# October

# 2018

## 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**

**October 2018**

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**#INFORMATION SOURCES USED:**

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

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

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

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

Contents

Guest Editor's comments:

I am honoured and at the same time humbled by the invitation to be the guest editor of this month's report.
It is an exciting time but at the same time a frustrating one to be involved in the preparedness and control of FMD.

There has been renewed interest in an international FMD vaccine bank as witnessed by the recent EuFMD Meeting in Italy. The OIE is proposing that countries be given new tools for FMD control, in the form of a revised version of the containment zone similar to what was adopted in the general chapter (4.3) in May 2018.

The OIE is looking at giving countries an emergency process to split off an OIE recognized free zone that would perform the function as a protection zone for free countries whose neighbour is experiencing an outbreak. The OIE is again looking at the possibility of harmonizing waiting periods for vaccinate to live and vaccinate to kill.

The advent of new molecular and diagnostic tools such as full genome sequencing, the use of monoclonal antibody panels for vaccine matching, highly specific DIVA tests, hi-potency vaccines and even the possibility of novel marker FMD vaccines on the horizon, all combine to build our optimism that one day in the future we may begin to think seriously of the possible eradication of FMD from the world.

We still however see the continued long distance trans-pool spread of various serotypes due to regional conflicts, migrations of people in North Africa and the Middle East and the increasing demand for animal protein in East Asia. We still see a lack of submissions to the world reference laboratories from endemic areas and so lack critical information of serotype circulation as well as early warning of the potential surfacing of new lineages.

The vaccine matching strain differentiation on the field isolate O/HKN/13/2018 in China (Hong Kong, SAR) in **pool 1** was identified as O/CATHAY, but the common vaccine strains O 3039, O Manisa and O TUR 5/09 did not provide good matching results.
O strain is still the predominate strain identified in isolates from **pools 2 and 3**.
**Pools 4, 5 and 6** still suffer from a lack of samples being submitted to reference laboratories for serotyping.
It is discouraging to see another 7 outbreaks in Colombia in **pool 7**. After many years of hard work and progress towards the eradication of FMD from South America, the deterioration of the public and animal health situation in Venezuela has once again snatched the goal of FMD freedom from hands of the South American people. PANAFTOSA, along with a number of South American countries with the support of Venezuela have developed a two year work plan to address the vaccine supply and infrastructure issues in Venezuela in order to continue on the path to eradication of FMD from the Americas. Eradication of FMD from the Americas would be a great step forwards to the eradication of the disease worldwide.

Thank-you for allowing me to share my thoughts as guest editor of this important publication of the EuFMD.

Tom Smylie

## I. GENERAL OVERVIEW

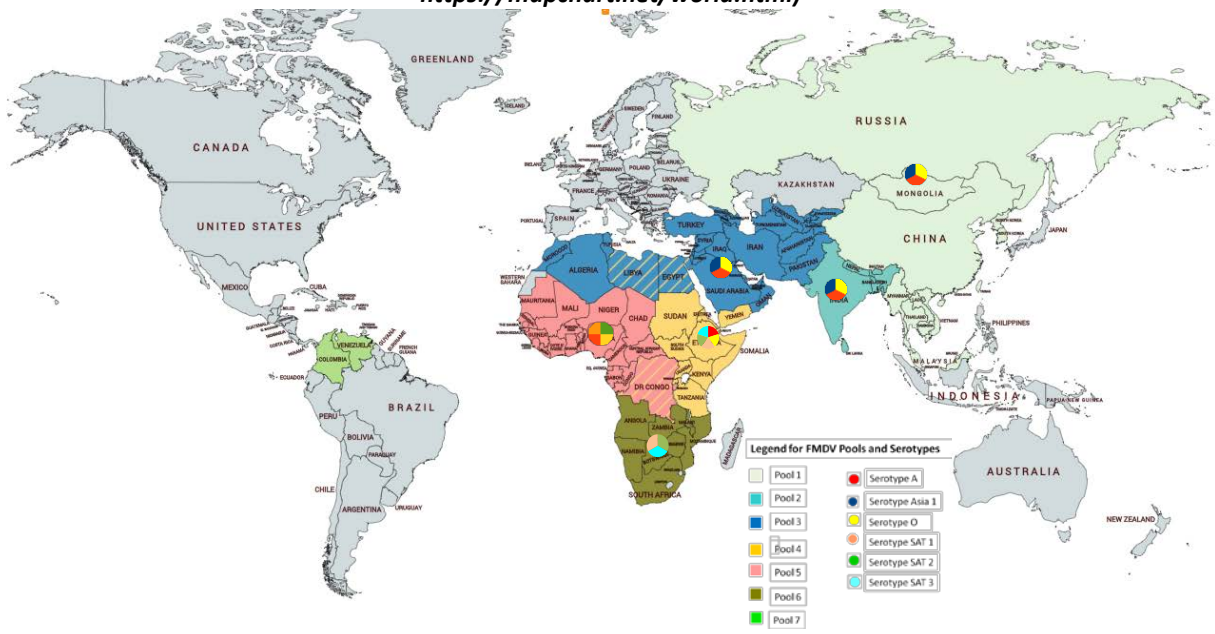
*Pools represent independently circulating and evolving* foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below 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**<br>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**<br>Bangladesh, Bhutan, India, Mauritius, Nepal, Sri Lanka | **A, Asia 1 and O** |
| 3 | **WEST EURASIA & MIDDLE EAST**<br>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**<br>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**<br>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**<br>Angola, Botswana, **Congo D. R.,** Malawi, Mozambique, Namibia, South Africa, Zambia*, Zimbabwe | **{O, A}*, SAT 1, SAT 2 and SAT 3** |
| 7 | **SOUTH AMERICA**<br>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. SUMMARY OF THE NEWS OF THE MONTH

### *POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA*

**China** [1] – A FMD outbreak due to serotype O was notified on October 10th 2018 on a cattle farm at Bayantuohai Township, Evenk Autonomous Banner, Hulunbeir, Inner Mongolia.

**China (Hong Kong, SAR)** [2] – None of the vaccine strains employed in the FMD vaccine matching strain differentiation (VMSD) tests conducted on the field isolate belonging to lineage O/CATHAY provided good matching results.

**Mongolia** [1, 2] **–** Three FMD outbreaks due to serotype O were notified in January and May 2018, respectively in camelidae and cattle at Dundgovi, Uvukhangai and Arkhangai, Mongolia.
The FMD VMSD tests conducted on the field isolates detected during 2018 and belonging to FMDV serotype O in general provide good matching results with all the vaccine strains employed.

**Thailand** [3] - Twenty seven FMD outbreaks were reported in the country during October 2018.

### *POOL 2 - SOUTH ASIA*

**India** [4] **–** The ICAR-Directorate of Foot and Mouth Disease, Mukteswar, India continues to exclusively detect, since 2015, FMDV O in the suspect samples.

### *POOL 3 - WEST EURASIA & MIDDLE EAST*

**Afghanistan** [5] **-** The Central Veterinary Research and Development Laboratory (CVDRL), Afghanistan detected FMDV serotypes O among the samples submitted.

**Algeria** [1] – The FMD epidemic due FMDV serotype O continues in the country with eleven further FMD outbreaks notified between July and September 2018.

**Israel** [1] **–** A second FMD outbreak was reported in September 2018, again due to serotype O, on a cattle farm at Golan, Hazafon.

**Pakistan** [6] **–** Of the six FMD suspected outbreaks, reported in Punjub for the current month five were confirmed as due to FMDV serotype A or O.

**Turkey** [2, 15] – FMDV O/ME-SA/PanAsia 2 was the topotype defined from the VP1 sequences submitted by the SAP Institute, Ankara, Turkey to the WRLFMD.

***POOL 4 - EASTERN AFRICA***

**Ethiopia** [7] - The National Animal Health Diagnostic and Investigation Center (NAHDIC) notified a FMD outbreak on clinical basis in the Amhara Region.

**Kenya** [8] – For the reporting month, the FMD National Reference Laboratory (FMDNRL), Embakasi, Kenya detected FMDV O among the cattle samples collected from outbreaks.

***POOL 5 - WEST/CENTRAL AFRICA***

**Cameroon** [9] **-** The Laboratoire National Vétérinaire (LANAVET), Garoua Cameroon detected FMDV among the 101 bovine samples examined.

**Ghana** [10] **–** The ACCRA Veterinary Laboratory detected FMD in samples submitted.

**Guinea** [1] **–** Eight FMD outbreaks due to serotype O were notified in the country between July and September 2018.

***POOL 6 - SOUTHERN AFRICA***

**South Africa** [1, 11] **–** Two distinct FMD outbreaks were reported during October 2018 respectively in cattle at Greater Giyani and in African buffalo at Maruleng, Limpopo.
For the reporting month, the ARC-Onderstepoort Veterinary Institute reported the detection of SAT 2.

***POOL 7 - SOUTH AMERICA*** [1, 12, 13]

**Columbia** [1] – Seven new outbreaks due to FMDV O, were notified in the country between mid-September and October 2018, further to the episode that occurred during September 2018 on a cattle farm in Boyacá.

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

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

## III. DETAILED POOL ANALYSIS

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

**China** [1]

An outbreak with clinical cases due to FMDV serotype O occurred on October 10th 2018 on a cattle farm at Bayantuohai Township, Evenk Autonomous Banner, Hulunbeir, Inner Mongolia.

The episode was confirmed on October 18th 2018 by the Lanzhou National Reference Laboratory for Foot and Mouth Disease (OIE Reference Laboratory) using reverse transcription - polymerase chain reaction (RT-PCR) followed by sequencing.

The source of this outbreak is unknown and the containment measures adopted were movement control inside the country, screening, traceability, quarantine, and official destruction of animal products, official disposal of carcasses, by-products and waste, stamping out, zoning disinfection and vaccination if available, but no treatment to the affected animals.

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

The most recent lineages reported by the WRLFMD as circulating in the country belonging to the serotype responsible for the present outbreak are O/ME-SA/Ind-2001e and O/Cathay respectively detected in samples collected in 2017 and 2018.

**Table 2:** summary of the cattle involved in the FMD outbreak that occurred on October 10th 2018 on a cattle farm at Bayantuohai Township, Evenk Autonomous Banner, Hulunbeir, Inner Mongolia. (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 | 140 | 17 | 0 | 140 | 0 | 12.14% | 0.00% | 0.00% | 100.00% |

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

**Map 2:** location of the FMD outbreak which occurred on October 10th 2018 on a cattle farm at Bayantuohai Township, Evenk Autonomous Banner, Hulunbeir, Inner Mongolia. (Source – WAHIS)


**China (Hong Kong, SAR)** [2]

The FMD VMSD tests conducted on the field isolate belonging to lineage O/HKN/13/2018 was identified as O/CATHAY did not provide good matching results with any of the following vaccine strains: O 3039, O Manisa and O TUR 5/09. Similar results were obtained for field isolates belonging to the same topotype detected in recent years as referred by the vaccine reports published by the WRLFMD.

This field isolate was one of the seven detected in the eight pig samples collected during June and July 2018 at Sheung Shui Slaughterhouse, Sheung Shui, New Territories. All the viruses detected clustered within one group and were closely related to other field isolates detected in the same autonomous region during 2017 and 2018.
O/CATHAY is the only lineage that is circulating in the country since 2010.

**Mongolia** [1, 2]

The three FMD outbreaks due to serotype O that were notified in January and May 2018 respectively in camelidae and in cattle at Dundgovi, Uvukhangai and Arkhangai, Mongolia were reported as resolved between March and June 2018.
The source of this outbreak is unknown and the containment measures adopted were movement control inside the country, screening, quarantine, stamping out, zoning, disinfection and vaccination as reported in Table 3, but without treatment to the affected animals.
A summary of the animals involved and locations of the outbreak are reported in Table 4 and Map 3.
The latest lineages reported for the country by the WRLFMD belonging to the serotype responsible for the above outbreaks are represented by O/SEA/Mya-98, O/ME-SA/PanAsia and O/ME-SA/Ind-2001e that were detected in the field samples collected between January and April 2018 from different species, including a camel and from other areas from those reported above.

**Table 3:** summary of the vaccination activities reported in different administrative divisions of Mongolia. (Source – WAHIS)

| Administrative division | Species | Total Vaccinated | Vaccination type |
|---|---|---|---|
| Dornod | Cattle | 166,526 | Not provided |
| | Goats | 290,011 | |
| | Sheep | 478,584 | |
| Khentii | Cattle | 177,056 | |
| | Goats | 483,809 | |
| | Sheep | 764,176 | |
| Sukhbaatar | Cattle | 206,012 | |
| | Goats | 973,009 | |
| | Sheep | 1,523,375 | |
| Total | | 5,062,558 | |

**Map 3:** location of the FMD outbreaks that occurred in January and May 2018 respectively in camelidae and in cattle at Dundgovi, Uvukhangai and Arkhangai, Mongolia. (Source – WAHIS)

**Table 4:** summary of the different species involved in the FMD outbreaks that occurred in January and May 2018 respectively in camelidae and in cattle at Dundgovi, Uvukhangai and Arkhangai, Mongolia. (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* |
|---|---|---|---|---|---|---|---|---|---|
| Camelidae | | 2 | 0 | 2 | 0 | ** | ** | 0.00% | ** |
| Cattle | 1 | 2 | 0 | 2 | 0 | ** | ** | 0.00% | ** |

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

**Not calculated because of missing information

The FMD VMSD tests conducted on the field isolates O/MOG/2/2018, O/MOG/7/2018 and O/MOG/10/2018 respectively belonging to O/ME-SA/Ind-2001e, O/SEA/Mya-98 and O/ME-SA/PanAsia detected during 2018 obtained good matching results with the vaccine strains employed represented by O 3039, O Manisa and O TUR 5/09, except for O Manisa with O/MOG/7/2018.

**Russian Federation** [14]

The Regional Reference Laboratory for FMD (ARRIAH, Russia) reported only the testing of 3,999 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.

The last reported lineages by the WRLFMD as circulating in the country are O/ME-SA/Ind-2001d detected in 2016 and A/ASIA/SEA-97 detected in 2014.

**SEACFMD** [3]

Twenty seven outbreaks were reported in Thailand during October 2018 among the countries of the South East Asia FMD Campaign with eight caused by serotype A, six by serotype O and the remaining of unknown origin.

The number of on-going events in the different reporting countries of this region is as listed in Table 5. Location of the circulating serotypes A and O in the single countries is represented in Maps 4 and 5.

**Table 5**: FMD outbreaks on-going and notified during up to October 2018 in the countries of the Southeast Asia Region (Source – SEAFMD Campaign)

| | N° of ongoing outbreaks prior to 2018 | Jan '18 | Feb '18 | Mar '18 | Apr '18 | May '18 | Jun '18 | Jul '18 | Aug '18 | Sep '18 | Oct '19 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cambodia | 114 | 8 | 3 | 6 | 3 | 14 | 5 | 0 | 1 | 0 | 0 | **154** |
| Laos | 8 | 0 | 0 | 12 | 14 | 22 | 0 | 0 | 0 | 0 | 0 | **56** |
| Myanmar | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | **6** |
| Malaysia | 54 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | **60** |
| Thailand | 236 | 13 | 7 | 5 | 3 | 3 | 6 | 2 | 1 | 8 | 27 | **311** |
| Viet Nam | 15 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **24** |
| **Totals** | **430** | **30** | **11** | **24** | **22** | **44** | **11** | **2** | **2** | **8** | **27** | **611** |

**Map 4:** location of the on-going FMD outbreaks reported during October 2018 due to serotype A in the countries reported in Table 5. (Source – SEAFMD Campaign)


**Map 5:** location of the on-going FMD outbreaks reported during October 2018 due to serotype O in the countries reported in Table 5. (Source – SEAFMD Campaign)

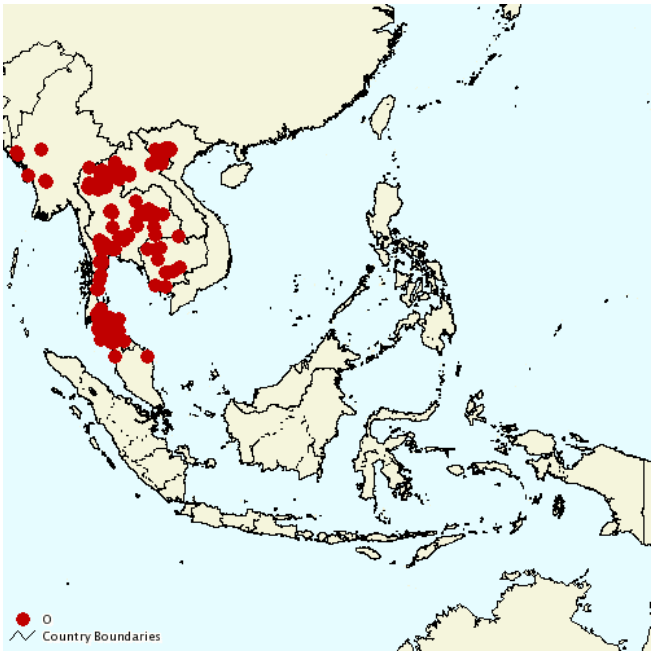


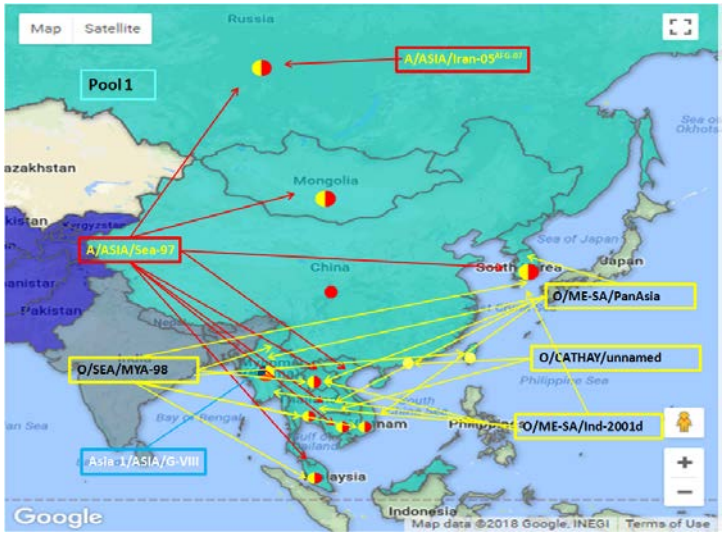
**Table 6**: Summary of the history of FMD Pool 1 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2013 -2017 see Map 6 below. (Source – Wahis, EuFMD Global Monthly Report)

| COUNTRY | FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2017 **(1st 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 1st semester 2016 2013 & 2015/A, 2012-2013, 2016/O, 2012 -2014/NOT TYPED | Oct 2018/O, May 2017/A | **See text** |
| **China, Hong Kong, SAR** | O | July 2018/O | **See text** |
| **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 | May 2018/O, August 2016/A | **See text** |
| **Mongolia** | 2014 & 2015, 2017/O, 2013, 2016/A | May 2018/O, Sept 2016/A | **See text** |
| **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 | Follow-up needed |
| **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 | Oct 2018 /A & O | **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 6**: FMD distribution between 2013 – 2017 by serotype and topotype in South East Asia – red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes and white script refers to new introduction of viral lineage in pool or country of the pool during 2017.
(Source – Google Fusion Maps, WRLFMD).

Conjectured circulating FMD viral lineages in Pool 1 [2, 15]:

- 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 – <u>South Asia</u>*

**India** [3]

The ICAR-Directorate of Foot and Mouth Disease, Mukteshwar, India detected FMDV serotype O among the 14 cattle samples examined using antigen and/or RNA detection diagnostic methods while five field isolates of the same serotype were submitted for vaccine matching tests.
The laboratory also conducted the serological testing of 477 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.
The sublineages circulating in the country are represented by O/ME-SA/2001d and O/ME-SA/2001e as described in the latest ICAR-DFMD Annual Report of 2016-17.

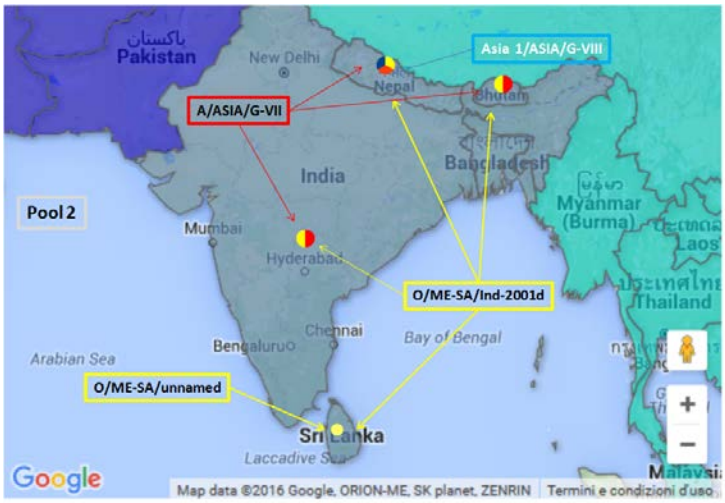
**Table 7:** Summary of the history of FMD Pool 2 between 2012– 2018. For geographic distribution of circulating FMDVs between 2013 -2017, see Map 7 below. (Source – WAHIS, EuFMD Global Monthly Report)

| COUNTRY | FMD HISTORY<br>FMDV serotypes, reported to OIE between 2012 – 2017<br>**(1st semester) | LAST OUTBREAK REPORTED/SEROTYPE<br># 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 | Follow-up needed |
| **India** | O, NOT SAMPLED<br>2012-2015/A<br>2012-2014/Asia 1 | Oct 2018/O, Apr 2015/A<br>Asia 1 | **See text** |
| **Mauritius** | 2016/O | Sep 2016/0 | Follow-up needed |
| **Nepal** | O,<br>2017/A<br>2012-2013, 2017/Asia 1 | Sep 2018/O, Mar 2018/Asia 1, April 2017/A | **See text** |
| **Sri Lanka** | Data up to 2016<br>2012 – 2016/O | May 2018/O | Follow-up needed |

**Map 7:** 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, 15]:

- O/ME-SA/Ind-2001 predominates outbreaks of this serotype detected also in Mauritius during 2016 (**not reported in Map**).
  The O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been detected during 2012-17.
- 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** [5]

The CVDRL, Afghanistan detected FMDV serotypes O in five of the 17 samples submitted for FMD diagnosis, while two samples were positive for FMDV but not serotyped and eight samples are still being processed.
A/ASIA/Iran-05 and O/ME-SA/PanAsia-2 are the most recent lineages detected by the WRLFMD in samples collected in the country during 2018.

**Algeria** [1]

Eleven new outbreaks in small cattle holdings, still caused by FMDV serotype O were reported in the country between July and September 2018 at Chlef, Tiemcen, Tipaza, Arreridj, Ouzou and Alger, eight of these outbreaks are reported as resolved.
The source of the outbreaks is not yet defined while the containment measures adopted are movement control inside the country, surveillance outside containment and/or protection zone, disinfection, vaccination permitted (if a vaccine exists), selective killing and disposal, vaccination, disinfection, slaughter and no treatment of affected animals.
A summary of the animals involved in the outbreaks and location of outbreaks are reported in Table 8 and Map 8.
As reported in the July issue of this report, FMDV O/EA-3 was the topotype identifed in the buccal epithelium collected from cattle present in the outbreaks of the July 20th and 21st 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 ≥ 98.1%.
VMSD 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.

**Table 8:** summary of the animals involved in the 11 FMD outbreaks that occurred on cattle farms between July 31st and September 19th 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 | 97 | 59 | 6 | 0 | 91 | 60.82% | 6.19% | 10.17% | 100.00% |

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

**Map 8:** location of the 11 FMD outbreaks that o
on cattle farms between July 31st and Septemb
2018. (Source – WAHIS)

**Israel** [1]

Following the FMD outbreak reported on September 5th 2018 on a cattle and goat farm at Mughar, Kineret, Hazafon a second outbreak due to O/ME-SA/PanAsia-2 was notified on a cattle farm on September 25th 2018 at Golan, Hazafon.

The containment measures adopted are as following: movement control inside the country, surveillance within and outside the containment and/or protection zone, quarantine, zoning, and vaccination in response to the outbreak.

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

Latest circulating topotypes belonging to FMDV serotype O reported by the WRLFMD are represented by O/EA-3 and O/ME-SA/PanAsia-2 detected in samples respectively collected during 2017 and 2018.

**Table 9:** summary of the animals involved in the FMD outbreak that occurred on a cattle farm on September 25th 2018 at Golan, Hazafon. (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 | 24 | 5 | 0 | 0 | 0 | 20.83% | 0.00% | 0.00% | 0.00% |

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

**Map 9:** location of the FMD outbreak that occurred on a cattle farm on September 25th 2018 at Golan, Hazafon. (Source – WAHIS)


**Pakistan** [6]

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.

During the reporting month six suspect FMD outbreaks which respectively occurred at districts of Abbotabad, Gujranwala and Rawalpind, of the Punjub Province (Map 10). The FMDV serotypes responsible for these outbreaks were A for only one outbreak in Rawalpind and O for the outbreaks of the other districts.

Latest circulating topotype belonging to FMDV serotype O reported by the WRLFMD is represented by O/ME-SA/PanAsia2 detected in samples collected during 2017.

A summary of the emergency and preventive vaccinations campaigns conducted in different provinces of Pakistan during October 2018 are reported in Table 10 and 11.

For the activities conducted for the capacity building of field veterinary staff for the control of FMD, three training workshops were held at Bahawalnagar, Punjub with the participation of 66 Veterinarian.

**Map 10:** location of the FMD outbreaks reported in Punjub, Pakistan during October 2018. (Source – Google Maps, Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)


**Table 10:** summary of the FMD outbreak control vaccination activities in Pakistan during October 2018. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

| Province | Ring Vaccination (Doses) |
|---|---|
| Punjab | 1100 |
| Khyber Pakhtunkhwa | 50 |
| **Total** | **1150** |

**Table 11:** summary of the FMD preventive vaccination activities in Pakistan during October 2018. (Source – Progressive Control of Foot and Mouth Disease in Pakistan, *Dr. Muhammad Afzal*, Project Coordinator)

| District | N° of Households | Animals Vaccinated (6 Monthly Dose) | | |
|---|---|---|---|---|
| | | Cattles | Buffaloes | Total |
| Pakpattan | 36220 | 159639 | 200412 | 360051 |
| Sheikhupura | 5836 | 31828 | 43058 | 74886 |
| Punjab | 42056 | 191467 | 243470 | 434937 |
| **Totals** | **84112** | **382934** | **486940** | **869874** |

**Turkey** [2, 15]

Four VP1 sequences submitted to the WRLFMD by the SAP Institute, Ankara, Turkey were genotyped as FMDV O/ME-SA/PanAsia-2 with most closely related sequences of field viruses respectively represented by ISR/2/2018 with a sequence identity (seq id) of 99.1%, by IRN/13/2018 with a seq id of 99.8% and Gazit/317556-470/ISR/2018 with a seq id of 96.8%, clustering in three different groups.

Information on species and location from which the viruses of these sequences were collected is not provided.

**Table 12:** Summary of the history of FMD Pool 3 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 11 below. (Source – Wahis, EuFMD Global Monthly Report)

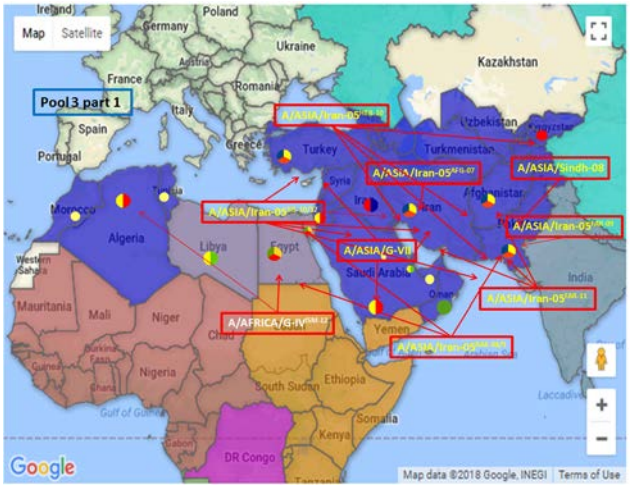
| COUNTRY | FMD HISTORY<br>FMDV serotypes, reported to OIE in 2012 – 2017<br>**(1st semester) | LAST OUTBREAK REPORTED/SEROTYPE<br># see pg. 1 | Comment |
|---|---|---|---|
| **Afghanistan** | 2013-2017/O, A, Asia 1, NOT TYPED<br>2012/SEROTYPE NOT REPORTED | Oct 2018/O, Sep 2018/ A, July 2018/ Asia 1 | **See Text** |
| **Algeria** | Data available up to 1st semester 2015<br>20177A, 2014 -2016/O | Sep 2018/O, Apr 2017/A | Follow –up needed |
| **Armenia** | 2015 -2016/A ,<br>2012-2014, 2017/DISEASE ABSENT | Dec 2015/A | Follow –up needed |
| **Azerbaijan** | DISEASE ABSENT | 2007/0 | Follow –up needed |
| **Bahrain** | DISEASE ABSENT/2016, 2017,<br>2012, 2014 &2015 /O | Mar 2015/O | Follow –up needed |
| **Egypt** | 2012, 2014, 2016, 2017/SAT 2<br>2012 – 2017/O, A | April 2017/O, Nov 2016/A<br>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,<br>Asia 1 & O | Feb 2018/A, Asia 1& O, | Follow –up needed |
| **Iraq** | 2015-2017/O, 2012-2016/A<br>2015/ SEROTYPE NOT REPORTED | Dec 2013/A, ASIA 1 | Follow –up needed |
| **Israel** | 2012-2015, 2017**/O<br>2017**/A | Sep 2018/O, June2017/A | **See text** |
| **Jordan** | 2017/O<br>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,<br>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<br>2012-2014/O | Oct 2013/O | Follow –up needed |
| **Morocco** | 2012-2014, 2017**/DISEASE ABSENT,<br>O/2015 | Oct 2015/O | Follow –up needed |
| **Oman** | 2012-2017/O | May 2015/SAT 2 | Follow –up needed |
| **Pakistan** | 2013-2017/O<br>2013-2014/A & ASIA 1<br>2012/ NO DATA REPORTED | Oct 2018/ A & O,<br>May 2018/ Asia 1 | **See text** |
| **Palestine** | O,<br>2012-2013/SAT 2 | July 2018/Untyped, Dec 2017/O, Mar 2013/Sat 2 | Follow –up needed |
| **Qatar** | 2012-2017/O<br>2016-2017/A | Dec 2013/O | Follow –up needed |
| **Saudi Arabia** | 2012-2014, 2016-2017**/O<br>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<br>2012- 2013/NOT TYPED | Nov 2012/ not typed &<br>Nov 2011/Asia 1, | Follow –up needed |

| | | | |
|---|---|---|---|
| **Tunisia** | 2017/A,<br>2015-16/ DISEASE ABSENT,<br>2014/O | April 2017/A, Oct 2014/O | Follow –up needed |
| **Turkey** | A & O, NOT TYPED<br>2012-2015/Asia 1 | Oct 2015/ A May, 2014-2015/ Asia 1 and O | Follow –up needed |
| **Turkmenistan** | 2013-2017**/DISEASE ABSENT,<br>2012/NO DATA REPORTED | Not available | Follow –up needed |
| **United Arab Emirates** | 2013-2014, 2016-2017/O<br>2012, 2015/DISEASE ABSENT | Sep 2016/O | Follow –up needed |
| **Uzbekistan** | 2014, 2016-2017/DISEASE ABSENT<br>2012, 2013 & 2015/NO DATA REPORTED | Not available | Follow –up needed |

**Map 11:** FMD distribution between 2013 – 2017 by serotype and topotype for West Eurasia and Middle East– red boxes and circles refer to serotype A genotypes, yellow to serotype O genotypes, green to serotype SAT 2 genotypes and white script to new introduction of viral lineage in pool or country of the pool during 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)

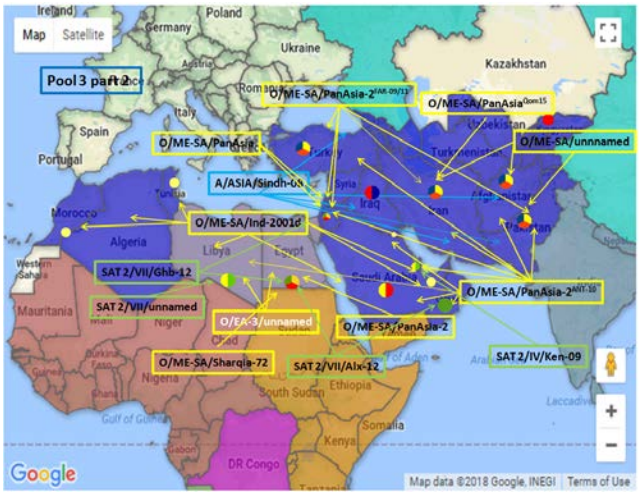
Conjectured circulating FMDV serotype A and Asia 1 lineages in Pool 3 [2, 15]:

- 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-2$^{QOM-15}$ 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*

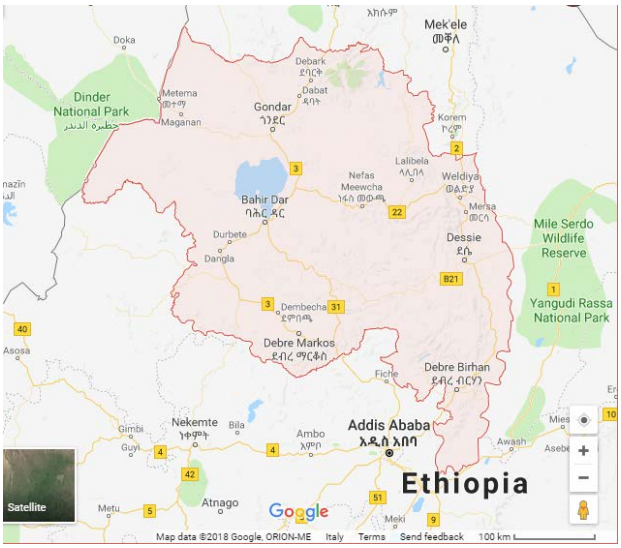
**Ethiopia** [7]

The NAHDIC notified a FMD outbreak on clinical basis in the Amhara Region (Map 12) for which samples were, however, not collected.

The laboratory tested 303 bovine sera of which 47 (15.5%) were positive and 1,223 small ruminant sera of which 8 were positive (0.7%). The samples were examined for screening purposes using the FMD ELISA for antibodies against the viral non-structural proteins (NSP).

A /AFRICA/G-IV, A/AFRICA/G-I, O/EA-3 and SAT 2/VII/Lib-12 are the most recent lineages reported by the WRLFMD as circulating in the country, which were detected in samples during 2017 and 2018.

**Map 12:** location of the FMD suspect outbreak reported by NAHDIC during October 2018. In the Amhara Region (Source – Google Fusion Maps and NAHDIC)




**Kenya** [8]

The FMD NRL, Embakasi, Kenya detected, during October 2018, FMDV O among the cattle samples collected from outbreaks.

A/AFRICA/G-I, O/EA-2, SAT 1/I and 1 SAT 2/IV were the lineages detected by the WRLFMD among the twenty one bovine samples collected between January 2017 and June 2018.

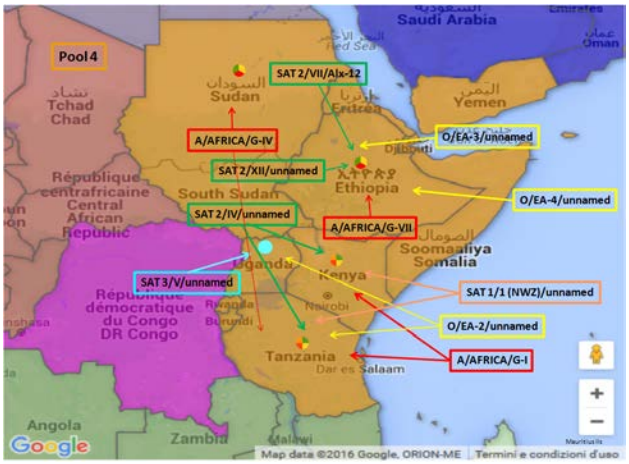
**Table 13:** Summary of the history of FMD Pool 4 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2013 -2017, see Map 13 below. (Source – WAHIS, EuFMD Global Monthly Report)

| COUNTRY | FMD HISTORY<br>FMDV serotypes, reported to OIE in 2012 – 2016<br>**(1st semester) | LAST OUTBREAK REPORTED/SEROTYPE<br>#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<br>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<br>2015/ NO DATA REPORTED<br>2013/ DISEASE ABSENT, 2012/O | Nov 2016/not reported,<br>Jan 2012/O | Follow –up needed |
| **Ethiopia** | O, 2015-2017/SAT 1<br>2012 & 2017/SAT 2, 2012, 2017/A | April 2018/O & SAT 2<br>Feb 2018/SAT 1,<br>Jan 2018/A | **See text** |
| **Kenya** | A, O, SAT1 & SAT2 | Oct 2018/O & A, May 2018/ SAT 1, Nov 2017/SAT 2 | **See text** |
| **Libya** | 2015-2017/NO DATA REPORTED<br>2012-2014/O | Oct 2013/ O, Sat 2/Apr 2012 | Follow-up needed |
| **Rwanda** | 2012-2013, 2017/A, O, SAT1 & SAT 2<br>2015-2016/NO DATA AVAILABLE | Nov 2012/not typed | Typing required |
| **Somalia** | 2012-13, 2015-2017/DISEASE PRESENT,<br>2014/PENDING | June 2016/not reported | Follow –up needed |
| **Sudan** | 2012-2014, 2017/O,<br>2015-2016/A, SAT 1<br>2013/SAT 2 | Mar 2018/A Dec 2016/ not sampled, June 2017/O & SAT 2 | **See text** |
| **South Sudan** | 2015 - 2017/DISEASE PRESENT<br>2014/A, O, SAT 1, SAT 2 & SAT 3<br>2012-2013 & 2016 NO DATA REPORTED | 2011 | **See text** |
| **United Republic of Tanzania** | 2012-2017/A, O, SAT 1 & SAT 2 | Oct 2016/SAT 1,<br>Aug 2016/O & SAT 2,<br>Jun 2016/ A | Follow –up needed |
| **Uganda** | 2016/DISEASE PRESENT,<br>2012, 2015, 2017/ SAT 1,<br>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,<br>2012/O | 2009/O | Follow –up needed |

**Map 13:** 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, 15]:

- O (topotypes EA-2 (Tanzania, DR Congo & Uganda), EA-3 and EA-4 (Ethiopia)
- A/AFRICA (genotypes I (Kenya, Tanzania, D.R. Congo), IV (Sudan, Eritrea, not reported in map) VII (Ethiopia)
- SAT 1 (topotypes I (Kenya, Tanzania), IX (Ethiopia))
- SAT 2 (topotypes IV (Kenya, Tanzania), VII (Sudan, Egypt, Ethiopia), XIII (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*

**Cameroon** [9]
The LANAVET, Garoua Cameroon detected FMDVin in nine of the 101 bovine samples examined by panFMDV PCR.
The laboratory also conducted NSP ELISA on 460 bovine serum samples with 389 (84.57%) testing positive.
The last report by the WRLFMD of circulating viral lineages in the country was in 2014 with the detection of A/AFRICA/G-IV and SAT2/VII/Lib-12.
The laboratory continues its collaborative research projects with the Ohio State University and Plum Island, USA.

**Ghana** [10]
The ACCRA Veterinary Laboratory detected FMD in 10 samples submitted to the laboratory for the reporting month using a PCR protocol provided by the National Institute for Animal Health, Tokyo Japan, with whom the laboratory is collaborating.
The laboratory personnel were also involved together with veterinary officers in field investigations and sample collection on FMD affected farms.
Most recent lineage reported for this country by the WRLFMD is O/WA in a sample collected during 2016.

**Guinea** [1]
Eight FMD outbreaks, due to serotype O, of which only one is still on-going, were notified in cattle of Forécariah, Kankan, Labe, Dalaba, Faranah and Mamou which occurred between July and September 2018.
Diagnosis of these outbreaks was carried out by Animal Health Laboratory, OIE and FAO Reference Laboratory, ANSES (OIE Reference Laboratory) and the WRLFMD respectively for molecular diagnosis and sequencing.
As reported in the September 2018 issue of this report, FMDV VP1 sequence of samples collected during outbreaks that occurred in the previous month of July 2018, and submitted by ANSES Paris France, on behalf of the country, to the WRLFMD, was identified as belonging to the O/EA-3 lineage.
The source of these outbreaks was reported as due to introduction of new live animals, illegal movement of animals, animals in transit, contact with infected animal(s) at grazing/watering and contact within livestock markets. The containment measures applied were movement control inside the country, surveillance outside containment and/or

protection zone, surveillance within containment and/or protection zone, traceability, quarantine, disinfection, slaughter, vaccination is permitted as is also treatment of affected animals.
A summary of the data relative to the animals involved in the outbreaks and location of these is reported in Table 14 and Map 14.

**Map 14:** location of the FMD outbreaks that occurred between July and September 2018 in Guinea. (Source –WAHIS-OIE)


**Table 14**: summary of the animal species in the FMD outbreaks that occurred between July and September 2018 in Guinea. (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 | 2397 | 259 | 29 | 0 | 2 | 10.81% | 1.21% | 11.20% | 1.29% |

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

**Table 15:** Summary of the history of FMD Pool 5 between 2012 – 2018. For geographic distribution of circulating FMDVs between 2012 -2016, see Map 15 below. (Source – WAHIS, EuFMD Global Monthly Report)

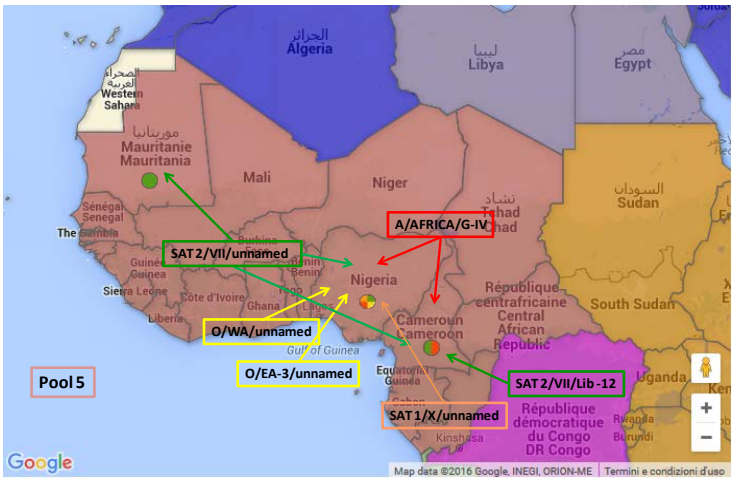
| Country | FMD history FMDV serotypes, reported to OIE in 2012 – 2017 **(1st semester) | Last outbreak reported/serotype #see pg. 1 | Comment (Genotyping would be useful for this region) |
|---|---|---|---|
| **Benin** | 2017/NO DATA REPORTED<br>2012-2016/A, O, SAT 1, SAT 2 | Jun 2014/O, A, SAT 1, SAT 2 | Follow –up needed |
| **Burkina Faso** | DISEASE PRESENT | Dec 2016/ not available | Follow –up needed |
| **Cameroon** | **DISEASE PRESENT | Sep 2018/untyped,<br>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<br>2014-15/ DISEASE ABSENT<br>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<br>Dec 2016/A, O & Sat 1 | Follow –up needed |
| **Congo** | NO DATA AVAILABLE | Jun 2013/not typed | Typing required |
| **Côte d'Ivoire** | 2013-2017/DISEASE PRESENT,<br>2012/A, | Jul 2016/not reported | Follow –up needed |
| **Equatorial Guinea** | 2014 – 2017/ NO DATA AVAILABLE<br>2012 – 2013/DISEASE SUSPECTED | Not available | Follow –up needed |
| **Gabon** | 2017/NO DATA AVAILABLE<br>2012, 2014-16/DISEASE ABSENT<br>2013/NO DATA AVAILABLE | Not available | Follow –up needed |
| **Gambia** | NO DATA AVAILABLE | July 2018/untyped<br>2012/O | Follow –up needed |
| **Ghana** | 2012 – 2017/DISEASE PRESENT | July 2018/untyped<br>June 2017/O,<br>Dec 2016/ SAT 2<br>2014/not available | **See text** |
| **Guinea-Bissau** | 2014-2017**/DISEASE PRESENT<br>2012-2013/DISEASE ABSENT | Aug 2018/O<br>Dec 2016/SAT1 & SAT 2 | Follow –up needed |
| **Guinea** | 2012-2013, 2015-2017 DISEASE ABSENT<br>2014/ DISEASE PRESENT | Sep 2018/O | **See text** |
| **Liberia** | NO DATA AVAILABLE | Not available | Follow –up needed |
| **Mali** | 2017/ NO DATA AVAILABLE<br>2016/DISEASE ABSENT<br>2015/A, SAT 1<br>2014-2015/SAT 2<br>2012/ NO DATA AVAILABLE | Oct 2016/not reported | Follow –up needed |
| **Mauritania** | 2017/ NO DATA AVAILABLE<br>2016/DISEASE SUSPECTED,<br>2014-2015**/SAT 2,<br>2012-2013/NO REPORTED OUTBREAKS | Dec 2014/SAT 2 | Follow –up needed |
| **Niger** | 2017/ DISEASE SUSPECTED<br>2016/DISEASE PRESENT BUT WITH NO QUALITATIVE DATA, 2015/O<br>2012 – 2014/NOT SAMPLED | 2014/not sampled, May 2015/O | Follow –up needed |
| **Nigeria** | 2015-2017/DISEASE PRESENT | Sep 2018/O &Sat 2 | Follow –up needed |

| | | | |
|---|---|---|---|
| | 2012-2014/O | Sept 2016/ SAT 1, Nov 2015/A | |
| **Sao Tome Principe** | 2013-2017/NO DATA AVAILABLE<br>2012/DISEASE ABSENT | Not available | Follow –up needed |
| **Senegal** | 2017/ DISEASE SUSPECTED<br>2015-2016/DISEASE PRESENT<br>2012, 2014/NOT SAMPLED<br>2013/NO DATA AVAILABLE | Sep 2018/O,<br>Feb 2015/ A, 2014/ SAT 2 | Follow –up needed |
| **Sierra Leone** | 2017/NO DATA AVAILABLE<br>2012 – 2016/DISEASE ABSENT | Sep 2018/serotyping pending, Oct 1958 | Follow –up needed |
| **Togo** | O & SAT 1 | 2012/O | Follow –up needed |

**Map 15:** 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 2serotypes 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 5 [15]:

- 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*

**South Africa** [1, 11]

Two distinct FMD outbreaks occurred during October 2018 with the first in cattle at Greater Giyani, Limpopo and the other in African buffalo at Maruleng, Limpopo.

Relative to the first outbreak due to FMDV serotype 2, the eight affected cattle contracted the disease through contact with wild animals and the containment measures applied are movement control inside the country and quarantine. Vaccination and treatment of affected animals is not allowed. Details on the consistency of the animals present on the epidemiological unit in which the outbreak took place are not reported.

The second outbreak was detected on a farm of 107 African buffalos, known also as Cape buffalo (Syncerus caffer) that were undergoing testing by the Agricultural Research Council, Onderstpoort Veterinary Institute, Transboundary Animal Diseases (OIE Reference Laboratory) for movement purposes and eight resulted positive (7.48%) on October 12th 2018, for FMDV antibodies in the liquid-phase blocking ELISA.

Even in this case the infection was contracted through contact with wild animals. The control measures adopted for this outbreak were as for those of the above.

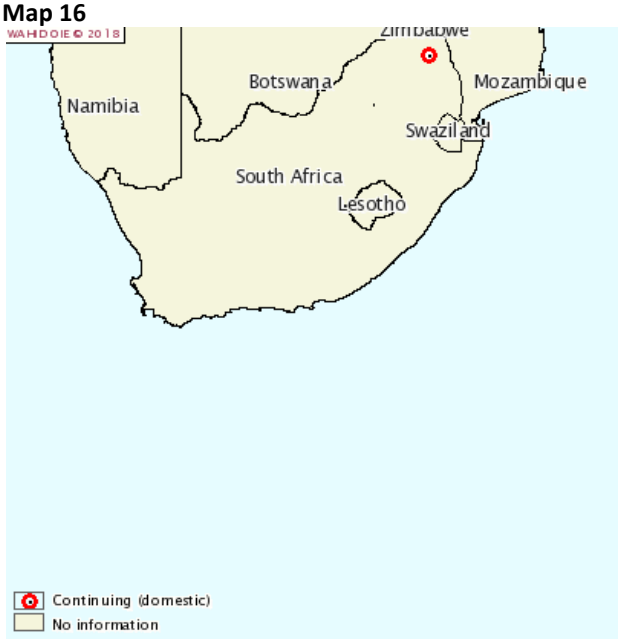
Both of the outbreaks reported above occurred in South Africa's FMD Protection Zone and do not affect the status of South Africa's FMD Free Zone.

As required by South African Legislation, the coordinates of the outbreaks are modified to protect confidentiality (Map 16 and 17).

The ARC-Onderstepoort Veterinary Institute reported the PCR detection of SAT 2 in two of the nine samples submitted for testing during the reporting month that were submitted to sequencing. The laboratory also conducted LPBE on 4,410 sera and NSP ELISA on 372 sera.

**Maps 16 and 17:** locations of the FMD outbreaks in cattle at Greater Giyani (on the left), Limpopo and the other in African buffalo at Maruleng, Limpopo(on the right). (Source –WAHIS-OIE)

**Map 16**




**Map 17**

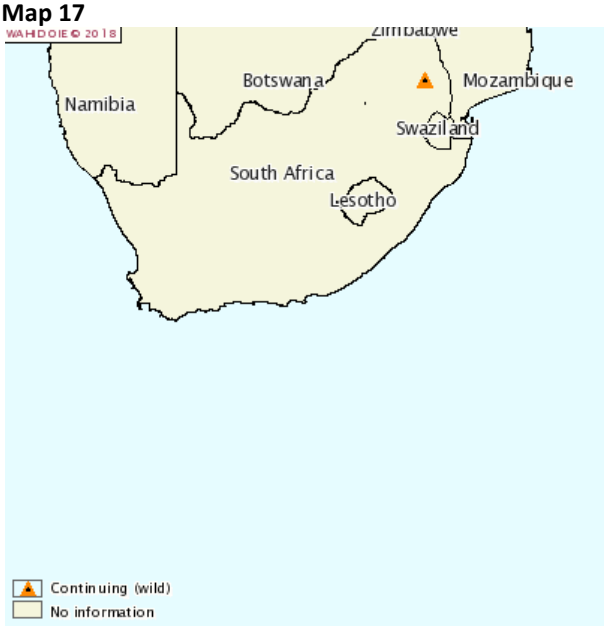


**Table 16** Summary of the history of FMD Pool 6, 2013 – 2018, for geographic distribution see Map 18 below. (Source – WAHIS, EuFMD Global Monthly Report)

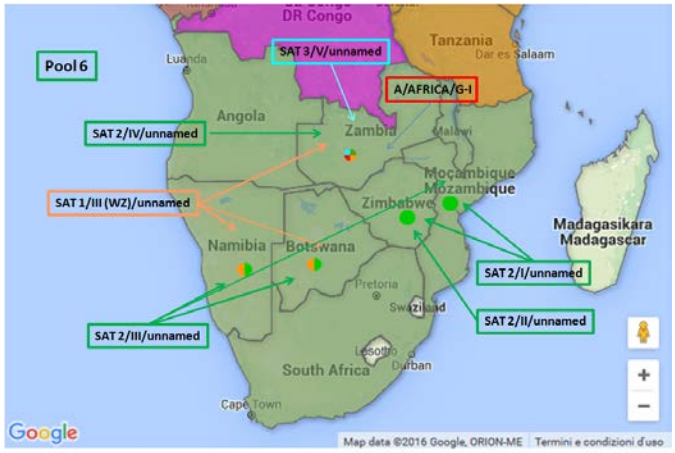
| COUNTRY | FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2017 **(1st semester) | LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1 | Comment |
|---|---|---|---|
| **Angola** | 2013-2017/NO DATA AVAILABLE<br>2015-2016/ DISEASE PRESENT<br>2013-2014/DISEASE ABSENT<br>2012/DISEASE SUSPECTED BUT NOT CONFIRMED | April 2016/SAT 2,<br>July 2015/ SAT 2 | Follow –up needed |
| **Botswana** | 2012-2017/SAT 2<br>2014-2015/SAT 1 | July 2018/SAT 2,<br>June 2015/SAT 1 | Follow –up needed |
| **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<br>2013-2015/ NO DATA AVAILABLE<br>2012/NO OUTBREAKS REPORTED | Aug 2018/SAT 2<br>June 2016/SAT 1 | Follow –up needed |
| **Mozambique** | 2016 – 2017/SAT 2<br>2012 -2015/DISEASE ABSENT | June 2018/ Typing pending,<br>Oct 2017/SAT 2,<br>May 2015/ SAT 1 | Follow –up needed |
| **Namibia** | 2017/NO DATA AVAILABLE<br>2014-2016**/SAT 2<br>22012-2014/SAT 1 | Sep 2017/SAT 2,<br>Aug 2017/typing pending,<br>May 2015/SAT 1 | Follow –up needed |
| **South Africa** | 2012-2015, 2017/SAT 2<br>2013, 2017/SAT 1<br>2015-16/SAT 3 | Oct 2018/SAT 2, Oct 2017/SAT 1,<br>Dec 2015/SAT 3 | **See text** |
| **Zambia** | 2016 – 2017/NOT TYPED<br>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,<br>Jan 2013/SAT 1 | Follow –up needed |
| **Zimbabwe** | 2012-2017/SAT 2<br>2014-2015/SAT 1<br>2013/SAT 3 | Sep2018/typing pending, SAT 1 & SAT 2, Jun 2013/SAT 3 | Follow –up needed |

**Map 18:** 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, 15]:

- 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*

**Columbia** [1]

Seven new outbreaks due to FMDV serotype O were notified in the country between end of September and October 2018, further to the episode that occurred during September 2018 on a cattle farm in Boyacá, located in the central area of the country. The outbreaks occurred in Boyacá, Cesar and La Guajira. A summary of these events is reported in Table 17 and location in Map 19.

The outbreak reported in Boyacá is within the containment zone, which was recognized by the OIE on December 11th 2017 and vaccination is in force on the farm while the relative area has high vaccination coverage.

For the five outbreaks of Cesar, the activities implemented to control and eradicate the disease in the affected area continue. Animals of affected and in-contact farms are being culled and disposed of by burial. Epidemiological surveillance continues with least 19,517 cattle, 4,168 pigs, 2,572 sheep and 213 goats inspected by checking oral cavity, extremities and mammary glands. During this surveillance, three secondary outbreaks were detected around the outbreak.

According to the Control and Eradication Plan established for this disease, apart from the stamping out of all sick animals and their contacts in the secondary outbreaks, the activities aimed at eradicating the disease, such as cleaning and disinfection, fallowing and introduction of sentinels, will be carried out.

Relative the outbreak of La Guajira, this farm is located 10 kilometres from the border with the Republic of Venezuela. An epidemiological investigation is being carried out to determine the spread of the disease and the possible origin of the virus. All control and eradication measures will be implemented.

Diagnosis of these outbreaks was by the National Veterinary Diagnosis Laboratory using different PCR methods and virus isolation.

Control measures put in force are movement control inside the country, surveillance outside containment and/or protection zone, surveillance within containment and/or protection zone, traceability, quarantine, disinfection, vaccination permitted (if a vaccine exists) with no of treatment of affected animals. Further measures that will be applied are official destruction of animal products, official disposal of carcasses, by-products and waste and stamping out.

**Table 17**: summary of the animal species and relative consistencies involved in the FMD outbreaks that occurred between mid-September and October 2018 in Columbia. (Source – WAHIS)

| Location | Date of event | N° of outbreaks | Species | Susceptible | Cases | Deaths | Killed and disposed of | Slaughtered | Apparent morbidity rate | Apparent mortality rate | Apparent case fatality rate | Proportion susceptible animals lost* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sogamoso, Boyacá | 17/09/2018 | 1 | Cattle | 19 | 1 | 0 | 19 | 0 | 5.26% | 0.00% | 0.00% | 100.00% |
| Valledupar, Cesar | 06/10/2018 | 1 | Cattle | 2 | 0 | 0 | 2 | 0 | 0.00% | 0.00% | - | 100.00% |
| | | | Sheep | 15 | 0 | 0 | 15 | 0 | 0.00% | 0.00% | - | 100.00% |
| | | | Swine | 112 | 11 | 0 | 112 | 0 | 9.82% | 0.00% | 0.00% | 100.00% |
| San Diego, Cesar | 10/08/2018 | 1 | Cattle | 216 | 2 | 0 | 216 | 0 | 0.93% | 0.00% | 0.00% | 100.00% |
| | | | Swine | 144 | 37 | 27 | 117 | 0 | 25.69% | 18.75% | 72.97% | 100.00% |
| San Diego and Valledupar, | 17/09 -14/10/2018 | 3 | Cattle | 43 | 3 | 0 | 43 | 0 | 6.98% | 0.00% | 0.00% | 100.00% |
| | | | Swine | 263 | 24 | 5 | 258 | 0 | 9.13% | 1.90% | 20.83% | 100.00% |
| La Guajira | 09/10/2018 | 1 | Cattle | 82 | 0 | 0 | 0 | 0 | 0.00% | 0.00% | - | 0.00% |
| | | | Sheep | 80 | 0 | 0 | 0 | 0 | 0.00% | 0.00% | - | 0.00% |
| | | | Swine | 27 | 23 | 20 | 0 | 0 | 85.19% | 74.07% | 86.96% | 74.07% |

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

**Map 19:** location of the FMD outbreaks that occurred between September and October 2018 in different areas of the Columbia as reported in Table 17. (Source – WAHIS-OIE and Google Maps)


**Rest of Latin America** [1, 12, 13]

The OIE FMD status of the countries in South America as reported in October 2018 is presented in Map 20.

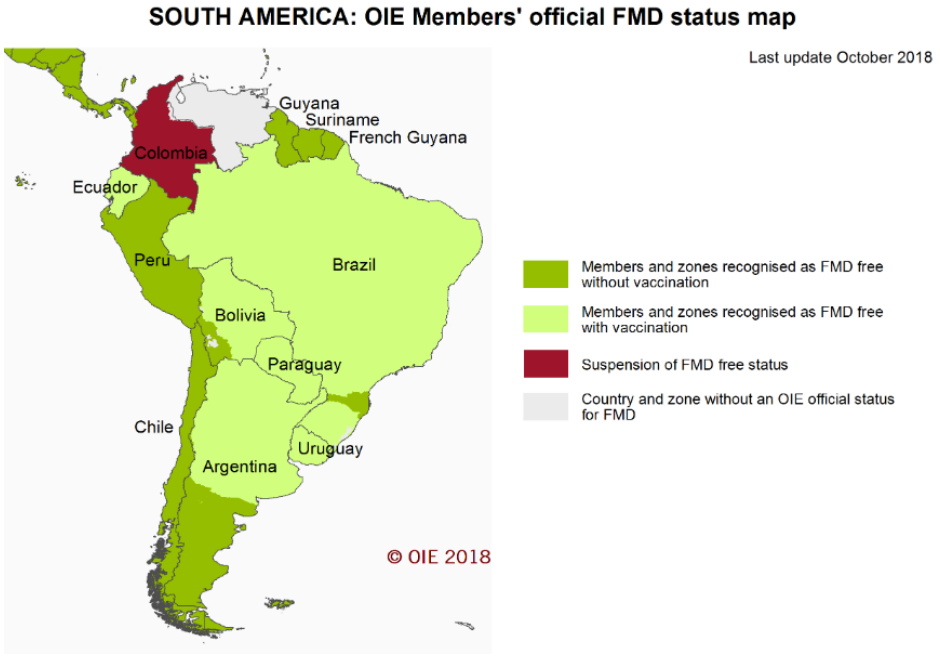
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the OIE maps (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 20). 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 18.

**Table 18:** Summary of the history of FMD Pool 16 between 2012 – 2018, for geographic distribution see Map 20. (Source – WAHIS, EuFMD Global Monthly Report)

| COUNTRY | FMD HISTORY FMDV serotypes, reported to OIE in 2012 2016**(1st semester) | LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1 | Comment |
|---|---|---|---|
| **Colombia** | DISEASE ABSENT | July 2018/O | Follow –up needed |
| **Venezuela (Bolivarian Republic of)** | DISEASE ABSENT** | 2011/O, 2013/A | National situation needs verification |

**Map 20:** FMD status for South America [1] (Source – OIE)



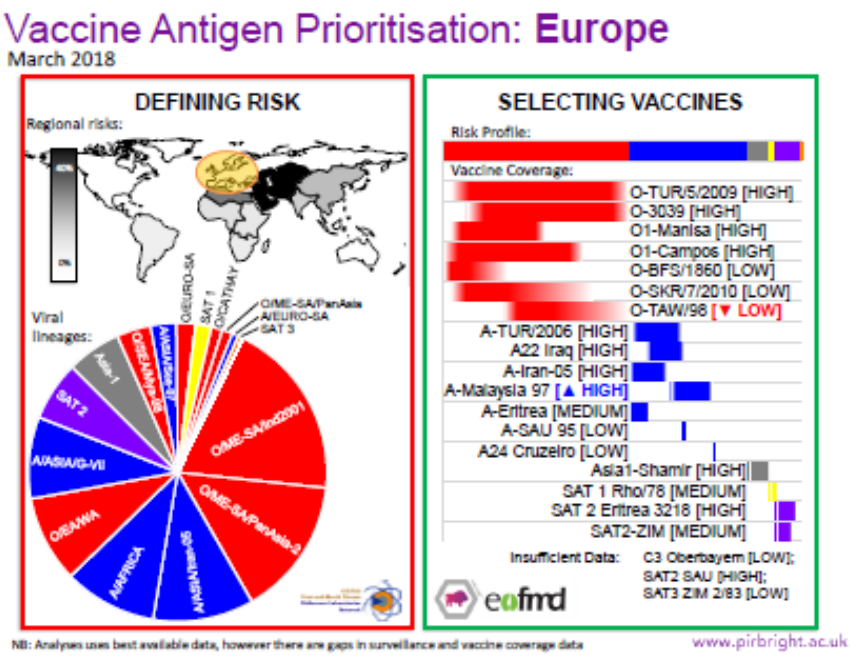
## IV. OTHER NEWS:

[2]The 3rd WRLFMD Quarterly Report for the period July – October 2018 contains a new format for recommendations of FMDV vaccines to be included in antigen banks for Europe. The discussion of Table 21 is available within the report.

**Table 21:** 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 | - | - | - | - | - | - | - | - |




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. http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home
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5. Central Veterinary Research and Development Laboratory **(**CVDRL), Aghanistan - *Dr.Ghulam,* Head of Laboratory
6. Progressive Control of Foot and Mouth Disease in Pakistan - *Dr. Muhammad Afzal*, Project Coordinator.
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8. National FMD Reference Laboratory, Embakasi, Kenya – *Dr. Kenneth Ketter*
9. Laboratoire National Vétérinaire (LANAVET) - Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*.
10. ACCRA VETERINARY LABORATORY, Ghana – Dr. Joseph Adongo Awuni
11. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr LE Heath/Ms E Kirkbride*
12. 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/
13. OIE/FAO FMD Reference Laboratory Network, Annual Report 2016
14. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana. Fomina.*
15. OIE/FAO FMD Reference Laboratory Network, Annual Report 2017