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MONTHLY REPORT
FOOT-AND-MOUTH DISEASE SITUATION



Food and Agriculture
Organization of the
United Nations



European
Commission

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

July 2018

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

July 2018

Guest Editor:
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EuFMD

#INFORMATION SOURCES USED:

Databases:

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

Other sources:

FAO/EuFMD supported FMD networks
FAO/EuFMD projects and field officers

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

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

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Guest Editor's comments:

It is a pleasure to be invited to write the introduction to this month's Global Foot-and-Mouth Disease Situation report.

I work as a consultant to EuFMD and in this edition, and will talk about an example of success of EuFMD support and regional cooperation in the Transcaucasus region.

The three Transcaucasian countries - Armenia, Azerbaijan and Georgia – belong to the FMD virus pool 3 - West Eurasia and Middle East. The last FMD outbreak in this region was reported in Armenia in 2015.

To avoid a potential FMD westward spread towards Europe the European Commission and EuFMD/FAO have supported FMD surveillance and control in the Transcaucasus countries (TCC) and in neighbouring Iran and Turkey for several years (MTF/INT/003/EEC).

All three countries are currently in stage 2 of the Progressive Control Pathway for FMD control (PCP) and base their FMD control on the Risk-based Strategic Plans according to the PCP guidelines.

The main risk hotspots of FMD virus introduction and spread are the lack of resources and power of the veterinary services to control animal movements, especially to seasonal pastures and on livestock markets.

Vaccination in the TCC generally focusses on high risk populations, which are identified through national risk assessments. Since the FMD risk situation in the region is very dynamic with new strains frequently emerging in neighbouring Iran and Turkey, support in FMD vaccine selection is an essential part of the EuFMD assistance to the TCC. Currently quadrivalent vaccines are used in the TCC to address the following FMDV lineages O/ME-SA/PanAsia-2, A/ASIA/Iran-05, A/ASIA/G-VII and Asia-1/Sindh-08.

A further focus of EuFMD support lies on regional cooperation between the three countries and their neighbours. A statement of intention has been endorsed by the TCC, Turkey, Iran and the Russian Federation, to share data on FMD outbreaks and vaccination and therefore improve FMD early warning and response. The database was developed under EuFMD responsibility and includes a mapping tool since this year.

Other areas of EuFMD support to the TCC include:

- Technical meeting to assist with the update of the RBSP and assessment of the FMD risk situation
- Employment of TCC national consultants
- Facilitation of regional FMD simulation exercises
- Support in the planning, implementation and analysis of FMD serological and clinical surveys

As export to the Middle East and Arab countries has increased in recent years, there is a growing demand for healthy animals within the countries. This results in a strong interest in an improved FMD situation and progressing along the PCP.

The three countries have identified candidate zones for PCP Stage 3 in which FMD control measures need to be accelerated to reduce the risk FMD introduction and spread. For example, surveys to detect clinically signs of FMD and increase awareness of the animal owners and the local veterinary services are planned to be implemented this year. In Georgia, already 3074 animals in 106 villages were investigated in the candidate zone until July.

During the past decade of cooperation between the EuFMD and the TCC, FMD control has greatly improved through the better understanding and management of risks. Also, the FMD awareness and transparency as well as the capacities and capabilities of the veterinary services and the regional cooperation have greatly improved the control of the infection.

Future cooperation will focus on further risk reduction and the progression towards zonal PCP stage 3 in this region.

Carsten Pöttsch
EuFMD

I. GENERAL OVERVIEW

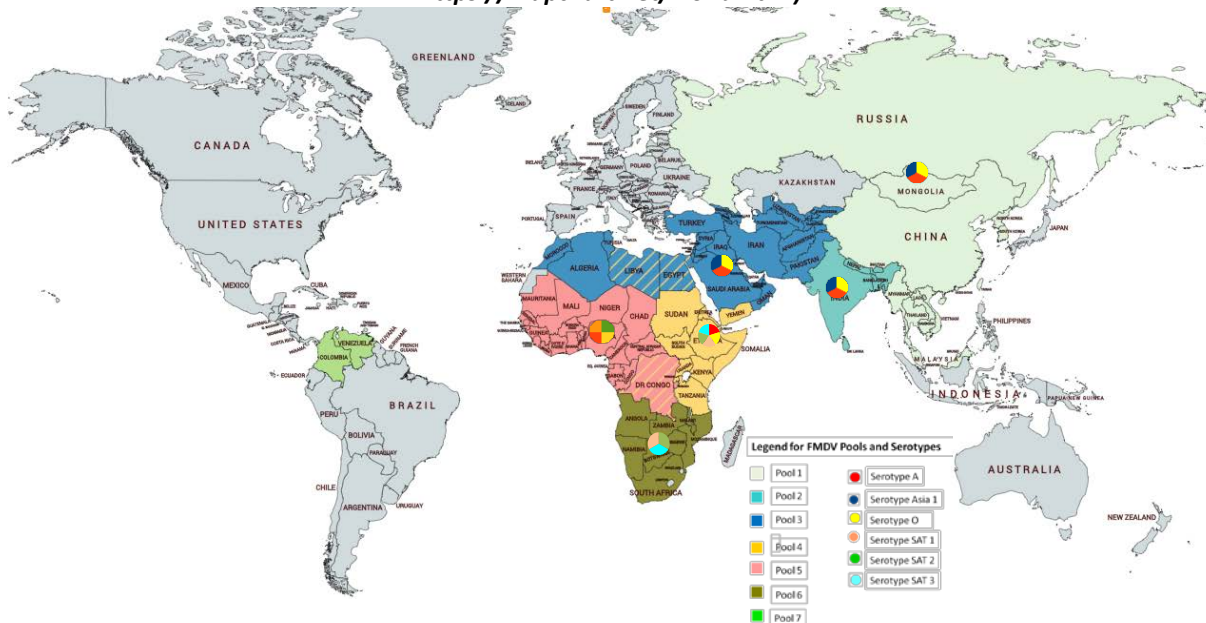
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below 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 2013 – 2017 (source EuFMD)

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

Egypt, Libya and Democratic Republic of Congo (highlighted in bold) are indicated as being in multiple pools, since they have evidence of FMDV originating from two or more pools. * ONLY IN NORTH ZAMBIA AS SPILL-OVER FROM POOL 4

MAP 1: Foot-and-mouth disease (FMD) virus pools: world distribution by serotype in 2013-2017 (source EuFMD, <https://mapchart.net/world.html>)



II. HEADLINE NEWS

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

China¹ – Four distinct FMD events involving pigs and cattle respectively occurred at Yunnan, Guangxi, Guangdong and Inner Mongolia between June 10th and July 16th 2018 for which FMDV serotype O was the causal agent.

POOL 2 - SOUTH ASIA

Bhutan² – Different vaccine strains employed in the vaccine matching strain differentiation (VMSD) tests obtained good matching results with the field isolates detected in 2017 and 2018, respectively belonging to topotypes A/ASIA/G-VII and O/ME-SA/Ind-2001.

India³ – Since April 2015, FMDV O continues to be the only serotype detected in the country.

POOL 3 - WEST EURASIA & MIDDLE EAST

Afghanistan⁴ – The Central Veterinary Research and Development Laboratory (CVDRL), Afghanistan reported the detection of FMDV Asia 1 and O during July 2018.

Some of the vaccine strains employed in the VMSD tests obtained good matching results with the field isolates detected during 2017 and belonging to the following topotypes: A/ASIA/Iran-05^{SIS-13}, Asia 1/ASIA/Sindh-08 and O/ME-SA/PanAsia-2^{ANT-10}.

Algeria^{1,2} – Further to the FMD outbreak due to FMDV O/EA-3 that occurred on a cattle farm in Tizi Ouzou on June 20th 2018, 12 new outbreaks were notified between June 25th and July 15th 2018, principally located on the coastal area of the country.

The vaccine strains employed in the VMSD tests obtained good matching results with the field isolates detected during the first notified outbreaks of June 2018.

Palestine¹ – Following the FMD outbreak for which virus serotyping is pending, that occurred on June 17th 2018 at Jenin, West Bank in cattle, three other events were diagnosed on serological basis between June 17th and 27th 2018, on sheep and goat farms.

Pakistan⁵ –FMDV serotypes A and O were detected in Punjab during July 2018.

POOL 4 - EASTERN AFRICA

Kenya⁶ – The FMD National Reference Laboratory, Embakasi, Kenya detected FMDV O among the cattle samples collected from outbreaks for the current reporting month.

Sudan² - A/AFRICA/G-IV, O/EA-3 and SAT2/VII/ALx-12 were the topotypes detected in the bovine samples collected between 2014 and 2018.

POOL 5 - WEST/CENTRAL AFRICA

Cameroon⁷ - The Laboratoire National Vétérinaire (LANAVET), Garoua Cameroon detected FMDV RNA in cattle samples.

Democratic Republic of Congo¹ –Three FMD outbreaks for which the serotype responsible is unknown were notified between May 28th 2017 and March 20th 2018 on cattle farms at Sud-Kivu.

Gambia¹ - Two FMD outbreaks for which serotyping is pending were reported in cattle on July 13th 2018 at Niani.

Ghana⁸ – The ACCRA Veterinary Laboratory reported the detection of FMDVs for which serotyping is ongoing.

Nigeria⁹ - FMDV was detected during the reporting month by National Veterinary Research Institute Vom, Nigeria.

Senegal¹⁰ – The Laboratoire National d'Elevage et de Recherches Vétérinaires, Senegal reported the detection of FMDV serotype O during July, 2018.

POOL 6 - SOUTHERN AFRICA

Botswana¹ –Eleven FMD outbreaks still due to FMDV serotype SAT 2, occurred between June 25th and July 17th 2018 on cattle farms in Ngamiland.

Malawi¹ – FMDV SAT 2 was responsible for the outbreak that occurred on June 6th 2018 involving cattle in a village of Dedza, Central.

Mozambique¹ – Twenty eight FMD outbreaks with serotyping pending were reported between December 23rd 2017 and June 27th 2018, in different areas of Tete in cattle.

Zimbabwe¹ – Four FMD outbreaks for which serotyping is pending were observed in cattle between July 10th and 17th 2018 in different villages of Mashonaland Central.

POOL 7 - SOUTH AMERICA^{1, 14, 15}

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

FMD in Latin America was last detected in Colombia in July 2017 with outbreaks due to FMDV serotype O, while PANAFTOSA reported historical outbreaks due to serotype A occurring in Venezuela in 2013.

COUNTER

***** 168 MONTHS (14 years) SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED**

III. DETAILED POOL ANALYSIS

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

China¹

Four distinct FMD events involving pigs and cattle, respectively occurred at Yunnan, Guangxi, Guangdong and Inner Mongolia between June 10th and July 16th 2018 which as for the previous month were all caused by FMDV serotype O.

The Lanzhou National Reference Laboratory for Foot and Mouth Disease (OIE Reference Laboratory) confirmed the diagnosis for all cases using gene sequencing and reverse transcription - polymerase chain reaction (RT-PCR).

For the outbreaks of Yunnan, Guangxi, Guangdong which occurred at livestock markets for the first two locations and where pigs were involved, the source of infection was due to legal movement of animals while for that in cattle at a village of Inner Mongolia the origin of infection was unknown.

The control measures that were in general implemented were movement control inside the country, screening, quarantine, official destruction of animal products, official disposal of carcasses, by-products and waste, stamping out, disinfection, vaccination permitted if available, while no treatment is being provided to the affected animals.

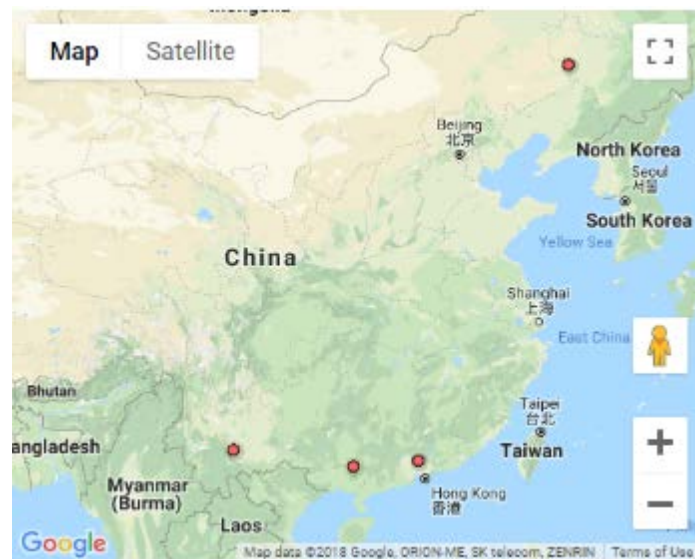
A summary of the epidemiological details of the outbreaks involved and location of outbreaks are reported in Table 2 and Map 2.

Table 2: summary of the animals involved in the FMD outbreaks that respectively occurred at Yunnan, Guangxi, Guangdong and Inner Mongolia between June 10th and July 16th 2018. (Source – WAHIS).

Location	Date of start of outbreak	Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Yuxi City, Xinping YizuDaizu Autonomous County, Yunnan	10/06/2018	Swine	62	3	1	61	0	4.84%	1.61%	33.33%	100.00%
Zhanjiang Township, Gangnan District, Guigang, Guangxi	10/06/2018	Swine	114	2	1	113	0	1.75%	0.88%	50.00%	100.00%
Tianhe Market, Tianhe District, Guangzhou, Guangdong	04/07/2018	Swine	1,244	32	0	1,244	0	2.57%	0.00%	0.00%	100.00%
Nurimu Township, Horqin Zuoyi Zhongqi, Tongliao, Inner Mongolia	16/07/2018	Cattle	149	11	0	149	0	7.38%	0.00%	0.00%	100.00%

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

Map 2: location of the FMD outbreaks reported at Yunnan, Guangxi, Guangdong and Inner Mongolia between June 10th and July 16th 2018 (Source – WAHIS, Google Fusion Maps)



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Russian Federation¹¹

For the current month, the Regional Reference Laboratory for FMD (ARRIAH, Russia) reported only the serological control of 4,818 sera for post vaccination monitoring purposes while also providing materials to the Federal Service for Veterinary and Phytosanitary Surveillance of the Ministry of Agriculture of the Russian Federation and advice to the veterinary services of the Russian Federation Subjects.

SEAFMD¹²

No FMD outbreaks were so far reported for July 2018 and ongoing outbreaks in the different reporting countries are as those listed in Table 3. Location of the circulating serotypes in the single countries is represented in Maps 3 and 4.

Table 3: FMD outbreaks ongoing and notified during 2018 in the countries of the Southeast Asia Region for (Source – SEAFMD Campaign)

Countries	On going Outbreaks prior to 2018	2018							Total
		Jan	Feb	Mar	Apr	May	Jun	Jul	
Cambodia	114	8	3	6	3	14	5	0	153
Laos	8	0	0	12	14	22	0	0	56
Myanmar	3	0	0	0	0	3	0	0	6
Malaysia	54	0	1	1	2	2	0	0	60
Thailand	236	13	7	5	3	3	4	0	271
Viet Nam	15	9	0	0	0	0	0	0	24
Total	430	30	11	24	22	44	9	0	570

Map 3: location of the ongoing FMD outbreaks reported during July 2018 due to serotype A in the countries reported in Table 3. (Source – SEAFMD Campaign)



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Map 4: location of the ongoing FMD outbreaks reported during July 2018 due to serotype O in the countries reported in Table 3. (Source – SEAFMD Campaign)

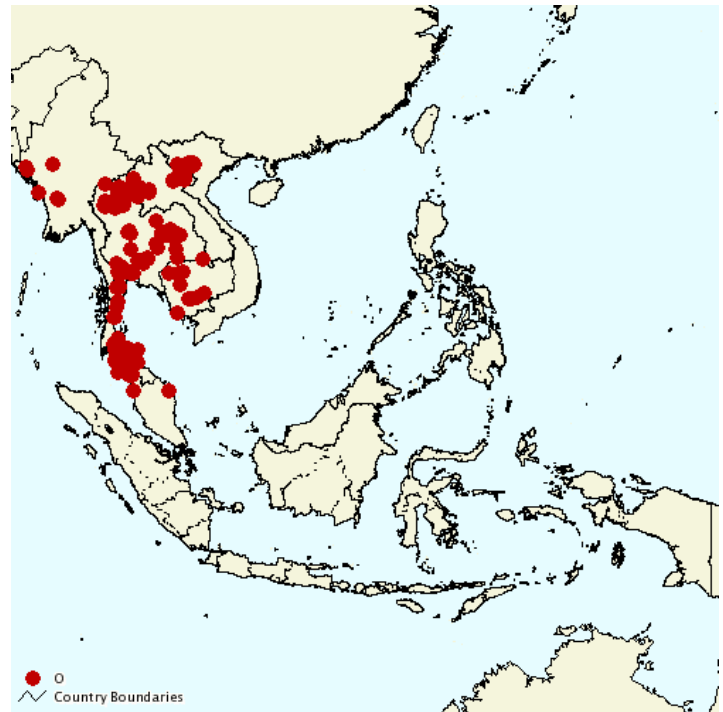


Table 4: Summary of the history of FMD Pool 1 between 2012–2018. For geographic distribution of circulating FMDVs between 2013 -2017 see Map 5 below. (Source – Wahis, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2017 **(1 st semester 2017)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	PENDING/2013-2017 O, A/2016, NOT SAMPLED/2017	Dec 2016/ A & O	See text
China	Data up to 1 st semester 2016 2013 & 2015/A, 2012-2013, 2016/O, 2012 -2014/NOT TYPED	July 2018/O, May 2017/A	See text
China, Hong Kong, SAR	O	Mar 2018/O	Follow-up needed
Democratic People's Republic of Korea	Data up to 2016 O/2016 2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Lao People's Democratic Republic	O/2016-20117, A /2015 2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS	Jan 2017/O Mar 2015/A,	See text
Malaysia	A/2016, 2012 –2017/O, 2013 & 2017/NOT TYPED	August 2016/A & O	See text
Mongolia	2014 & 2015, 2017/O, 2013, 2016/A	March 2018/O, Sept 2016/A	See text

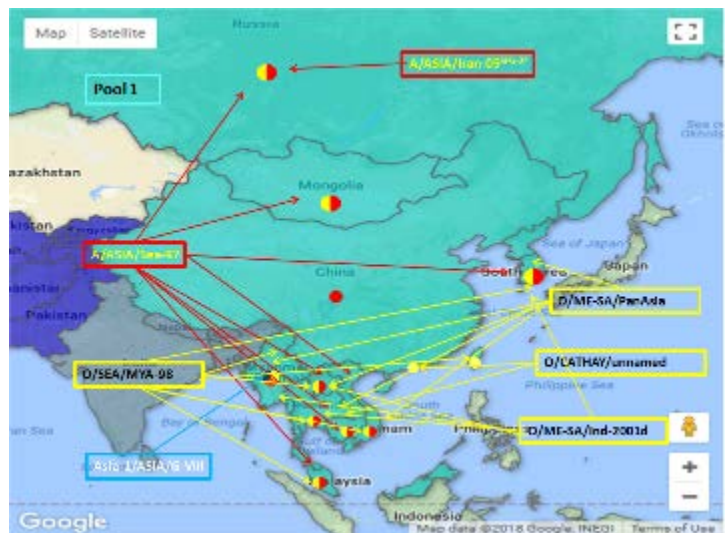
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Myanmar	2012-2017/O, 2015-2017/A & NOT TYPED	May 2018/O, April 2017/Asia 1, July 2016/ not typed, Oct 2015/A	See text
Republic of Korea	Data up to 2016 2014 -2016/O, 2012-2013/DISEASE ABSENT	April 2018/A, Feb 2017/O	See text
Russian Federation	2016/ASIA 1, 2013 – 2016/A, 2012, 2014 & 2017**/O	Feb 2018/O, Oct 2016/Asia 1, Jan 2016/ A	See text
Taiwan Province of China	Data up to 2016 2016/NO DISEASE PRESENT A/2015, 2012-2013/O	Jun 2015/A	Follow-up needed
Thailand	O, A NOT SAMPLED & NOT TYPED	Feb 2017 /A, Jan 2017/O June – July 2016/not typed	See text
Viet Nam	Data up to 2016 O, NOT SAMPLED, NOT TYPED 2013-2016/A	November 2017/A, Jan 2018/O and not typed	See text

Map 5: FMD distribution between 2013 – 2017 by serotype and toptype in South East Asia – red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes and white script refers to new introduction of viral lineage in pool or country of the pool during 2017. (Source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMD viral lineages in Pool 1^{2, 14}:

- Serotype O: O/SEA/Mya-98, O/CATHAY, O/ME-SA/PanAsia, O/ME-SA/Ind-2001d (new detection in Myanmar and Thailand during 2016)
- Serotype A: A/ASIA/Sea-97 and Iran-05^{SIS10} sublineage, only in the Russian Federation
- Serotype Asia-1 – reappearance of this serotype in 2016 in Russia and in 2017 in Myanmar – previous detection in the region was in 2006 in Vietnam and in China (People's Rep. of).



B. POOL 2 – South Asia

Bhutan² –

In the VMSS tests, vaccine strain A/GVII, but not A IRN/2005, A TUR 20/06 and A22 IRQ/24/64, gave good matching results with field strains A/BHU/26 and 27/2017, identified as A/ASIA/G-VII, while for field isolates O/BHU/24/2017 and o/BHU/2/2018 identified as O/ME-SA/Ind-2001e, good matching results were obtained with O 3039, O Manisa and O TUR 5/09.

India³

The ICAR-Directorate of Foot and Mouth Disease, Mukteswar, India detected FMDV serotype O in the 14 cattle samples examined using antigen and/or RNA detection diagnostic methods.

Serological testing was conducted on 7,170 samples collected during epidemiological studies. All diagnostic kits used are those developed by ICAR-PDFMD.

The laboratory conducts field investigations of FMD outbreaks and provides expert advice to the Government and to the National and Local authorities. The institution has on-going research studies and collaborations with international organisations.

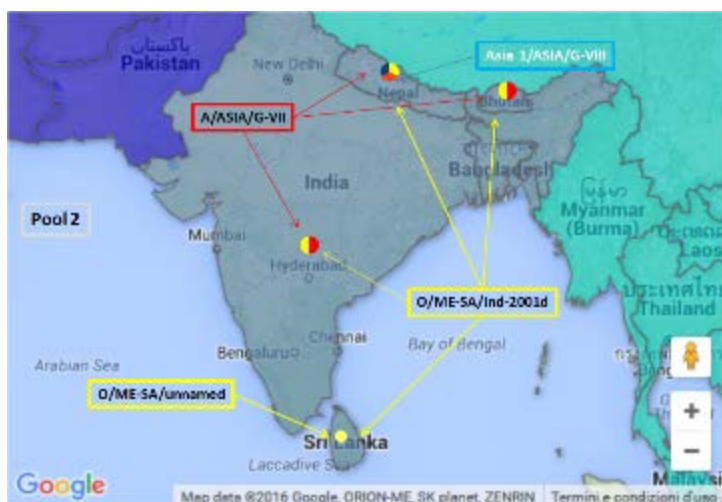
Table 5: Summary of the history of FMD Pool 2 between 2012– 2018. For geographic distribution of circulating FMDVs between 2013 -2017, see Map 6 below. (Source – WAHIS, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2017 **(1 st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Bangladesh	A, AISA 1 & O/2016 -2017, DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Dec 2016/A, ASIA 1 and O	Follow-up needed
Bhutan	2017/ A, 2013-2017/O, NOT TYPED or NOT REPORTED 2013 & 2014/NOT SAMPLED	Apr 2018/O, Sep 2017/A	See text
India	O, NOT SAMPLED 2012-2015/A 2012-2014/Asia 1	April 2018/O, Apr 2015/A Asia 1	See text
Mauritius	2016/O	Sep 2016/O	Follow-up needed
Nepal	O, 2017/A 2012-2103, 2017/Asia 1	June 2018/O, Mar 2018/Asia 1, April 2017/A	Follow-up needed
Sri Lanka	Data up to 2016 2012 – 2016/O	May 2018/O	Follow-up needed

Map 6: FMD distribution between 2013 – 2017 by serotype and topotype in South Asia - red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes and white script refers to new introduction of viral lineage in pool or country of the pool during 2017. (Source – Google Fusion Maps, WRLFMD)

Conjectured circulating FMDV lineages in Pool 2^{2, 14}:

- O/ME-SA/Ind-2001d predominates (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been detected during 2012-17), outbreaks of this serotype detected also in Mauritius during 2016 (**not reported in Map**)
- A/ASIA/G-VII (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters) – not reported in map – reappearance in 2017 in Nepal.



C. POOL 3 – West Eurasia & Middle East

Afghanistan ⁴

Of the 29 samples tested during July 2018 for FMDV by the CVDRL, Afghanistan one sample resulted positive for FMDV serotype Asia1, 18 samples for FMDV serotype O and one sample with serotype still undetermined.

Relative to the VMSSD tests carried out on the following field isolates the results were as following:

- For A/AFG/50/2017 belonging to toponotype A/ASIA/Iran-05^{SIS-13}, good matching results were obtained only by A TUR 20/06 and not by A Iran 2005, A/GVII and A22 IRQ;
- For ASIA 1/AFG/56/2017, belonging to toponotype Asia1/ASIA/Sindh-08, good matching results were obtained with Asia1 Shamir;
- For O7AFG/44/ and 52/2017 belonging to toponotype O/ME-SA/PanAsia-2^{ANT-10}, good matching results were obtained with O 3039, O Manisa and O TUR 5/09.

Algeria ^{1,2}

Following the first outbreak due to FMDV O/EA-3 that occurred on a cattle farm in Tizi Ouzou on June 20th 2018, 12 new events were notified on other cattle farms between June 25th and July 15th 2018 that were principally located on the coastal area of the country.

The source of the outbreak was not defined while the containment measures adopted are surveillance outside containment and/or protection zone, disinfection, vaccination permitted (if a vaccine exists), slaughter and no treatment of affected animals. A movement control of animals will be applied.

A summary of the animals involved in the outbreaks and location of outbreaks are reported in Table 6 and Map 7.

FMDV O/EA-3 was the toponotype detected in the buccal epithelium collected from cattle present in the outbreaks of the 20/21 July 2018, that respectively occurred at Blida and Tizi Ouzou with the most closely related field virus not pertaining to the country represented by NIG/10/2016 with a sequence identity $\geq 98.1\%$.

VMSSD tests conducted on these field isolates (O/ALG/1 & 2/2018) obtained good matching results with O 3039, O Manisa and O TUR 5/09.

A supplementary VMSSD test report was also issued for FMDV serotype A field isolates A/ALG/2 & 3/2017, detected during 2017 and characterized as toponotype A/AFRICA/G-IV where vaccine strains A/ERI/3/98, A22 IRQ/24/64 and A24 CRUZ Merial generally obtained good matching results, even if neutralization values for the latter vaccine strain were below acceptable limits, while vaccine strains A SAU 95, A/TUR/20/2006 and A24 CRUZ Merial did not achieve good matching results.

Map 7: location of the FMD outbreaks that occurred that occurred on cattle farms between June 25th and July 15th 2018.. (Source – WAHIS, Google Fusion Maps)



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Table 6: summary of the animals involved in the 12 FMD outbreaks that occurred on cattle farms between June 25th and July 15th 2018. (Source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	157	134	1	32	111	85.35%	0.64%	0.75%	70.70%

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

Pakistan⁵

The FMD control project in Pakistan is currently operating only in Punjab and information relative to other areas of the country is provided on a voluntarily basis.

Three FMD outbreaks due to serotype O and A were detected in district of Gujrat, Punjab (Map 8).

Punjab is also conducting emergency and preventive vaccinations campaigns with the respective administration of 550 and 1,065,816 doses. A summary of the doses administered in the different districts of Punjab is reported in Table 7.

Table 7: summary of the FMD outbreaks reported in Pakistan during July 2018. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

District	No. of Households	Animals Vaccinated		
		(6 Monthly Dose)		
		Cattles	Buffaloes	Total
Bahawalpur	7,209	66,808	20,467	87,275
Cholistan	862	37,730	575	38,305
Rahim Yar Khan	90,488	522,438	417,798	940,236
Punjab	98,559	626,976	438,840	1,065,816

Map 8: location of the FMD outbreaks reported in Punjab, Pakistan during July 2018. (Source – Google Fusion Maps, Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)**Palestine**¹

Another three FMD events were diagnosed on serological basis in sheep and goat farms between June 17th and 27th 2018 at Arrabeh, Ajjah and Jabai, Jenin West Bank, following the FMD outbreak that occurred on June 17th 2018 at Jenin, West Bank in cattle for which virus serotyping is pending.

While the source of infection is unknown, control measures in place are movement control inside the country, vaccination in response to the outbreak with an additional 7,500 sheep vaccinated, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, screening, traceability, quarantine, control of wildlife reservoirs, zoning, disinfection and no treatment provided to the affected animals.

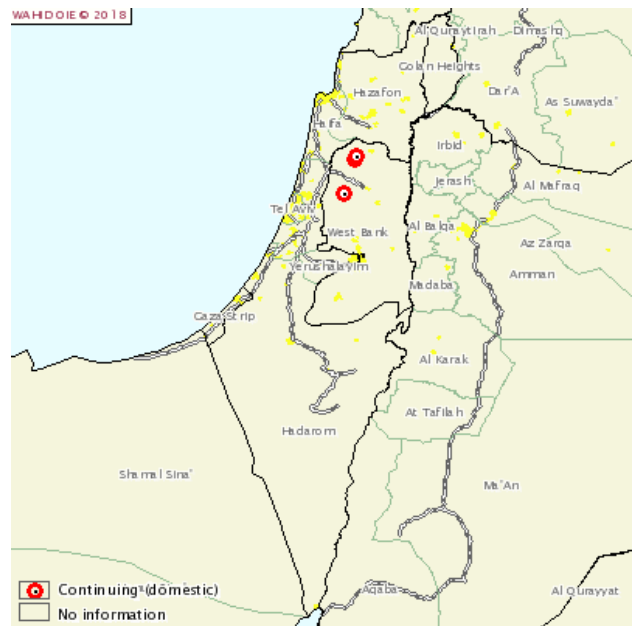
A summary of the animals involved in the outbreaks and location of the outbreaks are reported in Table 8 and Map 9.

Table 8: summary of the animals involved in the FMD outbreaks that occurred on June 17th and 27th 2018 at Arrabeh, Ajjah and Jabai, Jenin West Bank. (Source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Sheep / goats	421	215	0	0	0	51.07%	0.00%	0.00%	0.00%

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

Map 9: location of the FMD outbreaks that occurred on June 17th and 27th 2018 at Arrabeh, Ajjah and Jabai, Jenin West Bank. (Source – WAHIS)



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Table 9: Summary of the history of FMD Pool 3 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 10 below. (Source – Wahis, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2017 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2017/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	July 2018/ Asia 1 & O June, 2018/A	See Text
Algeria	Data available up to 1 st semester 2015 2017A, 2014 -2016/O	July 2018/O Apr 2017/A	See Text
Armenia	2015 -2016/A, 2012-2014, 2017/DISEASE ABSENT	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT	2007/O	Follow –up needed
Bahrain	DISEASE ABSENT/2016, 2017, 2012, 2014 &2015 /O	Mar 2015/O	Follow –up needed
Egypt	2012, 2014, 2016, 2017/SAT 2 2012 – 2017/O, A	April 2017/O, Nov 2016/A May-Jun 2016/Sat 2, Aug 2016/typing pending	Follow –up needed
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran (Islamic Republic of)	2012-2017/A, Asia 1 & O	Feb 2018/A, Asia 1& O,	Follow –up needed
Iraq	2015-2017/O, 2012-2016/A 2015/ SEROTYPE NOT REPORTED	Dec 2013/A, ASIA 1	Follow –up needed
Israel	2012-2015, 2017**/O 2017**/A	April 2018/O, June2017/A	Follow –up needed
Jordan	2017/O 2012-2016/DISEASE ABSENT	Mar 2017/O	Follow –up needed
Kazakhstan	2014-2017/ DISEASE ABSENT, 2012/O, 2012 – 2013/A	Jun 2013/ A & Aug 2012/O	Follow –up needed
Kuwait	2013 – 2014, 2017/ DISEASE ABSENT 2012, 2016/O	April 2016/O	Follow –up needed
Kyrgyzstan	2015 -2017/ DISEASE ABSENT, 2012-2014/O, A	Aug 2014/not typed & Apr 2013 /O, A,	Follow –up needed
Lebanon	2012- 2017**/DISEASE ABSENT	2010/not typed	Follow –up needed
Libya	2015-2017/NO DATA REPORTED 2012-2014/O	Oct 2013/O	Follow –up needed
Morocco	2012-2014, 2017**/DISEASE ABSENT, O/2015	Oct 2015/O	Follow –up needed
Oman	2012-2017/O	May 2015/SAT 2	Follow –up needed
Pakistan	2013-2017/O 2013-2014/A & ASIA 1 2012/ NO DATA REPORTED	July 2018/ A & O, May 2018/ Asia 1	See text
Palestine	O, 2012-2013/SAT 2	July 2018/Untyped, Dec 2017/O, Mar 2013/Sat 2	See text
Qatar	2012-2017/O 2016-2017/A	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014, 2016-2017**/O 2015-2016/A	Oct 2016/A & April 2016/O	Follow –up needed
Syrian Arab Republic	DISEASE ABSENT	2002/ A & O	Follow –up needed
Tajikistan	2014-2017**/DISEASE ABSENT 2012- 2013/NOT TYPED	Nov 2012/ not typed & Nov 2011/Asia 1,	Follow –up needed
Tunisia	2017/A, 2015-16/ DISEASE ABSENT, 2014/O	April 2017/A, Oct 2014/O	Follow –up needed

Turkey	A & O, NOT TYPED 2012-2015/Asia 1	Oct 2015/ A May, 2014- 2015/ Asia 1 and O	Follow –up needed
Turkmenistan	2013-2017**/DISEASE ABSENT, 2012/NO DATA REPORTED	Not available	Follow –up needed
United Arab Emirates	2013-2014, 2016-2017/O 2012, 2015/DISEASE ABSENT	Sep 2016/O	Follow –up needed
Uzbekistan	2014, 2016-2017/DISEASE ABSENT 2012, 2013 & 2015/NO DATA REPORTED	Not available	Follow –up needed

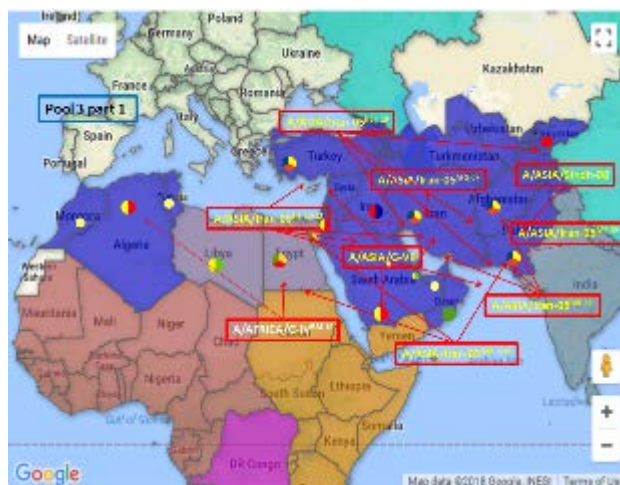
Map 10: FMD distribution between 2013 – 2017 by serotype and toptype for West Eurasia and Middle East– red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes, green to serotype SAT 2 genotypes and white script to new introduction of viral lineage in pool or country of the pool during 2017.

(source – Google Fusion Maps, WRLFMD).

(Note: Kazakhstan is not included in map as declared by OIE as FMD free, divided in zones with and without vaccination)

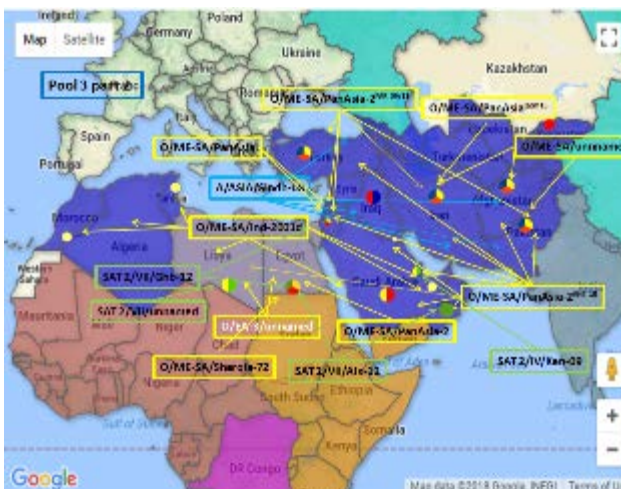
Conjectured circulating FMDV serotype A and Asia 1 lineages in Pool 3^{2, 14}:

- A/ASIA/Iran-05 (from AFG-07, HER 10, SIS-10-13, FAR 11 and BAR-08 sub-lineages)
- A/Asia/G-VII (recent incursion from South Asia)
- 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, Libya, Israel and Palestine
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa**Kenya**^{2,6}

The FMD National Reference Laboratory, Embakasi, Kenya detected FMDV O in two of the 39 cattle samples examined for the reporting month.

According to the country's report of August 6th 2018 to the OIE, the outbreaks which have occurred since August 2017 were due to a new variant of FMDV serotype O, belonging to topotype EA-2. Vaccine matching studies by virus neutralization tests confirmed this finding.

Source of these outbreaks was attributed to illegal movement of animals, contact with infected animals at grazing and watering spots, fomites (humans, vehicles, feed etc.) and airborne spread.

The containment measures in place are movement control inside the country, vaccination in response to the outbreaks, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, screening, quarantine, and disinfection, while affected animals are not receiving any treatment.

Sudan²

A/AFRICA/G-IV, O/EA-3 and SAT2/VII/ALx-12 were the topotypes detected in the 38 bovine samples collected between 2014 and 2018.

A summary of the genotyping results is reported in Table 10.

July 2018

Table 10: genotyping results of the FMDV positive bovine samples collected in Sudan between 2014 and 2018

Sample Identification	Location origin of sample	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country - Seq id %	Host species		
SUD/18/2014	Khartoum-Al Tibna	24/12/2014	A/AFRICA/G-IV	/	cattle		
SUD/20/2014							
SUD/21/2014							
SUD/22/2014							
SUD/3/2018	Khartoum-Al Shigla	06/02/2018					
SUD/4/2018		07/02/2018					
SUD/6/2018	Khartoum-Kuku (Mahlab 2)	20/03/2018		O/EA-3		EGY/3/2016 (>95.6)	cattle
SUD/7/2018							
SUD/8/2018							
SUD/9/2018	Khartoum-Safola	22/03/2018					
SUD/10/2018	Khartoum- Al Shigla	28/03/2018		SAT 2/VII/Alx-12		/	/
SUD/11/2018							
SUD/12/2018							
SUD/1/2016	Northern state-border control	25/12/2016					
SUD/2/2017	Khartoum-Kuku (Mahlab 3)	04/01/2017	O/EA-3		EGY/33/2017 (>99.2)	cattle	
SUD/3/2017							
SUD/4/2017	Khartoum-Al Rdwan	09/01/2017					
SUD/5/2017	Khartoum-Al Rdwan (No. 1)	07/02/2017					
SUD/7/2017	Khartoum-Al Rdwan (No. 3)						
SUD/15/2017	Khartoum-Al Aelfon (No. 2)	04/06/2017					
SUD/6/2017	Khartoum-Al Rdwan (No. 2)	07/02/2017	SAT 2/VII/Alx-12		Daqahlia 1/Egy/2017 (98.4)	/	
SUD/7/2017	Khartoum-Al Rdwan (No. 3)						
SUD/9/2017	Khartoum-Al Rdwan (No. 4)	21/02/2017					
SUD/12/2017	Khartoum-Al Rdwan (No. 2)						
SUD/14/2017	Khartoum-Al Aelfon (No. 1)	04/06/2017					

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Table 11: Summary of the history of FMD Pool 4 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2013 -2017, see Map 11 below. (Source – WAHIS, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2016 **(1 st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Democratic Republic of Congo	2012 – 2017**/A, O & SAT 1	June 2017/not typed	Follow –up needed
Djibouti	DISEASE ABSENT	Not available	Follow –up needed
Egypt	2012, 2014, 2016, 2017/SAT 2 2012 – 2017/O & A	May-Jun 2016/ O & Sat 2, March 2016/A, Aug 2016/typing pending	Follow –up needed
Eritrea	2014, 2016-2017/ DISEASE PRESENT 2015/ NO DATA REPORTED 2013/ DISEASE ABSENT, 2012/O	Nov 2016/not reported, Jan 2012/O	Follow –up needed
Ethiopia	O, 2015-2017/SAT 1 2012 & 2017/SAT 2, 2012, 2017/A	April 2018/O & SAT 2 Feb 2018/SAT 1, Jan 2018/A	Follow –up needed
Kenya	A, O, SAT1 & SAT2	July 2018/O, May 2018/ SAT 1, Nov 2017/A & SAT 2	See text
Libya	2015-2017/NO DATA REPORTED 2012-2014/O	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Rwanda	2012-2013, 2017/A, O, SAT1 & SAT 2 2015-2016/NO DATA AVAILABLE	Nov 2012/not typed	Typing required
Somalia	2012-13, 2015-2017/DISEASE PRESENT, 2014/PENDING	June 2016/not reported	Follow –up needed
Sudan	2012-2014, 2017/O, 2015-2016/A, SAT 1 2013/SAT 2	Mar 2018/A Dec 2016/ not sampled, June 2017/O & SAT 2	See text
South Sudan	2015 - 2017/DISEASE PRESENT 2014/A, O, SAT 1, SAT 2 & SAT 3 2012-2013 & 2016 NO DATA REPORTED	2011	Follow –up needed
United Republic of Tanzania	2012-2017/A, O, SAT 1 & SAT 2	Oct 2016/SAT 1, Aug 2016/O & SAT 2, Jun 2016/ A	Follow –up needed
Uganda	2016/DISEASE PRESENT, 2012, 2015, 2017/ SAT 1, 2012, 2014, 2015, 2017/O	May 2017/O Nov 2014/SAT1, Jan 2015/A and SAT 3, July 2015/ SAT 2 and untyped	Follow –up needed
Yemen	2013 – 2017/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA, 2012/O	2009/O	Follow –up needed

Map 11: FMD distribution between 2013 – 2017, by serotype and topotype for East Africa - red boxes and circles refers to serotype A genotypes, yellow refers to serotype O genotypes, green refers to serotype SAT 2 genotypes and light blue refers to SAT 3 genotypes. (source – Google Fusion Maps, WRLFMD).

East Africa is known to be endemic for FMD, but available data is at present limited.

Conjectured circulating FMDV lineages in Pool 4^{2, 14}:

- O (topotypes EA-2 (Tanzania, DR Congo & Uganda), EA-3 and EA-4 (Ethiopia))
- A/AFRICA (genotypes I (Kenya, Tanzania, D.R. Congo), VII (Ethiopia))
- SAT 1 (topotypes I (Kenya, Tanzania), IX (Ethiopia))
- SAT 2 (topotypes IV (Kenya, Tanzania), VII (Sudan, Egypt, Ethiopia), XII (Ethiopia, Sudan))
- SAT 3 (only detected in African buffalo in the south of the QENP, Uganda in 1970 & 1997 and recently in 2013)



E. POOL 5 – West / Central Africa

Cameroon⁷

LANAVET, Garoua Cameroon detected FMDV RNA in 21 of the 158 (13.29%) cattle samples examined. The last viral lineages reported by the WRLFMD for the country was in 2014 with the detection of A/AFRICA/G-IV and SAT2/VII/Lib-12.

Of the 22 sheep serum samples, only one was positive in the ELISA detecting non-structural protein (NSP) antibodies. The laboratory continues its collaborative research projects with the Ohio State University and Plum Island, USA.

Democratic Republic of Congo¹

The three FMD outbreaks for which the serotype responsible is yet unknown occurred on cattle farms at Kavunge, Kibomboza and Nakabaraza, Sud-Kivu, respectively on May 28th 2017 and March 17th and 20th 2018.

Laboratory diagnosis was not carried out while the source of the outbreaks was attributed to the introduction of new live animals and illegal animal movement.

Although animals of all ages and sexes were affected, the disease mostly hit young animals and those of improved breeds.

The containment measures adopted are movement control inside the country, surveillance within containment and/or protection zone, quarantine, zoning, vaccination permitted (if a vaccine is available) and surveillance outside containment and/or protection zone while no treatment of affected animals is provided.

A summary of the animals involved and location of the outbreaks are given in Table 12 and Map 12.

Table 12: summary of the animals involved in the FMD outbreaks that occurred on cattle farms at Kavunge, Kibomboza and Nakabaraza, Sud-Kivu respectively on May 28th 2017 and March 17th and 20th 2018.

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	1,053	194	0	0	0	18.42%	0.00%	0.00%	0.00%

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

July 2018

Map 12: location of the FMD outbreaks that occurred on cattle farms at Kavunge, Kibomboza and Nakabaraza, Sud-Kivu respectively on May 28th 2017 and March 17th and 20th 2018 (Source – WAHIS)



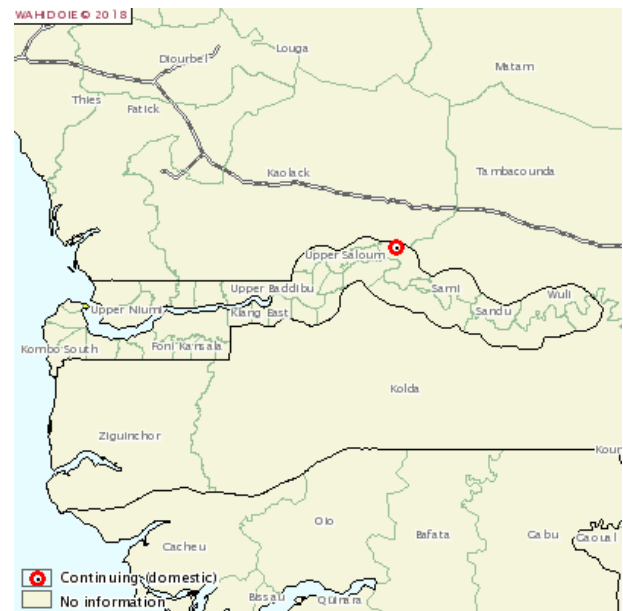
Gambia ¹

The two FMD outbreaks, for which serotyping is pending reported on July 13th 2018 in cattle of the villages of Njallal Samba and Ndownen, Niani, involved both Ndama and Zebu/Ndama young and adult animals of a traditional subsistence production system.

The origin of the outbreak is unknown while the control measures in place are movement control inside the country, surveillance outside containment and/or protection zone, ante and post-mortem inspections, vaccination permitted (if a vaccine exists) and no treatment of affected animals.

A summary of the animals involved and location of the outbreaks are represented in Table 13 and Map 13.

Map 13: location of the FMD outbreaks for which serotyping is pending reported on July 13th 2018 in cattle of the villages of Njallal Samba and Ndownen, Niani. (Source – WAHIS)



July 2018

Table 13: summary of the animals involved in the FMD outbreaks for which serotyping is pending reported on July 13th 2018 in cattle of the villages of Njallal Samba and Ndowen, Niani.

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	2,700	440	66	0	0	16.30%	2.44%	15.00%	2.44%

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

Ghana ⁸

The ACCRA Veterinary Laboratory reported the detection of FMDVs in all of the 82 samples tested by PCR for which serotyping is on hold due to lack of diagnostic kits. In a primary analysis by PCR, FMDV serotype SAT 2 was excluded. The above samples were collected from reported suspected cases of FMD in Ashanti region (Offinso District, and Brong Ahafo Region at Techiman, and Kintampo districts) as shown in Map 14.

The most recent viral lineages reported by the WRLFMD for the country was in 2016 with the detection of O/WA, O/EA-3 and SAT1/X.

ACCRA Veterinary Laboratory has ongoing collaborations with the Botswana Institute for Technology Research and Innovation (BITRI).

Map 14: location of where the FMDV positive bovine samples were collected during July 2018. (Source – ACCRA Veterinary Laboratory, Ghana, Google Fusion Maps)



Nigeria ⁹

FMDV was detected using Lateral flow Device Tests in cattle samples collected from bovine Toro LGA Bauchi State (see Map 15) during the reporting month by National Veterinary Research Institute (NVRI) Vom, Nigeria. For this the Laboratory provides advice on management of the infection to the farmers.

The NVRI are continuing with their twinning programme with CODA –CERVA, Belgium and with ANSES, France.

The most recent viral lineages reported by the WRLFMD for the country was in 2016 with the detection of O/WA, O/EA-3 and SAT1/X.

July 2018

Map 15: location of where the FMDV positive bovine samples were collected during July 2018. (Source –NVRI, Nigeria, Google Fusion Maps)



Senegal ¹⁰

The LENVR, Senegal reported the detection of FMDV and in particular serotype O during July, 2018. The laboratory also reported that in the last two months FMD suspect outbreaks were notified on weekly basis. The laboratory is also giving support to West African countries to confirm FMD outbreak suspicions and also in serotyping the detected viruses.

Table 14: Summary of the history of FMD Pool 5 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 16 below. (Source – WAHIS, EuFMD Global Monthly Report)

Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2017 **(1 st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	2017/NO DATA REPORTED 2012-2016/A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT	Dec 2016/ not available	Follow –up needed
Cameroon	**DISEASE PRESENT	July 2018/untyped, Nov 2014/O, SAT 2, May 2014/SAT 1, Apr 2014/ A	See text
Cabo Verde	DISEASE ABSENT	Not available	Follow –up needed
Central African Republic	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Chad	2016 - 2017/DISEASE PRESENT 2014-15/ DISEASE ABSENT 2012 – 2013/ DISEASE PRESENT	Aug 2016/Not reported	Follow –up needed
Democratic Republic of the Congo	2012 – 2017**/A, O & SAT 1	Mar 2018/untyped Dec 2016/A, O & Sat 1	See text
Congo	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Côte d'Ivoire	2013-2017/DISEASE PRESENT, 2012/A,	Jul 2016/not reported	Follow –up needed

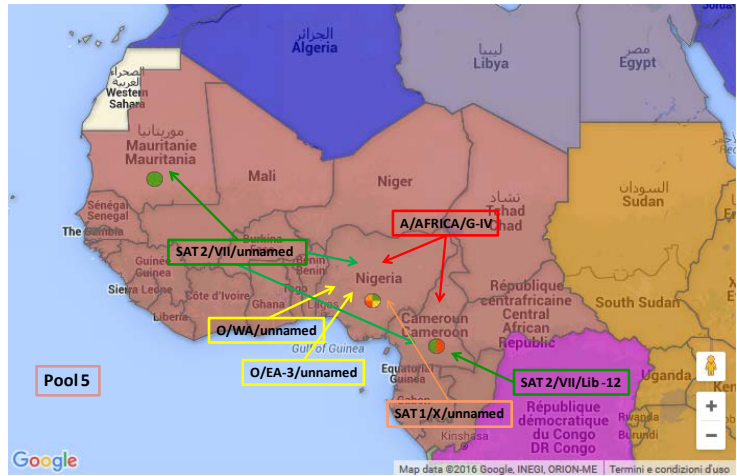
July 2018

Equatorial Guinea	2014 – 2017/ NO DATA AVAILABLE 2012 – 2013/DISEASE SUSPECTED	Not available	Follow –up needed
Gabon	2017/NO DATA AVAILABLE 2012, 2014-16/DISEASE ABSENT 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Gambia	NO DATA AVAILABLE	July 2018/untyped 2012/O	See text
Ghana	2012 – 2017/DISEASE PRESENT	July 2018/untyped June 2017/O, Dec 2016/ SAT 2 2014/not available	See text
Guinea-Bissau	2014-2017**/DISEASE PRESENT 2012-2013/DISEASE ABSENT	Oct 2016/O Dec 2016/SAT1 & SAT 2	Follow –up needed
Guinea	2012-2013, 2015-2017 DISEASE ABSENT 2014/ DISEASE PRESENT	2014/not available	Follow –up needed
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2017/ NO DATA AVAILABLE 2016/DISEASE ABSENT 2015/A, SAT 1 2014-2015/SAT 2 2012/ NO DATA AVAILABLE	Oct 2016/not reported	Follow –up needed
Mauritania	2017/ NO DATA AVAILABLE 2016/DISEASE SUSPECTED, 2014-2015**/SAT 2, 2012-2013/NO REPORTED OUTBREAKS	Dec 2014/SAT 2	Follow –up needed
Niger	2017/ DISEASE SUSPECTED 2016/DISEASE PRESENT BUT WITH NO QUALITATIVE DATA, 2015/O 2012 – 2014/NOT SAMPLED	2014/not sampled, May 2015/O	Follow –up needed
Nigeria	2015-2017/DISEASE PRESENT 2012-2014/O	July 2018/untyped Mar 2018/ SAT 2 Feb Sept 2016/ O & SAT 1 Nov 2015/A	See text
Sao Tome Principe	2013-2017/NO DATA AVAILABLE 2012/DISEASE ABSENT	Not available	Follow –up needed
Senegal	2017/ DISEASE SUSPECTED 2015-2016/DISEASE PRESENT 2012, 2014/NOT SAMPLED 2013/NO DATA AVAILABLE	July 2018/O, Feb 2015/ A, 2014/ SAT 2	See text
Sierra Leone	2017/NO DATA AVAILABLE 2012 – 2016/DISEASE ABSENT	Oct 1958	Follow –up needed
Togo	O & SAT 1	2012/O	Follow –up needed

Map 16: FMD distribution between 2013 – 2017 by serotype and topotypes for West Africa. Red boxes and circles refer to serotype A genotypes, yellow refers to serotype O genotypes, orange boxes to serotype SAT 1 genotypes, green refers to serotype SAT 2 serotypes and white script in map refers to new introduction of viral lineage in pool or country of the pool during 2017. (Source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMDV lineages in Pool 5¹⁴.

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



F. POOL 6 – Southern Africa

Botswana¹

Eleven FMD outbreaks, still due to FMDV serotype SAT 2, occurred between June 25th and July 17th 2018 on cattle farms in Ngamiland.

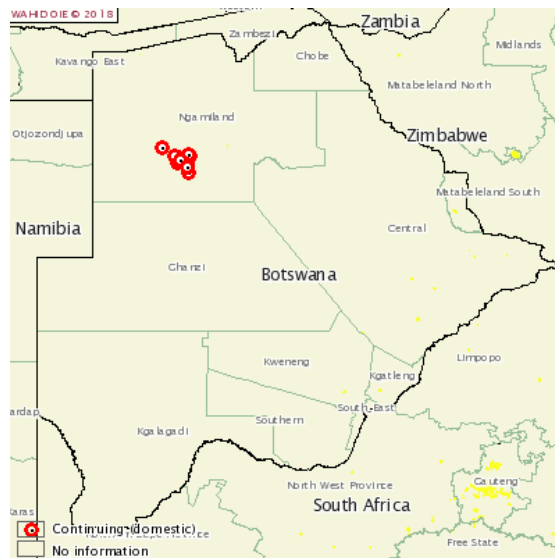
Diagnosis was carried out by the Botswana Vaccine Institute (OIE Reference Laboratory) using virus isolation.

The affected animals were kept on communal grazing areas even if source of infection is unknown.

The containment measures adopted are vaccination in response to the outbreaks with the administration of 76,076 doses to cattle, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, traceability, disinfection and no treatment of affected animals.

A summary of the animals involved in the outbreaks and location of these events are represented in Table 15 and Map 17.

Map 17: location of the FMD outbreaks that occurred between June 25th and July 17th 2018 on cattle farms in Ngamiland. (Source –WAHIS-OIE)



Mozambique ¹

The 28 FMD outbreaks notified on clinical basis took place in different areas of Tete in cattle, between December 23rd 2017 and June 27th 2018. Laboratory diagnosis is being conducted on serological basis by the Veterinary Research Institute, DCA.

The source of the outbreaks is reported as due to contact with infected animals at grazing and watering points or through fomites (humans, vehicles, feed, etc.)

The control measures in place are: movement control inside the country, surveillance within containment and/or protection zone, quarantine, vaccination permitted, if available, and no treatment of affected animals.

A summary of the epidemiological details of the event and location of the outbreaks are reported in Table 17 and Map 19.

Table 17: summary of the cattle involved in the FMD that took place in different areas of Tete in cattle, between December 23rd 2017 and June 27th 2018. (Source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	95,591	2,669	8	0	0	2.79%	0.01%	0.30%	0.01%

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

Map 19: location of the FMD outbreaks with serotyping pending that took place in different areas of Tete in cattle, between December 23rd 2017 and June 27th 2018. (Source - WAHIS-OIE)



South Africa ¹³

The ARC Onderstepoort Veterinary Institute examined 3,492 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 193 sera using FMD NSP ELISA.

Zimbabwe ¹

Another four FMD outbreaks for which serotyping is pending were observed in cattle between July 10th and 17th 2018 in different villages of Mashonaland Central, further to that notified on June 28th 2018.

Laboratory diagnosis is being conducted by the Central Veterinary Laboratory using liquid-phase blocking ELISA and NSP ELISA by the Botswana Vaccine Institute (Regional Reference Laboratory) which is using virus isolation and sequencing. Source of outbreaks is due to the illegal movement of animals, contact with infected animals at grazing and watering points.

Intensive surveillance is ongoing in the area and implementation of control measures remain in force in the North-East of the country following the Rushinga FMD outbreak reported in the last week of June 2018. FMDV continues to spread along the border with Mozambique. Officials of the Department of Veterinary Services (DVS) of Mash

July 2018

Central, Mash East and Manicaland held a meeting with those of Tete province of Mozambique to discuss the FMD outbreak affecting either side of the border. Eight illegally moved cattle were publicly destroyed by the DVS to prevent further spread of disease and to discourage would-be offenders.

Other control measures adopted were movement control inside the country surveillance outside containment and/or protection zone surveillance within containment and/or protection zone screening traceability quarantine zoning, vaccination of 38,000 cattle. No treatment is provided to affected animals

A summary of the epidemiological details of the FMD outbreaks and location of the outbreaks are reported in Table 18 and Map 20.

Table 18: summary of the cattle involved in the FMD outbreaks for which serotyping is pending were observed in cattle between July 10th and 17th 2018 in different villages of Mashonaland Central. (Source – WAHIS)

Species	Susceptible	Cases	Deaths	Killed and disposed of	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	7,190	178	0	0	0	2.48%	0.00%	0.00%	0.00%

Map 20: location of the FMD outbreaks reported reported in cattle at Bopoma, Mary Mount, Rushinga, Mashonaland Central that started on June 28th 2018. (Source – Google Fusion Maps, WAHIS-OIE)



Table 19: Summary of the history of FMD Pool 6, 2013 – 2018, for geographic distribution see Map 21 below. (Source – WAHIS, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2017 **(1 st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2013-2017/NO DATA AVAILABLE 2015-2016/ DISEASE PRESENT 2013-2014/DISEASE ABSENT 2012/DISEASE SUSPECTED BUT NOT CONFIRMED	April 2016/SAT 2, July 2015/ SAT 2	Follow –up needed
Botswana	2012-2017/SAT 2 2014-2015/SAT 1	July 2018/SAT 2, June 2015/SAT 1	See text
Democratic Republic of the Congo	2012 – 2017**/A, O & SAT 1	Dec 2016/A, O & Sat 1	Follow –up needed
Malawi	2016 – 2017/SAT 2 2013-2015/ NO DATA AVAILABLE	June 2018/SAT 2 June 2016/SAT 1	See text

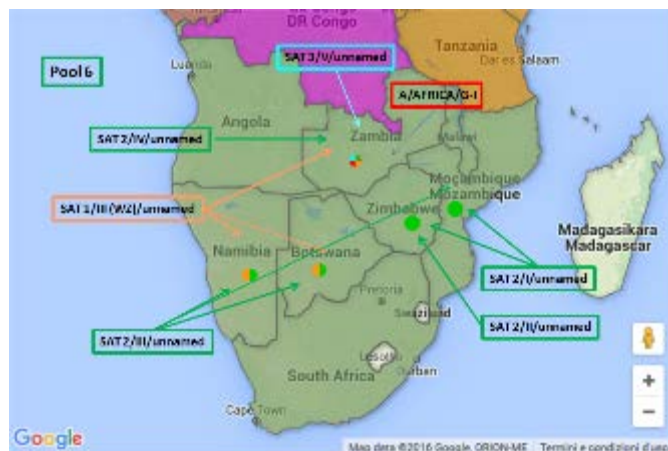
	2012/NO OUTBREAKS REPORTED		
Mozambique	2016 – 2017/SAT 2 2012 -2015/DISEASE ABSENT	June 2018/ Typing pending, Oct 2017/SAT 2, May 2015/ SAT 1	See text
Namibia	2017/NO DATA AVAILABLE 2014-2016**/SAT 2 22012-2014/SAT 1	Sep 2017/SAT 2, Aug 2017/typing pending, May 2015/SAT 1	Follow –up needed
South Africa	2012-2015, 2017/SAT 2 2013, 2017/SAT 1 2015-16/SAT 3	May 2018/SAT 2, Oct 2017/SAT 1, Dec 2015/SAT 3	See text
Zambia	2016 – 2017/NOT TYPED 2016/SAT 3, 2013-2014/ NO DATA AVAILABLE 2012/SAT 1 & SAT 2	April 2018/ A &O, May 2017/SAT 3, Mar 2017/SAT 2, Jan 2013/SAT 1	Follow –up needed
Zimbabwe	2012-2017/SAT 2 2014-2015/SAT 1 2013/SAT 3	July 2018/typing pending April 2018/ SAT 1, May 2017/SAT 2, Jun 2013/SAT 3	See text

Map 21: FMD distribution by serotype and topotype for Southern Africa, 2013 – 2017 - red refers to serotype A, orange refers to SAT 1, green refers to serotype SAT 2. (source – Google Fusion Maps, WRLFMD).

Swaziland and Lesotho are free from FMD without vaccination. There is a zone in both Botswana and Namibia, which has been FMD free without vaccination, since 2010 and 1997 respectively.

Conjectured circulating FMDV lineages in pool 6^{2, 14}:

- Serotype SAT 1 (topotypes I, II and III) – new detection of SAT 1/III (WZ)/unnamed in Botswana during 2016
- Serotype SAT 2 (topotypes I, II, III and IV) - new detection of SAT 2/III/unnamed in Namibia
- Serotype SAT 3 (?) (topotypes I, II and III) – new detection of SAT 3/V/unnamed in Zambia during 2016



G. POOL 7 – South America

Rest of Latin America^{1, 14, 15}

The OIE FMD status of the countries in South America as reported in December 2017 is presented in Map 22.

Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the OIE maps (see: <http://www.oie.int/en/animal-health-in-the-world/official-disease-status/fmd/en-fmd-carte/>).

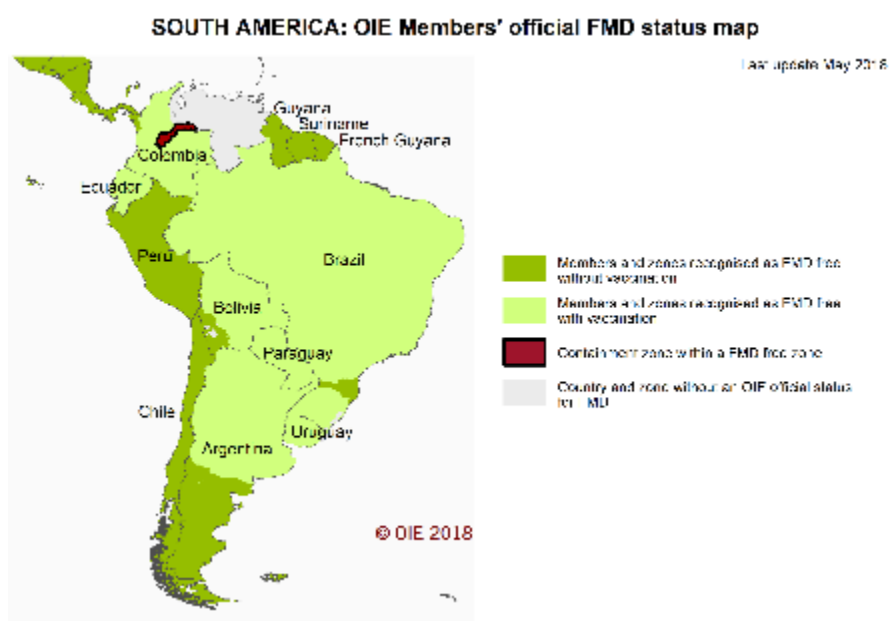
Small areas of the continent may still be considered as endemic but clinical cases are rare (Map 22). In fact, before the outbreak which occurred in Columbia, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013 caused by serotype A during the OIE/FAO FMD Laboratory Meeting held in November 2016. The FMD history relative to the Region for 2012 –2017 is reported in Table 20.

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Table 20: Summary of the history of FMD Pool 16 between 2012 – 2018, for geographic distribution see Map 22 below. (Source – WAHIS, EuFMD Global Monthly Report)

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2016** (1 st semester)	LAST OUTBREAK REPORTED/SEROTYPE <small>#see pg. 1</small>	Comment
Colombia	DISEASE ABSENT	July 2017/O	Follow –up needed
Venezuela (Bolivarian Republic of)	DISEASE ABSENT**	2011/O, 2013/A	National situation needs verification

Map 22: FMD status for South America ¹ (Source – OIE)



IV. OTHER NEWS:

The 3rd WRLFMD Quarterly Report for the period April – June 2018 contains a new format for recommendations of FMDV vaccines to be included in antigen banks for Europe. The discussion of Table 23 is available within the report.

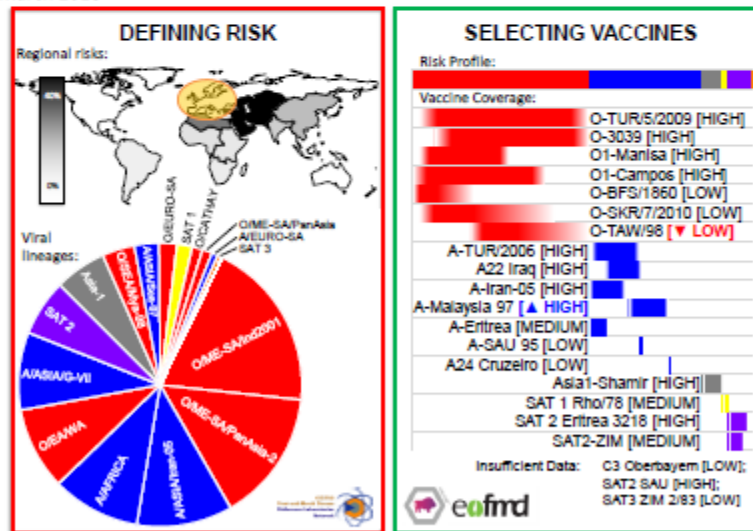
Table 23: Recommendations from WRLFMD® on FMD virus strains to be included in FMDV antigen banks (for Europe).

This report showcases a new format for recommendations of FMDV vaccines to be included in antigen banks. These outputs are generated with a new tool (called PRAGMATIST) that has been developed in partnership between WRLFMD® and EuFMD. These analyses accommodate the latest epidemiological data collected by the OIE/FAO FMD Laboratory Network regarding FMDV lineages that are present in different *source regions* (see Table below), as well as available *in vitro*, *in vivo* and field data to score the ability of vaccines to protect against these FMDV lineages.

Lineage	West Eurasia	East Asia	North Africa	India and Southern Asia	East Africa	West and Central Africa	Southern Africa	South America
O/ME-SA/PanAsia-2	35	-	-	-	-	-	-	-
O/ME-SA/PanAsia	-	10	-	-	-	-	-	-
O/SEA/Mya-98	-	33	-	-	-	-	-	-
O/ME-SA/Ind2001	6	20	35	80	-	-	-	-
O/EA or O/WA	3	-	20	-	45	37	-	-
O/EURO-SA	-	-	-	-	-	-	-	74
O/CATHAY	-	10.5	-	-	-	-	-	-
A/ASIA/Sea-97	-	25	-	-	-	-	-	-
A/ASIA/Iran-05	25.5	-	-	-	-	-	-	-
A/ASIA/G-VII	17.5	-	-	16	-	-	-	-
A/AFRICA	-	-	35	-	24	25	-	-
A/EURO-SA	-	-	-	-	-	-	-	26
Asia-1	12.5	1.5	-	4	-	-	-	-
SAT 1	-	-	-	-	10	10	27	-
SAT 2	0.5	-	10	-	20	28	57	-
SAT 3	-	-	-	-	1	-	16	-
C	-	-	-	-	-	-	-	-

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The table defines the relative distribution of FMDV lineages in each of the eight *source regions*, while the figure highlights the importance of these *source regions* for Europe (using data collected at the EU-RL Workshop); please contact WRLFMD/EuFMD for assistance to tailor these outputs to other geographical regions. NB: Vaccine-coverage data presented is based on available data and may under-represent the true performance of individual vaccines.

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. S. Saravanan*.
4. Central Veterinary Research and Development Laboratory (CVDRL), Afghanistan - *Dr. Ghulam*, Head of Laboratory
5. Progressive Control of Foot and Mouth Disease in Pakistan - *Dr. Muhammad Afzal*, Project Coordinator.
6. National FMD Reference Laboratory, Embakasi, Kenya – *Dr. Eunice Chepkwony* and *Miss. Hellen Mutua*.
7. Laboratoire National Vétérinaire (LANAVET) - Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*.
8. ACCRA VETERINARY LABORATORY, Ghana – *Dr. Joseph Adongo Awuni*.
9. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini*.
10. The Laboratoire National d'Elevage et de Recherches Vétérinaires, Senegal – *Miss Mariame Diop* and *Dr. Moustapha Lô*.
11. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana. Fomina*.
12. South East Asia FMD (SEAFMD) Campaign - <http://www.arahis.oie.int/reports.php?site=seafmd>
13. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr LE Heath/Ms E Kirkbride*.
14. OIE/FAO FMD Reference Laboratory Network, Annual Report 2016
15. 45th Ordinary Meeting of the South American Commission for the Fight Against Foot-and-Mouth Disease (COSALFA) - 19-20 April 2018, Santa Cruz de la Sierra, Bolivia. - <http://www.panaftosa.org/cosalfa45/>