APRIL

2017

MONTHLY REPORT
FOOT-AND-MOUTH DISEASE SITUATION

Food and Agriculture Organization of the United Nations

European Commission

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

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

April 2017

Guest Editor:
Dr Mark Bronsvoort
Reader in veterinary epidemiology, Epidemiology, Economics and Risk Assessment Group (EERA), The Roslin Institute and Royal (Dick) School of Veterinary Studies, University of Edinburgh, United Kingdom.

#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.

April 2017

Contents

Guest Editor's comments

I am very honoured to have the job of guest editor this month. I started working on FMD in 2000 as a PhD student in Cameroon. At that time there was very little in the way of systematic reporting of FMD from endemic areas and little interest in endemic settings. I remember Paul Kitching sitting on the terrace of the Transcam Hotel in Ngaoundere confidently telling me that our proposed plan to sample 150 herds across an area the size of Ireland to study an endemic setting was impossible. He was very nearly right and I almost lost my lower lip to the cause when a cow managed to flick her horn in my face. However, so much has changed in the intervening years with most notably the progressive control pathway for FMD, which should be applauded for its innovation and to EuFMD/FAO for getting countries, particularly in sub-Saharan Africa, to engage with the process. Nevertheless, there is still much to do.

There is a lot to comment on this month. Firstly, it is striking looking at the latest global maps the incredible achievements made in South America with 40 months since the last confirmed outbreaks. This stands as a great example to other endemic regions of what is possible with a coordinated programme across borders.

The situation in SE Asia (Pool 1) continues to cause concern with several countries continuing to report serotype O. In particular, the ongoing spread of O/ME-SA/Ind2001d in Myanmar is of interest, as it seems to continue to maintain itself over a large geographical area. The re-emergence of Asia1 in this region is also of concern after several years of not being reported and given is closeness to an isolate from neighbouring Bangladesh from 2013, raises many questions about where this virus has been circulating undetected in the region or if this represents vaccine escape. There were few reports of outbreaks form Pool 2 in South Asia this month but the background level of reports would suggest that there is probably ongoing circulation of serotype O and notably the jump of O/ME-SA/Ind2001d to Mauritius, which is especially disappointing given its isolation.

Pool 3 covers a large geographical area with an extremely complex on going FMD problem. The outbreak of serotype A in Algeria appears to have spread into Tunisia although this is not altogether unexpected given the close proximity of the outbreaks. The region as a whole continues to see outbreaks of serotypes O and A but fortunately no recent reports of SAT2. This complex epidemiological situation is likely linked to the ongoing political instability in many parts of the region and movements of people and their animals/products.

Pool 4 in East Africa and Pool 5 in West and Central Africa again present a complex mix with O, A, SAT1 and SAT2 serotypes circulating in each pool. However, the low level of reports is not a cause for complacency as virus continues to circulate in these areas with little vaccine coverage and poor surveillance. A renewed effort is needed to really sample these pools across a large geographical area to start to understand the flow and scale of persistence of the various strains and the levels of mixing between these pools. The situation in southern Africa (Pool 6) appears to be settling with no further reports from Zimbabwe or South Africa for this month.

The complex international picture remains difficult to interpret. Without the submission of more samples and active surveillance across endemic areas and areas with vaccination outbreaks risk going undetected and we are left trying to guess the connections and possible routes. Of course this also comes at a time with much political turmoil in key endemic regions and we need to look at using cheap virus capture tools like the lateral flow devices to facilitate countries submitting samples to help fill in the gaps.

I. GENERAL OVERVIEW

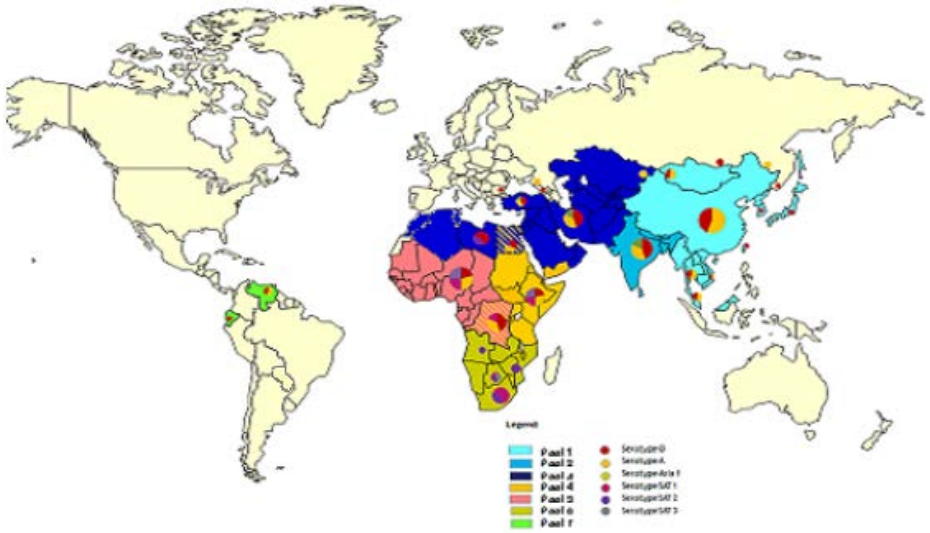
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below are continuously circulating in parts of the pool area and would be detected if sufficient surveillance were 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] – Following the notification of FMD in November 2016 in Xinjiang, another event, still caused by serotype O, was reported on a cattle holding on the 16th of April 2017.

Mongolia [1] **–** Another FMD outbreak occurred on a cattle farm, at Sukhbaatar on the 11th of April 2017, further to the episodes reported in the country between January and April 2017.

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 Thailand is evidence of the reemergence of this serotype in this area as its circulation was last detected in this Pool in China (People's Rep. of) in 2009.

POOL 2 - SOUTH ASIA

Bhutan [3] –A suspicion of a FMD outbreak was reported in April 2017 in cattle at Samtse, which was the location same where the disease occurred in the previous month.

POOL 3 - WEST EURASIA & MIDDLE EAST

Algeria [1, 4,] – A new FMD outbreak was reported in Setif on a small bovine holding on the 7th of April 2017. This episode is further to the FMD outbreaks, which occurred on the 24th of March and 2nd of April on three cattle farms respectively located in Relizane, Medea and Bordj Bou Arreridj.
The laboratory investigations conducted confirm that all the field isolates causing the current outbreaks belong to the A/AFRICA/G-IV lineage.
Vaccine matching strain differentiation (VMSD) tests identified vaccine strains having good matching results with the field isolates responsible for the abovementioned outbreaks.

Israel [1, 5] – While the FMD outbreak caused by O/EA-3 in February 2017 in Hadarom was resolved, another event occurred on the 1st of May 2017 at Hazafon involving cattle. Preliminary identification of the virus responsible of this outbreak report it as A/ASIA/G. Further details will included in the forthcoming issue of this report.

Palestinian Auton. Territories [1] – The FMD outbreak caused by O/EA-3 that occurred in March 2017 was declared as resolved.

Jordan [1] – Even in the case for this country, the FMD events due to serotype O, which occurred between the 21st of February and 9th of March 2017, in Hamman, Al Balqa and Irib, were declared as resolved as confirmed by the surveillance conducted in different governorates.

Pakistan [6] - The Progressive Control of Foot and Mouth Disease Project reported 54 FMD outbreaks occurring in some of the territories of the country during April 2017. FMDV A, ASIA 1 and O were the serotypes responsible for the outbreaks. As the Project has been completed, reporting from this country is currently on voluntary basis.

Saudi Arabia [2] – VMSD tests carried out on FMDVs belonging to serotypes A and O which were detected in the 25 samples collected in the country between October and December 2016, identified vaccine strains with good matching results only for the latter serotype.

Tunisia [1] – A FMD outbreak due to serotype A was reported on a cattle farm at Bizerte on the 24th of April 2017. Previous occurrence of this disease in the country was in October 2014.

POOL 4 - EASTERN AFRICA

No FMD outbreaks were reported for this Pool during April 2017.

POOL 5 - WEST/CENTRAL AFRICA

Cameroon [7] **-** The Laboratoire National Vétérinaire (LANAVET), Garoua detected FMDV in 127 of the 230 bovine samples examined.

POOL 6 - SOUTHERN AFRICA

Zambia [1] – A FMD outbreak occurred on the 22nd of March 2017 in cattle in Mbala, Northern. Virus typing is still pending.

POOL 7 - SOUTH AMERICA

Latin America [1,8] – 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

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

****** 152 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]

A FMD outbreak occurred on a cattle farm on the 16th of April 2017 in Xinjiang caused by serotype O. The Lanzhou National Foot and Mouth Disease Reference Laboratory (OIE Reference Laboratory) confirmed the diagnosis on the 21st of April 2017 using reverse transcription - polymerase chain reaction (RT-PCR) and virus isolation. Summary of the animals involved and location of outbreak are reported in Table 2 and Map 2.

The source of the outbreak is unknown and the control measures adopted are disinfection, movement control inside the country, quarantine, zoning, surveillance within and outside containment and/or protection zone, stamping out, official disposal of carcasses, by-products and waste, and vaccination in response to the outbreak.

Table 2: summary of the animals involved in the FMD outbreak of the 16th of April 2017 in Xinjiang China (People's Rep. of).

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	34	15		34	0	44.12%	**	**	**

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

**Not calculated because of missing information

Map 2: location of the FMD outbreak of the 16th of April 2017 in Xinjiang China (People's Rep. of).

As reported in the March issue of this report, the two FMDV VP1 sequences obtained the Lanzhou National Foot and Mouth Disease Reference Laboratory (OIE Reference Laboratory) from the viruses detected in the field samples that were also collected in the outbreaks that occurred in Xinjiang in 2017were genotyped as O/ME-SA/Ind-2001d by the WRLFMD. The virus not pertaining to the country that is most closely related to these field isolates is Zabaikalskiy/3/RUS/2016 with a sequence identity (seq. id.) between 99.4 and 99.7%.

Mongolia [1]

Another FMD outbreak was reported in Sukhbaatar on a cattle holding on the 11th of April 2017, further to the ones notified in the country during the 1st trimester of 2017, again in Sukhbaatar and also in Dornod, Khentii and

Dornogovi. FMDV serotype O continues to be the only serotype causing these events and a summary of the animals involved and location of outbreaks are reported in Table 3 and Map 3.
The source of these episodes is still unknown and the control measures adopted in the area are movement control inside the country, screening, vaccination in response to the outbreak, quarantine, disinfection, stamping out and zoning. A summary of the number and animal species vaccinated is reported in Table 4; information on the type of vaccine employed is unavailable. The percentage of livestock that was vaccinated constitutes approximately 10% of the FMD susceptible animal population of the country (http://www.fao.org/faostat/en/#home).
O/SEA/Mya 98 was the last viral lineage for the serotype causing the current outbreaks that was reported by the WRLFMD to circulate in the country in samples collected in 2015.

Table 3: summary of the animals involved in the FMD outbreak that occurred on the 11th of April 2017, in Sukhbaatar Mongolia.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	/	14	0	14	0	**	**	0.00%	**

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

Map 3: location of the FMD outbreak that occurred on the 11th of April 2017, in Sukhbaatar Mongolia.

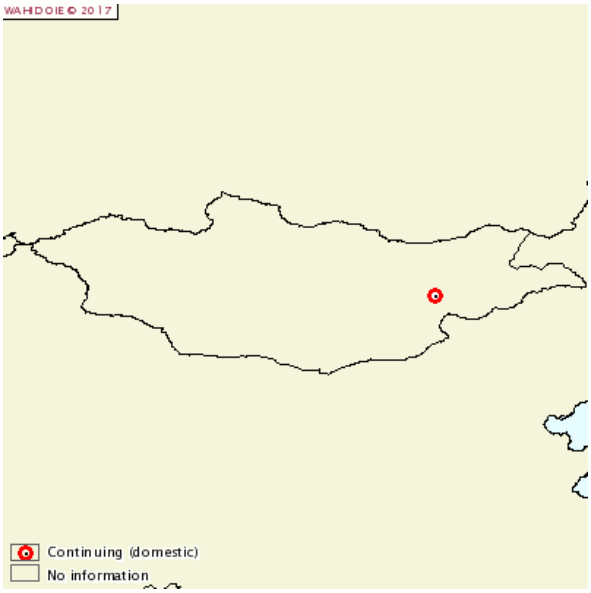


Table 4: location and number of animals divided per species vaccinated in Mongolia following the FMD outbreaks that occurred during the 1st quadrimester of 2017.

Administrative division	Species	Total Vaccinated
SUKHBAATAR	Cattle	206,012
	Sheep	1,523,375
	Goats	973,009
DORNOD	Cattle	166,526
	Goats	290,011
	Sheep	478,584
KHENTII	Sheep	764,176
	Goats	483,809
	Cattle	177,056
Total		**5,062,558**

Myanmar [2]

The analysis conducted by the WRLFMD on the VP1 sequence data submitted by the OIE Regional Reference Laboratory for FMD in Southeast Asia, Thailand relative to 13 FMDV field isolates collected in April 2017 in Myanmar, confirmed the circulation of Asia 1/ASIA/GVIII, O/ME-SA/Ind2001d and O/SEA/Mya-98 in this country.

The detection of Asia 1 in a field sample relative to 2017, for which species and location of collection are not reported, denotes the re-emergence of the serotype in this area, after its last detection in 2006 in Vietnam and 2009 in China (People's Rep. of) and its most recent report in 2016 by Cambodia in Wahis. The most closely related field virus not pertaining to the country is represented by BAN GA Sr-187 2013, with a seq id of 97.6%. This virus was isolated in cattle in Bangladesh, country that belongs to Pool 2.

The nine FMDV field isolates genotyped as O/ME-SA/Ind2001d were all collected from cattle and the most closely related field viruses not pertaining to the country are respectively represented by SKR/1/2017 (seq id 98.7), 70206/SKR/2017, (seq id 99.4%), both isolated in South Korea, Zabaikalskiy/3/RUS/2016 (seq id 98.7% - 99.5%) isolated in Russia, and NEP/19/2015 (98.7%) isolated in Nepal.

The three field isolates genotyped as O/SEA/Mya-98 are most closely related to the following field viruses not pertaining to the country: VIT/6/2005TAI/22/2015 (seq id 93.5%) isolated in Vietnam, TAI/22/2015 (seq id 99.1%) isolated in Thailand.

For each of the viral lineages, the close relationship to more than one field isolate belonging to a different country indicates the multiple spreading pathways these lineages use to pass from one country to another.

Location of where the FMDV O serotype isolates were collected is shown on Map 4.

Map 4: locations of where O/ME-SA/Ind2001d (yellow dots) and O/SEA/Mya-98 (green dots) positive isolates were collected in Myanmar during April 2017.

Russian Federation [9]

The Russian Federation Regional Reference Laboratory for FMD, Russia examined 1,941 serum blood samples for the presence of FMDV antibodies for monitoring post-vaccination serological investigations.

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.

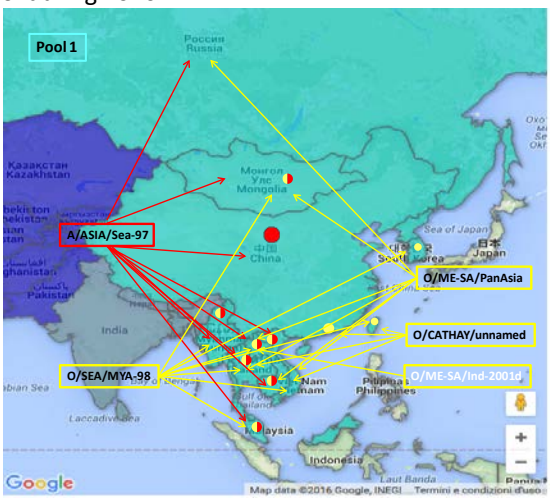
Table 5: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 5 below.

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	April 2017/O, May 2015/A	See text Follow-up needed
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	Follow-up needed
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 Follow-up needed
Myanmar	2012-2016/O, 2015/A & NOT TYPED	April 2017/Asia 1 & O, July 2016/ not typed, Oct 2015/A	See text 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 5: 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 [2, 18]:

- 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 [3]

On the 3rd April 2017, NCAH reported an outbreak of FMD in cattle herd of 70 animals at Peuna Kharkha, Denchukha geog, Samtse with 20 animals presenting clinical signs of FMD. Control measures including ban on the movement of animals and animal products have been implemented.

India [10]

No FMD activities and outbreaks were reported by the Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India.

Nepal [12]

No FMD activities and outbreaks were reported by the National Foot and Mouth Disease and TADS Laboratory, Nepal.

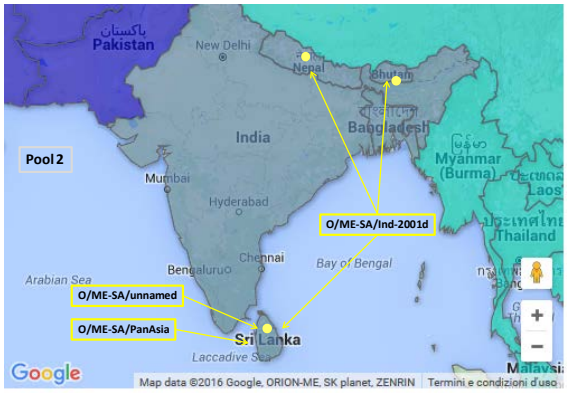
Table 6: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 6 below.

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

Map 6: FMD distribution by serotype and topotype in South Asia, 2012 – 2016 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [2, 18]:

- 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

Algeria [1, 4]

Further to the outbreaks on three cattle farms that were respectively reported in Relizane, Medea and Bordj Bou Arreridj between the 24th of March and 2nd of April, an another FMD outbreak occurred in Setif on a small bovine holding on the 7th of April 2017. The two young animals that were the only ones present on the holding showed evident signs of disease represented by mouth ulcers and gum erosions. Location of the outbreak is shown in Map 7.

The Central Veterinary Laboratory employing RRT-PCR and typing ELISA confirmed detection of FMDV serotype A on the 10th of April 2017.

The source of the outbreak is unknown and the control measures put in place are as following: movement control inside the country, disinfection, stamping out, official disposal of carcasses, by-products and waste and vaccination in case an appropriate one is identified.

Map 7: location of the outbreak reported in Setif on the 7th of April 2017.

Additional laboratory investigations, of the viruses responsible of the first outbreaks were conducted by the Algerian National Laboratory, in conjunction with the OIE/FAO FMD Reference Laboratory of the Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia Romagna Brescia, Italy and the WRLFMD. The results produced confirm that all the field isolates responsible for the present outbreaks belong to the A/AFRICA/G-IV lineage.

As reported in the March issue of this report, the sequences of the viruses from the Algerian outbreaks are closely related to each other (seq id 98.9 and 100%), while the closest field virus not pertaining to the country is NIG/01/15, isolated from cattle in Nigeria with a seq id between 97.3 and 98.4%. Algeria is the second country in Pool 3, in addition to Egypt, with the circulation of A/AFRICA/G-IV. However, in the case of Egypt the most closely related field virus, not pertaining to the country, is an isolate detected in Ethiopia in 2015.

This information indicates that the two variants of the same viral lineage are following independent spreading pathways.

The present outbreaks are the first evidence of the circulation of FMDV serotype A in the country since 1977, as the previous outbreaks were due to FMDV serotype O, with latest circulating lineage represented by O/ME-SA/Ind2001d.

In the VSMD tests conducted by the WRLFMD, O/ERI/3/38 and A22 IRQ/24/64 were the vaccine strains identified as having good matching results with field isolates (A/ALG 2 and 3/2017). On the contrary, in the same test, vaccine strains A/IRN/2005 and A/TUR/220/2006 did not obtain good matching values.

Israel [1, 5]

A new FMD outbreak occurred in cattle on the 1st of May 2017 at Hazafon. The diagnosis was confirmed on the 8th of May 2017 by the Kimron Veterinary Institute, Foot and mouth disease Laboratory (OIE Reference Laboratory), while preliminary identification of this virus report it as A/ASIA/G-VII. A summary of the animals involved and location of the outbreak are reported in Table 7 and Map 8.

As the source of the outbreak is unknown, an epidemiological investigation is ongoing and the following controls measures were also adopted: movement control inside the country, screening, vaccination in response to the outbreak, quarantine, surveillance within the containment and/or protection zone and zoning.

Table 7: summary of the animals involved in the FMD outbreak that occurred on the 1st of May 2017 at Hazafon, Israel.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	60	20	0	0	0	33.33%	0.00%	0.00%	0.00%

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

Map 8: location of the outbreak that occurred on the 1st of May 2017 at Hazafon, Israel.

.

Pakistan [6]

The Progressive Control of Foot and Mouth Disease Project reported 54 FMD outbreaks during the surveillance activities carried out in April 2017 in Pakistan. 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 9.

Ring vaccination was carried out in Punjab with the administration of 500 doses.

Table 8: Province and District distribution of FMD outbreaks with relative serotypes that occurred in Pakistan in April 2017

Location of Outbreaks (N°)		Number of Outbreaks (%) due to FMD Virus Serotype(s)				
Province	**District**	**'O'**	**'A'**	**'Asia-1'**	**Un-Typed**	**Not tested**
Khyber Pakhtunkhwa (4)	Lower Dir (1)	--	--	--	1	--
	Abbottabad (2)	--	--	--	2	--
	Peshawar (1)	1	--	--	--	--
	Buner (1)	1	--	--	--	--
Azad Kashmir (35)	Mirpur (10)	4	--	4	2	--
	Muzaffarabad (4)	--	--	--	4	--
	Attock (2)	1	--	--	1	--
	Gujrat (2)	2	--	--	--	--
	Sargodha (2)	--	--	--	2	--
	Rawalpindi (4)	--	--	--	4	--
	Lahore (1)	--	--	--	--	1
	Sheikhupura (1)	1	--	--	--	--
	Gujranwala (2)	--	--	1	--	1
	Okara (4)	3	--	--	1	--
	Multan (3)	3	--	--	--	--
Islamabad Capital Territory (14)	Islamabad (14)	1	1	10	2	--
Total (54)		**17 (31.48)**	**1 (1.85)**	**15 (27.78)**	**19 (35.19)**	**2 (3.7)**

Map 9: Location of the Districts where FMD outbreaks occurred in Pakistan during April 2017.

Saudi Arabia [1]

VMSD tests carried out on the following viral lineages, A/ASIA/G-VII and O/ME-SA/PanAsia 2^{ANT-10} detected in the 25 samples collected in the country between October and December 2016, identified vaccine strains with good matching results only for the latter viral lineage.

O 3039, O Manisa and O/TUR/5/2002 represented the vaccine strains with good matching results for O/ME-SA/PanAsia 2^{ANT-10}, while no matching results were obtained by vaccine strains A Iran 2005, A TUR 20/06 and A22 IRQ/24/64 for viral lineage A/ASIA/G-VII.

Tunisia [1]

FMD due to serotype A was reported on a cattle farm at Bizerte on the 24th of April 2017. The Veterinary Research Institute of Tunisia confirmed on the same day the diagnosis of serotype A using RRT-PCR and typing ELISA. Genotyping of this virus would confirm the genetic relationship with those responsible for the current outbreaks occurring in Algeria.

Last FMD outbreak that had occurred in the country was October 2014 and this was caused by FMDV serotype O.

Source of the outbreak was attributed to the illegal movement of animals and their introduction on the premises affected by the outbreak. Lately, illegal cross-border animal movements were registered.

Clinical signs represented by fever, lameness, stomatitis, ulcers of all ages and salivation were observed in 17 of the 22 cattle (21 young bulls and a cow) owned by a butcher. Location of the outbreak is shown in Map 10.

To control the outbreak the country has adopted the following preventive measures: disinfection and stamping out. Further to these provisions, national and regional crisis units have been activated and perifocal vaccination was carried out using a vaccine with a potency superior to 6 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 carried out in November 2016.

Map 10: location of the FMD outbreak that was reported at Bizerte, Tunisia on the 24th of April 2017.

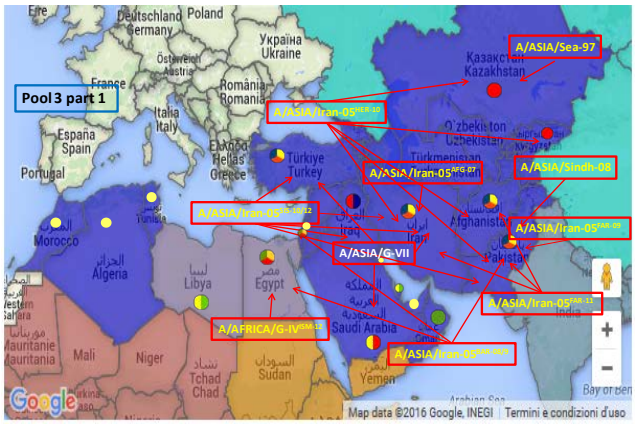
Table 9: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 11 below.

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	Jul 2016/O, Jun 2016/Asia 1 & May 2016/A,	Follow –up needed
Algeria	Data available up to 1st semester 2015 2014 -2015/O	Apr 2017/A, Apr 2015/O	See text
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	July 2016/A & O, 2013/Asia 1	Follow –up needed
Iraq	2015-16/O, 2012-2016/A 2015/ SEROTYPE NOT REPORTED, 2012-13	Dec 2013/A, ASIA 1	Follow –up needed
Israel	2012-2015**/O	Feb 2017/O	See text Follow –up needed
Jordan	DISEASE ABSENT	Mar 2017/O, 2006/A	Follow –up needed
Kazakhstan	2014-2016**/ DISEASE ABSENT, 2012/O,2012 –2013/A	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	O/2016 2013 – 2014/ DISEASE ABSENT, 2012/O	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	
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	April 2017/A, Asia 1 & O	See text
Palestine	O, 2012-2013/SAT 2	Feb 2017/O, Mar 2013/Sat 2	See text Follow –up needed
Qatar	NO DATA AVAILABLE/2016 2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014, 2016**/O A/2015	Oct 2016/A & April 2016/O	See text Follow –up needed
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2016/ NO DATA REPORTED 2014-2015**/DISEASE ABSENT 2012- 2013/NOT TYPED	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2015-16**/ DISEASE ABSENT, 2014/O	April 2017/A, Oct 2014/O	See text Follow –up needed
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 11: 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.

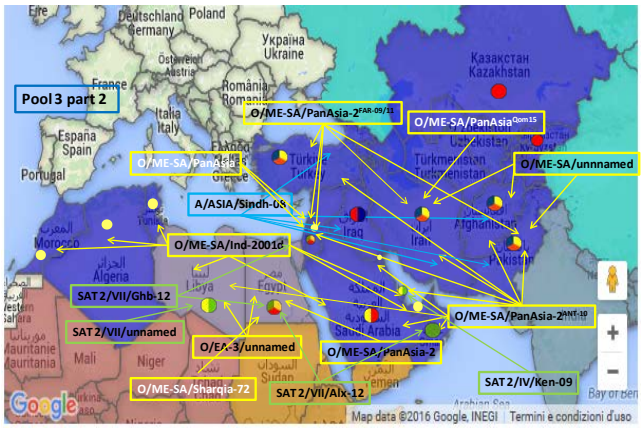
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [2, 18]:

- 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 [12]

The National Animal Health Diagnostic and Investigation Center, Ethiopia is collaborating with EuFMD on the design of a national FMD Progressive Control Pathway strategic plan.

The NAHDIC personnel were also involved in the outbreak investigation of FMD outbreaks supporting the field veterinarians and farmers for the choice of vaccine to employ.

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

Kenya [13]

The National FMD Reference Laboratory Embakasi, Kenya did not detect FMDV in the suspect bovine sample examined using antigen detection Elisa and Real time PCR.

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.

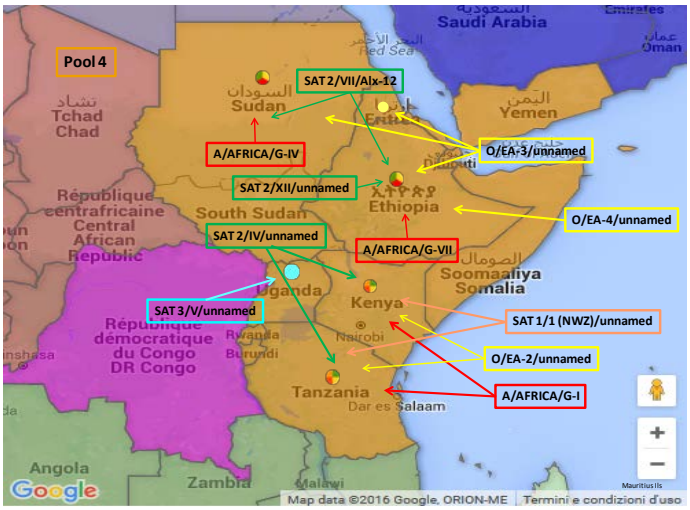
Table 10: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 12 below.

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
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 12: 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 [2, 18]:

- 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 [7]

The Laboratoire National Vétérinaire (LANAVET), Garoua detected FMDV in 127 of the 230 (55.21%) bovine samples examined using pan-FMDV PCR.
LANAVET has an ongoing collaborative study with the Ohio State University and Plum Island Laboratory, USA.
Most recent genotypes identified in the country were represented by A/AFRICA/G-IV and SAT 2/VII/Lib-12 in samples collected in 2013 for which VMSD tests are not available.

Nigeria [14]

The National Veterinary Research Institute Vom, Nigeria examined 217 bovine serum samples of which 50 (23.04%) were positive.
The Institute is currently continuing its collaboration with CODA CERVA, Belgium on an OIE twinning programme.

Ghana [15]

No FMD outbreaks were reported during April 2017 the ACCRA Veterinary Laboratory, Ghana and the ACCRA Veterinary Laboratory of Ghana.
The laboratory is collaborating with the Botswana Vaccine Institute through a Masters student who is currently conducting field sampling for FMD research work.

Senegal [16]

No FMD outbreaks were reported during april 2017 by the Laboratoire National de l'Elevage et de Recherches Vétérinaires of Senegal.

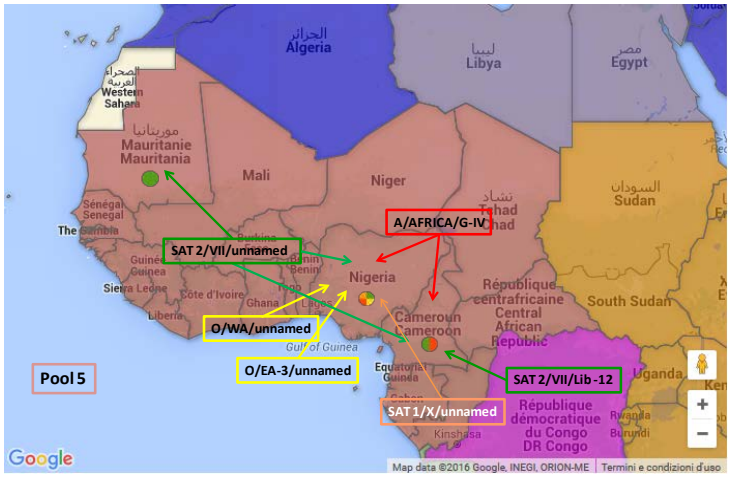
Table 11: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 13 below.

Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (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 Typing required
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 Follow –up needed
Guinea Biss.	2015-16**/DISEASE SUSPECTED 2014/ DISEASE PRESENT 2012-2013/DISEASE ABSENT	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	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 Follow –up needed
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	Follow –up needed
Sierra Leone	DISEASE ABSENT**	Oct 1958	Follow –up needed
Togo	O, SAT 1	2012/O	Follow –up needed

Map 13: 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 [2, 18]

- 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

Republic of South Africa [17]

No FMDV was detected in the ten bovine samples examined in PCR by the ARC- Onderstepoort Veterinary Institute. The laboratory also examined 2,916 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 74 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects.

The FMD research group, led by Dr Francois Maree, is involved in an international research project funded by Ecology and Evolution of Infectious Diseases program of the National Science Foundation, together with researchers from the UK and USA, investigating the ecological and evolutionary mechanisms in FMDV persistence in buffalo. The laboratory also has collaborations with the WRLFMD, Oregon State University, SANParks and State Veterinary Services, KNP on the ecological and evolutionary mechanisms in foot-and-mouth disease virus persistence in buffalo.

Zambia [1]

A FMD outbreak for which serotyping is pending occurred on the 22nd of March 2017 in cattle located in the village of Chizombwe, Mbala, Northern. The Central Veterinary Research Institute confirmed diagnosis on the 11th of April 2017 using RT-PCR and 3ABC serological ELISA.

A summary of the animals involved in the outbreak and location of this episode are reported in Table 12 and Map 14.

Two kraals in the village were affected and local farmers reported cases of FMD clinical signs represented by lameness, drooling and sores in the mouth and feet of cattle. Mbala Central Veterinary Camp was not involved in the FMD events that occurred in 2016 and the disease has not spread to other villages or camps. Surrounding villages that had their cattle vaccinated did not report cases.

The source of the disease was due to the illegal movement of animals and contact with affected animals at common pastures and watering points. Clinical surveillance inside and outside affected areas continues. Other control measures adopted were movement control inside the country, quarantine, Surveillance within and outside containment and/or protection zone, vaccination would be adopted if an appropriate vaccine were available.

Table 12: summary of the animals involved in the FMD outbreak that occurred the 22nd of March 2017 in the village of Chizombwe, Mbala, Northern, Zambia.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	148	27	0	0	0	18.24%	0.00%	0.00%	0.00%

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

Map 14: location of the FMD outbreak that occurred the 22nd of March 2017 in the village of Chizombwe, Mbala, Northern, Zambia.

.

Zimbabwe [1]

The Department of Livestock and Veterinary Services at Harare, Zimbabwe reported that no FMD outbreaks have occurred in the last six months in the administrative division where the first event of the series of episodes due to FMDV serotype 2 had been recorded in May 2014. The various episodes were due to the illegal movement of animals and the control measures adopted were movement control inside the country, quarantine, surveillance outside the containment zone and or protection zone, modified stamping out and vaccination in response to the outbreaks. The last vaccinations were carried out in 1,412 cattle in Masvingo where a 28-day booster will be administered. Details on the type of vaccine employed are not available.

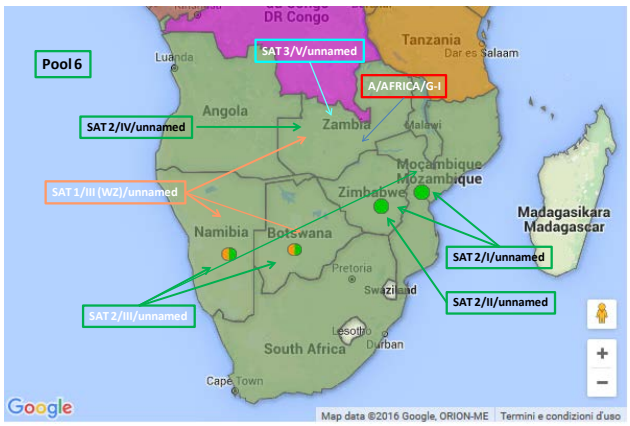
Table 13: Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map 15 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
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 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	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, Nov 2014/ SAT 2, Aug 2013/SAT 1	See text Follow –up needed
Zambia	2016/SAT 3 & NOT TYPEC 2013-2014/ NO DATA AVAILABLE 2012/SAT 1, SAT 2	Jan 2013/SAT 1, SAT 2, Feb 2015/A, Mar 2016/SAT 3	See text 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	See text Follow –up needed

Map 15: 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 [2, 18]:

- 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, 12]

The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 16.

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 16). 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 14

Map 16: FMD status for South America [1]

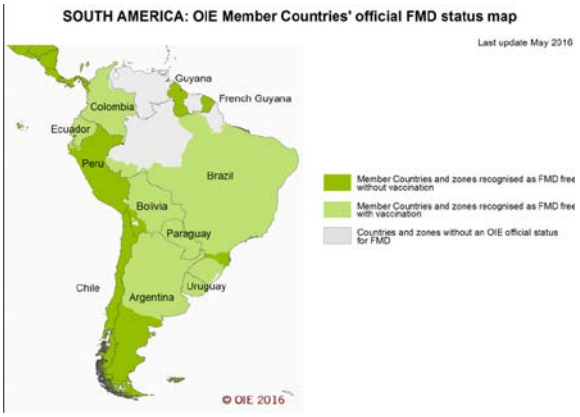


Table 14: Summary of the history of FMD Pool 16, 2012 – 2016, for geographic distribution see Map 16 below.

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

IV. OTHER NEWS:

[2]The 1st WRLFMD Quarterly Report for the period January – March 2017 published the table below (Table17) 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

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. http://www.ncah.gov.bt/newsdetail.php?ID=309
4. Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia Romagna (IZSLER), Brescia, Italy (OIE/FAO FMD Reference Laboratory) – *Dr. Emiliana Brocchi.*
5. https://www.promedmail.org/post/5029780
6. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
7. Laboratoire National Vétérinaire (LANAVET) - Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*.
8. 44a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa - 6 – 8 March 2017, Rio de Janeiro, Brasil.
9. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana Fomina*.
10. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India - *Dr. S. Saravanan*.
11. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*.
12. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
13. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.
14. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini.*
15. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni.*
16. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – *Miss Mariame Diop and Dr. Moustapha Lô.*
17. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr F. Maree, Dr L. E. Heath/Ms E. Kirkbride*.
18. OIE/FAO FMD Reference Laboratory Network, Annual Report 2015