good matching results were obtained by all of the vaccines strains employed, O 3039, O Manisa and O TUR 5/09.

Pakistan [1 & 7]

The FMD control project is currently operated only Punjab and information relative to other areas of the country are provided on voluntarily basis.
The 15 FMD outbreaks due to FMDV serotypes A, Asia 1 and O notified during October 2017, occurred in the three provinces of Azad Jammu and Kashmir, Khyber Pakhtunkhwa and Punjab.
The distribution of FMDV serotypes relative to the outbreaks and location of these are reported in Table 6 and Map 7.

Table 6: summary of the FMD outbreaks reported in Pakistan during October 2017. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

Province	District	Number Outbreaks	Number of Outbreaks due to FMDV Serotype(s)				
			'O'	'A'	'Asia-1'	Un-Typed	Not tested
Khyber Pakhtunkhwa	Mardan	1	--	--	--	1	--
Azad Jammu and Kashmir	Mirpur	3	--	--	--	--	3
Punjab	Attock	2	1	--	--	1	--
	Pakpattan	3	--	--	3	--	--
	Layyah	5	--	5	--	--	--
	Rawalpindi	1	--	--	--	1	--
Totals		15	1	5	3	3	3

Map 7: location of the FMD outbreaks reported in Pakistan during October 2017. (Source – Google Fusion Maps, Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

During the same month, emergency and preventive vaccination were also carried out in different areas of the country as respectively reported in Tables 7 and 8.

Table 7: summary of the emergency vaccination activities conducted in some provinces of Pakistan during October 2017. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

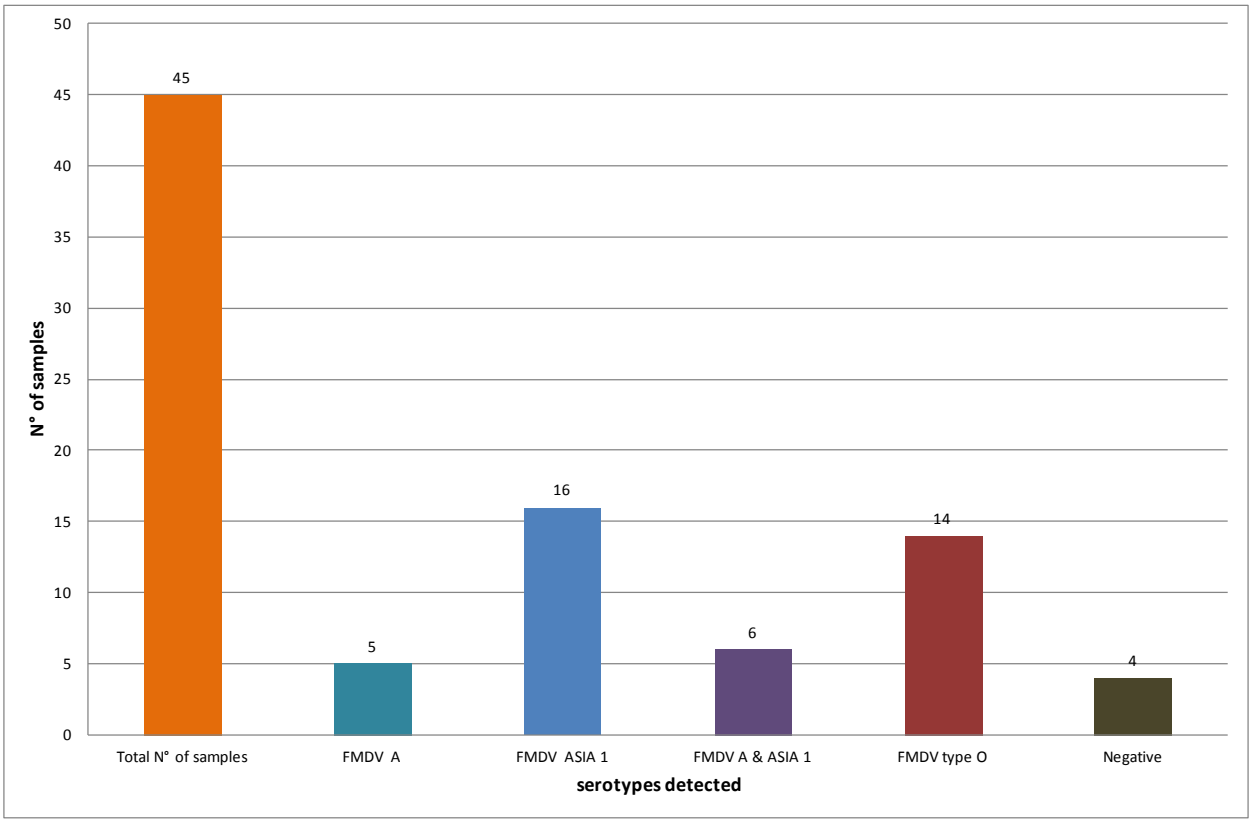
Province	Ring Vaccination (Doses)
Punjab	300
Islamabad Capital Territory	25
Khyber Pakhtunkhwa	1,000
Total	**1,325**

Table 8: summary of the preventive vaccination activities conducted in the various districts of the Punjab province, Pakistan during October 2017. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

Administrive division	No. of Households	Animals Vaccinated					
		(Primary Dose)			(Booster Dose)		
		Cattles	Buffaloes	Total	Cattles	Buffaloes	Total
Pakpattan	37,481	--	--	--	142,069	191,398	333,467
Sahiwal	9,912	35,853	27,680	63,533	29,438	17,032	46,470
Sheikhupura	20,643	88,502	116,311	204,813	5,361	11,129	16,490
Okara	101,884	--	--	--	545,357	373,302	918,659
Vehari	34,106	39,572	32,779	72,351	154,119	146,202	300,321
Punjab	204,026	163,927	176,770	340,697	876,344	739,063	1,615,407
Totals	408,052	327,854	353,540	681,394	1,752,688	1,478,126	3,230,814

FMDV serotypes A, ASIA 1 and O were detected in a set of 45 samples (31 from cattle and 14 from buffaloes) collected in the country between January 2016 and September 2017.
A summary of the serotyping results are represented in Graph 2. Of note is the detection of mixed infections due to serotype A and ASIA 1. In brief 91.11% of the samples tested resulted positive for FMDV, with serotype ASIA 1 (39.02%) and O (34.15%) being most frequent, followed by serotype A (12.20%). Of note is the relative frequent occurrence of samples with mixed infections due to serotypes A and ASIA 1 (14.63%).

Graph 2: relative distribution of the FMDV serotypes among the samples collected in the different provinces of Pakistan between January 2016 and September 2017. (Source – CVDRL, Afghanistan, WRLFMD)



[8]1ST WEST EURASIA FMD EPIDEMIOLOGY & LABORATORY NETWORKS MEETING was held at Tibilisi, Georgia on September 18th -20th 2017.

Following is a summary of the presentation of each country.

Armenia - presented by Satenik Kharatyan, Head of department of diagnosis of animal infectious diseases and the quality control of the biologics of "FSRAASC" SNCO.

The last outbreak registered in the country is that of March 2016, in Armavir caused by FMDV A/ASIA/G-VII.

The country has adopted a risk-based vaccination plan using vaccines with an efficiency ≥ $6PD_{50}$. Vaccine strains employed are A Iran 05, A/G-VII, O PanAsia2, Asia1 Sindh 08, produced by FGBI "ARRIAH". The country's objective is to achieve 100% vaccine coverage in cattle, with multiple boosters administered every three months in calves up to the age of 18 months and an annual vaccination of small ruminants in high-risk areas, such as borders, cattle markets and migration routes. Coverage achieved up to September 2017 was 61.6%.

After completion of vaccination, a post vaccine efficacy monitoring campaign will be set up based on NSP-ab and SP-ab detection.

Azerbaijan - presented by Tamilla Aliyeva, National Consultant

Last outbreak in the country was in 2007. At present a FMD clinical and serological surveillance plan are in place.

The present vaccination campaign is based on the immunization twice per year of all the large ruminant population (spring and autumn) and annually for the small ruminants. Monitoring and evaluation of vaccination campaign consists in vaccine coverage defined by the SP level as well as an evaluation of cool chain during vaccination campaign (distribution, transportation, storage, using).

The vaccines used in 2016 for large ruminants were a Trivalent: Shelkovo: A Sis 10, O Panasia 2 ANT 10, Asia-1 Sindh 08 , the SAP (Turvac Oil): A /Tur 14, O/ Tur 07, Asia-1/ Tur 15, while for small ruminants a bivalent vaccine: A/Iran/2005/10, O Panasia 2 ANT 10 (Shelkovo) was used.

Vaccine used in 2017 for large ruminants: Tetravalent: A/SAU2015 (GVII), A/TUR 2014, O/PanAsia-2, Asia-1/TUR 2015 while for small ruminants a bivalent, A/TUR 2014, O/PanAsia-2.

A NSP serosurvey conducted during 2016 in hotspot areas represented by bordering villages with Iran, Armenia and Georgia, in which 911 and 781 sera were respectively collected from large and small ruminants detected a prevalence of 2.63% for the former and 2.56 % for the latter. The SP sero-monitoring campaign detected 84.5% coverage for large ruminants and 74.98% for small ruminants.

Further to the seromonitoring activities, the country has also set up as part of the FMD control strategy, an animal movement control plan, as well as a series of activities to strengthen the veterinary services and increase public awareness.

Georgia - presented by Zurab Rukhadze

FMD was last detected in the country in 2001. Georgia is currently in PCP stage 2 and risk-based control measures were implemented for the sector or zone targeted, based on the FMD strategic control plan developed in Stage 1.

In 2015, a risk based strategic plan was set and is structured as for other diseases with all actions documented and standardized, including sero-survey design, guidelines for its operation and paper forms. An electronic system is in place for the control of the disease with animal identification and registration.

Vaccines used are those recommended by the EuFMD, which are of high potency > $6PD_{50}$, with risk based and mass vaccination of small and large ruminants twice a year since 2012. Booster vaccination of calves and lambs was introduced in 2007. FMD sero-surveys, based on a scientific and epidemiological approach, designed in collaboration with EuFMD, are in place and have been carried out since 2014 including small and large ruminants and carried out taking also into account high risk zones. The NSP sero- survey carried out in 2016 in 7 high risk areas detected between 5 to 15% seropositivity in large ruminants and between 5 to 19% seropositivity in small ruminants.

The country has identified Racha-Lechkhum Kvemo Svaneti and Mestia as candidate zones for PCP stage 3.

Iran - presented by the FMD National Reference Laboratory Network

A total of 378 samples were examined by the FMD NRL network with the detection of FMDV serotypes A (95 – 48.97%), 0 (84- 43.30%) and ASIA 1 (15 - 7.73%). The sequencing of the samples identified the following genotypes: A/Asia/G VII, A/Asia/Iran 05, ASIA//Asia/Sindh08 and O/ME-SA/PanAsia-2.

The vaccines identified by the laboratory as suitable for the country are O Manisa, O 3039,A Iran05, A saudi 95, Asia 1 Shamir, aiming the commercial strains and O Panasia, A GII, A 05, Asia 1 sindh08 for the locally produced strains.

The country also presented a capacity-building plan for the rapid identification of circulating FMDV and to deliver sero-monitoring services.

Kazakhstan – presented by Tyulegenov S.

Since May 2017, the country is officially free from FMD with the division into zones where vaccination is practised and zones without vaccination. As part of the recommendations of the OIE Scientific Commission, the country has adopted an NSP serological surveillance where the sample size is determined using a two stage clustering sampling method, including young animals from 3 to 12 months and where the level of disease absence is determined for each zone. Further to this, the country has also carried out FMD simulation exercises.

Russian Federation – presented by ARRIAH.

A limited English translation of the presentation was given which was focused on the outbreaks that the country experienced from 1991 and 2016 as also the situation updated according to the OIE in January 2017. Other information presented was the probable ways of entry of FMD in the country.

Tajikistan - presented by Andamov I. - Head of the Department of Anti-Epizootic Surveillance of the State Veterinary Surveillance Service of the Ministry of Agriculture of the Republic of Tajikistan

The country registered FMD in 2003 and 2006, as well as in 2011 sporadic cases in some areas share borders with Afghanistan.

In the different regions of the country, vaccine coverage ranges from 20.2% to 44.5% in cattle and 2.6% to 33.5% in sheep and goats.

Vaccines used in the country are the following

•Triple vaccine of Indian production type A, O, Asia 1 from the strain of Raksha.

•Triple vaccine of Indian production type A, O, Asia 1 from the FUTVAC strain of the company "Brilliant Biopharma Limited".

•Triple vaccine of Russian production ARRIAH Pokrov city, type A, O, Asia 1

• Bivalent vaccine of Russian production ARRIAH Pokrov city, type A, O.

•Triple vaccine of Russian biocomplex Shchelkovo type A, O, Asia 1.

• Bivalent vaccine of Russian biocomplex Shchelkovo type A, O.

•Triple vaccine of production of the Islamic Republic of Iran

• Rosie's bioproduct. type A, O, Asia 1

Turkey – A. Naci Bulut Leader of WELNET FMD Şap Institute, Ankara,Turkey

Circulating strains in Anatolia region in Turkey are O/ME-SA/PanAsia2 and A/ASIA/G-VII. The Thrace region has been free of FMD with vaccination since May 2010. A temporal distribution of the outbreaks was presented as shown in Figures 1 , as also a summary of the vaccine matching tests Figure 2 conducted by the same laboratory. The presentation was focused on the new control FMD strategy to eradicate the disease in Anatolia with the update of the present risk based control programme including more aggressive activities with the aim to reach a OIE FMD free status with vaccination by 2023. The main components of the strategy are the elimination of risk caused by animal movement, the improvement of outbreak management, the elimination of the virus circulation, the reduction of risk due to animal markets and dealers, the improvement of the monitoring and evaluation system and stopping virus incursions.

Figure 1: distribution of the FMD outbreaks in Anatolia, Turkey during 2017 per serotype (Source - A. Naci Bulut Leader of WELNET FMD Şap Institute, Ankara,Turkey)

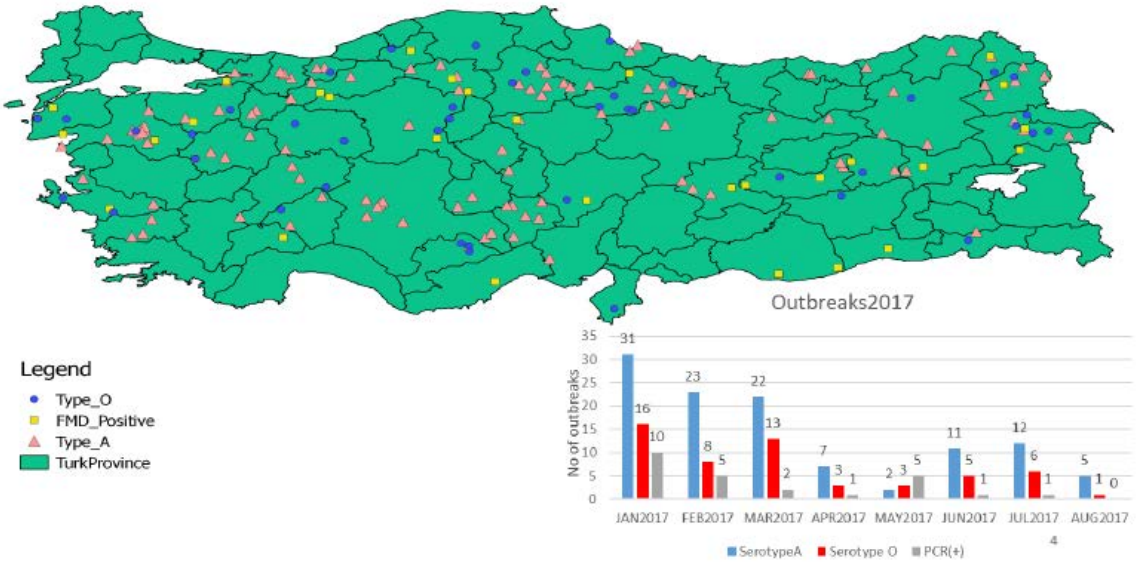


Figure 2: summary of vaccine matching (antigenic characterisation by VNT) conducted by Şap Institute, Ankara,Turkey (Source - A. Naci Bulut Leader of WELNET FMD Şap Institute, Ankara,Turkey)
N- no matching, M- matching.

	Vaccine strain		
	O1 Manisa	OTUR07	OTUR14
O QOM-(2015 isolate)	N	M	N
O QOM-(2016 isolate)	N	M	N
O QOM-(2017 isolate)	N	M	N

	Vaccine strain	
	GVII	ATUR16 /GVII
A05 (2006 isolate)	N	N
A05 (SIS10 / 2011 isolate)	N	N
A05 (SIS10 / 2015 isolate)	N	N
GVII (BAN-12 / 2016 isolate)	M	M
GVII (BAN-12 / 2017 isolate)	M	M
GVII (SAM16 / 2016-2017 isolate)	M (Partially)	M

	Vaccine strain		
	As1 Shamir	Asia1 TUR11	Asia1 TUR 14
As1 Sindh 08 (2015 isolate)	N	N	M

Table 9: Summary of the history of FMD Pool 3 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 8 below. (Source – Wahis, EuFMD Global Monthly Report)

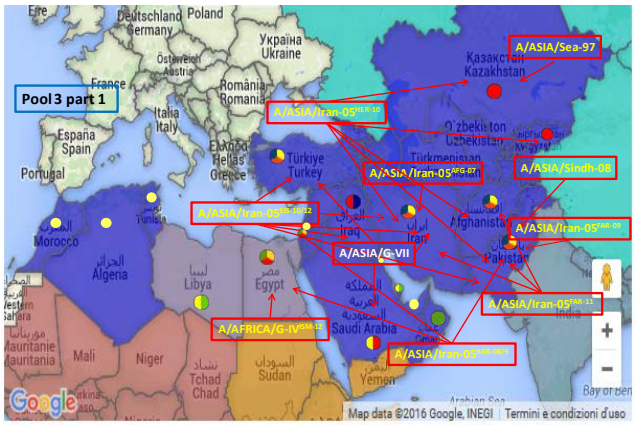
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2016**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	Sep 2017/A & O, Aug 2017/Asia 1	**See text**
Algeria	Data available up to 1st semester 2015 2014 -2015/O	Apr 2017/A, Apr 2015/O	Follow –up needed
Armenia	2015 -2016**/A , 2012-2014/DISEASE ABSENT	Dec 2015/A	**See text**
Azerbaijan	DISEASE ABSENT	2007/0	**See text**
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	**See text**
Georgia	DISEASE ABSENT	2001/ASIA 1	**See text**
Iran (Islamic Republic of)	2012-2016/A, Asia 1 & O	Feb 2017/A & O, 2013/Asia 1	**See text**
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	**See text**
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,	**See text**
Tunisia	2015-16**/ DISEASE ABSENT, 2014/O	April 2017/A, Oct 2014/O	Follow –up needed
Turkey	A & O, NOT TYPED Asia 1/2012-15	Oct 2015/ A May, 2014-2015/ Asia 1 and O	**See text**
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
Uzbekistan	2012,2013 & 2015/NO DATA REPORTED 2014/DISEASE ABSENT	Not available	Follow –up needed

Map 8: 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).

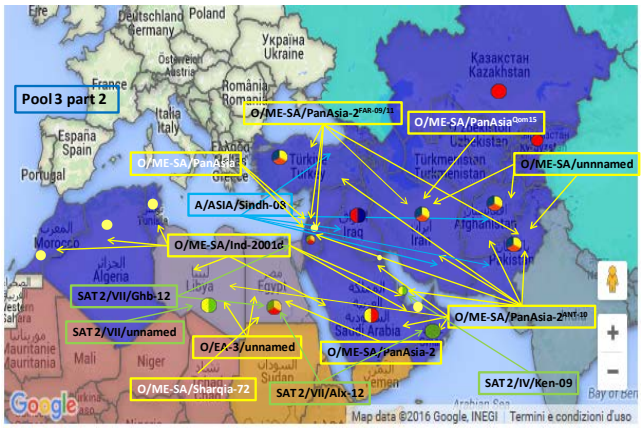
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [1, 11]:

- 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 [9]

For October 2017, the NAHDIC detected FMDV serotype O using an antigen ELISA in 11 swab and tissue samples collected in cattle from an outbreak area. Circulation of the disease was also confirmed by the serological positivity of five of six sera examined by 3ABC ELISA.

The laboratory personnel was involved in the outbreak investigation and in providing instructions to the local community for the containment of the FMD.

Kenya [10]

The FMD National Reference Laboratory, Embakasi, Kenya reported during October 2017 FMDV serotypes A, O SAT 1 and SAT 2 in 15 cattle samples collected during outbreaks.

The laboratory personnel was involved in the outbreak investigation and in providing advice to the local services for the control of FMD.

The laboratory has ongoing collaborations with Sandia National Laboratories, USA.

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, SAT 1/I (NWZ)/unnamed in 2013 and SAT 2/IV/unnamed in 2012.

Table 10: Summary of the history of FMD Pool 4 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 9 below. (Source – Wahis, EuFMD Global Monthly Report)

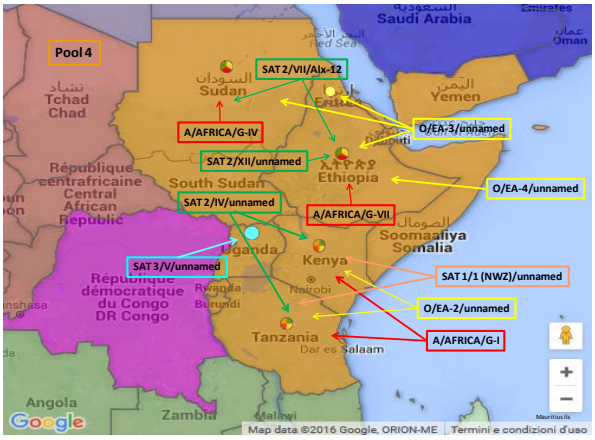
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Democratic Republic of Congo	2012 – 2016**/A, O, SAT 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	Oct 2017/O, Jun 2017/A, March 2017/SAT 1, May 2016/SAT 2	**See text**
Kenya	2012 – 2016 /NOT TYPED, A, O, SAT1, SAT2	Oct 2017/A, O, SAT 1 & SAT 2	**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,	Dec 2016/ not sampled, Oct 2016/O, Dec 2013/A,	Follow –up needed

	2012-2014/O & NOT TYPED 2013/SAT 2,	Jan 2014/SAT 2	
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 9: 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, 11]:

- 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 [14]

The Laboratoire National Vétérinaire (LANAVET), Garoua, Cameroon detected FMDV antibodies in 12 (7.89 %) of the 152 ovine and caprine serum samples examined using non-structural protein (NSP) ELISA. Other diagnostic activities as on hold as material is out of stock.

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.

Nigeria [15]
The National Veterinary Research Institute Vom, Nigeria is in the process of examining a set of 13 FMD suspect epithelial samples. The latter laboratory conducted epidemiological investigations in the outbreaks and provided advice to farmers on the containment of FMD. The National Veterinary Research Institute Vom, Nigeria continues its OIE twinning programme with CODA CERVA, Belgium.

Ghana [16] and Senegal [17]
The ACCRA Veterinary Laboratory, Ghana, 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 while

Table 11: Summary of the history of FMD Pool 5 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 10 below. (Source – Wahis, EuFMD Global Monthly Report)

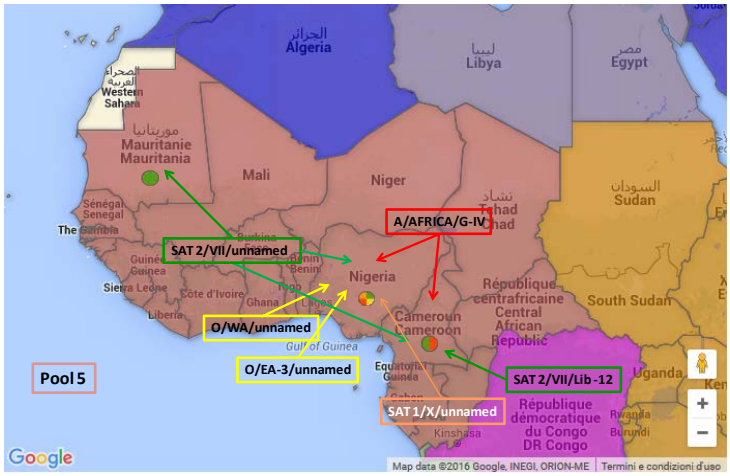
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	2016/NO DATA REPORTED A, O, SAT 1, SAT 2/2012-2015	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE 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 10: 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, 11]:

- 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]

The FMD outbreak occurred on September 19th 2017 in grazing cattle at a communal area at Ngamiland, Botswana has been identified by the Botswana Vaccine Institute (OIE Reference Laboratory) as due to SAT 2/III.

Up to October 4th 2017, 101 cases were recorded in six crushes all within a 10km radius. Tracing back and forward is ongoing. Containment measures applied are movement control inside the country, surveillance within containment and/or protection zone, control of wildlife reservoirs, traceability, zoning, vaccination permitted if a suitable vaccine is available), disinfection and ante and post-mortem inspections. No treatment is administered to the affected animals.

Namibia [1]

For the FMD outbreaks due to SAT 2 were reported in cattle, between July 24th and September 12th 2017 at Katima-Mulilo, Zambezi due to contact with wild animals the following containment measures are still in place: 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.

Table 12: Summary of the history of FMD Pool 6 between 2012 – 2017. For geographic distribution of circulating FMDVs between 2012 -2016, 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
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	Sep 2017/typing pending,	**See text**

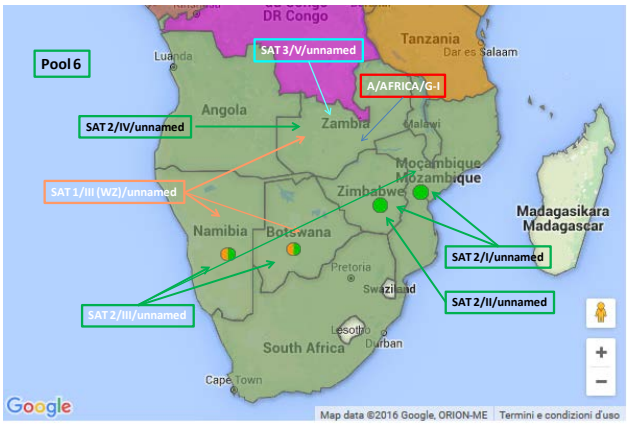
	2014-2015/SAT 1	July 2015/SAT 2, June 2015/SAT 1	
Democratic Republic of the Congo	2012 – 2016/A, O, SAT 1	Dec 2016/A, O & Sat 1	Typing required
Malawi	2012/NO OUTBREAKS REPORTED 2013-2015/ NO DATA AVAILABLE	Aug 2017/typing pending, Oct 2011,	Follow –up needed
Mozambique	2016**/ NO DATA AVAILABLE 2012 -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, May 2015/SAT 1	**See text**
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,	Follow –up needed
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	Follow –up needed

Map 11: 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

Rest of Latin America [1, 11 & 12]

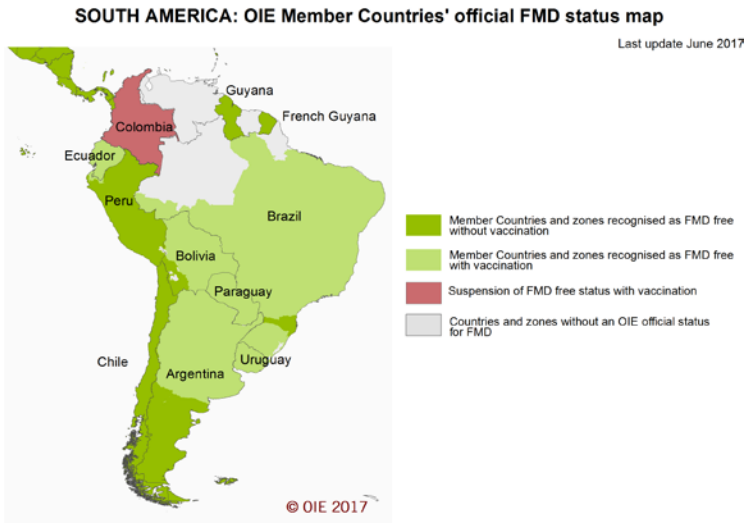
The OIE FMD status of the countries in South America as reported in June 2017 is presented in Map 12.

Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, 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/).
Following an immediate notification received from the OIE Delegate of Colombia on an outbreak of FMD in Arauca Department, the "FMD free status where vaccination is practised" for a zone of Colombia resulting from the merge of five distinct zones designated by the Delegate of Colombia, is suspended with effect from 11 June 2017.
Small areas of the continent may still be considered as endemic but clinical cases are rare (Map 12). In fact, before the outbreak reported in Columbia, PANAFTOSA reported data during the OIE/FAO FMD Laboratory Meeting held in November 2016, for historical FMD outbreaks that occurred in Venezuela in 2013 caused by serotype A. The FMD history relative to the Region for 2012 –2017 is reported in Table 13.

Table 13: Summary of the history of FMD Pool 16 between 2012 – 2017, for geographic distribution see Map 12 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	Follow –up needed
Paraguay	DISEASE ABSENT	Dec 2011/O	Follow –up needed
Venezuela (Bolivarian Republic of)	DISEASE ABSENT**	2011/O, 2013/ A	National situation needs verification

Map 12: FMD status for South America [1] (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 14)
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).
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. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. S. Fomina.*
4. National Centre for Animal Health, Bhutan: http://ncah.gov.bt/index.php
5. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India - *Dr. S. Saravanan*.
6. Central Veterinary Diagnostic and Research Laboratory *(CVDRL)*, of Kabul Afghanistan – Dr. Nazem Shirazi.
7. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
8. 1ST West Eurasia Fmd Epidemiology & Laboratory Networks Meeting, at Tibilisi, Georgia on September 18th -20th 2017
9. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
10. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Hellen Mutua.*
11. OIE/FAO FMD Reference Laboratory Network, Annual Report 2016
12. 44a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa - 6 – 8 March 2017, Rio de Janeiro, Brasil.
13. PD- FMD Annual Report 2016-17: http://www.pdfmd.ernet.in/index_files/Content/Reports/ICAR_DFMD_AR_2016_17_English.pdf
14. Laboratoire National Vétérinaire (LANAVET) - Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*.
15. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini.*
16. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni.*
17. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – *Miss Mariame Diop and Dr. Moustapha Lô.*