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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

February 2017

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#INFORMATION SOURCES USED:

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

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

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

Contents

Firstly, it is a great pleasure to be the guest editor for the 'Monthly Report' and I am acutely aware of the need to maintain the standards set by previous guest editors.
I suspect I am like many of the readers of this report and normally just browse it and other sources of information on FMD outbreaks, without any real reflection. But the need to write this editorial really helped to focus the mind, and my first reaction was that there is quite a lot of FMD around at the moment but, equally importantly, we are only seeing the tip of the iceberg.

We know that some 17 countries have reported FMD this month but our knowledge of a large number of other countries or regions ranges from a pretty good guess of the situation through to complete ignorance (or to quote Donald Rumsfeld 'We don't know what we don't know').

Certainly, there will be situations where disease is present in a country or region but is not reported for one or more of the following reasons:

1. Authorities may be worried about the economic or political consequences of disease declaration. Certainly, there are examples of deliberate failure to report but this is a risky business nowadays. National or even social media are very likely to report some evidence of disease even if the Authorities do not. Considering this, it is difficult to imagine more than a very low frequency of deliberate under reporting.
2. The general and long accepted problem of recognising and discriminating FMD from other conditions in livestock unless experienced people are available. This is particularly the case with FMD in sheep and goats where the symptoms are often much more difficult to detect and identify.
3. And last but certainly not least, the simple and understandable neglect of animal health in poor countries and those suffering the massive humanitarian problems caused by war and famine.

The data on East Africa exemplifies many of the problems facing other parts of the world. Five of the seven serotypes of FMD (A, O, SAT1. SAT2 and SAT3) are almost certainly prevalent in the region and the relevant table, and indeed other tables in this report, show many examples of 'not typed' or 'no data reported/available'.

This region of Africa has always been of special concern internationally because of the potential for spread of the SAT viruses northwards into the Middle East and North Africa. There have been outbreaks in the Middle East due to SAT1 in 1961-1965 and 1970 and SAT2 sporadically from 2000 onwards (initially Saudi Arabia and later, Egypt, Libya, Oman and Palestine) and certainly SAT2 is still present (Egypt 2016). This raises the nightmare scenario of one or several of the SAT serotypes spreading into Europe and Asia. SAT2, in particular, could wreak havoc if it were to escape outside of its existing boundaries and has been described by some as the 'O' of Africa because of its widespread occurrence within the continent. One comment from a vaccine perspective is that, for perhaps obvious reasons, very few companies have any experience of manufacturing SAT vaccines and would take a long time to gear up to produce sufficient numbers of doses.

Several 'hot-spots' merit attention (not forgetting that a 'hot-spot' may in fact be due as much to comprehensive reporting and not just the level of disease). Pakistan reported 307 outbreaks in February 2017 and most were of the O serotype. Although the situation in India is less clear, it reported several outbreaks of O serotype. Also, an Indian (ICAR Directorate) Report on FMD for the period 2015-2016 reported 252 outbreaks, 244 of which were O serotype and the rest A and Asia1 serotypes. This prompts me to ask why the O serotype is as prevalent as it is and equally why other serotypes are less so. Perhaps my knowledge is not what it should be but I would be interested to entertain any theories or facts.

The other main region I want to comment on is South-East Asia. Not so much because of the particular prevalence of disease but because map O reminded me of an excellent presentation some years ago by Dr Ozawa of OIE who showed a slide of the large number of known and suspected cattle and buffalo movements between countries of the region (Cambodia, China, Laos, Malaysia, Myanmar, Thailand and Vietnam). Very similar scenarios are seen throughout the world and really undermine other control measures, allowing the disease to 'fast-track' through a region. While in Asia, it is necessary to comment on the problems facing the South Korean authorities with both O and now A serotypes being reported. The A virus was isolated close to the border with North Korea but the closest (sequence) identity is with a Vietnamese isolate and it is difficult to imagine that Vietnam could be the source. However, stranger things are not unknown with FMD.

I want to close my comments with a tribute.
Chris Schermbrucker was both a friend and colleague during the time I worked in vaccine manufacturing. Sadly, he passed away very recently and will be greatly missed by all that knew him. I recall a particular view he held based on a lifetime of experience and which has some bearing on my comments above. He said to me many times that, if you looked hard enough, you could find the C serotype in the field despite its apparent absence. Several years after Chris retired, it was speculated by others that the last C outbreak in 2004 in the Amazonas region of Brazil may have been due to virus circulating undetected.

I. GENERAL OVERVIEW

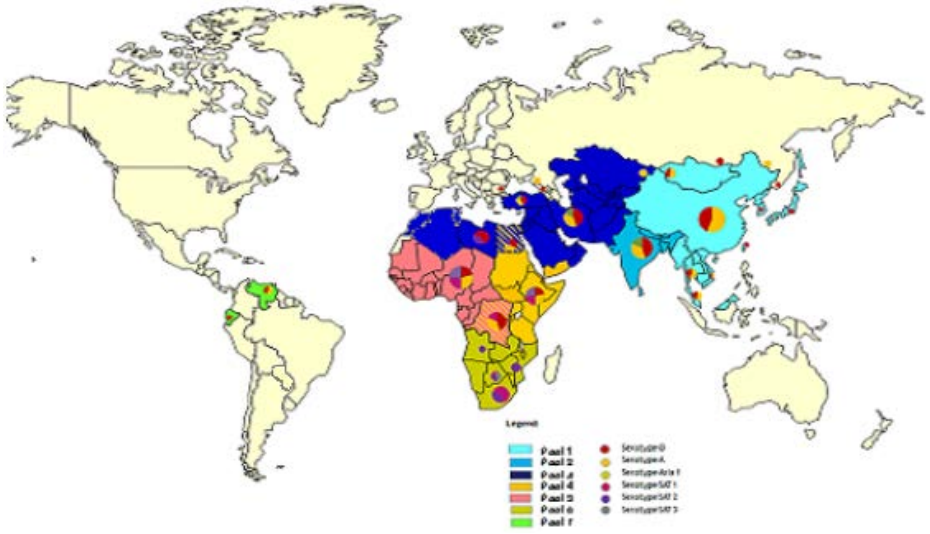
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below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

Table 1: List of countries representing each virus pool for the period 2011 – 2015

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

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

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



II. HEADLINE NEWS

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

China (People's Rep. of) [1] – A FMD outbreak caused by serotype O occurred on the 25th of January 2017, on a mixed species farm in Rinbung, Tibet.
Further to the outbreak reported in Xinjiang, in January 2016, another event caused by serotype O was observed in a backyard cattle farm on the 7th of February 2017.

Korea (Rep. of) [1, 2] **–** FMD serotype O was also responsible for the outbreak of the 5th of February 2017, on a cattle farm in Chungcheongbuk-Do situated in the central part of the country.
Another FMD outbreak reported in the northern part of the country, in Gyeonggi-Do, on the 8th of February 2017 in cattle was this time caused by serotype A virus.
Samples from the two respective outbreaks were immediately forwarded to the WRLFMD for genotyping of the field isolates that were identified as A/ASIA/SEA-97 and O/ME-SA/Ind2001d.
Details of the results of the cell culture/ELISA serotyping, genotyping of VP1 and vaccine matching strain differentiation (VMSD) tests carried out by the WRLFMD on FMDV field strains, which are cited in this report, will be available in the forthcoming issue of the 1st Quarterly (January-March 2017) WRLFMD Report.

Mongolia [1] **–** FMD outbreaks occurred between the 24th and 29th of January 2017, on three multispecies ruminant farms situated in Sukhbaatar and Dornod.

Russian Federation [2] **–** FMDV sequences submitted to the WRLFMD by the Russian Federation Regional Reference Laboratory for FMD (ARRIAH, Russia) relative to the outbreak that occurred in Zabaikalskiy Kray, in November 2016 were identified as O/ME-SA/Ind2001d.

Vietnam [2] – Field viruses belonging to FMDV serotypes A and O detected by the WRLFMD among the thirty-five samples collected from different animal species between 2015 and 2016 were submitted to vaccine matching strain differentiation (VMSD) tests. Vaccine strains with good matching results were detected for each serotype.

POOL 2 - SOUTH ASIA

Bhutan [2] **–** Six field isolates of FMDV serotype O detected by the WRLFMD among the fourteen bovine samples collected between 2015 and 2016 were genotyped as O/ME-SA/Ind2001d. VMSD tests carried out on the only field virus isolated in cell culture identified vaccine strains with good matching results.

India [3] – The Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India detected FMDV serotype O in clinical samples of cattle and buffaloes.

Nepal [4] **–** the National Foot and Mouth Disease and TADS Laboratory also reported the circulation FMDV serotype O.

POOL 3 - WEST EURASIA & MIDDLE EAST

Israel [1] **–** A FMD clinical outbreak due to serotype O was detected on the 4th of February 2017, on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom.

Jordan [1] **-** FMD clinical outbreaks due to serotype O were observed between the 21st of February and 9th of March 2017, on three farms, where sheep, goats and cattle were respectively present in Hamman, Al Balqa and Irib, Jordan. Details of these events will be included in next month's issue.

Pakistan [5] - The Progressive Control of Foot and Mouth Disease Project reported that 307 FMD outbreaks occurred in the country during February 2017. FMDV serotype O was responsible for nearly all of the typed outbreaks. Other serotypes detected were A and ASIA 1.

Palestinian Auton. Territories [1] **-** Also due to serotype O, were the FMD clinical outbreaks that respectively occurred on the 2nd and 5th of February 2017in two cattle farms in Rafah and Jabalia, in the Gaza Strip.

POOL 4 - EASTERN AFRICA

Ethiopia [6] **–** The National Animal Health Diagnostic and Investigation Center (NAHDIC) detected FMDV serotypes A, O and SAT 1 in bovine tissue samples collected from outbreaks.

Kenya [7] - The National FMD Reference Laboratory Embakasi, Kenya reported FMDV SAT 1 in bovine samples.

POOL 5 - WEST/CENTRAL AFRICA

Nigeria [8] **–** The National Veterinary Research Institute Vom, Nigeria reported the suspicion of an FMD outbreak in Oyo State.

POOL 6 - SOUTHERN AFRICA

Republic of South Africa [1] **–** A FMD outbreak for which serotyping is pending occurred on the 1st of March 2017 on a cattle farm in Mpumalanga.

Zimbabwe [1] **–** Two clinical FMD outbreaks in cattle were observed on the 9th and 22nd of January 2017 respectively in villages of MATABELELAND NORTH and MIDLANDS for which serotyping is still pending.

POOL 7 - SOUTH AMERICA

Latin America [2] – No FMD outbreaks were reported for this Region during January 2017. During the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported serological data for historical FMD outbreaks that occurred in Venezuela in 2013. These now represent the most recent confirmed FMD cases in South America.

COUNTER

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

****** 150 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 caused by serotype O occurred on the 25th of January 2017, on a cattle and sheep backyard farm in Rinbung, Tibet. The disease in this area was last reported in 2015. The National Foot and Mouth Disease Reference Laboratory (OIE Reference Laboratory) confirmed the diagnosis on the 3rd of February using reverse transcription - polymerase chain reaction (RT-PCR). Summary of the animals involved and location of outbreak are reported in Table 2 and Map 2.

The source of the outbreak was attributed to the introduction of new live animals. The preventive measures adopted for the control of the disease are the following: movement control inside the country, vaccination in response to the outbreak, quarantine, disinfection, stamping out and official disposal of carcasses, by-products and waste, and zoning.

Table 2: summary of the animals involved in the FMD outbreak of the 25th January 2017, in Rinbung, Tibet (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	82	28	/	82	/	34.15%	**	**	**
Sheep	34	**	/	34	/	**	**	**	**
Totals	**116**		**/**	**116**	**/**	**24.14%**			

*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 25th January 2017 in Rinbung, Tibet (People's Rep. of).

Following the outbreaks respectively reported in November 2016 and January 2017, FMD, caused again by serotype O, reoccurred in the southwestern part of Xinjiang, in the northwest area of the country. The disease was observed on the 7th of February 2017, on a small farm where sheep and cattle were present. Laboratory diagnosis was confirmed on the 14th of February 2017 by the Lanzhou Veterinary Research Institute, (National and OIE Reference Laboratory) using reverse transcription - polymerase chain reaction (RT-PCR) and virus isolation. Summary of the animals involved and location of outbreak are reported in Table 3 and Map 3.

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

Table 3: summary of the animals involved in the FMD outbreak of the 7th February 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	42	21	0	42	0	50.00%	0.00%	0.00%	100.00%
Sheep	54	0	0	54	0	0.00%	0.00%	-	100.00%
Totals	**96**	**21**	**0**	**96**	**0**	**21.87%**	**0.00%**	**0.00%**	**100.00%**

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

Map 3: location of the FMD outbreak of the 7th February 2017 in Xinjiang, China (People's Rep. of).

Korea (Rep. of) [1, 2]

Following the last FMD outbreak reported in April 2016, the disease caused by FMDV serotype O reoccurred on the 5th of February 2017, on a cattle farm in Chungcheongbuk-Do, which is located in the central part of the country. The Animal and Plant Quarantine Agency (OIE Reference Laboratory) confirmed the diagnosis on the same day of observation of the outbreak using real-time reverse transcriptase/polymerase chain reaction (RRT-PCR).

Summary of the animals involved and location of outbreak are reported in Table 4 and Map 4.

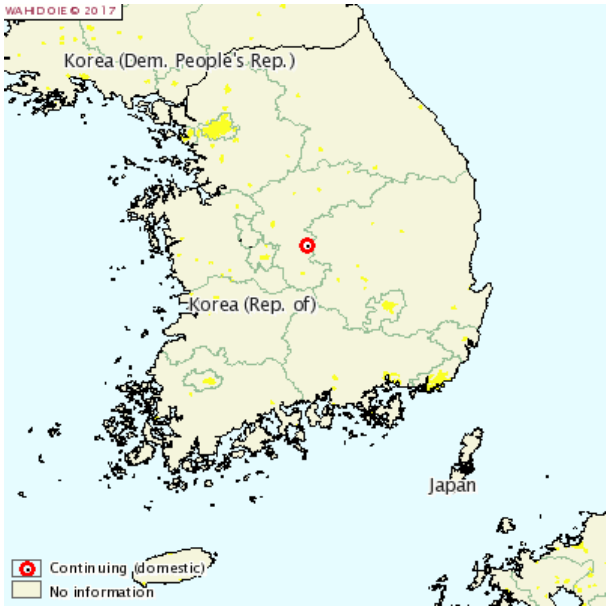
The source of the outbreak is unknown and for this, an epidemiological surveillance is ongoing. The preventive measures adopted in the area are the following: movement control inside the country, screening, vaccination in response to the outbreak, surveillance within and outside containment and/or protection zone, quarantine, disinfection, stamping out and official disposal of carcasses, by-products and waste, control of wildlife reservoirs and zoning.

Table 4: summary of the animals involved in the FMD outbreak of the 5th of February 2017, on cattle farm in Chungcheongbuk-Do, Korea (Rep. of).

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	195	15	0	195	0	7.69%	0.00%	0.00%	100.00%

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

Map 4: location of the FMD outbreak of the 5th of February 2017, on cattle farm in Chungcheongbuk-Do, Korea (Rep. of).



Another FMD outbreak, independent from the previous one as the FMDV involved is serotype A, was reported in the northern part of the country, in Gyeonggi-Do, on the 8th of February 2017 in cattle.
Even in this case, the Animal and Plant Quarantine Agency (OIE Reference Laboratory) rapidly confirmed the diagnosis that was carried out on the 9th of February, using RRT-PCR.
Summary of the animals involved and location of outbreak are reported in Table 5 and Map 5.
Even in this case the source of the outbreak is unknown and an epidemiological surveillance is being conducted. The preventive measures adopted in the area are the following: traceability, movement control inside the country, screening, vaccination in response to the outbreak, surveillance within and outside containment and/or protection zone, quarantine, disinfection, stamping out and official disposal of carcasses, by-products and waste, control of wildlife reservoirs and zoning.

Map 5: location of the FMD outbreak of the 8th of February 2017, in Gyeonggi-Do, Korea (Rep. of).

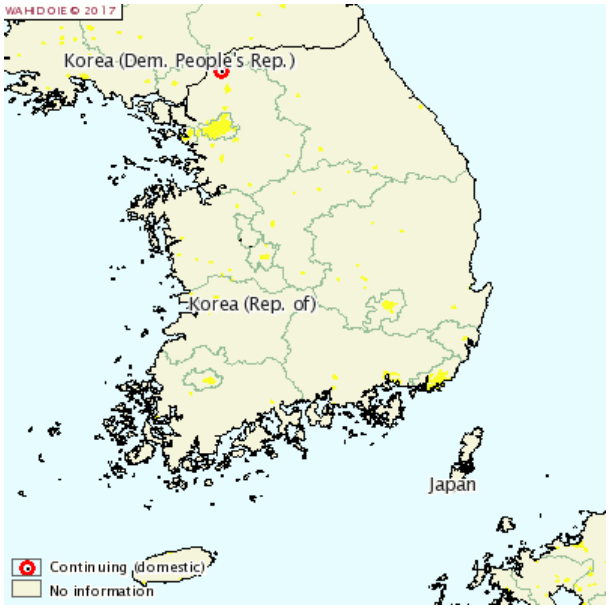


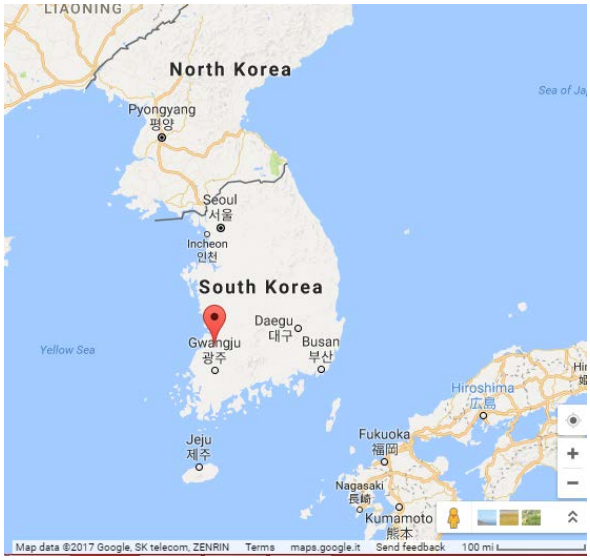
Table 5: summary of the animals involved in the FMD outbreak of the 8th of February 2017, in Gyeonggi-Do, Korea (Rep. of).

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	100	5	0	100	0	5.00%	0.00%	0.00%	100.00%

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

Samples from each of the above outbreaks were immediately forwarded to the WRLFMD that further to confirming the initial serotyping conducted by the country's laboratory, proceeded with the genotyping the field isolates that were identified as A/ASIA/SEA-97 and O/ME-SA/Ind2001d.
For A/ASIA/SEA-97, most closely related field virus, not pertaining to the country was VIT/16/2016, isolated from a pig, with a sequence identity (seq id) of 99.8%, while for O/ME-SA/Ind2001d, the most closely related field virus was Zabaikalskiy/3/RUS/2016 from cattle, with a seq id of 99.5%.
Another sample collected from a third outbreak on the 6th of February, from cattle at JeonBuK (for location see Map 6) was also genotyped as O/ME-SA/Ind2001d. Even for this virus, the most closely related field virus was Zabaikalskiy/2/RUS/2016, (seq id 99.7%) still from the outbreak that occurred in Zabaikalskiy, the Russian Federation in November 2016.

Map 6: location of the FMD outbreak, which occurred on the 6th of January 2017, in JeonBuK, Korea (Rep. of).



Mongolia [1]

Two and one FMD outbreaks caused by serotype O respectively occurred on the 24th and 29th of January 2017, on multispecies ruminant farms. The State Central Veterinary Laboratory confirmed the first diagnosis on the 28th of January 2017 and the methods employed were antigen (ag) detection ELISA and real-time PCR.
Most recent viral lineages isolated in the country respectively in 2015 and in 2016 were O/SEA/Mya-98 and A/ASIA/Sea-97.
Summary of the animals involved and location of outbreak are reported in Table 6 and Map 7.
The source of the outbreaks is unknown and the preventive measures adopted in the area are the following: traceability, movement control inside the country, screening, vaccination in response to the outbreak (see details in Table 7), quarantine, disinfection, stamping out and zoning.

Table 6: summary of the animals involved in the FMD outbreaks which occurred between the 24th and 29th of January 2017, in Sukhbaatar and Dornod, Mongolia.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	/	625	0	520	0	**	**	0.00%	**
Goats	/	6	0	6	0	**	**	0.00%	**
Sheep	/	32	0	32	0	**	**	0.00%	**
Total	/	663	0	558	0	/	/	/	/

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

**Not calculated because of missing information

Map 7: location of the FMD outbreaks, which occurred between the 24th and 29th of January 2017, in Sukhbaatar and Dornod, Mongolia.

Table 7: summary of the animals vaccinated in Sukhbaatar and Dornod, following the FMD episodes that occurred between the 24th and 29th of January 2017 – details of type of vaccine used are unknown.

Administrative division	Species	Animals Vaccinated
Dornod	Goats	101,786
	Sheep	174,253
	Cattle	54,195
Sukhbaatar	Cattle	74,796
	Goats	314,467
	Sheep	427,573
Total animals vaccinted		**1,147,070**

Russian Federation [2]

The two FMDV sequences, submitted by the FGI–ARRIAH, Russia relative to the outbreak which occurred in Zabaikalskiy Kray, in November 2016 were genotyped as O/ME-SA/Ind2001d. The most closely related field virus not pertaining to the country is represented by a field virus isolated from a pig in Bangladesh, BAN/GKa-236(pig)/2015 with a seq id, ranging from 99.5 and 99.8%.

Vietnam [2]

Six field viruses were submitted to vaccine matching strain differentiation (VMSD) tests with the following results: -
- field isolates A/VIT/10/2015 and A/VIT/1/2016, belonging to viral lineage A/ASIA/Sea-97, obtained good matching results with A Iran 2005 and A22 IRQ/24/64, but not with A MAY 97 and A /TUR 20/06.
- field isolate O/VIT/8/2015 and O/VIT/ 20/2016 genotyped as O/ME-SA/Ind2001d obtained good matching results with O 3039, O Manisa and o Tur 5/09. The same vaccine strains did not match with field isolates O/VIT/17/2016, genotyped as O/SEA/mya-98 and with O/VIT/8/2016, genotyped as O/Cathay.

Table 8: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 8 below.

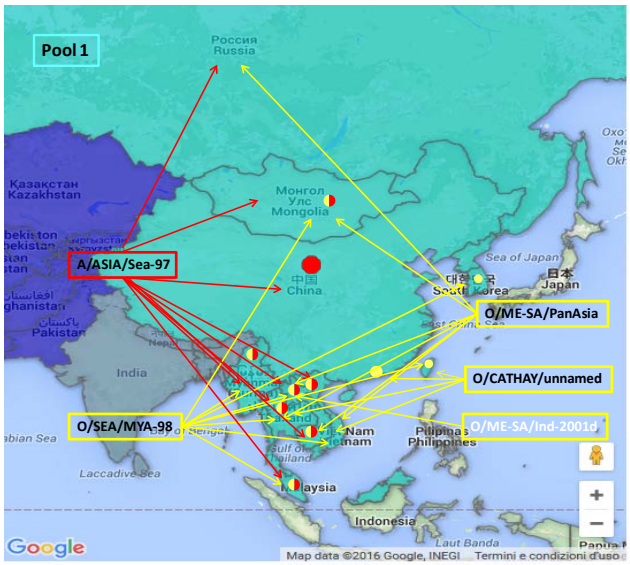
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	O, 2013-2015/NOT SAMPLED	July 2016/ not typed or not sampled, Sep 2015/O and A, Aug 2014/ not typed, June 2014/not typed	Follow-up needed
China (People's Rep. of)	2012-2013/O, 2013 & 2015/A 2012 - 2014/NOT TYPED**	Feb 2017/O, May 2015/A	See text Follow-up needed
China (Hong Kong, SAR)	O**	Aug 2015/O	Follow-up needed
China (Taiwan Province)	2012-2013/O, A/2015**	Jun 2015/A	Follow-up needed
Korea (DPR)	2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Korea (Rep. of)	2012-2013/DISEASE ABSENT 2014/O, 2015/ NO DATA REPORTED	Feb 2017/O & A	See text Follow-up needed
Laos PDR	2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS 2015/ NO DATA REPORTED	Mar 2016/O Mar 2015/A,	Follow-up needed
Malaysia	2012 –2015/O 2013 & 2015/NOT TYPED	August 2016/A & O	Follow-up needed
Mongolia	2013/A & NOT TYPED, 2014 & 2015**/O	Jan 2017/O, Sept 2013/A,	See test Follow-up needed
Myanmar	2012-2014/O, 2015/A & NOT TYPED	Aug 2016/O, July 2016/ not typed, Oct 2015/A	Follow-up needed
Russian Federation	2012, 2014 & 2015/O, 2013 - 2015/A	Dec 2016/O, Oct 2016/Asia 1, Jan 2016/ A	See text

Thailand	O, A NOT SAMPLED & NOT TYPED	Sep 2016 /A, Aug 2016/O June – July 2016/not typed	Follow-up needed
Vietnam	O, NOT SAMPLED, NOT TYPED 2013, 2014 & 2015/A,	November 2016/O, Aug 2016/A and not typed	See text Follow-up needed

Map 8: 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, 13]:

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



B. POOL 2 – South Asia

Bhutan [2]

The six field isolates belonging to FMDV serotype O, detected among the fourteen bovine samples collected between 2015 and 2016 were genotyped as O/ME-SA/Ind2001d. The sequences of these viruses were most closely related to the sequences of the following field viruses not pertaining to the country, BAR/15/2015 (98.6% - 98.9% seq id), BAN/NL/Lo-245/2015 (99.7% seq id), NEP/6/2016 (99.5% - 99.8% seq id) denoting the different epidemiological origin of the same viral lineage.

All the vaccine strains used in the VMSD tests, represented by O 3039, O Manisa and O Tur 5/09, obtained good matching results with O/BHU/9/2016, the only field virus that was isolated in cell culture.

India [3]

The ICAR-PDFMD, Mukteswar, India reported for the detection of FMDV serotype O among the clinical samples collected from two cattle and four buffaloes using FMDV antigen and/or RNA detection; three field isolates were genotyped for serotype O and three field viruses were subjected to vaccine matching exercise. Further to this, 1,615 serum samples were tested for FMDV antibodies within ongoing epidemiological studies. 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 investigation 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 [4]

As for the previous months, the National Foot and Mouth Disease and TADS Laboratory reported the circulation FMDV serotype O. The laboratory personnel were also involved in providing expert advice to Government services national/local authorities.

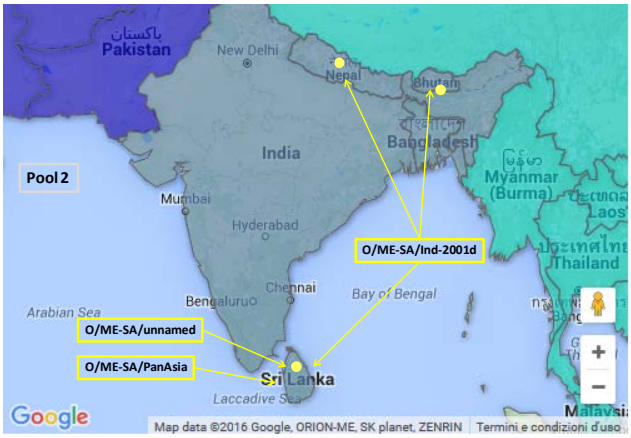
Table 9: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 9 below.

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

Map 9: FMD distribution by serotype and topotype in South Asia, 2012 – 2016 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [2, 13]:

- 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

Israel [1]

A FMD clinical outbreak due to serotype O was observed on the 4th of February 2017, on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom. Last occurrence of the disease in the country was in December 2015, caused by O/ME-SA/PanAsia. The outbreak was characterized by drop in milk production, loss of appetite, lesions on the udder, and erosions in mouth, limping and fever with two cows dying just after calving. The last case was observed on the 18th of February 2017 in an adult cow over 18 months. As all the new cases were detected in young calves, the source of this infection is probably ingestion of unpasteurized milk.

The Foot-and-mouth disease laboratory (National laboratory) of the Virology Division of the Kimron Veterinary Institute confirmed the diagnosis on the 6th of February 2017, using Ag detection ELISA and conventional PCR and Real-time PCR. Cell-culture isolation and sequencing were also carried out, however, the results of the latter are not yet available.
Summary of the animals involved and location of outbreak are reported in Table 10 and Map 10.
The source of the outbreak is unknown and the preventive measures adopted in the area are the following: traceability, movement control inside the country, screening, quarantine, surveillance within and outside the containment and protection zone, vaccination in response to the outbreak, quarantine, disinfection and zoning.
A cumulative morbidity of the FMD event (Figure 1) was kindly provided by Dr. Dr. Tamir Goshen Deputy Chief Veterinary Officer of the Field Veterinary Service Director.

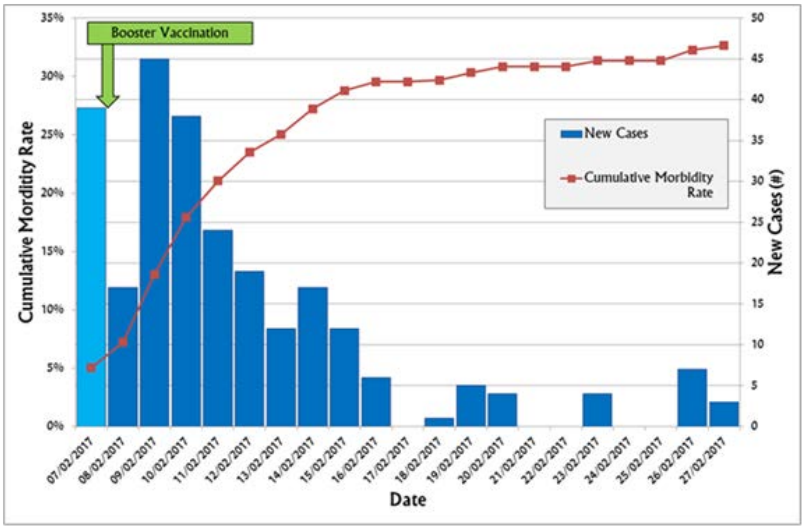
Table 10: summary of the animals involved in the FMD outbreak observed on the 4th of February 2017, on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom, Israel.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	650	239	3	0	0	36.77%	0.46%	1.26%	0.46%

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

Map 10: location of the FMD outbreak observed on the 4th of February 2017, on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom, Israel.

Figure 1: cumulative morbidity of the outbreak observed on the 4th of February 2017, on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom, Israel.



Pakistan [5]

The Progressive Control of Foot and Mouth Disease Project reported that 307 FMD outbreaks occurred in the country during February 2017. FMDV serotype O was responsible for nearly all of the typed outbreaks. Other serotypes detected were A and ASIA 1. Details of distribution of serotypes per location are reported in Table 11 and Map 11.
In response to FMD outbreaks and on cost sharing basis, the number of vaccine doses administered during February 2017 was 13,330. A summary of the number of interventions carried out in the different Provinces is presented in Table 12.

Table 11: Province and district distribution of FMD outbreaks with relative serotypes that occurred in Pakistan during February 2017.

Location of outbreaks and n° ()		Number (%) of Outbreaks due to FMD Virus					
Province	District	'O'	'A'	'Asia 1'	'Mixed'	Un-Typed	Not tested
Sindh (29)	Dadu (6)	2	-	-	-	4	--
	Matiari (3)	2	-	-	-	1	--
	Shikarpur (10)	8	-	2	-	-	--
	Mirpurkhas (1)	1	-	-	-	-	--
	Khairpur (6)	5	-	-	-	1	--
	Tando Allahyar (2)	1	-	-	-	1	--
	Hyderbad (1)	-	-	-	-	1	--
Federally Administered Tribal Areas (1)	Khyber Agency (1)	1	--	--	--	--	--
Khyber Pakhtunkhwa (20)	Abbottabad (13)	4	--	--	--	9	--
	Lower Dir (2)	1	--	--	--	1	--
	Swabi (5)	--	--	--	--	5	--
Azad Kashmir (11)	Mirpur (21)	5	--	--	--	9	7
	Bhimber (6)	3	--	--	--	3	--
	Muzaffarabad (4)	3	--	--	--	1	--
Punjab (217)	Faisalabad	36	--	1	--	8	--
	Khanewal	17	--	--	--	13	--
	Sargodha	1	--	--	--	2	--
	Gujrat	--	--	--	--	2	--
	Okara	4	4	--	--	4	--
	Attock	9	--	--	--	--	--
	Rawalpindi	--	--	--	--	9	--
	Sahiwal	2	--	1	--	--	--
	Hafizabad	4	--	--	--	3	--
	Lahore	4	--	--	--	7	--
	Sheikhupura	5	--	2	--	--	--
	Layyah	2	--	--	--	--	--
	Bhakkar	4	--	--	--	1	--
	Vehari	--	--	--	--	1	--
	Chakwal	12	--	--	--	5	--
	Jhelum	--	--	--	--	2	--
	Nankana	1	--	--	--	--	--
	Mianwali	1	1	--	--	2	--
	Pakpattan	1	--	--	--	--	--
	Gujranwala	2	--	--	--	1	--
	Jhang	3	1	--	1	3	--
	Kasur	3	--	1	--	--	--
	MB Din	2	--	--	--	1	--
	Multan	12	--	--	--	4	--
	Muzzaffargarh	4	--	--	--	6	--
	Khushab	2	--	--	--	--	--
Islamabad Capital Territory (4)	Islamabad (4)	3	--	--	--	1	--
Gilgit-Baltistan (5)	Ghanche (5)	1	--	--	--	4	--
Total (307)		171 (55.70)	6 (1.95)	7 (2.28)	1 (0.33)	115 (37.5)	7 (2.28)

Table 12: Vaccination activities carried out during February 2017 in the various Provinces of Pakistan.

Province	Ring Vaccination	Cost sharing basis (Doses)	
Sindh	2,250	--	
Punjab	4,300	4,150	
Azad Kashmir	1,225	--	
Islamabad Capital Territory	900	475	
Totals	**8,675**	**4,625**	**13,330**

Map 11: Location of the Districts where FMD outbreaks occurred in Pakistan during February 2017.

During the reporting month, Capacity Building training courses were organised by the PC-FMDP in Punjab attended by 122 Veterinary Officials and 186 Veterinary Assistants who also received sample collection kits.

Palestinian Auton. Territories [1]

Also due to serotype O, were the FMD clinical outbreaks that respectively occurred in two cattle farms in Rafah and Jabalia, in the Gaza Strip on the 2nd and 5th of February 2017.

The infected population of the outbreak in Rafah was calves from 12 to 18 months of age.

The Foot-and-mouth disease laboratory of the Virology Division of the Kimron Veterinary Institute confirmed the diagnosis of the disease on the 8th of February 2017, using Real-time PCR and cell-culture isolation.

Summary of the animals involved and location of outbreak are reported in Table 13 and Map 12.

The source of the outbreak is due to the introduction of live animals and the preventive measures adopted in the area are the following: traceability, movement control inside the country, screening, quarantine, surveillance within and outside the containment and protection zone, vaccination in response to the outbreak, quarantine, disinfection and zoning.

Map 12: location of the FMD clinical outbreaks that respectively occurred in two cattle farms in Rafah and Jabalia, in the Gaza Strip on the 2nd and 5th of February 2017.

Table 13: summary of the animals involved in the FMD clinical outbreaks that respectively occurred in two cattle farms in Rafah and Jabalia, in the Gaza Strip on the 2nd and 5th of February 2017.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	425	85	22	0	/	20.00%	5.18%	25.88%	**

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

**Not calculated because of missing information

Table 14: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 13 below.

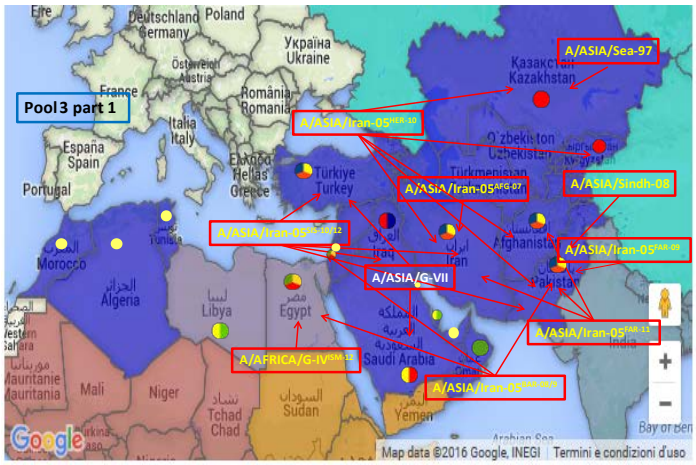
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2015**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	Jul 2016/O, Jun 2016/Asia 1 & May 2016/A,	See text
Algeria	2014 -2015**/O	Apr 2015/O	Follow –up needed
Armenia	2012-2014/DISEASE ABSENT 2015/A	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT**	2007/0	Follow –up needed
Bahrain	2012, 2014 &2015 /O	Oct 2014/O	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	May-Jun 2016/ O & Sat 2, March 2016/A, Aug 2016/typing pending	Follow –up needed
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran	2012-2014/A, Asia 1 & O 2015**/SEROTYPE NOT REPORTED	July 2016/A & O, 2013/Asia 1	Follow –up needed
Iraq	2012-2013/O, 2012-2014/A 2015/ SEROTYPE NOT REPORTED	Dec 2013/A, O	Follow –up needed
Israel	2012-2015**/O	Feb 2017/O	See text Follow –up needed
Jordan	DISEASE ABSENT**	2006/A	Follow –up needed
Kazakhstan	2012/O,2012 –2013/A 2014-2015**/ DISEASE ABSENT	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	2012/O 2013 – 2014/ DISEASE ABSENT	Jan-Feb 2016/O	Follow –up needed
Kyrgyzstan	2012-2014/O, A 2015/ NO DATA REPORTED	Aug 2014/not typed & Apr 2013 /O, A,	Follow –up needed
Lebanon	DISEASE ABSENT 2015/ NO DATA REPORTED	2010/not typed	Follow –up needed
Libya	NO DATA REPORTED	Oct 2013/O	Follow –up needed
Morocco	DISEASE ABSENT**	Oct 2015/O	
Oman	2012-2014/O 2015/ NO DATA REPORTED	May 2015/SAT 2	Follow –up needed

Pakistan	2012 & 2015/ NO DATA REPORTED 2013-2014/A, ASIA 1 & O	Feb 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	2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014/O 2015/ NO DATA REPORTED	Oct 2016/A & April 2016/O	Follow –up needed
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2012- 2013/NOT TYPED 2014-2015**/DISEASE ABSENT	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2014/O 2015/ DISEASE ABSENT	Oct 2014/O	Follow –up needed
Turkey	Asia 1, A & O, NOT TYPED	Oct 2015/ A May & 2014-2015/ Asia 1 and O	Follow –up needed
Turkmenistan	2012/NO DATA REPORTED 2013-2015/DISEASE ABSENT	Not available	Follow –up needed
United Arab Emirates	2012, 2015/DISEASE ABSENT 2013-2014/O	Feb 2016/O	Follow –up needed

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.

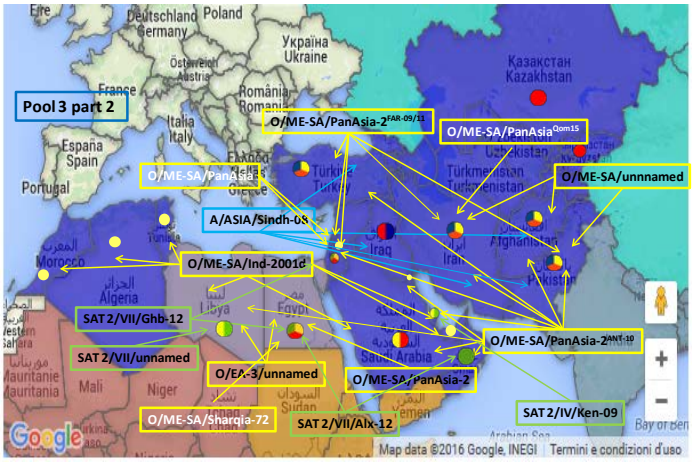
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [2, 13]:

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



Conjectured circulating FMDV 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 [6]

The twelve bovine tissue samples collected from outbreaks of FMD tested positive for FMDV serotypes A, O and SAT 2 when examined by NAHDIC using Ag detection ELISA.

The laboratory personnel was also involved in the outbreak investigation of these events supporting the field veterinarians and farmers for the choice of vaccine to employ.

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

Kenya [7] - The National FMD Reference Laboratory Embakasi, Kenya reported the detection of FMDV SAT 1 in bovine samples. The FMD diagnostic methods used were antigen detection Elisa, Real time PCR and virus isolation using LFBK cells. EuFMD has provided FMD diagnostic kits to the laboratory.

The laboratory personnel were involved in the epidemiological investigations of outbreaks and in the provision of advice to field veterinarians and farmers on the type of vaccine to employ.

Samples last forwarded by the country to the WRLFMD for genotyping was in 2013. The genotypes detected in relation to the serotypes reported this month were A/AFRICA/G-1 and SAT 2/IV/unnamed from samples respectively collected in 2013 and 2012.

Table 15: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 14 below.

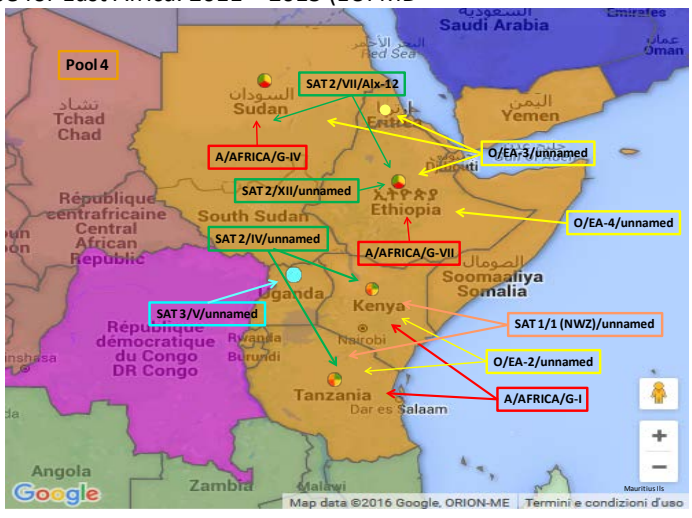
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Congo d. R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required

Djibouti	DISEASE ABSENT**	Not available	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	March 2016/A, May-Jun 2016/ O & Sat 2	Follow –up needed
Eritrea	2012/O, 2013/ DISEASE ABSENT 2014/ DISEASE PRESENT 2015/ NO DATA REPORTED	Jan 2012/O	Follow –up needed
Ethiopia	O**, 2012/A, 2012 & 2105/SAT 2, 2015**/SAT 1	Feb 2017/ A, O & SAT 1 May 2016/SAT 2	See text
Kenya	A, O, SAT1, SAT2, 2012 – 2015 /NOT TYPED	Jan 2016/ A, O & SAT 1, Oct 2015/ SAT 2	See text
Libya	NO DATA REPORTED	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Rwanda	2012-2013/A, O, SAT1, SAT 2	Nov 2012/not typed	Typing required
Somalia	2012-2014/NOT SAMPLED 2013 – 2014/ NO DATA AVAILABLE	2011	Follow –up needed
Sudan	2013/SAT 2, 2012-2014/O & NOT TYPED 2015**/A & NOT SAMPLED	Dec 2013/ O & A, Jan 2014/SAT 2	Follow –up needed
South Sudan	2014/A, O SAT 1, SAT 2, SAT 3, 2012-2013 & 2015/ NO DATA REPORTED	2011	Follow –up needed
Tanzania	2012-2015/A, O, SAT 1, SAT 2	May 2015/O Apr2013/ A, SAT 1, SAT2	Follow –up needed
Uganda	2012/ SAT 1,2012, 2014/O, 2013/NOT TYPED 2015/NO DATA REPORTED	May 2014/O Nov 2014/SAT1, Jan 2015/A and SAT 3, July 2015/ SAT 2 and untyped	Follow –up needed
Yemen	2012/O, 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA 2015/NO DATA REPORTED	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, 13]:

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



E. POOL 5 – West / Central Africa

Cameroon [9]

The LANAVET, Garoua detected non-structural protein antibodies(NSP) in 34 of the 54 (62.96%) bovine samples tested in the NSP ELISA. The laboratory activities are limited due to the lack of diagnostic kits.
LANAVET continues its collaborative activities 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 [8]

The National Veterinary Research Institute Vom, Nigeria reported for February 2017, the suspicion of an FMD outbreak in Oyo State for which the laboratory is organizing the collection of diagnostic samples from the affected animals.

Ghana [10] **and Senegal** [11]

No FMD outbreaks and activities were reported February 2017 respectively by the Laboratoire National de l'Elevage et de Recherches Vétérinaires, Senegal and the ACCRA Veterinary Laboratory, Ghana, except for technical advice offered by ISRA/LNERV for the organization of vaccination programmes to the local veterinary services.

Table 16: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 15 below.

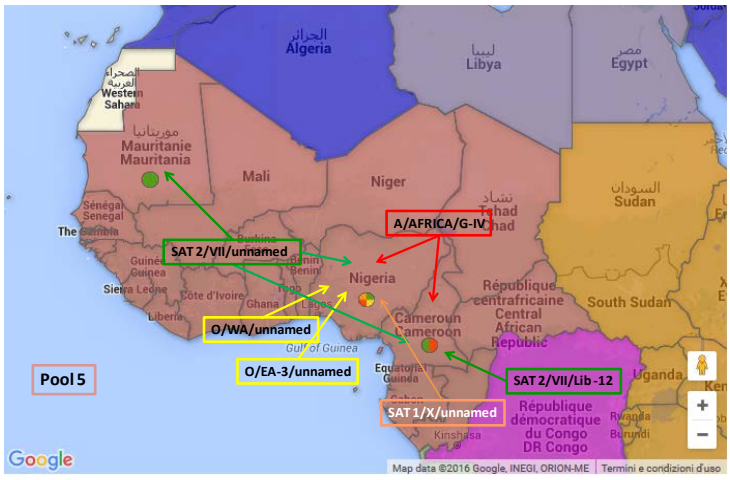
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT SEROTYPES NOT REPORTED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

Gambia	NO DATA AVAILABLE	2012/O	Follow –up needed
Ghana	2012 – 2015**/SEROTYPES NOT REPORTED	Dec 2016/ O & SAT 2 2014/not available	See text Follow –up needed
Guinea Biss.	2012-2013/DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED 2015/ Disease suspected	Dec 2016/SAT1 &SAT 2	Follow –up needed
Guinea	2012-2013, 2015/ DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED	2014/not available	Follow –up needed
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2012/ NO DATA AVAILABLE 2013/ SEROTYPES NOT REPORTED 2014-2015/SAT 2 2015/A, SAT 1	2011/2012, no precise data	
Mauritania	2012-2013/NO REPORTED OUTBREAKS 2014-2015**/SAT 2	Dec 2014/SAT 2	Follow –up needed
Niger	2012 – 2014/NOT SAMPLED	2014/not sampled, May 2015/O	Follow –up needed
Nigeria	2014-2015/O	Feb 2017/not typed Sept 2016/ O & SAT 1 Nov 2015/A, Sept 2014/ SAT 2	See text
Sao Tome Principe	2012/DISEASE ABSENT, 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Senegal	2013/NO DATA AVAILABLE 2012, 2014-2015**/ NOT SAMPLED	2014/ SAT 2, Feb 2015/ A and O	See text Follow –up needed
Sierra Leone	DISEASE ABSENT	Oct 1958	Follow –up needed
Togo	O, SAT 1	2012/O	Follow –up needed

Map 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 [2, 13]

- 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 [1, 12]

A FMD outbreak for which serotyping is pending occurred on the 1st of March 2017 on a cattle farm in Mpumalanga. The 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.

Last occurrence of the disease in the country was in February 2016.

The Onderstepoort Veterinary Institute Transboundary Animal Diseases Programme (OIE Reference Laboratory) confirmed the diagnosis on the 3rd of March 2017, using liquid-phase blocking ELISA and PCR, while serotyping is pending.

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

The source of the outbreak is unknown and the preventive measures adopted in the area are the following: traceability, movement control inside the country, screening, quarantine, surveillance within the containment and protection zone, while vaccination is prohibited.

Table 17: summary of the animals involved in the FMD clinical outbreak on the 1st of March 2017 on a cattle farm in Mpumalanga.

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Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	1500	12	0	0	0	0.80%	0.00%	0.00%	0.00%

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

Map 16: location of the FMD clinical outbreak on the 1st of March 2017 on a cattle farm in Mpumalanga.

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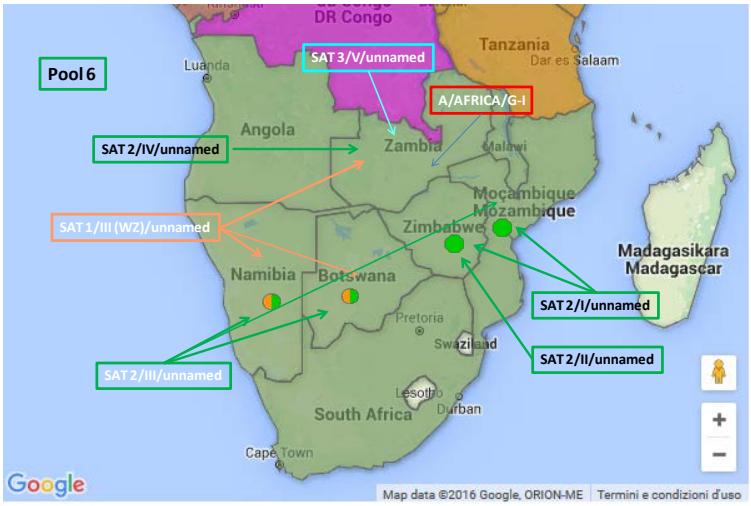
The ARC- Onderstepoort Veterinary Institute examined 2,815serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 236 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects. The FMD research group, led by Dr Francois Maree is involved in two international research projects: the first is a collaborative research project between the USDA-ARS, ARC-OVI and Makerere University in support of the national FMD control program in Uganda while the other is on the persistence of a highly contagious pathogen: ecological and evolutionary mechanisms in foot-and-mouth disease virus. The laboratory has received funding from the National Research

Foundation of South Africa to develop a phage display buffalo antibody library. The laboratory also has collaborations within the Global FMD Research Alliance (GFRA) and is member of the OIE/FAO FMD Network.

Table 18: 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 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013-2014/ DISEASE ABSENT 2015/ SEROTYPES NOT REPORTED	July 2015/ SAT 2 April 2016/typing pending	Follow –up needed
Botswana	2012-2015/SAT 2 2014-2015/SAT 1	Jun 2015/typing pending July 2015/SAT 2, June 2015/SAT 1	Follow –up needed
Congo D. R.	2012 – 2015/A, O, SAT 1	Jun 2013/not typed	Follow –up needed
Malawi	2012/NO REPORTED OUTBREAKS 2013-2015/ NO DATA AVAILABLE	Oct 2011, Sep 2015/SAT 1	Follow –up needed
Mozambique	2012 -2013/DISEASE ABSENT, 2014/ SEROTYPES NOT REPORTED 2015/ NO DATA AVAILABLE	Dec 2016/SAT 2, Sep 2016/ Typing pending, May 2015/ SAT 1	Follow –up needed
Namibia	2012-2014/SAT 1 2014-2015/SAT 2	May 2015/SAT 1, Jun 2015/SAT 2, July/typing pending	Follow –up needed
South Africa	2012-2015/SAT 2 2013/SAT 1 2015/SAT 3	Feb 2017/not typed Dec 2015/SAT 3, Nov 2014/ SAT 2, Aug 2013/SAT 1	See text Follow –up needed
Zambia	2012/SAT 1, SAT 2 2013-2015/ NO DATA AVAILABLE	Jan 2013/SAT 1, SAT 2, Mar 2016/SAT 3	Follow –up needed
Zimbabwe	2012-2015**/SAT 2 2013/SAT 3 2014/SAT 1	Feb 2017/not typed Sep 2016/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	See text 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 [2, 13]:

- 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

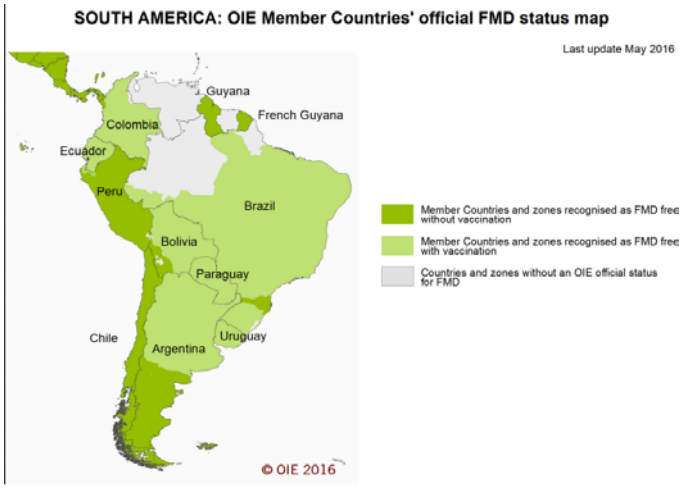
South America [1, 14]

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). The FMD history between 2012 –2015 is reported in Table 19. In fact, during the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013, these now represent the most recent confirmed FMD cases in South America.

Table 19: Summary of the history of FMD Pool 7, 2012 – 2015, 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:

[2]The 4th WRLFMD Quarterly Report for the period October – December 2016 published the table below (Table 20) 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 20: Recommendations from WRLFMD® on FMD virus strains to be included in FMDV antigen banks (for FMD-free countries) - October 2016.

Note: Virus strains are NOT listed in order of importance

High Priority	A/ASIA/G-VII(G-18)* O Manisa O PanAsia-2 *(or equivalent)* O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 *(or A TUR 06)* A22 Iraq SAT 2 Saudi Arabia *(or equivalent i.e. SAT 2 Eritrea)*
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 *(or Thai equivalent such as A/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

V. REFERENCES - Superscripts

1. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
2. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org.
3. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (Dr B. B. Dash) FAO.
4. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*.
5. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
6. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
7. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.

8. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini*
9. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - Dr. Simon Dickmu Jumbo.
10. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni*
11. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – Miss Mariame Diop and Dr. Moustapha Lô
12. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr Francois -Maree*
13. OIE/FAO FMD Reference Laboratory Network, Annual Report 2014
14. 43a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa, Punta del Este, Uruguay, 7-8 April, 2016. http://www.panaftosa.org/cosalfa43/