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MONTHLY REPORT
FOOT-AND-MOUTH DISEASE SITUATION

Food and Agriculture Organization of the United Nations

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

April 2017

Guest Editor:
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#INFORMATION SOURCES USED:

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

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

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

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

Contents

Guest Editor's comments

It is my pleasure to be invited as guest editor this month.

In the nineties, I worked in Cambodia as a veterinarian supporting the department of Animal Health and Production. Notifications of FMD outbreaks were reported regularly. However only in very few cases, we were able to visit the outbreak in time to take good samples. These days, when I see O/CAM12/94 listed in the phylogenetic trees of WRL Pirbright reports, it reminds me of such a lucky strike. It was a very hot day out in the countryside with one pair of cows showing clinical signs of FMD and another pair owned by the same farmer without signs. That intrigued me as I was trained that FMD was one of the most infectious animal diseases. As a result, upon return from Cambodia in 1996, I started a MSc in veterinary epidemiology to acquire the tools to study disease at population level and pursuing prevention of infection rather than to follow the trail of disease by treating sick animals. Currently, I am privileged to work as Component Manager of the Progressive Control Pathway for FMD (PCP-FMD) at EuFMD.

This month, the report describes FMD outbreaks in Israel related to A/Asia/G-VII. The route of introduction of the A/Asia/G-VII is still unknown. However, its occurrence in this part of the Middle East was anticipated, given the outbreaks related to this serotype/strain reported in the neighbourhood (Kingdom of Saudi Arabia, Iran and Turkey) last year. It is therefore somewhat of a surprise that outbreaks caused by serotype O were reported in the West Bank of the Palestinian Autonomous Territories. These may be a spill-over from the O/EA-3 outbreak in the Gaza Strip earlier this year. The reason for me to refer to 'a surprise' is that there are no direct animal movements possible between the different Palestinian Authority Territories. Thus, other routes need to be considered. For that, extended epidemiologic investigations are a requirement to better understand risks of incursion and spread.

Last month, the SEACFMD commissioned a risk assessment study on the incursion of exotic FMD virus into South-East Asia. This study applied the principles of qualitative risk assessment and considered 10 risk pathways of FMD virus release (incursion) into SE Asia and 8 risk pathways of subsequent exposure (onwards spread). Amongst others, it made use of the Global Monthly Reports and WRL Pirbright reports to describe the threats of exotic FMD viruses in adjacent regions and regions with which SE Asia is trading. Clearly, direct animal movements from adjacent South-Asia into South-East Asia were assessed a very high risk. However, given the volume and frequency of animal products and by-products (boneless meat, offal, food-waste, bone crush, skins) being imported from FMD-endemic countries, these risk pathways were not to be underestimated. And, although specific countries in the region had higher risks of incursion, the consequences of incursion impacted the whole region (the incursion of O/SE-MEA/Ind2001d is an example). Thus, it was recommended for the region to jointly support early detection (training of local vets, raising awareness, improving diagnostic capacities) and rapid response (training, equipment, vaccine bank) in those countries most at risk for incursion of an exotic strain *(the study is soon to be released and can be accessed through the OIE-SRR-SEA office)*. I see this study as a good example of using the information from the Global Monthly Reports as a starting point for getting a better understanding about the FMD situation and for supporting decision making.

Given the many issues around FMD reporting, sampling and testing, the results of this report are only showing the tip of the FMD iceberg. Nonetheless, I wish this reporting will encourage virologists and epidemiologists to jointly investigate risk pathways of FMD virus incursions, not only for local or national situations but regionally as well. I expect that this reporting will support decision making on contingency planning and preparedness to mitigate the impact when incursions occur. Finally, I look forward to the new lay-out and the changes forthcoming to even better serve the FMD community about the risks posed by FMD virus circulation around the globe.

Chris Bartels

I. GENERAL OVERVIEW

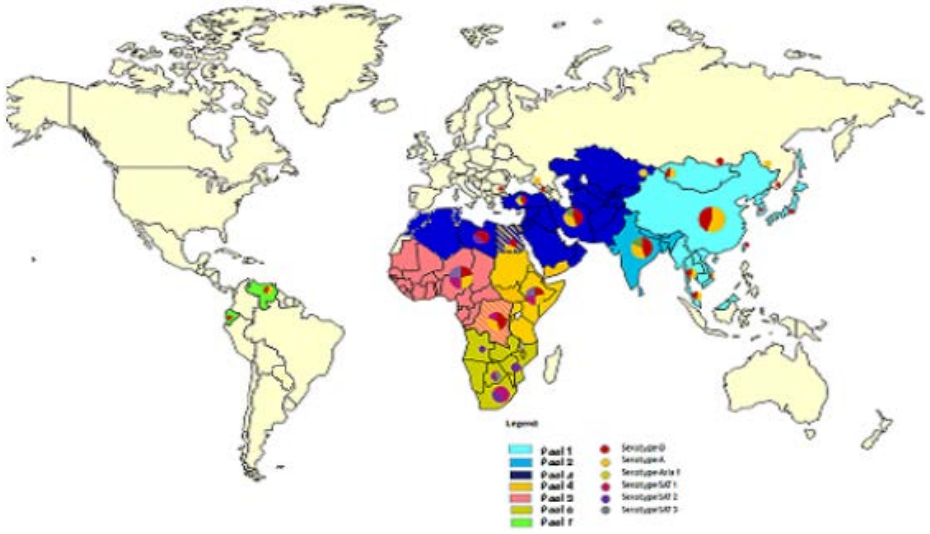
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below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

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 not detected since 2006)**
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

China (People's Rep. of) [1] – Two FMD outbreaks caused by serotype A respectively occurred on the 24th and 28th of April 2017 on cattle farms in the province of Xinjiang. Last report of this serotype in China (People's Rep. of) was in 2015.
Another episode, this time due to FMDV serotype O, was observed on May 15, 2017 on a cattle farm in the province of Guangdong.

Mongolia [2] **–** The Russian Federation Regional Reference Laboratory for FMD (FGBI-ARRIAH) isolated FMDV serotype O in samples collected in this country.

Korea (Rep. of) [3] **–** Supplementary vaccine matching strain differentiation (VMSD) tests identified vaccine strains having good matching results with the field isolates belonging to FMDVs serotype A and O, responsible for the outbreaks that occurred in the country in February 2017.

POOL 2 - SOUTH ASIA

Bhutan [4] – On the 4th of May, 2017, cattle belonging to migratory herds of Habaylakha, Layna, Tshangkap and Epji of Lokchina geog under Chukha Dzongkhag were affected by FMD.

India [5] **–** The Indian Council of Agricultural Research -Directorate of Foot and Mouth Disease, Mukteswar, India reported the detection of FMDV serotype O from the seven cattle samples that were tested using antigen and/or RNA detection assays.

Nepal [3, 6] **–** The National Foot and Mouth Disease and TADS Laboratory confirmed the detection of FMDV serotype O in samples examined during the reporting month.
FMDV serotype O field samples respectively isolated in the country during 2016 and 2017 obtained good matching results in the VMSD tests conducted by the WRLFMD

POOL 3 - WEST EURASIA & MIDDLE EAST

Afghanistan [7] **-** FMDV serotypes A, Asia 1 and O were detected in the 78 samples examined by the Central Veterinary Diagnostic and Research Laboratory *(*CVDRL), of Kabul Afghanistan.

Iran [3] – FMDV serotypes A and O were detected by the WRLFMD in the 24 samples collected in the country from sheep and cattle during 2016 and 2017. The respective serotypes were genetically typed as A/ASIA/G-VII, A/ASIA/Iran-05^{FAR09} and A/ASIA/Iran-05^{FAR11} and O/PanAsia2^{ANT-10} and O/PanAsia2^{QOM-15}.

Israel [1, 3] – Two FMD outbreaks caused by A/Asia/G-VII that involved cattle, respectively occurred on the 1st and 22nd of May 2017 at Aramsha, Acco and at Qela, Golan, Hazafon.
VMSD tests identified vaccine strains with good matching results with the FMDV field isolate belonging to serotype O responsible of the outbreaks that occurred in the country during February 2017.

Pakistan [8] - The Progressive Control of Foot and Mouth Disease Project UTF/PAK/139/PAK reported for the current month 30 FMD outbreaks occurring in some of the territories of the country. FMDV A and O were the serotypes responsible for these outbreaks. As the Project has been completed, reporting from this country is currently on voluntary basis.

Palestinian Auton. Territories [1, 3] – Two FMD outbreaks for which serotyping is pending occurred on 1st and 9th May 2017 respectively at Ramallah, West Bank and at Yatta, West Bank. The outbreaks involved cattle and sheep.
VMSD tests carried out on an FMDV field isolate belonging to serotype O responsible of the outbreak that occurred in the country during February 2017, identified vaccine strains with good matching results.

Tunisia [1] – A new FMD outbreak occurred on a cattle farm on the 24th of April 2017in Bizerte, while the event that was previously reported on the same date and in the same locality is resolved. Both outbreaks are due to FMDV serotype A.

POOL 4 - EASTERN AFRICA

Ethiopia [3] **–** FMDV O/EA3 and O/EA4 lineages were detected in the twenty-seven bovine samples collected in the country during 2016 and 2017.

Kenya [9] **-** FMDV serotypes A and SAT 1 were detected in the five bovine samples examined by the FMD National Reference Laboratory, Embakasi.

POOL 5 - WEST/CENTRAL AFRICA

Guinea Bissau [3, 10, 11] **–** A sample collected in the country in October 2016 and detected as positive for FMDV by the Istitute Senegalase de Recercherche Agricoles, Dakar, Senegal was forwarded for confirmation to ANSES, Paris France. The virus sequence obtained by the latter laboratory was submitted to the WRLFMD for further phylogenetic analysis where it was typed as O/WA.

POOL 6 - SOUTHERN AFRICA

SAR [1, 12] **–** A FMD outbreak was observed on the 1st of March 2017 involving cattle of a village of Mpumalanga. The ARC-Onderstepoort Veterinary Institute diagnosed the event as due to FMDV serotype SAT 2.

POOL 7 - SOUTH AMERICA

Latin America [1, 13] – No new FMD outbreaks were reported for this Region for the current month. During the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported sequence data for historical FMD outbreaks that occurred in Venezuela in 2013 thus confirming that the most recent FMD cases confirmed in South America occurred during that period.

COUNTER

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

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

III. DETAILED POOL ANALYSIS

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

China (People's Rep. of) [1]

During April and May 2017, FMD outbreaks caused by serotype A and O were reported in China (People's Rep. of). FMDV serotype A caused outbreaks on the 24th and 28th of April 2017 on two distinct cattle farms in the province of Xinjiang. Previous reports of this serotype in China (People's Rep. of) were in 2015 in the administrative divisions of Anhui, Hubei and Tibet.

The two cattle farms involved in the present outbreaks were located in the towns of Aksu and Changji Hui Autonomous Prefecture of the province of Xinjiang. The Lanzhou National Reference Lab for Foot and Mouth Disease (OIE Reference Laboratory) confirmed the outbreaks on the 4th of May 2017 using reverse transcription - polymerase chain reaction (RT-PCR).

Source of infection was correlated with the introduction of live animals and clinical signs were observed through active surveillance conducted by the local veterinary authorities.

Measures applied for the control of the outbreak were movement control inside the country, vaccination in response to the outbreaks, surveillance within containment and/or protection zone, quarantine, official disposal of carcasses, by-products and waste, stamping out and disinfection.

A summary of the animals involved and the geographic location of the outbreaks are respectively reported in Table 2 and Map2.

Table 2: summary of the animals involved in the FMD outbreaks of the 24th and 28th of April 2017 in Xinjiang China (People's Rep. of).

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	85	55		85	0	64.71%	**	**	**

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

**Not calculated because of missing information

Map 2: location of the FMD outbreaks of the 24th and 28th of April 2017 in Xinjiang China (People's Rep. of).

The other FMD outbreak that occurred during the same reporting period was on a cattle farm in the province of Guangdong and was due to FMDV serotype O. The episode was observed on the 15th of May 2017 and was again confirmed by the National Reference Lab for FMD on the 23rd of May 2017.
Source of infection is unknown and control measures applied were the same as those mentioned above.
A summary of the animals involved and the geographic location of the outbreaks are respectively reported in Table 3 and Map 3.

Table 3: summary of the animals involved in the FMD outbreak of the 15th of May 2017 in Guangdong China (People's Rep. of).

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	85	55		85	0	64.71%	**	**	**

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

**Not calculated because of missing information

Map 3: location of the FMD outbreak of the 15th of May 2017 in Guangdong China (People's Rep. of).

Korea (Rep. of) [3]

Supplementary VMSD tests were carried out by the WRLFMD for the respective field isolates responsible for outbreaks that occurred in the country in February 2017: A/SKR/3/2017, belonging to A/ASIA/Sea-97 lineage, and O/SKR/1 and 2/2017, belonging to the O/ME-SA/Ind-2001d lineage. While O Campos strain obtained good matching results for the relative field isolates, A24 Cruzeiro did not give favourable results for the isolate belonging to the relative serotype.

Mongolia and Russian Federation [2]

The Russian Federation Regional Reference Laboratory for FMD (FGBI-ARRIAH) confirmed the presence of FMDV serotype O in samples collected in Mongolia.
The FGBI-ARRIAH examined 4,810 serum blood samples for the detection of FMDV antibodies that were collected for the serological monitoring held during post-vaccination investigations. Immunological studies of the properties of FMDV serotype O are were also carried out.

The FGBI-ARRIAH constantly provides 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.
The laboratory is also conducting collaboration on FMD with the Republic of Korea.

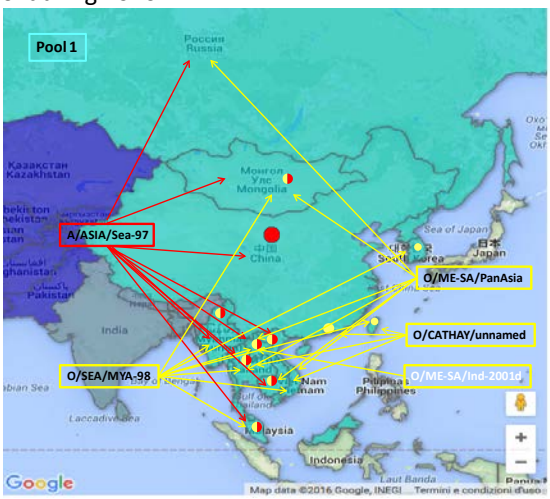
Table 4: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 4 below.

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/2015, NOT SAMPLED, (ASIA /2015)	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)	Data up to 1st semester 2015 2013 & 2015/A, 2012-2013/O, 2012 -2014/NOT TYPED	May 2017/A and O	**See text**
China (Hong Kong, SAR)	O	Aug 2016/O	Follow-up needed
China (Taiwan Province)	2016/NO DISEASE PRESENT A/2015, 2012-2013/O	Jun 2015/A	Follow-up needed
Korea (DPR)	O/2016 2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Korea (Rep. of)	Data up to 1st semester 2015 2014 -2015/O, 2012-2013/DISEASE ABSENT	Feb 2017/O & A	**See text**
Laos PDR	Data up to 1st semester 2015) A, O/2015 2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS	Mar 2016/O Mar 2015/A,	Follow-up needed
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	April 2017/O, Sept 2013/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
Russian Federation	2013 – 2016**/A, 2012, 2014 & 2015/O	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 2013-2016/A	November 2016/A, Aug 2016/O and not typed	Follow-up needed

Map 4: 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 [3, 20]:

- 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 2009 in China (People's Rep. of)



B. POOL 2 – South Asia

Bhutan [4]

On the 4th of May 2017, 116 cattle belonging to migratory herds of Habaylakha, Layna, Tshangkap and Epji of Lokchina geog under Chukha Dzongkhag were affected by FMD. Six calves and two cows died of the disease.
The epidemiological team from Regional Livestock Development Centre, Tsimasham and Chukha Livestock sector, implemented control measures and vaccinated 529 susceptible animals present around the outbreak areas. Samples were sent to the Laboratory Support Unit of the National Centre for Animal Health, Serbithang.

India [5]

The ICAR-PDFMD, Mukteswar, India reported since May 2015, the sole detection of FMDV serotype O among the clinical samples examined using FMDV antigen and/or RNA detection as also for the current month from the samples of seven cattle; five isolates positive for this serotype were also submitted to genotyping. Within ongoing epidemiological studies, 929 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 continue to be involved in the field investigations of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities. The institution is continuing research studies and collaborations with international organisations.

Nepal [3, 6, 14]

The National Foot and Mouth Disease and TADS Laboratory confirmed the detection of FMDV serotype O in samples examined during the reporting month. The laboratory also carried out FMD serological analysis and was involved in providing expert advice to Government services and national/local authorities.
In addition, the Department of Livestock Services of the country reported 23 FMD outbreaks which occurred during January - March 2017 that affected 873 animals, including buffaloes, cattle, sheep and goats, and of which 12 died of the disease. The cases were reported at Kaski, Parbat, Ramechap and Saptari districts of Nepal. At least 104,506 animals were administered FMD vaccine within a ring vaccination policy.
Field isolates, O/NEP/35/2016 and O/NEP/1/2017, belonging to the O/ME-SA/ind-2001d lineage were employed in the VMSD tests. Both isolates obtained good matching results with vaccine strain O/TUR/5/09, while only the former field isolate obtained good matching results with O 3039. None of the field strains obtained good matching results with O Manisa.

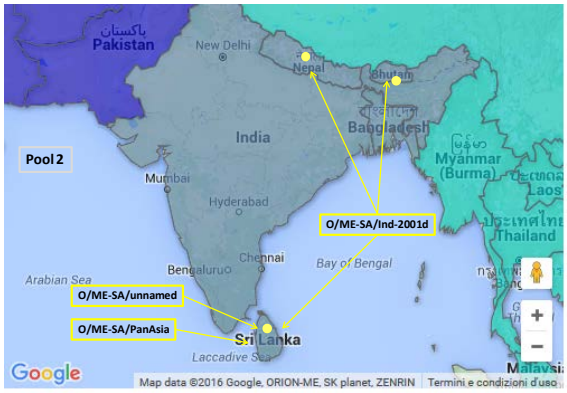
Table 5: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 5 below.

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	**See text**
Bhutan	2013-2016/O, NOT TYPED, 2013 & 2014/NOT SAMPLED	May 2017/Untyped June 2016/O,	**See text**
India	NO DATA AVAILABLE/2016, O, A, NOT SAMPLED 2012-2014/Asia 1 2013/NOT TYPED	May 2017/O, Apr 2015/A Asia 1	**See text**
Mauritius	DISEASE ABSENT	Sep 2016/0	Follow-up needed
Nepal	O, 2012-2103/Asia 1	May 2017/O	**See text**
Sri Lanka	2015 -16/NO DATA REPORTED, 2012 – 2014/O	2016/O	Follow-up needed

Map 5: FMD distribution by serotype and topotype in South Asia, 2012 – 2016 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [3, 20]:

- 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 – West Eurasia & Middle East

Afghanistan [7]

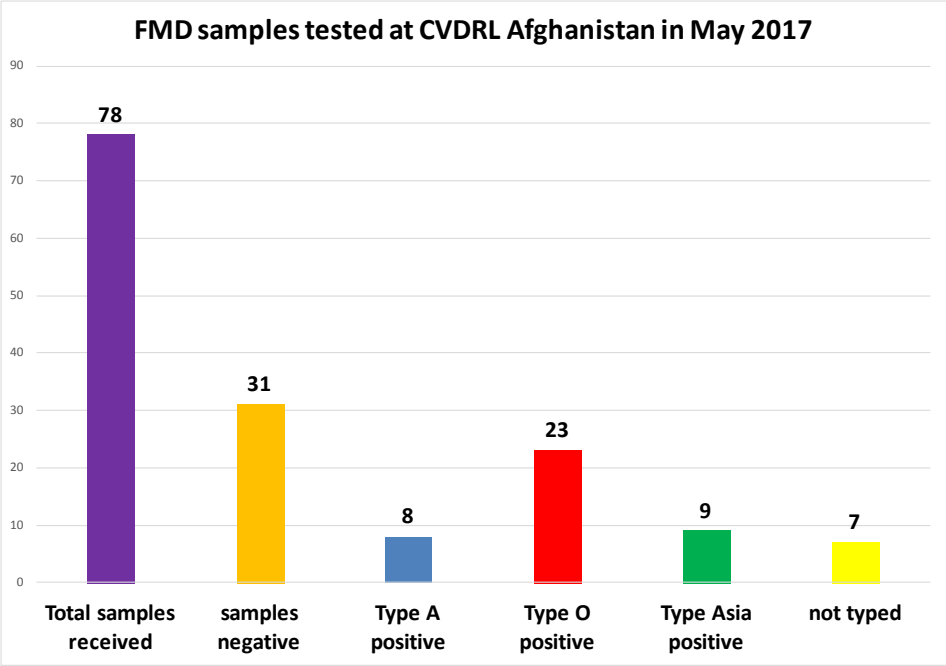
FMDV serotypes A, Asia 1 and O were detected in the 78 samples, collected during May 2017 from different provinces of the country and examined by the Central Veterinary Diagnostic and Research Laboratory *(*CVDRL), of Kabul Afghanistan. The relative distribution of the serotypes among the samples is presented in Figure 1.

Location of the samples collected during 2016 and positive for the different FMDV serotypes are presented in Maps 6 to 8.

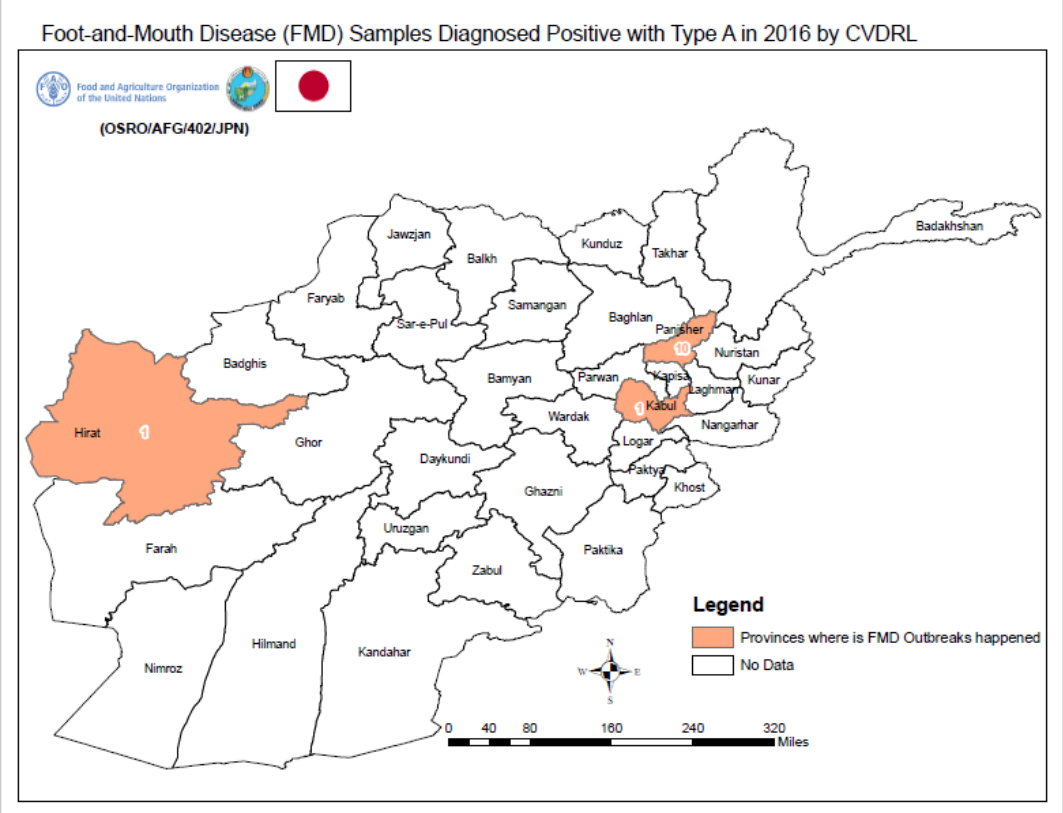
The number of serum samples tested in ELISA using kits produced by the OIE/FAO FMD Reference Laboratory of the Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia Romagna, Italy for antibodies against non-structural proteins were 387 with 158 (40.8%) resulting positive.

The laboratory is involved in providing expert advice to Government services national/local authorities and is also conducting collaborations with international organizations.

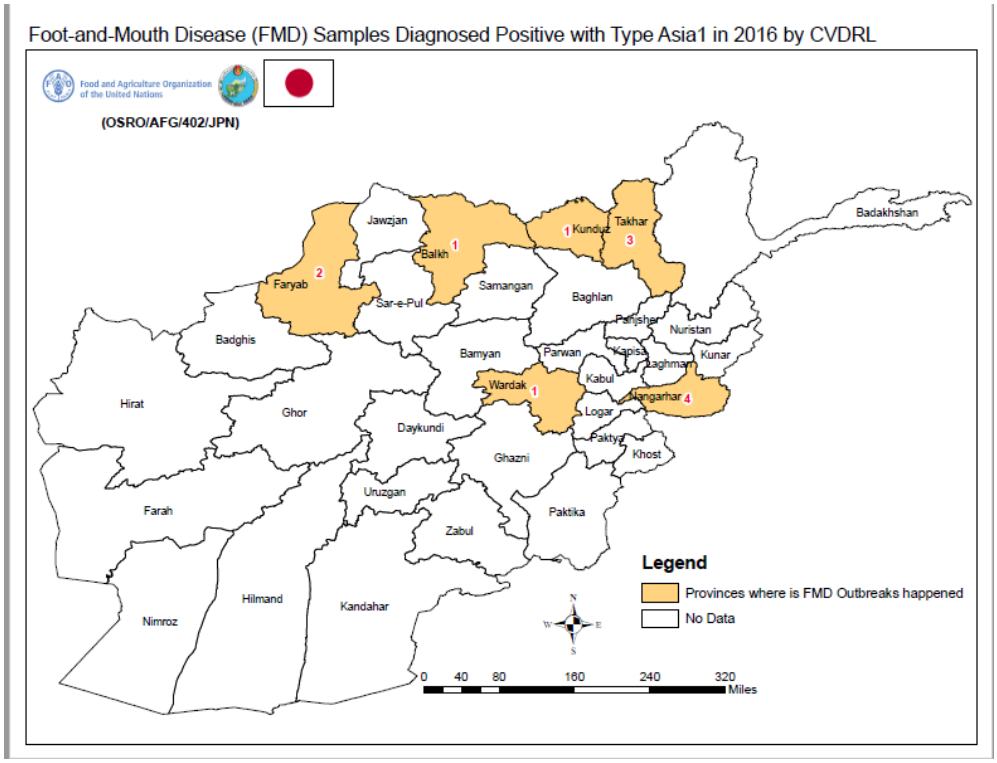
Figure 1: relative distribution of the FMDV serotypes among the samples 78 samples, collected during May 2017 from different provinces of Afghanistan.



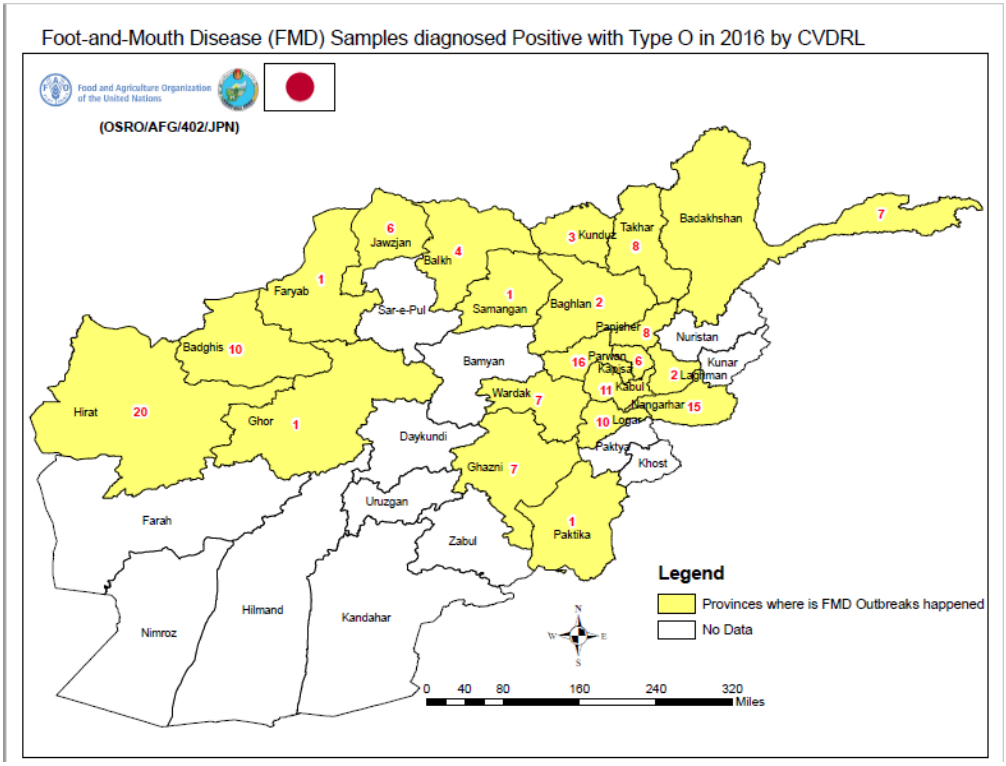
Map 6: location of samples positive for FMDV serotype A that were detected at CVDRL, Afghanistan during 2016.



Map 7: location of samples positive for FMDV serotype A that were detected at CVDRL, Afghanistan during 2016.



Map 8: location of samples positive for FMDV serotype A that were detected at CVDRL, Afghanistan during 2016.



Iran [3]

FMDVs, belonging to the following viral lineages A/ASIA/G-VII, A/ASIA/Iran-05^{FAR09} and A/ASIA/Iran-05^{FAR11} and O/PanAsia2^{ANT-10} and O/PanAsia2^{QOM-15}, were detected by the WRLFMD in 18 of the FMDV 24 samples collected in the country during 2016 and 2017, from sheep (7) and cattle (17). A summary of the animal species, date of collection, location and other field viruses related to the field isolates are reported in Table 6.

Table 6: summary of genotype FMDV isolates collected in Iran between December 2016 and February 2017.

Sample Identification	Location Origin	Species from which isolate was detected	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species
IRN/34/2016	Mahmood abad	cattle	06/12/2016	**A/ASIA/Iran-05^{FAR-09}**	PAK/53/2015 (97.9)	cattle
RN/39/2016	Dou toyeh		30/12/2016	**A/ASIA/G-VII**	ARM/1/2015 (98.4)	
IRN/2/2017	Dam shahr		07/01/2017	**A/ASIA/Iran-05^{FAR-09}**	PAK/53/2015 (97.9)	
RN/4/2017	Azadi, Khozestan		11/01/2017	**A/ASIA/G-VII**	ARM/2/2015 (99.1)	
IRN/6/2017	Jaligh, East Azerbaijan	sheep	25/01/2017	**A/ASIA/Iran-05^{FAR-09}**	PAK/53/2015 (97.5)	
IRN/7/2017	Abasi complex, Sistan & Baluchestan	cattle	31/01/2017	**A/ASIA/Iran-05^{FAR-11}**	BAL/PAK/iso-2/2011_A (95.4)	
IRN/9/2017	Ghale sadri, Qom		15/02/2017	**A/ASIA/Iran-05^{FAR-09}**	PAK/53/2015 (97.5)	
IRN/10/2017	Dam shahr, Qom		20/02/2017		PAK/53/2015 (97)	
IRN/13/2017	Bager abad, Qom	sheep	25/02/2017		PAK/53/2015 (97.5)	
IRN/31/2016	Kenareh, Fars	cattle	14/11/2016	**O/ME-SA/PanAsia-2^{Ant-10}**	AFG/27/2013 (96.8 - 97.3)	
IRN/35/2016	Dasht shirbad, Esfahan		14/12/2016			
IRN/36/2016	Matin abad, Esfahan	sheep	22/12/2016			
IRN/37/2016	Kousaj, West Azerbaijan	cattle	24/12/2016			
IRN/3/2017	Dam shahr, Qom	sheep	07/01/2017			
IRN/5/2017	Ghale sadri, Qom	cattle	12/01/2017			
IRN/8/2017	Damz abad, Tehran		02/02/2017			
IRN/11/2017	Dam shahr, Qom		20/02/2017			
IRN/12/2017	Mohamadeih, Markazi		23/02/2017	**O/ME-SA/PanAsia-2^{QOM-15}**		

Israel [1, 3]

Further to the FMD outbreaks that occurred in the country in February 2017 caused by serotype O, two new FMD outbreaks this time due to A/ASIA/G-VII occurred in cattle on the 1st of May at Aramsha, Acco, Hazafon and on the 22nd of May 2017 at Qela, Golan, Hazafon. The Kimron Veterinary Institute, Foot and mouth disease Laboratory (OIE Reference Laboratory) confirmed the diagnosis of the outbreaks respectively on the 8th and 25th of May 2017, using real-time PCR.

Epidemiological investigations are ongoing in the attempt of defining the source of the outbreaks.

While the outbreak in Aramsha involved two free ranging beef herds, the outbreak of Qela occurred in a vaccinated herd made up of free ranging cattle (50 dams and 18 calves) within which six animals presented classical FMD symptoms. The measures applied for the control of the disease are movement control inside the country, vaccination in response to the outbreaks, screening, quarantine and zoning.

A summary of the animals involved in the two episodes is reported in Table 7 while location of outbreaks is reported in Map 9.

Table 7: summary of the animals respectively involved in the FMD outbreaks of the 1st and 22nd of May 2017 in Aramsha and Qela, Hazafon, Israel.

Location of outbreak	Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Aramsha	Cattle	60	20	0	0	0	33.33%	0.00%	0.00%	0.00%
Qela	Cattle	68	6	0	0	0	8.82%	0.00%	0.00%	0.00%
Totals		**128**	**26**	**0**	**0**	**0**	**20.31%**	**0.00%**	**0.00%**	**0.00%**

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

Map 9: location of the FMD outbreaks of the 1st and 22nd of May 2017 in Aramsha and Qela, Hazafon, Israel.

VMSD tests carried out on a FMDV field isolate, O/ISR/1/2017 belonging to viral lineage O/EA-3 responsible of the outbreaks that occurred in the country during February 2017, identified with the exception of O Manisa, vaccine strains O 3039 and O TUR/5/09 has those having good matching results.

Pakistan [8]

The Progressive Control of Foot and Mouth Disease Project UTF/PAK/139/PAK reported 30 FMD outbreaks occurring in some of the territories of the country during May 2017. FMDV A and O were the serotypes responsible for the outbreaks. The number and location of outbreaks in the different provinces of the country per FMDV serotypes responsible for these events is reported in Table 8 and Map 10.

Ring vaccination was carried out with the administration of 625 and 50 doses respectively in Azad Kashmir and Islamabad Capital Territory.

For capacity building of field staff, a laboratory assessment of four labs and relevant staff was carried out at Sargodha, Multan, DG Khan and Bahawalpur.

Further to this, 45 Focal Points of the districts Sahiwal, Okara, Pak Pattan, Vehari and Sheikhupura were trained in FMD epidemiology with particular reference on how to recognize FMD, what are the losses to the farmers following an outbreak of FMD, how the disease spreads, what are the responsibilities of a farmers while field staff is vaccinating animals, what a farmer should do in case his animals become sick and facilities to the farmers by the Project after reporting an outbreak of FMD. Similar points were also discussed for Peste des Petite Ruminats.

Technical material was also handed out to each participant. Each Focal Person was given the task to organize and conduct five awareness seminars for farmers.

Map 10: location of the FMD outbreaks reported in Pakistan during May 2017.

Table 8: summary of the FMD outbreaks reported in Pakistan during May 2017.

Total outbreaks		Number Outbreaks	Number of Outbreaks due to FMD Virus		
Province	**District**		**'O'**	**'Asia-1'**	**Un-Typed**
Azad Kashmir	Bhimber	2	2	--	--
	Mirpur	9	7	--	2
Punjab	Jhang	4	--	--	4
	Okara	3	3	--	--
	Faisalabad	2	2	--	--
	Gujrat	4	2	--	2
	Lahore	1	--	--	1
Islamabad Capital Territory	Islamabad	2	1	--	1
Balochistan	Zhob	3	--	3	--
Total		**30**	**17**	**3**	**10**

Palestinian Auton. Territories [1, 3]

Following the FMD events that occurred in February 2017, Palestine is again affected by FMD outbreaks.
The current two outbreaks, for which serotyping is pending, occurred on 1st May at Ramallah, West Bank, involving a fattening farm containing a mixed herd with 200 calves and 110 sheep and on the 9th May 2017 at Yatta, West Bank, in which 131 sheep were present. FMD diagnosis was confirmed for both events on the 10th May 2017 by the Central National Veterinary Laboratory which examined sheep and bovine samples using real-time PCR.
The source of the outbreaks is unknown and the control measures adopted are the following: movement control inside the country, vaccination in response to the outbreaks, surveillance outside and within the containment and/or protection zone, screening, traceability, quarantine, control of wildlife reservoirs, zoning and disinfection.
A summary of the animals involved in the two events is reported in Table 9 while location of outbreaks is reported in Map 11.

Table 9: summary of the animals involved in the FMD outbreaks of the 1st and 9th of May 2017 in Ramallah and Yatta, West bank, Palestinian Auton. Territories.

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	200	60	0	0	0	30.00%	0.00%	0.00%	**
Sheep	241	36	9	0	0	14.94%	3.73%	25.00%	**
	441	**96**	**9**	**0**	**0**	**24.00%**	**2.04%**	**9.38%**	**

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

**Not calculated because of missing information

Map 11: location of the FMD outbreaks of the 1st and 9th of May 2017 in Ramallah and Yatta, West bank, Palestinian Auton. Territories.

VMSD tests identified with the exception of O 3039, vaccine strains O Manisa and O TUR/5/09 has having good matching results with the FMDV field isolate, O/PAT/5/2017 belonging to viral lineage O/EA-3 which was responsible of the outbreaks that occurred in the country during February 2017.

Tunisia [1]

Another FMD outbreak due to serotype A was reported on a cattle farm again at Bizerte, on the same date as the one reported in the previous issue of this report, i.e. on the 24th of April 2017. The Veterinary Research Institute of Tunisia confirmed the diagnosis on the 5th of May 2017 using RRT-PCR and typing ELISA. Last FMD outbreak that occurred in the country was in October 2014, caused by FMDV serotype O.

According to field investigations, source of the reported outbreak was due to affected animals originating from the first outbreak situated in the Imada of Hached.

On 8th and 26th of May both outbreaks were respectively reported as resolved.

Of the 32 animals present on the farm, wo one-year-old Holstein young bulls presented salivation, coughing, lameness, gums, and tongue ulcers. On May 4th, 2017, the general condition of those animals improved and ulcers had healed. Location of the outbreak is shown in Map 12.

Map 12: location of the 2nd FMD outbreak reported at Bizerte, Tunisia on the 24th of April 2017.

As also reported in the April issue of this report, the control measures adopted were within the last outbreak was disinfection and stamping out. Further to these provisions, national and regional crisis units were activated and perifocal vaccination was carried out using a vaccine with a potency superior to six PD_{50} and containing FMDV serotypes A, O and SAT1. The anti-FMD vaccination campaign had already commenced in February 2017. Since 2014, five vaccination campaigns were conducted, with the last complete round concluded in November 2016.
Results of the VMSD tests, carried out by the WRLFMD, demonstrated that the vaccine strain A22 Iraq gives good matching results with the serotype responsible of the outbreak.

Table 10: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 13 below.

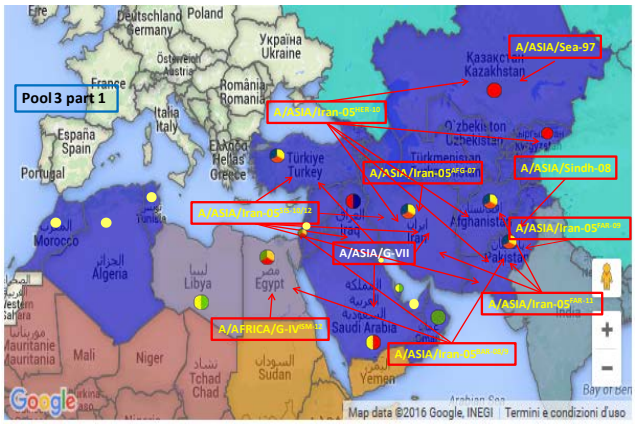
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2016**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	May 2017/ A, Asia 1 & O	**See text**
Algeria	Data available up to 1st semester 2015 2014 -2015/O	Apr 2017/A, Apr 2015/O	Follow –up needed
Armenia	2015 -2016**/A , 2012-2014/DISEASE ABSENT	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT	2007/0	Follow –up needed
Bahrain	DISEASE ABSENT/2016, 2012, 2014 &2015 /O	Mar 2015/O	Follow –up needed
Egypt	2012, 2014, 2016**/SAT 2 2012 – 2016**/O, A	May-Jun 2016/ O & Sat 2, March 2016/A, Aug 2016/typing pending	Follow –up needed
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran	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, Feb 2017/O	**See text**
Jordan	DISEASE ABSENT	Mar 2017/O, 2006/A	Follow –up needed
Kazakhstan	2014-2016**/ DISEASE ABSENT, 2012/O,2012 –2013/A	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	O/2016 2013 – 2014/ DISEASE ABSENT, 2012/O	Jan-Feb 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	May 2017/ A and O, April 2017/ Asia 1	**See text**

Palestine	O, 2012-2013/SAT 2	May 2017/serotying pending Feb 2017/O, Mar 2013/Sat 2	**See text**
Qatar	NO DATA AVAILABLE/2016 2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014, 2016**/O A/2015	Oct 2016/A & April 2016/O	See text Follow –up needed
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2016/ NO DATA REPORTED 2014-2015**/DISEASE ABSENT 2012- 2013/NOT TYPED	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2015-16**/ DISEASE ABSENT, 2014/O	April 2017/A, Oct 2014/O	**See text**
Turkey	A & O, NOT TYPED Asia 1/2012-15	Oct 2015/ A May, 2014-2015/ Asia 1 and O	Follow –up needed
Turkmenistan	2013-2016**/DISEASE ABSENT, 2012/NO DATA REPORTED	Not available	Follow –up needed
United Arab Emirates	O/2016 2012, 2015/DISEASE ABSENT 2013-2014/O	Feb 2016/O	Follow –up needed

Map 13: 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.

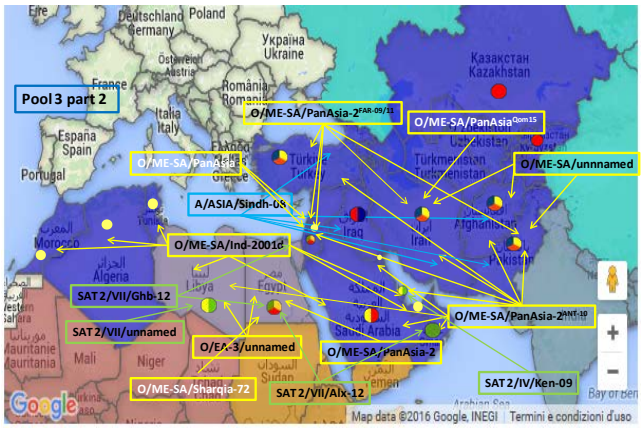
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [3, 20]:

- 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 - 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 Lybia
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa

Ethiopia [3, 15]

The NAHDIC, Ethiopia is collaborating with EuFMD on the design of a national FMD Progressive Control Pathway strategic plan.

Seventeen of the 27 bovine samples collected between February 2016 and March 2017 resulted FMDV positive, and the circulating genotypes identified are O/EA-3 and O/EA-4. A summary of the genotyping results is reported in Table 11.

Table 11: summary of the genotyping of the FMDV isolates collected in Ethiopia between February 2016 and March 2017.

Sample Identification	Location origin of sample	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species
ETH/2/2016	Sebeta, Sebeta, Finfinne Special Zone, Oromia	10/02/2016	O/EA-4	/	
ETH/3/2016	Semero, Sakuro, Jimma, Oromia	23/02/2016			
ETH/4/2016	Dambi Bali, Mako, Illubabor, Oromia	04/08/2016			
ETH/6/2016	Adama, Adama, East Shoa, Oromia	03/09/2016			
ETH/7/2016	Melka sadi, Bokaji, Arsi, Oromia	05/09/2016			
ETH/8/2016	Maru cobot, Adea Berga, West Shoa, Oromia	31/10/2016			
ETH/9/2016	Bishan dimo, Adea Berga, West Shoa, Oromia	31/10/2016			
ETH/11/2016	Menagesha kolobo, Welmera, Finfinne Special Zone, Oromia	11/11/2016			
ETH/12/2016	Sire Berga, Adea Berga, West Shoa, Oromia	11/11/2016			
ETH/13/2016	Kolfe 01, Kolfe Keranyo, Kolfe Keranyo subcity, Addis Ababa	18/11/2016			
ETH/16/2016	Kimbibit, Kimbibit, North Shoa, Oromia	27/11/2016			
ETH/18/2016	Maru cobot, Adea berga, West Shoa, Oromia	30/11/2016			
ETH/22/2016	Mogoro, Kimbibit, North Shoa, Oromia	27/12/2016			
ETH/2/2017	Kidame Gebeya, Hawa Gellan, Kelem Welega, Oromia	18/03/2017	O/EA-3	PAT/2/2017 (98.7 99.1)	cattle
ETH/3/2017	Godina lencha, Yemalogi, Kelem Welega, Oromia	18/03/2017			
ETH/4/2017	Meko lencha, Sayoo, Kelem Welega, Oromia	18/03/2017			
ETH/5/2017	Meko lencha, Sayoo, Kelem Welega, Oromia	18/03/2017			

Kenya [9]

The National FMD Reference Laboratory Embakasi, Kenya detected FMDV serotype A in one sample and serotype SAT 1 in three of the five bovine samples examined using antigen detection Elisa and Real time PCR.

The laboratory conducted vaccine potency assays to assess vaccine test suitability for pre-purchase screening purposes.

The laboratory was involved in training field staff on appropriate sampling procedures for FMDV.

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-I and SAT 2/IV/unnamed from samples respectively collected in 2013 and 2012.

Table 12: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 14 below.

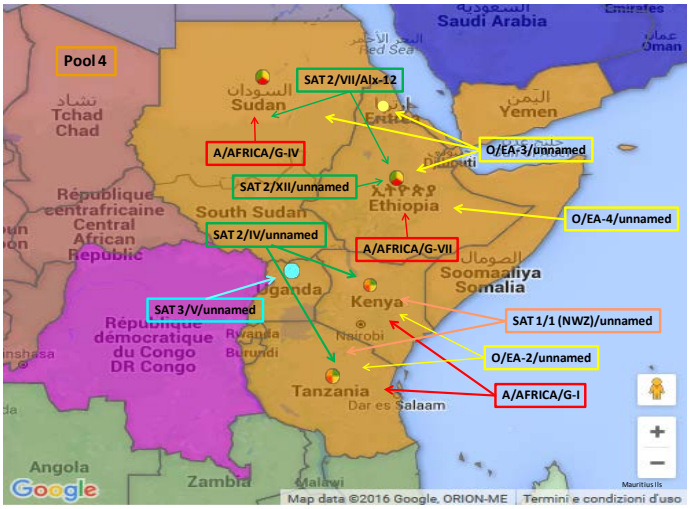
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment

	**(1st semester)		
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Congo d. R.	2012 – 2016**/A, O, SAT 1	Jun 2013/not typed	Typing required
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	Jan 2012/O	Follow –up needed
Ethiopia	O, 2015-16/SAT 1 2012 & 2105/SAT 2, 2012/A	March 2017/ A, O & SAT 1 May 2016/SAT 2	**See text** **Follow-up needed**
Kenya	2012 – 2016 /NOT TYPED, A, O, SAT1, SAT2	Mar O & SAT 1, Jan 2016/ A, Oct 2015/ SAT 2	**See text** **Follow-up needed**
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	2011	Follow –up needed
Sudan	2015-16 -16/A, SAT 1 & NOT SAMPLED, 2012-2014/O & NOT TYPED 2013/SAT 2,	Dec 2013/ O & A, Jan 2014/SAT 2	Follow –up needed
South Sudan	2015/DISEASE PRESENT 2014/A, O SAT 1, SAT 2, SAT 3 2012-2013 & 2016 NO DATA REPORTED	2011	Follow –up needed
Tanzania	2012-2016/A, O, SAT 1, SAT 2	May 2015/O Apr2013/ A, SAT 1, SAT2	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 14: 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 [3, 20]:

- 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 [16], Ghana [17], Nigeria [18] and Senegal [19]

The Laboratoire National Vétérinaire (LANAVET), Garoua, Cameroon, the ACCRA Veterinary Laboratory, Ghana and the Laboratoire National de l'Elevage et de Recherches Vétérinaires of Senegal reported that there were no communications or diagnostic confirmation of FMD outbreaks in the respective countries while the National Veterinary Research Institute Vom, Nigeria received thirteen FMD suspect samples that are yet to be examined.

Guinea Bissau [3, 10, 11]

A sample collected from a cow in Bafata, Guinea Bissau, in October 2016 and detected as FMD positive by the Istitute Senegalase de Recercherche Agricoles, Dakar, Senegal was forwarded for confirmation to ANSES, Paris France. The virus sequence was submitted by the latter laboratory to the WRLFMD for further phylogenetic analysis and was identified as O/WA. The closest field isolate to this virus is that isolated in Senegal in 2008 with a sequence identity of 91.9% denoting the epidemiological gap between to the two viral isolations.

Table 13: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 15 below.

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	2013/ 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**

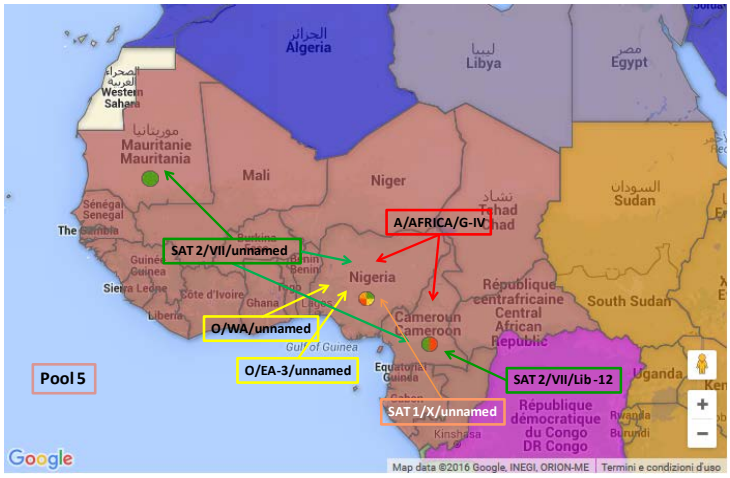
Cape Verde	DISEASE ABSENT	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Chad	2016/DISEASE PRESENT 2014-15/ DISEASE ABSENT 2012 – 2013/ DISEASE PRESENT	2016/Not typed	Follow –up needed
Congo D. R.	2012 – 2016**/A, O, SAT 1	Jun 2013/not typed	Typing required
Congo R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Cote D'Ívoire	2013-16/ DISEASE PRESENT, 2012/A, NOT SAMPLED	Jun 2013/not typed	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 Biss.	2015-16**/DISEASE SUSPECTED 2014/ DISEASE PRESENT 2012-2013/DISEASE ABSENT	Oct 2016/O Dec 2016/SAT1 &SAT 2	**See text**
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	2011/2012, no precise data	Follow –up needed
Mauritania	2014-2015**/SAT 2, 2012-2013/NO REPORTED OUTBREAKS	Dec 2014/SAT 2	Follow –up needed
Niger	2016/NO DATA AVAILABLE 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, 2014NOT SAMPLED 2013/NO DATA AVAILABLE	2014/ SAT 2, Feb 2015/ A and O	**See text**
Sierra Leone	DISEASE ABSENT**	Oct 1958	Follow –up needed

Togo	O, SAT 1	2012/O	Follow –up needed

Map 15: 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 [3, 20]:

- 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

Mozambique [1]

The country reported the vaccination of 12,121 cattle heads in Maputo using Aftovax which contains FMDV SAT 1and SAT 2 antigens. Control measures still in place in this area are represented by movement control inside the country, surveillance outside and within the containment and/or protection zone, screening, traceability, quarantine. Source of outbreaks is due Illegal movement of animals. Maputo and Gaza provinces in general are facing a very severe drought and uncontrolled movement of cattle. Wild animals looking for grazing and water are being sighted in main water bodies. Currently there are no reports of clinical cases of FMD, which were last observed in Deccember 2016.

SAR [1, 12]

A FMD outbreak was observed on the 1st of March 2017 involving cattle of a village of Mpumalanga. The ARC-Onderstepoort Veterinary Institute characterised on the 3rd of March the outbreak virus as FMDV serotype SAT 2 the FMDV responsible of the event.

The present outbreak is located in South Africa's FMD Protection Zone, which is not part of the FMD Free Zone and therefore does not affect South Africa's OIE recognised FMD free status.

The source of the outbreaks is unknown and the control measures adopted are as following: movement control inside the country, screening, traceability, quarantine. Vaccination is prohibited.

A summary of the animals involved in the two events is reported in Table 14 while location of outbreaks is reported in Map 16.

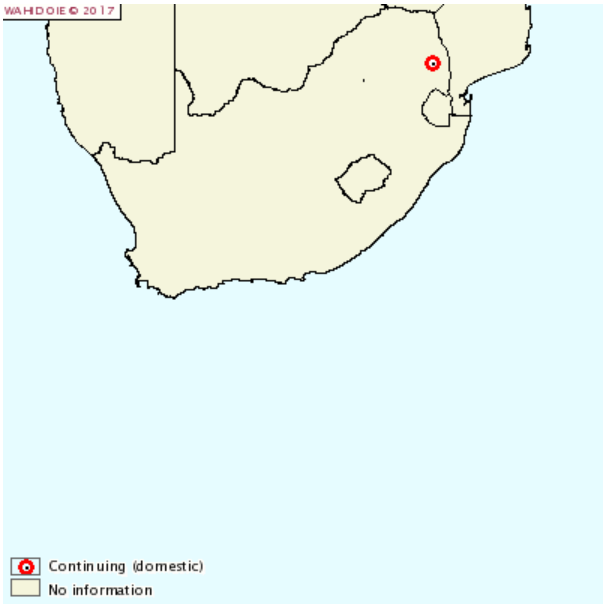
Table 14: summary of the animals involved in the FMD outbreak that occurred the 1st of March 2017 at Bushbuckridge, Mpumalanga SAR.

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle		7	0	0	0	**	**	0.00%	**

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

**Not calculated because of missing information

Map 16: location of the FMD outbreak that occurred the 1st of March 2017 at Bushbuckridge, Mpumalanga SAR.



FMDV serotype SAT 2 was detected by the ARC- Onderstepoort Veterinary Institute in two of the 28 samples examined using PCR.

The laboratory also examined 4,605 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 413 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects.

Many of the techniques that have been applied is used in the diagnosis of FMD in events of cattle outbreaks. An ogoing project provided data that will be used to validate the diagnostic test for application in buffalo. Considering the cost of disease-free buffalo it is essential to have data on diagnostic sensitivity and specificity of diagnostic tests for buffalo as well. During the last month, researchers at TAD, ARC-OVI have completed the >900 SAT1, SAT2 and SAT3 liquid phase blocking ELISA for 2016 capturing periods.

The FMD research group, led by Dr Francois Maree, is involved FMD research activities and has collaborations within the Global FMD Research Alliance (GFRA). In a collaborative research project with the Oregon State University (USA), the Pirbright Institute (UK), Agricultural Research Council (ARC-OVI), South African National Parks (SANParks) and the South African Veterinary Services (SAVS, DAFF) we look at the transmission of foot-and-mouth disease in buffalo to understand how these transmission events takes place.

Table 15: Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map 17 below.

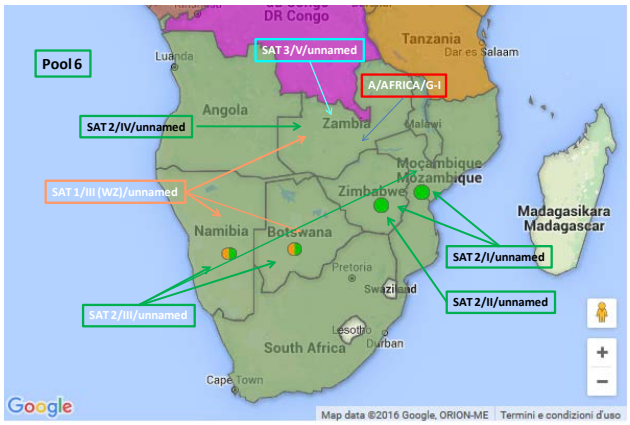
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2015-2016**/ DISEASE PRESENT 2013-2014/DISEASE ABSENT 2012/DISEASE SUSPECTED BUT NOT CONFIRMED	July 2015/ SAT 2 April 2016/typing pending	Follow –up needed
Botswana	2012-2016**/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 – 2016**/A, O, SAT 1	Jun 2013/not typed	Typing required
Malawi	2012/NO OUTBREAKS REPORTED 2013-2015/ NO DATA AVAILABLE	Oct 2011, Sep 2015/serotyping pending	Follow –up needed
Mozambique	2016**/ NO DATA AVAILABLE	Dec 2016/SAT 2,	**See text**

	2012 -2015/DISEASE ABSENT	Sep 2016/ Typing pending, May 2015/ SAT 1	
Namibia	2014-2016**/SAT 22012-2014/SAT 1	May 2015/SAT 1, Jun 2015/SAT 2, July/typing pending	Follow –up needed
South Africa	2015-16**/SAT 3 2012-2015/SAT 2 2013/SAT 1	Feb 2017/SAT 2 Dec 2015/SAT 3, Aug 2013/SAT 1	**See text**
Zambia	2016/SAT 3 & NOT TYPEC 2013-2014/ NO DATA AVAILABLE 2012/SAT 1, SAT 2	Mar 2017/SAT 2, Jan 2013/SAT 1, Feb 2015/A, Mar 2016/SAT 3	Follow –up needed
Zimbabwe	2012-2016/SAT 2 2014-15SAT 1 2013/SAT 3	Mar 2017/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	Follow –up needed

Map 17: 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 [3, 20]:

- 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

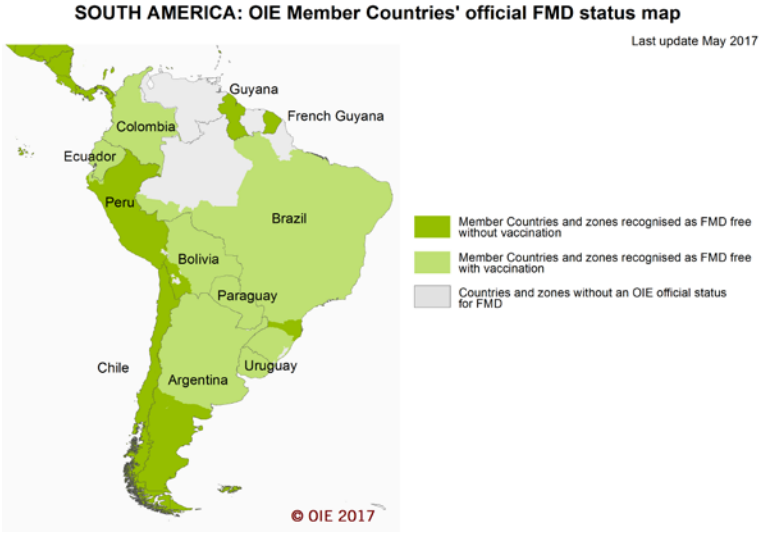
South America [1, 13]

The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 18.
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 18). 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. The FMD history relative to the Region for 2012 –2016 is reported in Table 16.

Table 16: Summary of the history of FMD Pool 16, 2012 – 2016, for geographic distribution see Map 18 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 18: FMD status for South America [1]



IV. OTHER NEWS:

Please note that for Myanmar the information reported in the April issue is as follows:

Myanmar [2] – The analysis by the WRLFMD of the VP1 sequence data relative to FMDV field isolates collected in April 2017 in Myanmar that were submitted by the OIE Regional Reference Laboratory for FMD in Southeast Asia, Thailand confirmed the circulation within this country of Asia 1/ASIA/GVIII and O/ME-SA/Ind2001d.

The detection of Asia 1 in **Myanmar** is evidence of the re-emergence of this serotype in this area as its circulation was last detected in this Pool in China (People's Rep. of) in 2009.

Bangladesh [21] - The Daily Janakantha reported on 10th of May 2017, a FMD outbreak at Kamlakanda under the Netrokona District.

[3]The 1st WRLFMD Quarterly Report for the period January – March 2017 published the table below (Table 17) 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 17: 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

RECOMMENDATIONS FROM WRLFMD® ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS (FOR FMD-FREE COUNTRIES)

March 2017:

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 from Saudi Arabia and Iran highlights an apparent gap in vaccines supplied by international manufacturers for this viral lineage.

‡Antigenic-matching for the A/AFRICA/G-IV isolates collected from the recent field outbreaks in Algeria is currently underway. In the meantime, historical data generated for representative viruses from this lineage indicates that A-Eritrea-98 provides a closer antigenic match - in comparison to other serotype A vaccines such as A22, A-Iran-05 or A-Tur-06.

V. REFERENCES - Superscripts

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2. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. S. Kremenchugskaya.*
3. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org.
4. http://ncah.gov.bt/newsdetail.php?ID=260.
5. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India - *Dr. S. Saravanan*.
6. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*.
7. Central Veterinary Diagnostic and Research Laboratory *(*CVDRL), of Kabul Afghanistan – Dr. Nazem Shirazi.
8. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
9. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.
10. Istitute Senegalase de Recercherche Agricoles, Dakar, Senegal
11. *ANSES - Laboratoire de Santé Animale, Laboratoire de référence OIE pour la fièvre aphteuse- Dr. Labib Bakkali Kassimi*
12. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr F. Maree, Dr L. E. Heath/Ms E. Kirkbride*.
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15. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
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17. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni.*
18. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – *Miss Mariame Diop and Dr. Moustapha Lô.*
19. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini.*
20. OIE/FAO FMD Reference Laboratory Network, Annual Report 2015
21. ECTAD_SA_Weekly_Animal_Disease_E-Information_Vol_6_No_20_18_May_2017