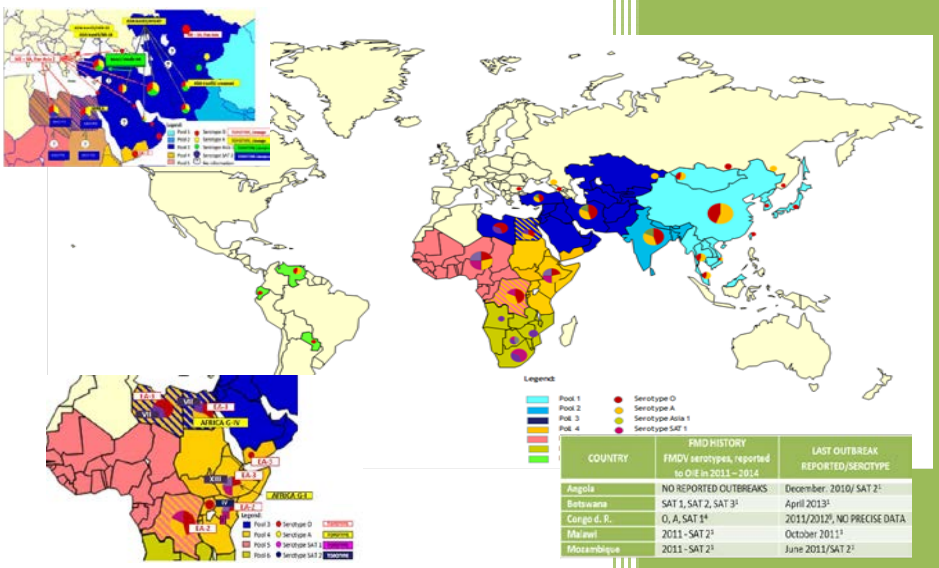
2015

Foot-and-Mouth Disease Situation
Monthly Report June 2015



COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2011 – 2014	LAST OUTBREAK REPORTED/SEROTYPE
Angola	NO REPORTED OUTBREAKS	December. 2010/ SAT 2[1]
Botswana	SAT 1, SAT 2, SAT 3[1]	April 2013[1]
Congo d. R.	O, A, SAT 1[4]	2011/2012[9], NO PRECISE DATA
Malawi	2011 - SAT 2[3]	October 2011[1]
Mozambique	2011 - SAT 2[3]	June 2011/SAT 2[1]

EuFMD

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

June 2015

Guest Editor
Dr. Donald King
Head of WRLFMD,
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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'm very pleased to be asked to write a few short editorial comments to accompany this month's EuFMD update. This report highlights current FMD outbreaks reported to the OIE (WAHID) and summarises new results from different FMD Reference Laboratories. These findings provide a reminder about the ease by which FMD can spread within endemic regions, as well as re-emphasise the potential of the virus to cause incursions into FMD-free countries. Within Europe, no outbreaks have been reported since 2011, when FMD last occurred in Burgas Province, Bulgaria. However, the continued preparation and vigilance against FMD remains important for European FMD Reference Laboratories, and in May 2015, colleagues at The Pirbright Institute, hosted the annual EU-RL workshop (in Sunningdale, UK: see photograph below) to review the different threats to Europe and recent data regarding the performance of FMD vaccines and diagnostic tests.

At this meeting, delegates from National Reference Laboratories from European Union Member States (and neighbourhood countries) heard updates regarding FMD outbreaks that have been reported this year in North Africa (via an informative presentation from Dr Hafsa Madani, LCV/INMV, Algeria), and discussed work undertaken to evaluate FMD vaccines that might be used against this viral lineage (O/ME-SA/Ind-2001). These studies include field work in North Africa (reported by IZSLER) and an *in-vivo* potency study (undertaken by CVI-Lelystad and The Pirbright Institute) to evaluate the performance of O-BFS and O-Manisa. Away from North Africa, the changing epidemiological patterns of FMD in other regions were discussed: including West Africa and West EurAsia where the WRLFMD has characterised field viruses representing different SAT 2 (topotype VII) lineages in Mauritania and Oman, respectively. Elsewhere, in East Asia, new A/ASIA/Sea-97 sequence data has been provided from Kinmen Island, Chinese Taipei (Taiwan) and associated with serological positive cattle. Taken together with the data for the serotype O FMD outbreaks in Republic of Korea earlier in 2015 (O/SEA/Mya-98), these sequences continue to highlight the intimate epidemiological connections between livestock industries in different countries across the region. From a European context many of these FMD threats appear to be geographically distant, although the current extent of global trade and international travel make it difficult to anticipate where FMD incursions may occur. Therefore, the challenge is to maintain surveillance and laboratory capacity during these periods where national funding in Europe to support these activities is waning.

All the best for a pleasant summer!

Don

I. GENERAL OVERVIEW

Pools represent independently circulating and evolving 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).

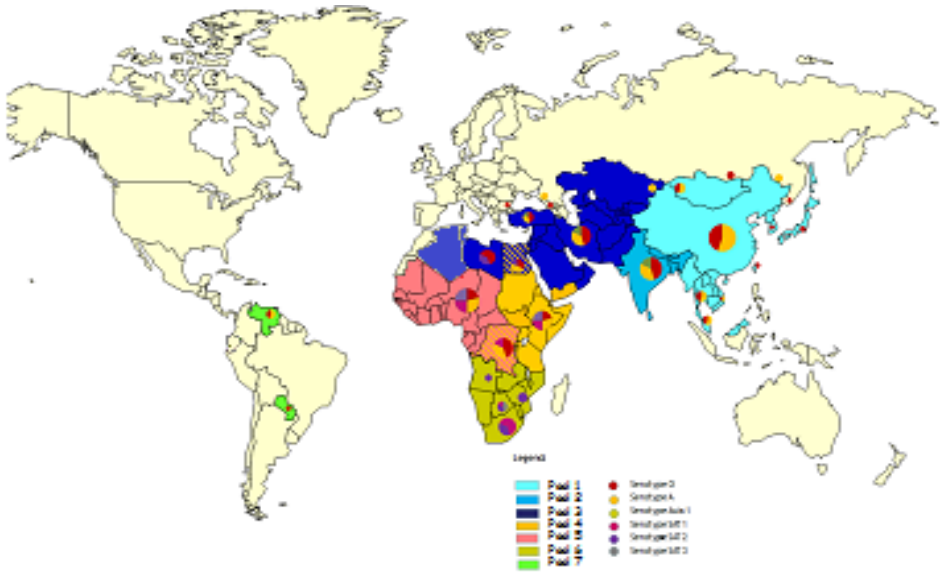
Table 1: List of countries representing each virus pool for the period 2010 – 2015

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

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

Foot-and-mouth disease (FMD) virus pools: world distribution by serotype in 2011-2015 *(Map 1)*

(Presence of Pool 4 in Libya and North Zambia not shown on map)



II. HEADLINE NEWS

POOL 1

China (Taiwan Province) [1] **–** Following the FMD case detected on the 8th of May 2015, a serological diagnosis of another case of FMDV serotype A was carried out on the 9th of June 2015, in a bovine animal in a village of Kinmen County, China (Taiwan Province).

China (Hong Kong, SAR) [2] – Porcine tissue samples collected during April 2015, in China (Hong Kong, SAR), were confirmed as positive by the WRLFMD for FMDV serotype O.

Mongolia [2] – Bovine tissue samples collected during February 2015 in Mongolia were identified by the WRLFMD as FMDV O/SEA/Mya-98.

Rep. of Korea [2] – The FMD outbreaks caused by serotype O, reported in Rep. of Korea occurring between December 2014 and April 2015 in pigs and cattle were reported as resolved on the 19th of June 2015**.**

POOL 2

India [3] **–** Four cattle samples were tested by the Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, for FMDV antigen and/or RNA and FMDV serotype O was detected.

POOL 3

Afghanistan [2] – Twenty-one bovine samples collected during 2013 and 2014 were tested by the WRLFMD using reverse transcription - polymerase chain reaction (RT-PCR), antigen (Ag) ELISA and virus isolation with the detection of FMDV serotypes Asia 1 and O. The genotyping of the FMDV isolates classified these respectively as Asia1/Asia/Sindh-08 and O/ME-SA/PanAsia-2^{ANT-10}. In the vaccine matching test, field isolate Asia 1 AFG 04/14 did not match with Asia 1 Shamir.

Algeria[4] – Genotyping carried out by the OIE/FAO Reference Laboratory (RL) for Vesicular Diseases of the Istituto Zooprofillatico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER), Brescia, Italy on two FMDV VP1 PCR amplicons identified these as O/ME-SA/Ind-01. The amplicons were obtained from ovine samples collected during the outbreaks of the current year.

Egypt [2] - In the vaccine matching tests conducted by the WRLFMD, FMDV O and SAT 2 field isolates of 2013 and 2014 partially matched with the vaccine strains.

Oman [2]- Genotyping by the WRLFMD of the FMDVs isolated in bovine samples collected during May 2015 identified them as SAT 2/VII/Alx-12.

Pakistan [2, 5] – Sixteen FMD outbreaks were reported during June 2015, throughout Pakistan, within the Progressive Control of Foot and Mouth Disease Project, caused by two of the FMDV serotypes, A and O. In the vaccine matching tests conducted by the WRLFMD, including FMDV serotype A and Asia 1 isolates of 2014 and 2015, only one of the field strains of serotype A partially matched with the vaccine strains employed.

POOL 4

Ethiopia [2, 6] – Eight samples collected during 2014 and 2015 from unspecified animal species were confirmed as positive by the WRLFMD for FMDV serotypes O, SAT 1 and SAT 2.

Kenya [7] - The Foot-and-Mouth Disease Laboratory, Embakasi, Kenya detected FMDV serotypes A, SAT 1 and SAT 2 respectively in ten bovine samples using FMD Ag detection ELISA and/or RT-PCR.

POOL 5

Cameroon [8] **-** The Laboratoire National Vétérinaire (LANAVET) found nine positive samples of the 200 bovine specimens tested by a FMDV pan-serotypic RT-PCR.

Mauritania [2] **–** Four FMDV positive samples collected from cattle during the outbreak that occurred in December 2014 were genotyped by the WRLFMD as SAT2/VII/unnamed.

POOL 6

Botswana [1] - A FMD outbreak was detected on clinical basis on the 21st of June 2015 in a cattle crush in Chobe, Botswana. FMDV serotype identification is still pending.

Mozambique [1, 2] - A clinical FMD outbreak was detected on the 20th of May 2015 in cattle in a village of Maputo, Mozambique for which serotyping is still pending.
Four bovine tissue samples collect during 2014, were all genotyped as FMDV serotype SAT 2/I/unnamed. Two of the field strains used in the vaccine matching tests partially matched with the vaccine strains employed.

Namibia [1] – A total of 14 FMD outbreaks in cattle caused by FMDV SAT 2, starting on the 11th of May and continuing also during June 2015 were reported in cattle in a village of Ohangwena, Namibia.

RSA [9] - The ARC-Onderstepoort Veterinary Institute tested for FMDV by RT-PCR five samples with one resulting positive.

Zimbabwe [1, 2] **–** Three separate episodes of FMD are reported as ongoing in Zimbabwe. The latest consists of three clinical FMD outbreaks that were detected on the 15th of June 2015 in cattle in a village of Midlands, Zimbabwe. Serotyping for these outbreaks is pending.
The WRLFMD detected FMDV serotype SAT2 among the 13 bovine samples collected in 2010, 2011 and 2014. The positive samples were submitted to genotyping and the isolates were identified as SAT 2/I/unnamed and SAT 2/II/unnamed. The SAT 2 positive strains collected during 2014 matched with the vaccine strains employed in the vaccine matching tests.

POOL 7

Latin America [1] - No outbreaks reported.

COUNTER

****** 42 MONTHS SINCE THE LAST OUTBREAK IN SOUTH AMERICA WAS REPORTED***
****** 130 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED***

III. DETAILED POOL ANALYSIS

A. POOL 1 – *SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA Central /East Asia*

China (Taiwan Province) [1, 2]

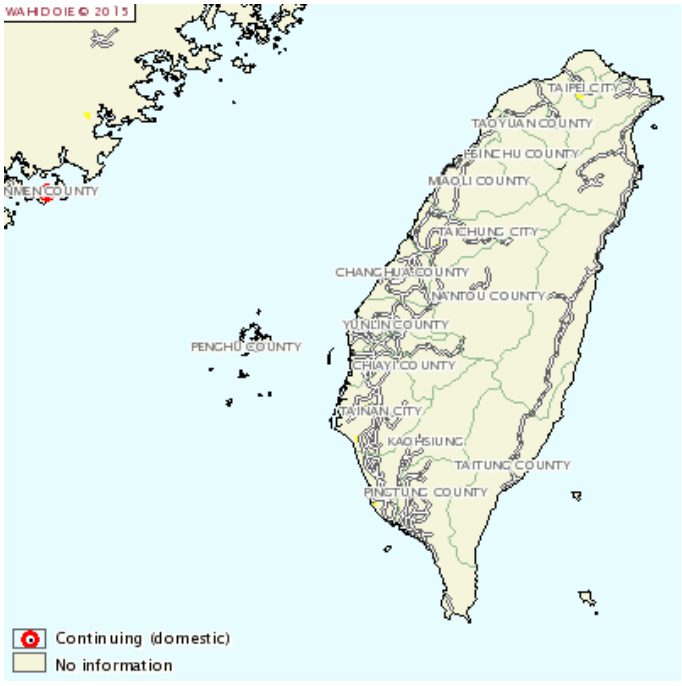
Further to the FMD case detected on the 8th of May 2015, a serological diagnosis of FMDV serotype A was carried out on the 9th of June 2015, by the National Laboratory (Animal Health Research Institute, AHRI) in another bovine animal, in a village of Kinmen County, China (Taiwan Province). Following a first non-structural protein (NSP) antibody reaction detected on the 18th of May, in one bovine serum sample collected from an animal that was within the movement control surveillance zone established around the index case, confirmed on 8th of May 2015, the local disease control centre (LDCC) conducted clinical investigations, during which neither clinical signs nor viral reactions of foot and mouth disease were detected. Sampling of sera and oropharyngeal fluids respectively for serological and virological tests were also collected. Probang samples of five bovine collected between the 9th and 25th of May 2015 were sent to the WRLFMD where they were found negative in RT-PCR, cell culture isolation and Ag ELISA.

Subsequent to the second NSP positive test result of the 1st of June 2015, serum samples were also sent to the WRLFMD and were confirmed positive on the 8th of June 2015, using serotype A-specific VNT and liquid-phase blocking ELISA. As the use of a FMDV serotype A vaccine is prohibited in Taiwan, the National Laboratory (Animal Health Research Institute, AHRI) on the 9th of June 2015 attributed the serological reactivity to an infection due to the aforementioned serotype.

The positive animal was culled on 10th of June 2015 and further epidemiological investigations and intensified surveillance of surrounding cloven-hoofed animal farms are underway in the area. Only one animal was reported as involved in this episode. Origin of outbreak is unknown or inconclusive.

Sanitary control measures applied are: stamping out, quarantine, movement control inside the country, screening, zoning disinfection of infected premises/establishments. Vaccination is prohibited and animals present in the outbreak are not being treated. Location of outbreak is reported in Map 2.

Map 2: Location of FMD outbreak reported in June 2015, in Kinmen County, China (Taiwan Province).



China (Hong Kong, SAR) [2]

Following the last outbreak reported in China (Hong Kong, SAR) caused by FMDV serotype O in October 2014, two of the four porcine tissue samples (3 epithelium and 1 foot) collected at the end of April 2015, were also confirmed as positive by the WRLFMD for the same serotype. The clinical samples positive for FMDV in all tests employed

were the epithelia. Since at least 2005, FMDV O/CATHAY has been the principal strain circulating, with reports of circulation also of FMDV O/SEA/Mya-98 limitedly to 2010 and 2011. It is important to verify to which genotype the latest field isolates belong, as well as, their behaviour in vaccine matching tests for the evaluation of an eventual appropriate vaccine intervention.

Mongolia [2]

The FMDV viruses of the four bovine tissue samples collected during February 2015 in Mongolia, during which period an outbreak of FMD was reported to the OIE, were genotyped as FMDV O/SEA/Mya-98. Location of collection of samples is not reported. Most closely related field virus to the Mongolian field isolates is O/MAY/2/2014, having a sequence identity (seq. id.) of 99.37% while most closely related reference virus is O/MYA/7/98 (DQ164925) with a seq. id. of 92.18 %. Detailed information on the serotyping, genotyping and vaccine matching tests results reported in this document is contained in the WRLFMD Quarterly Report (April – June, 2015). Field strains circulating in the last two years in Mongolia for the same serotype were O/ME-SA/PanAsia and O/SEA/MYA-98, respectively.

Rep. of Korea [1,2]

The FMD outbreaks caused by FMDV serotype O, reported in Rep. of Korea and occurring between the 3rd of December 2014 and 28th of April 2015 in pigs and cattle, were reported as resolved on the 19th of June 2015. The number of outbreaks registered during the period in WAHID was 185. The last reported strain by the WRLFMD was FMDV O/SEA/Mya-98 from outbreaks occurring in July 2014.

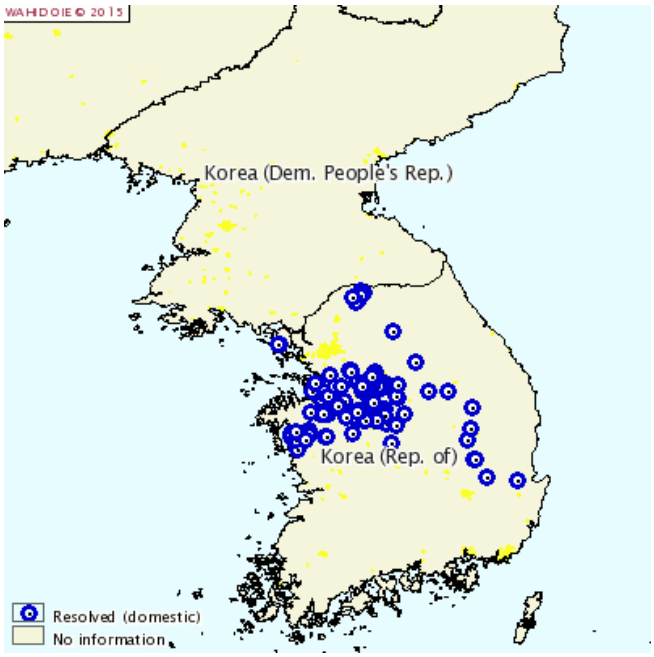
All infected animals were destroyed, however the origin of the start of the events remains unknown. The control measures applied in the course of the outbreaks were: control of wildlife reservoirs, quarantine, movement control inside the country, screening, zoning, vaccination in response to the outbreaks, disinfection and disinfestation and modified stamping out.

Summary of the animals involved and location of the events are respectively reported in Table 3 and Map 3.

Table 3: summary of the animal species involved in the FMD outbreaks reported between December 2014 and April 2015 in Rep. of Korea.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered
Cattle	239	6	0	6	0
Swine	466,793	155,761	0	160,350	0
Totals	**467,032**	**155,767**	**0**	**160,356**	**0**

Map 3: Location of FMD outbreaks, reported in June as resolved that occurred between December 2014 and April 2015 in Rep. of Korea.



Russian Federation [1, 10]

The Russian Research Institute for Animal Health (FGBI-ARRIAH) during June continued providing support in the provision of materials and advice respectively to the Federal Service for Veterinary and Phytosanitary Surveillance of the Ministry of Agriculture of the Russian Federation and to the Veterinary services of the Russian Federation Subjects. The laboratory is carrying out studies on the immunobiological properties of FMDV serotupe O. During June, 9,117 sera were tested for the presence of FMD antibodies for post-vaccination monitoring.

Vaccination in response to the FMD outbreaks by serotype A, that occurred in January 2014 and reported as resolved on the 2nd of June, involving cattle and pigs in Zabajkal`Skij Kray, Russian Federation is continuing and a summary of the activity is reported in Table 4.

Table 4: location and species vaccinated for FMD in Zabajkal`Skij Kray, Russian Federation reported in June 2015 (details of serotypes used for vaccination not reported).

Administrative division	Species	N° vaccinated
ZABAJKAL`SKIJ KRAY	Sheep / goats	10,517
	Cattle	11,881
	Cattle	4080
Total Vaccinated		**26,478**

Southeast Asia [11]

There are no reports of FMD outbreaks for June 2015, in the countries listed in Table 5. The updated number of episodes ongoing from the previous months is 235. The last reported outbreak was in Malaysia, in May 2015. The circulating FMDV serotypes are A, Asia 1 and O. Location of outbreaks is presented in Map 4.

Table 5: Summary of FMDV outbreaks reported as ongoing during June 2015 in the countries of the Southeast Asia area listed below.

Countries	Apr-15	May-15	Continuing Outbreaks
Cambodia	0	0	**142**
Myanmar	0	0	**3**
Malaysia	1	1	**49**
Thailand	0	0	**4**
Viet Nam	0	0	**38**
Total			**236**

Map 4: Location of FMD outbreaks reported as ongoing during June 2015 in the countries of the Southeast Asia area listed in Table 2 (SEAFMD).

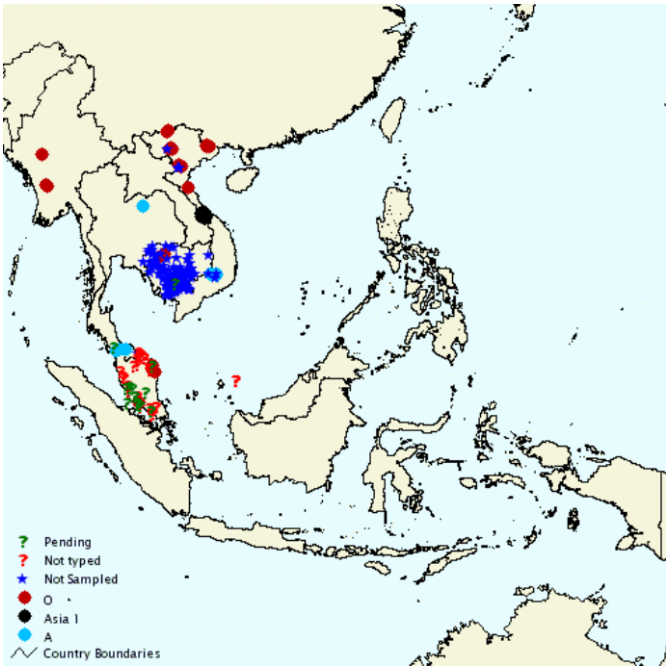


Table 6: Summary of the history of FMD Pool 1, 2012 – 2014, for geographic distribution see Map 5 below.

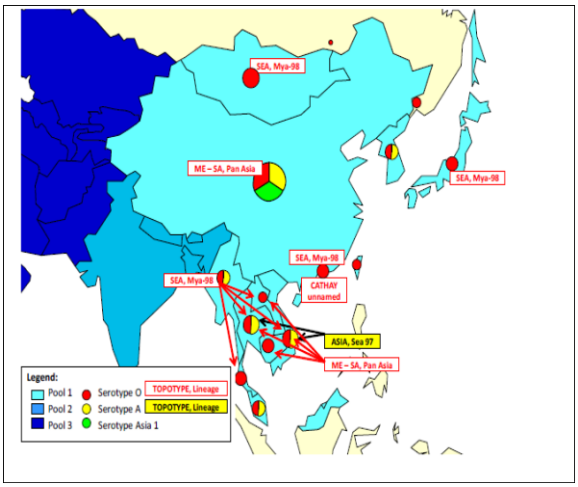
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Cambodia	O, 2013-2014/NOT SAMPLED	Apr 2015/O, Aug 2014/ not typed	See text Typing required
China (People's Rep. of)	2012-2013/O, 2013/A,	Apr 2015/O, May 2015/A	
China (Hong Kong, Sar)	O	Oct 2014/O	See text
China (Taiwan Province)	2012-2013/O,	Jun 2015/A	See text
Korea (DPR)	2012-2013/DISEASE ABSENT	May 2014/not confirmed, July 2014/O	
Korea (Rep. of)	2012-2013/DISEASE ABSENT	April 2015/O	See text
Laos PDR	2012/DISEASE PRESENT WITH	Mar 2013/O	

	QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS		
Malaysia	2012 –2013/O 2013/NOT TYPED	Apr 2015/O	See text Typing required
Mongolia	2013/A	Sept 2013/A, May 2015/O	See text
Myanmar	2012-2013/O	Apr 2015/O, July 2014/ not typed	See text Typing required
Russian Federation	2012/O, 2013/A	March 2015/O and A	See text
Thailand	O, A and NOT TYPED	Jun 2014 /A, Oct 2012/O, Sept 2014/not typed	See text Typing required
Vietnam	O, NOT SAMPLED 2013- 2014/A,	Apr 2015/A and Asia 1 Jun 2014/O, July 2014/not typed	See text Typing required

Map 5: FMD distribution by serotype and topotype in South East Asia, 2010 – 2014 (EuFMD).

Conjectured circulating FMD viral lineages in pool 1 per 2014 [15]:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/CATHAY
- Serotype A: A/ASIA/Sea-97
- Serotype Asia-1 (not detected in the region since 2005 (Myanmar) and 2006 (P.R. China)



B. POOL 2 – South Asia

India [3]

The PDFMD, Mukteswar detected FMDV serotype O among the 4 clinical samples tested by FMDV antigen and/or RNA detection methods. The laboratory also conducted genotyping of 4 clinical isolates positive for FMDV serotype O, while 5 field FMDV serotype O positive isolates were subjected to vaccine matching tests.

A total of 29,677 sera were tested for FMDV antibodies for epidemiological studies. FMD diagnosis was carried out using indigenous diagnostic kits developed at PDFMD, Mukteswar.

The laboratory personnel are continuously involved in the investigation of FMD field outbreaks and in providing expert advice to Government, national/local authorities or to other services. The laboratory has ongoing research studies and collaborations with international organisations.

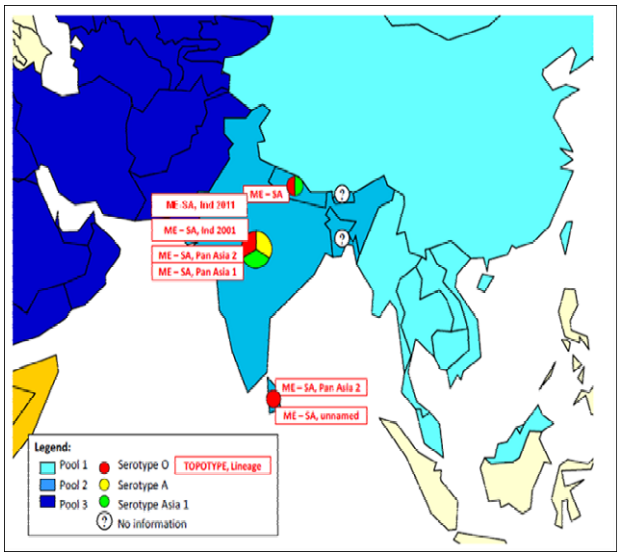
Table 7: Summary of the history of FMD Pool 2, 2012 – 2014, for geographic distribution see Map 6 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment
Bangladesh	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Bhutan	NOT TYPED, 2013/NOT SAMPLED 2013-2014/O	Not available	Follow –up needed
India	O, A, NOT SAMPLED 2012-2013/Asia 1 2013/NOT TYPED	Apr 2015/Asia 1, Jun 2015/O	See text
Nepal	O, 2012-2103/Asia 1	Apr 2014/O	
Sri Lanka	2012 – 2013/O	Sept 2014/O	

Map 6: FMD distribution by serotype and topotype in South Asia, 2011 – 2014 (EuFMD).

Conjectured circulating FMDV lineages in pool 2 per 2014 [15]:

- O/ME-SA/Ind-2001 (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been recognized during 2012-13)
- O/ME-SA/PanAsia-2 (last detected in 2011 in Sri Lanka)
- A/ASIA/IND (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters)



C. POOL 3 – <u>West Eurasia & Middle East</u>

Afghanistan [2]

Twenty-one bovine samples collected during 2013 and 2014 were tested by the WRLFMD using RT-PCR, Ag ELISA and virus isolation and FMDV serotypes Asia 1 and O were detected in one and nine samples respectively, while two samples resulted positive for both serotypes.

The genotyping of the FMDV isolates classified these as Asia1/Asia/Sindh-08 and O/ME-SA/PanAsia-2^{ANT-10}. Most closely related field virus to the FMDV serotype Asia 1 isolates is Asia1/AFG/4/2014, having a seq. id. between 99.53% and 100% while most closely related reference virus is Asia1/PAK/8/2008 with a seq. id. between 94.31 and 94.47%. Most closely related field viruses to the FMDV serotype O isolates are O/PAK/23/2014, with a seq. id. between 98.90% and 99.69% and O/PAK/12/2014 with a seq. id. between 99.37% and 99.69% while, most closely related reference virus is O/IRN/88/2009 with a seq. id. between 94.37 and 95.31%.

In the vaccine matching test, field strain FMDV Asia 1 AFG 04/14 did not match with Asia 1 Shamir.

Algeria [2, 4]

The genotyping of two FMDV VP1 PCR amplicons by the FAO/OIE RL of the IZSLER identified these as O/ME-SA/Ind-2001. The amplicons were obtained from ovine samples collected during the outbreaks of the current year. The two sequences share a 99.4% nucleotide identity, while one of the isolates shares an identity respectively of 98% and 99% to non-Algerian viruses, represented by Libyan field isolates of 2013. The last outbreak reported in Algeria for this episode was in April 2015 and the events mostly involved small ruminants. The episode was reported as resolved on the 3rd of May 2015.

Vaccination in response to the outbreak were ongoing during June 2015, details of which are reported in Table 8, and small ruminants are predominant in receiving the vaccine as also from past reports.

Table 8: location and species vaccinated for FMD in Algeria during June 2015 (details of serotypes used for vaccination not reported).

Administrative division	Species	Total Vaccinated
EL OUED	Cattle	367
EL BAYADH	Cattle	1,810
	Goats	8,374
	Sheep	99,407
Total vaccinated		109,958

Egypt [2]

In the vaccine matching tests, FMDV O and SAT 2 field isolates of 2012 and 2014 partially matched with the vaccine strains. A summary of the results is reported in Table 9.

Table 9: summary of vaccine matching test results for bovine samples collected during 2012 and 2014 in Egypt.

Field Isolates	Vaccines		
	O 3030	O Manisia	O Tur 5/09
O Egy 23/14	NM	NM	M
O Egy 36/14	M	NM	M
	SAT2 Eri	SAT2 Zim	
SAT2 Egy 43/12	M	NM	
SAT2 Egy 24/14	M	NM	

M - suggests close relationship between field isolates and vaccine strain. A potent vaccine containing the vaccine strain is likely to confer protection

NM - little or no close relationship

Oman [2]

Genotyping by the WRLFMD of the FMDVs isolated in three bovine samples all collected at Rumais, Muscat, Oman, during May 2015 identified them as SAT 2/VII/Alx-12. Previous circulation of this serotype was never reported.

Most closely related field virus to these isolates is SAT2/ETH/19/2014, having a seq. id. between 98.15% and 98.30% while most closely related reference virus is SAT2/SAU/6/2000 (AF367135) with a seq. id. between 90.88% and 91.04%.

Pakistan [5]

Sixteen FMD outbreaks were reported during June 2015, throughout Pakistan, FMD Project, GCP/PAK/123/USA, for the Development of a Technical Framework for the Progressive Control of the disease in Pakistan, caused by two of the FMDV serotypes, A and O, with the former serotype being predominant. The outbreaks occurred in the following provinces, Azad Kashmir (7) FATA (2) and Sindh (7). Vaccination was carried out in 57,220 animals and a summary of these activities is presented in Table 10.

Table 10: summary of animals vaccinated in the different livestock production units, during June 2015, in Pakistan

Province	Ring Vaccination	Dairy Colonies	Rural dairy production system	Cost sharing basis*	Government Livestock Farms/ Yaks/ Cholistan desert farming system
Total	575	17,351	28,483	5,069	5,742

*Farmers of dairy colonies are actively participating in the cost-sharing vaccination program.

Members of the Project participated to an Awareness Seminar for livestock farmers. Dr. Muhammad Afzal (Project Coordinator) and Dr. Muhammad Javed Arshed (National Field Officer) briefed the attendees (more than 250) on biosecurity measures, disease reporting, and selection of appropriate vaccine and vaccination for FMD. Farmers' queries regarding FMD and other animal health issues were duly answered and Awareness material such as FMD urdu brochure and urdu leaflet containing information regarding FMD vaccine and vaccination were distributed among the farmers. Eleven Capacity Building Seminars were organized in Punjab to which 88 Veterinary Officers and 55 Field Assistants attended and during which 139 sample collection kits were distributed. During June, meetings were held with the technical staff of Karachi Safari Park to organize the collection of blood samples from FMD susceptible wild mammals, including 12 species.

A summary of the results of the vaccine matching tests, conducted by the WRLFMD, testing field strains of FMDV serotypes Asia 1 and O, isolated during 2014 and 2015, is shown in Table 11. The samples for the vaccine matching tests were chosen from a numerous set of samples (32) collected from cattle and water buffalo between January 2014 and February 2015. FMDV types O (ME-SA/PanAsia-2^{ANT-10}), A (ASIA/Iran-05^{FAR-09} and $^{FAR-11}$) and Asia 1 (ASIA/Sindh-08) were identified in 13, 8 and 5 samples respectively while three samples contained both serotypes O and A and contained all the three serotypes identified in the other samples.

The limited matching results of the FMDV serotype A and Asia 1 strains should be duly considered for the success of the ongoing vaccination campaigns. Furthermore, the latest vaccine matching results for the same FMDV circulating serotypes in some neighbouring countries of Pakistan, such as Afghanistan, Iran and Turkey should also be evaluated to verify the efficacy of the common use of these vaccine strains in these bordering countries.

Table 11: summary of vaccine matching test results for bovine (serotype A) and water buffalo (serotype Asia 1) samples collected during 2014 and 2015 in Pakistan.

Field Isolates	Vaccines		
	A Iran 2005	A22 Irq	A Tur20/06
A Pak 03/15	NM	NM	NM
A Pak 10/15	M	NM	NM
	Asia 1 Shamir		
Asia 1 Pak 35/14	NM		
Asia 1 Pak 1/15	NM		

M - suggests close relationship between field isolates and vaccine strain. A potent vaccine containing the vaccine strain is likely to confer protection

NM - little or no close relationship

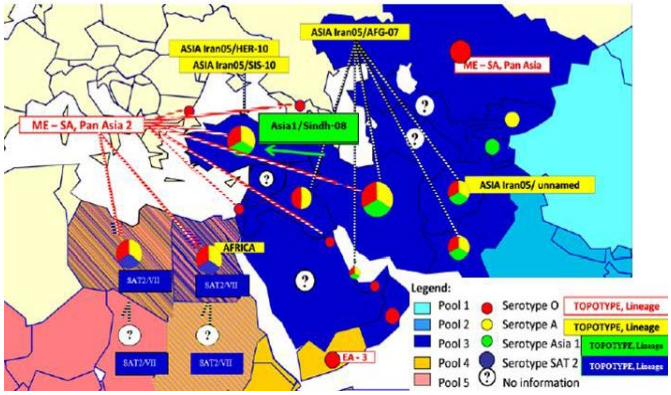
Table 12: Summary of the history of FMD Pool 3, 2012 – 2014, for geographic distribution see Map 7 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment (Genotyping or vaccine matching tests needed for this pool)
Afghanistan	2013/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	2014/A, Asia 1, O	See text
Algeria	2014/O	Apr 2015/O	See text
Armenia	2012-2013/DISEASE ABSENT	Not available	Follow –up needed
Azerbaijan	DISEASE ABSENT	Jun 2001	Follow –up needed
Bahrain	2012 /O	Oct 2014/O	
Egypt	2012, 2014/SAT 2 2012 - 2014/O, A	April 2014/Sat 2, Jan-Mar 2015/A & O	See text
Georgia	DISEASE ABSENT	2002	Follow –up needed
Iran	O, A, 2012-2013/Asia 1	Jun 2013/Asia 1, Apr 2014/O, A	
Iraq	2012-2013/O, A	Dec 2013/A, O	Follow –up needed
Israel	2012-2013/O	Nov 2013/O	Follow –up needed
Jordan	DISEASE ABSENT	2006	Follow –up needed
Kazakhstan	2012/O 2012 –2013/A	Aug 2012/O, Jun 2013/ A	Follow –up needed
Kuwait	2012/O 2013 – 2014/ DISEASE ABSENT	Jan 2012/O	Follow –up needed
Kyrgyzstan	2012-2013/O, A	Apr 2013 /O, A, Aug 2014/NOT TYPED	Typing required
Lebanon	DISEASE ABSENT	2010	Follow –up needed
Libya	NO DATA AVAILABLE	Oct 2013/O	Follow –up needed
Oman	2012-2013/O	Dec 2013, May 2015/SAT 2	See text
Pakistan	DISEASE LIMITED TO ONE OR MORE ZONES	May 2015 / Asia 1, Jun 2015/A, O	See text
Autonomous Territories Palestine	O, 2012-2013 - SAT 2	Mar 2013/Sat 2, Nov 2014/O	
Qatar	2012-2013/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2013/O	Nov 2013/O	
Syrian Arab Republic	DISEASE ABSENT	Mar/2002	Follow –up needed
Tajikistan	2012/NOT TYPED 2013/DISEASE ABSENT	Nov 2011/Asia 1, Nov 2012/ NOT TYPED	
Tunisia	2014/O	Oct 2014/O	
Turkey	Asia 1, A, O, NOT TYPED	Nov 2014/O, Feb 2015/ A and Asia 1	
Turkmenistan	NO DATA AVAILABLE	Not available	Follow –up needed
United Arab Emirates	2012/DISEASE ABSENT 2013-2014/O	Jan 2014/O	Follow –up needed
Uzbekistan	NO DATA AVAILABLE	Not available	

Map 7: FMD distribution by serotype and topotype for West Eurasia and Middle East, 201 – 2014 (EuFMD).

Conjectured circulating FMDV lineages in pool 3 per 2014 [15]:

- O/ME-SA/PanAsia-2 (predominantly from ANT-10 and FAR-09 sub-lineages)
- O/ME-SA/Ind-2001 (recent incursion per 2013 from the Indian sub-continent)
- A/ASIA/Iran-05 (from SIS-12, SIS-10, FAR-11 and BAR-08 sub-lineages)
- Asia-1 (Sindh-08 lineage).



D. POOL 4 – Eastern Africa

Ethiopia [2, 6]

Eight samples collected from unspecified domestic species, collected during 2014 and 2015 from the regions of Addis Ababa, Benshan gul Gumz, Oromia and Somali, were respectively confirmed as positive by the WRLFMD for FMDV serotypes O, SAT 1 and SAT 2.

The National Animal Health Diagnostic and Investigation Centre (NAHDIC), Ethiopia did not receive samples for FMDV diagnosis or was involved in the investigation of outbreaks during June 2015.

Kenya [7]

The Foot-and-Mouth Disease Laboratory, Embakasi, Kenya detected FMDV serotypes A, SAT 1 and SAT 2 respectively using FMD Ag detection ELISA and/or RT-PCR in ten bovine samples collected in Kenya. The same laboratory also carried out post-vaccination monitoring.

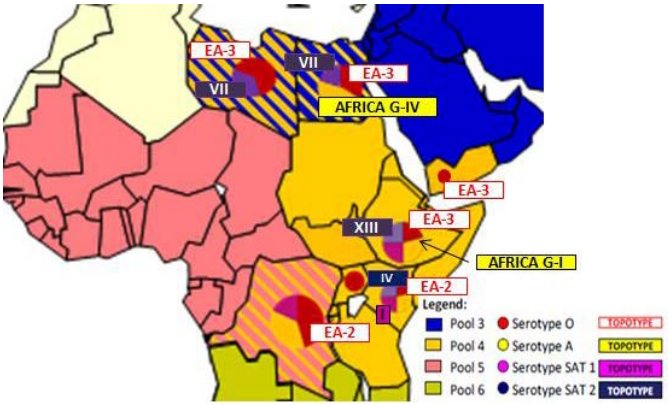
Table 13: Summary of the history of FMD Pool 4, 2012 – 2014, for geographic distribution see Map 8 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 - 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Burundi	NO DATA AVAILABLE	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Congo d. R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Djibouti	DISEASE ABSENT	Not available	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 - 2014/O, A	April 2014/Sat 2, May 2014/A, Oct 2014/O	See text
Eritrea	2012/O	Jan 2012/O	Follow –up needed
Ethiopia	O, 2012/A, SAT 2	Jun 2014/A, Jun 2015/O, SAT 1 and SAT 2, Jan 2015/confirmation pending,	See text
Kenya	O, SAT1, SAT2, 2012 – 2013/A, 2012/NOT TYPED	Jun 2015/ A, SAT1 and SAT 2 Apr 2015/O	See text
Libya	NO DATA AVAILABLE	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Rwanda	2012-2013/A, O, SAT1, SAT 2	Nov 2012/not typed	Typing required
Somalia	2012/NOT SAMPLED 2013 – 2014/ NO DATA AVAILABLE	2011	Follow –up needed

Sudan	O, 2013/SAT 2, 2013-2014/NOT TYPED	2013/O, SAT2	Follow –up needed
South Sudan	NO DATA AVAILABLE	2011	Follow –up needed
Tanzania	2012/O 2012-2013/A, SAT 1, SAT 2,	Mar 2013/O Apr2013/ A, SAT 1, SAT2	
Uganda	2012/O, SAT 1 2012-2013/NOT TYPED	May 2014-Jan 2015/O, A, SAT1, 2 and 3	Genotyping required
Yemen	2012/O 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed

Map 8: FMD distribution by serotype and topotype for East Africa. 2011 – 2014 (EUFMD)

East Africa is known to be endemic for FMD, but currently available data are limited.



Conjectured circulating FMDV lineages in pool 4 per 2014 [15]:

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

E. POOL 5 – West / Central Africa

Cameroon [8]

The Laboratoire National Vétérinaire (LANAVET) tested more than 200 bovine samples using a FMDV pan-serotypic RT-PCR of which nine resulted positive. The laboratory is currently out of stock for serological kits for FMD, but is continuing its research collaborative projects with Plum Island Animal disease Centre and Ohio State University, USA by collecting samples to send to them.

Ghana [12]

The ACCRA Veterinary Laboratory for June 2015 did not report FMD outbreaks in Ghana, while serum samples were tested for FMDV antibodies.

Mauritania [2]

Four FMDV positive samples collected from cattle during the outbreak that occurred in December 2014 were genotyped by the WRLFMD as SAT2/VII/unnamed. Most closely related field virus to these isolates is SAT2/NIG/1/2012 with a seq. id. between 97.69% and 98.15% while most closely related reference virus is SAT2/CAR/8/2005 (JX570616) with a seq. id. of 90.28%. Detailed information is contained in the WRLFMD

Quarterly Report (April – June, 2015). The high sequence identity between the field isolates from Mauritania and Nigeria confirms the movement of the FMDV through sahelian susceptible animals or their commodities.

Nigeria [13]

The National Veterinary Research Institute for June 2015 did not report FMD outbreaks in Nigeria.

Table 14: Summary of the history of FMD Pool 5, 2012 – 2014, for geographic distribution see Map 9 below.

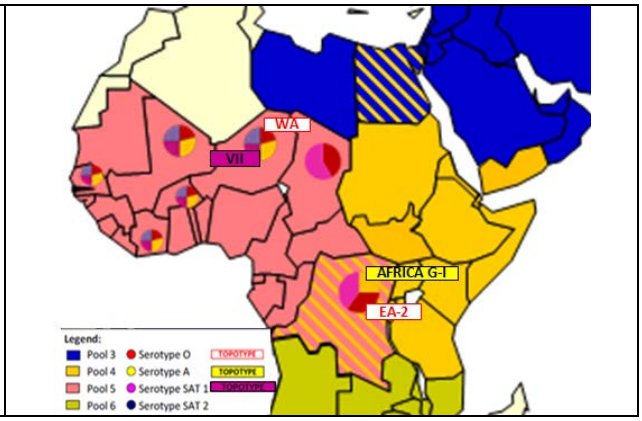
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2014	Last outbreak reported/serotype[#]	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	
Burkina Faso	SEROTYPES NOT REPORTED	2013/ not available	Follow –up needed
Cameroon	SEROTYPES NOT REPORTED	Apr 2014/ A, Nov 2014/O, SAT 2, May 2014/SAT 1, Jun 2014, Jan 2015 and Jun 2015/untyped	See text
Cape Verde	NO DATA AVAILABLE	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	
Chad	2012 – 2013/SEROTYPES NOT REPORTED	Not available	
Congo D. R.	2012 – 2013/A, O, SAT 1	Jun 2013/not typed	Typing required
Congo R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Cote D'Ívoire	2012/A, NOT SAMPLED 2013/ SEROTYPES NOT REPORTED	Jun 2013/not typed	
Equatorial Guinea	DISEASE SUSPECTED BUT NOT CONFIRMED	Not available	Follow –up needed
Gabon	NO DATA AVAILABLE	Not available	
Gambia	NO DATA AVAILABLE	2012/O	
Ghana	2012 – 2014/SEROTYPES NOT REPORTED	2014/not available	See text
Guinea Biss.	DISEASE ABSENT	No data available	Follow –up needed
Guinea	2012-2013/ DISEASE ABSENT	2014/not available	
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2012/DISEASE ABSENT 2013/ SEROTYPES NOT REPORTED	2011/2012, no precise data	
Mauritania	2012-2013/NO REPORTED OUTBREAKS	Dec 2014/SAT 2	See text
Niger	2012 – 2014/NOT SAMPLED	2014/not sampled	Identification required
Nigeria	2012 – 2014/NOT SAMPLED	Sept 2014/0, SAT 1 and SAT 2, Feb 2015/ A	Genotyping required Follow –up needed
Sao Tome Principe	2012/DISEASE ABSENT, 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Senegal	2012, 2014/NO DATA AVAILABLE 2013/DISEASE ABSENT,	2014/ SAT 1 Feb 2015/ A and O	See text Follow –up needed
Sierra Leone	DISEASE ABSENT	Oct 1958	Follow –up needed

Togo	O, SAT 1, 2013/NOT TYPED	2012/O	Follow –up needed

Map 9: FMD distribution by serotype and topotypes for West Africa, 2011 – 2014 (EuFMD)

Conjectured circulating FMDV lineages in pool 5 per 2014 [15]:

- Serotype O (topotypes WA, EA-3 (Nigeria))
- Serotype A (topotype AFRICA, genotypes IV and VI)
- Serotype SAT 1
- Serotype SAT 2 (topotype VII)



F. POOL 6 – SOUTHERN AFRICA

Botswana [1]

A clinical FMD outbreak was detected on the 21st of June 2015 in a cattle crush in Chobe, Botswana. Confirmation of the outbreak is pending and is being carried out by the Botswana Vaccine Institute (OIE's Reference Laboratory) using virus isolation.

The outbreak is suspected in the FMD vaccination zone 1, in the northern part of Botswana, close to the border with Namibia. Grazing of the animals involved, is in a communal area adjacent to a wildlife management area where African buffaloes are present. The FMD cases are limited to 11 calves aged between 4-7 months and 2 adult animals, one of which was newly introduced from FMD free zones and is the animal with the oldest lesions. Source of the outbreak is reported as being due to contact with wild species. Sanitary measures being applied are quarantine, disinfection and ring vaccination with a trivalent vaccine, containing FMDV serotypes SAT 1, 2, 3, is being applied in a 10 km radius zone. Affected animals are not being treated.

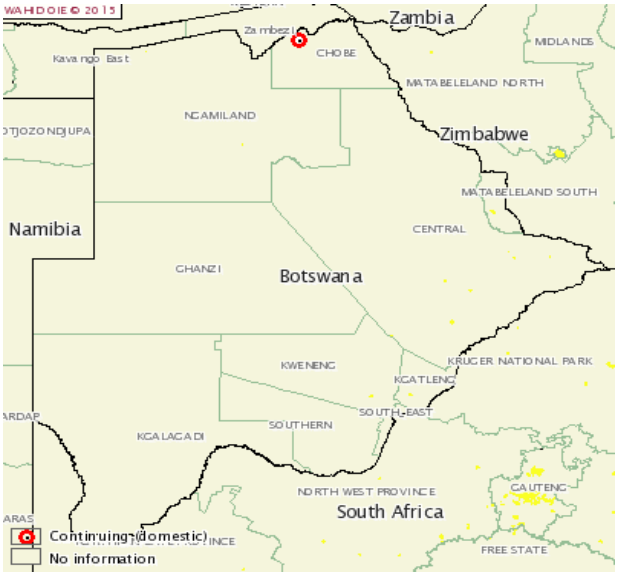
Summary of species involved and location of outbreaks are reported in Table 15 and Map 10 respectively.

Table 15: summary of the number of bovines involved in the FMD outbreaks reported in June 2015 Chobe, Botswana.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	218	13	0	0	0	5.96%	0.00%	0.00%	0.00%

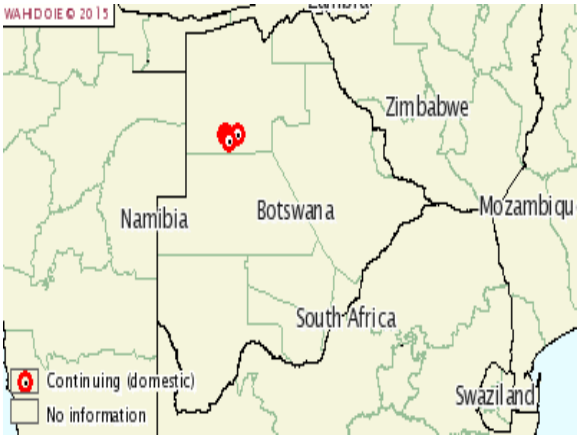
*Removed from the susceptible population through death, destruction and/or slaughter

Map 10: Location of FMD outbreak reported in June 2015 in Chobe, Botswana.



Following the five FMD outbreaks due to FMDV serotype SAT2 that occurred during March and April 2015, in Ngamiland Botswana (Map 11), a booster vaccination campaign in areas with low coverage is being conducted, together with passive and active clinical surveillance. Booster vaccination has been completed. Surveillance in the outbreak area and surrounding crushes continues and 9,716 cattle were identified and visually inspected in the grazing areas but no evidence of clinical disease was observed.

Map 11: Location of FMD outbreaks reported between March and April 2015 in Ngamiland Botswana.



Mozambique [1, 2]

A clinical FMD outbreak was detected on the 20th of May 2015 in cattle in a village of Maputo, Mozambique, close to the border with the RSA. A preliminary laboratory diagnosis was carried out by the Central Veterinary Laboratory of the Agricultural Research Institute of Mozambique (National laboratory) on the 27th of May using a NSP ELISA. Further confirmation is being carried out by the Botswana Vaccine Institute by virus isolation and serotyping and by virus neutralisation test. The disease is present in cattle of all ages and both sexes that are presenting mouth and foot lesions, hypersalivation and fever. The affected area is in the FMD control zone near Kruger National Park in South Africa and Limpopo National Park in Mozambique. The source of the outbreak is attributed to contact with wild species. In fact, the current drought in the area is causing the concentration of high

number of stock in a few water bodies and consequently increasing the movement of susceptible animals and the risk of contact with wildlife species. Control measures being adopted are quarantine, movement control inside the country, screening, disinfection. Vaccination in response to the outbreaks will be applied while affected animals are not treated.
Summary of species involved and location of outbreaks are reported in Table 16 and Map 12 respectively.
FMDV isolated from four bovine tissue samples collect during 2014, were all genotyped as FMDV serotype SAT 2/I/unnamed. Most closely related field virus to these isolates is SAT2/MOZ/4/2014* (BVI), having a seq. id. between 99.53% and 100% while most closely related reference virus is SAT2/SA/106/59 (AY593848) with a seq. id. between 82.72% and 83.18%. Two of the genotyped field strains (SAT 2 MOZ 02/14 and 04/14) used in the vaccine matching tests matched with the vaccine strains employed (SAT 2 Eri and SA2 ZIM), except for SAT 2 MOZ 02/14 with SAT 2 Eri.

Table 16: summary of the number of bovines involved in the FMD outbreaks reported in May 2015 Maputo, Mozambique.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	15,000	35	0	0	0	0.23%	0.00%	0.00%	0.00%

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

Map 12: Location of FMD outbreak reported in May 2015 in Maputo, Mozambique.

Namibia [1]

A total of 14 FMD outbreaks in cattle caused by FMDV SAT 2 occurred during May and June 2015 in Ohangwena, Oshikoto, Omusati Kavango West, Namibia.
Laboratory diagnosis was confirmed on the 12th of June 2015 by the Central Veterinary Laboratory (National laboratory) using liquid-phase blocking and NSP ELISAs and real-time PCR.

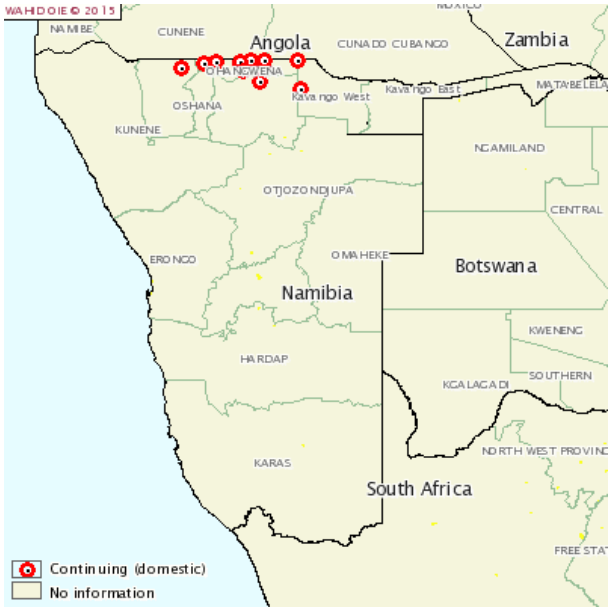
The source of the outbreak is unknown. Control measures being adopted are quarantine, movement control inside the country, screening, zoning, disinfection and vaccination in response to the outbreaks while affected animals are not treated.
Summary of species involved and location of outbreaks are reported in Table 17 and Map 13 respectively.

Table 17: summary of the number of bovines involved in the FMD outbreaks reported during May and June 2015 in Ohangwena, Oshikoto, Omusati Kavango West, Namibia.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	2737	154	0	0	0	5.63	0.00%	0.00%	0.00%

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

Map 13: Location of FMD outbreaks reported in May and June 2015 in Namibia.



RSA [9]

The ARC-Onderstepoort Veterinary Institute tested for FMDV by RT-PCR five samples with one resulting positive and typing of this is underway. Liquid-phase blocking ELISA for antibodies against FMDV serotypes SAT 1, SAT 2 and SAT 3 and NSP ELISA were used to test 5,427 and 171 samples, respectively.
The laboratory personnel are involved in the investigation of FMD field outbreaks and in providing expert advice to Government, national/local authorities or to other services. The laboratory has ongoing research studies and collaborations with international organisations.

Zimbabwe [1, 2]

Three clinical FMD outbreaks were detected on the 15th of June in cattle in a village of Midlands, Zimbabwe. Diagnosis is being conducted by the Central Veterinary Laboratory (National laboratory) using solid-phase blocking ELISA and serotyping is pending.

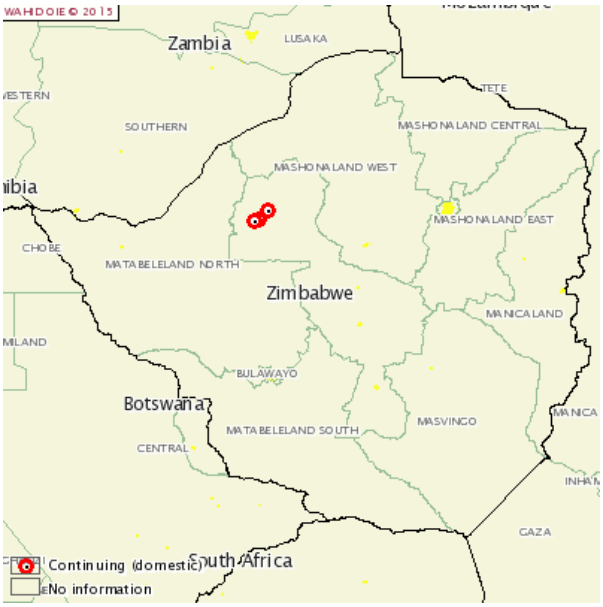
The three affected dip tanks are just outside Chirisa Game Park were wild buffaloes are resident. As for Mozambique, the drought situation in this area has obliged the communal farmers in taking their cattle into the game park for grazing. The source of the outbreaks is due to contact with wild species.
Cattle in the area had last been vaccinated in 2013. The whole district of Gokwe South has been put under quarantine with vaccination of all cattle in the interface starting on 22nd of June 2015. Intensive surveillance is being carried out in the areas immediately surrounding the vaccinated zone. Control measures being applied are control of wildlife reservoirs, quarantine and movement control inside the country. No treatment is being administered to affected animals. Summary of species involved and location of outbreaks are reported in Table 18 and Map 14 respectively.

Table 18: summary of the number of bovines involved in the FMD outbreaks reported in June 2015 in the Midlands, Zimbabwe.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	4,847	36	0	0	0	0.74%	0.00%	0.00%	0.00%

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

Map 14: Location of FMD outbreaks reported in June 2015 in the Midlands, Zimbabwe.



Other twenty-nine FMD outbreaks have been reported further to the first episode observed on the 1st of April 2015 in Matabeleland South, Zimbabwe, some of which are already reported as resolved. Source of the outbreaks has been attributed to illegal movement of animals, contact with infected animals at grazing/watering and contact with wild species. Surveillance is being carried out in the area through weekly inspections of the affected premises and of all properties within a 20-km-radius zone. Continuing new episodes are due to the local spread from infected communal dip tank areas to adjacent ones with the mixing of animals as they pass from watering to grazing. Outbreaks are occurring in routine vaccination areas (Chiredzi, Manicaland and Mwenezi) as routine FMD vaccinations in these areas are long overdue. These areas adjacent to national parks with resident wild buffalo where cattle and wildlife share grazing and watering points. Available vaccine was not adequate to cover all

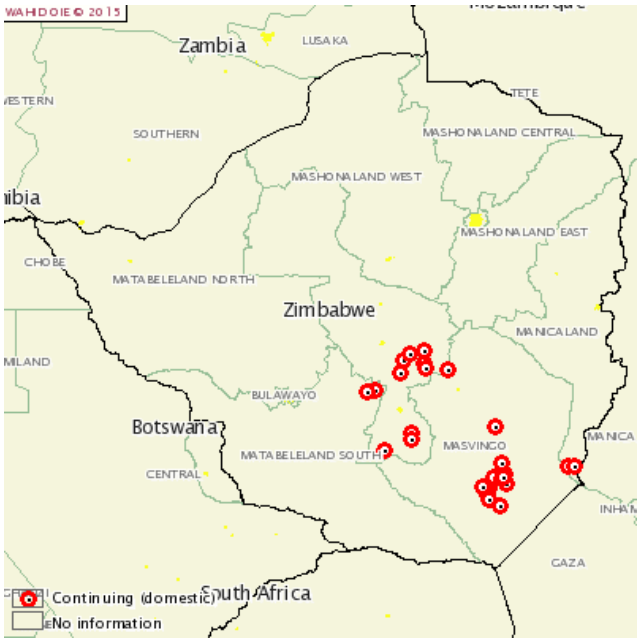
affected areas and has been directed to a 10 km cordon area that has been created to prevent further spread of the outbreaks to the north and west of the country. Affected districts are under quarantine and controlled movement is being allowed outside the prescribed infected areas. Limited movement is being allowed within the infected districts to access grazing and water as well as for direct slaughter at designated abattoirs.
Summary of species involved and location of outbreaks are reported in Table 19 and Map 15 respectively.

Table 19: summary of the number of bovines involved in the other twenty-nine FMD outbreaks have been reported further to the first episode observed on the 1st of April 2015 in Matabeleland South, Zimbabwe.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	42,812	790	0	0	0	1.85%	0.00%	0.00%	0.00%

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

Map 15: Location of FMD outbreaks of the other twenty-nine FMD outbreaks reported further to the first episode observed on the 1st of April 2015 in Matabeleland South, Zimbabwe.



Two FMD outbreaks in cattle initially diagnosed on clinical basis that started on the 13th of April in Matabeleland South, Zimbabwe are reported on the 28th of June as resolved. Diagnosis was confirmed on the 17th of April 2015 by the Central Veterinary Laboratory (National laboratory) using reverse transcription - polymerase chain reaction (RT-PCR). Virus isolation is ongoing at the Botswana Vaccine Institute Laboratory (OIE's Reference Laboratory). As in the previously described cases, source of the outbreaks is due to the Illegal movement of animals and contact with infected animal(s) at grazing/watering. The infected farms are still under quarantine and movement are allowed to send animals only for direct slaughter at prescribed abattoirs. Weekly inspections are currently ongoing; no new cases were detected at Koce, Mbokodo, Weebit, Umkayeni and Weldene farms. New cases were detected at the two infected farms that share fences with Mbokodo. These were a result of direct spread from Mbokodo. All infected farms and surrounding areas within 20 km radius have been vaccinated to prevent further spread as reported in Table 20. Control measures being applied are quarantine, movement control inside the

country, screening, zoning. Summary of species involved and location of outbreaks are reported in Table 21 and Map 16 respectively.

Table 20: location and species vaccinated for FMD in Matabeleland South, Zimbabwe during June 2015 (details of serotypes used for vaccination not reported).

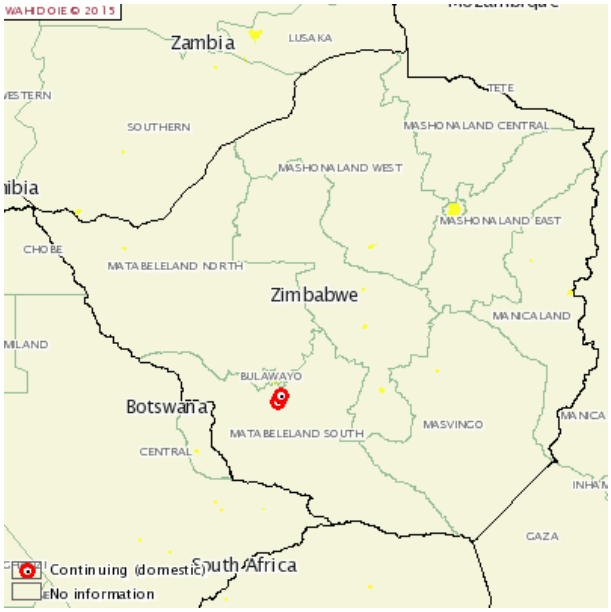
Administrative division	Species	Total Vaccinated	Details
MATABELELAND SOUTH	Cattle	40,000	First round of cattle vaccination done with 28-day booster vaccination to follow
MATABELELAND NORTH	Cattle	17,000	

Table 21: summary of the number of bovines involved in the two FMD outbreaks of the 13th of April 2015 in Matabeleland South, Zimbabwe.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	631	12	0	0	0	1.90%	0.00%	0.00%	0.00%

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

Map 16: Location of involved in the two FMD outbreaks of the 13th of April 2015 in Matabeleland South, Zimbabwe.



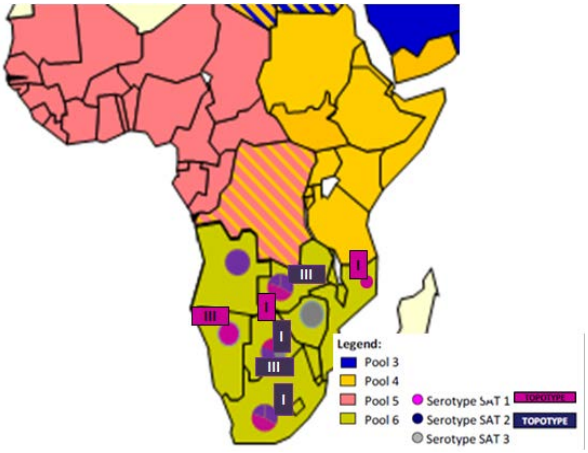
The WRLFMD detected FMDV serotype SAT 2 in six of the 13 bovine samples collected in 2010, 2011 and 2014. The genotypes of the positive isolates were respectively identified as SAT 2/I/unnamed and SAT 2/II/unnamed. Most

closely related field viruses to the these isolates are SAT2/MOZ/1/2010 (seq. id. 99.69%), SAT2/ZIM/1/2004 (BTy plaque 5) (seq. id. 96.14%), SAT2/ZIM/11/2014 (BVI) (seq. id. 100%) and SAT2/ZIM/12/2002 (seq. id. 93.52%) while most closely related reference viruses are SAT2/SA/106/59 (AY593848) (seq. id. 83.18%) SAT2/ZIM/14/2002 (KF219689) (seq. id. 93.53-94.14%) SAT2/ZIM/7/83 (AF136607) (seq. id. 90.28%).
The FMDV serotype SAT 2 positive isolates (SAT 2 ZIM 01/14 and 03/14) matched with the vaccine strains SAT 2 Eri and SAT 2 ZIM in the vaccine matching tests.

Table 22: Summary of the history of FMD Pool 6, 2012 – 2014, for geographic distribution see Map 17 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013/DISEASE ABSENT 2014/NO DATA AVAILABLE	May 2015/ SAT 2	Follow –up needed
Botswana	2012-2014/SAT 2 2014/SAT 1	Jun 2015/typing pending Mar 2015/SAT 2, Oct 2014/SAT 1	See text Typing required
Congo D. R.	2012 – 2013/A, O, SAT 1	Jun 2013/not typed	Follow –up needed
Malawi	2012 -2013/NO REPORTED OUTBREAKS	Oct 2011	Follow –up needed
Mozambique	2012 -2013/DISEASE ABSENT, 2014/NO DATA AVAILABLE	Oct 2014/SAT 2, Jun 2015/ typing pending	See text Typing required
Namibia	2012-2013/SAT 1	Jun 2015/SAT 2	See text Typing required
South Africa	2012/SAT 2 2013/SAT 1	Aug 2013/SAT 1, Nov 2014/ SAT 2	See text Genotyping required
Zambia	2012/SAT 1, SAT 2	Jan 2013/SAT 1, SAT 2	Follow –up needed
Zimbabwe	2012-2013/SAT 2 2013/SAT 3 2014/SAT 1	Jun 2013/SAT 3, Sept 2014/SAT 1, Jun 2015/typing pending	See text

Map 17: FMD distribution by serotype and topotype for southern Africa, 2011 – 2014 (EuFMD)



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

Conjectured circulating FMDV lineages in pool 6 per 2014 [15]:

- Serotype SAT 1 (topotypes I, II and III)
- Serotype SAT 2 (topotypes I, II and III)

Serotype SAT 3 (topotypes I, II and III)

G. POOL 7 – South America

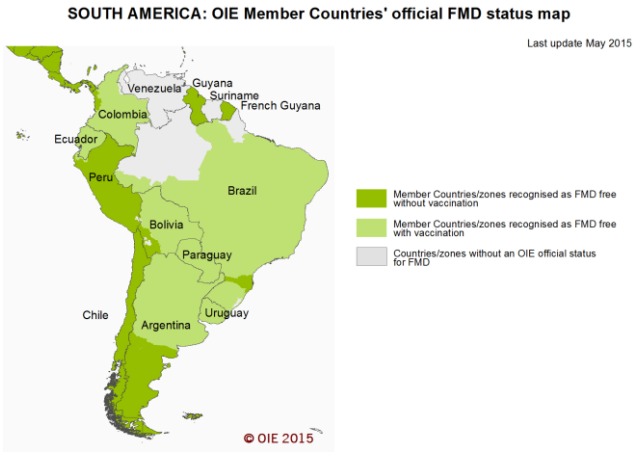
South America [1,14]

The OIE FMD status of the countries in South America as in April 2015 is presented in Map 18. Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the OIE maps (see: http://www.oie.int/en/animal-health-in-the-world/official-disease-status/fmd/en-fmd-carte/). Small areas of the continent may still be considered as endemic but clinical cases are rare (Table 23 and Map 18). The FMD history between 2011 –2013 given in Table 23.

Table 23: Summary of the history of FMD Pool 7, 2012 – 2014, for geographic distribution see Map 18 below

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Ecuador	DISEASE ABSENT	Aug 2011/O	
Paraguay	DISEASE ABSENT	Dec 2011/O	
Venezuela	DISEASE ABSENT	2011/O, A	National situation needs verification

Map 18: FMD distribution for South America [1].



IV. OTHER NEWS:

[2]The WRLFMD Quarterly Report April – June 2015 has published the following table (Table 24) that contains a list of FMDV strains for FMD-Free countries antigen banks. The discussion of this table is within the report.
The WRLFMD is at present working to adopt a risk-based approach for identifying FMDV lineages and relate these to priority vaccines for use in Europe and other FMD-free settings.

Table 24: Recommendations by the WRLFMD® on fmd virus strains to be included in FMDV antigen banks (for FMD -free countries) – June 2015
Note: Virus strains are NOT listed in order of importance

High Priority	O Manisa O PanAsia-2 *(or equivalent)* O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 *(or A TUR 06)* A22 Iraq SAT 2 Saudi Arabia *(or equivalent i.e. SAT 2 Eritrea)*
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 (or Thai equivalent such as A/Sakolnakorn/97) A Argentina 2001 O Taiwan 97 *(pig-adapted strain or Philippine equivalent)*
Low Priority	A Iran '96 A Iran '99 A Iran 87 or A Saudi Arabia 23/86 *(or equivalent)* A15 Bangkok related strain A87 Argentina related strain C Noville SAT 2 Kenya SAT 1 Kenya SAT 3 Zimbabwe

V. REFERENCES - Superscripts

1. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
2. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org
3. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (*Dr B. B. Dash*) FAO
4. OIE/FAO Reference Laboratory (RL) for Vescicular Diseases of the Istituto Zooprofillatico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER), Brescia, Italy
5. Progressive Control of Foot and Mouth Disease in Pakistan, GCP/PAK/123/USA - (*Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator)
6. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - (*Dr. Daniel Gizaw*)
7. National FMD Reference Laboratory, Embakasi, Kenya - (*Dr. Abraham Sangula*)
8. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - (*Dr. Simon Dickmu Jumbo*)
9. ARC-Onderstepoort Veterinary Institute, Republic of South Africa - (*Dr LE Heath/Ms E Kirkbride*)
10. Regional Reference Laboratory for FMD (ARRIAH, Russia) - (Dr. Svetlana Fomina)
11. SEAFMD, http://www.arahis.oie.int/reports.php?site=seafmd
12. ACCRA Veterinary Laboratory, Ghana - (*Dr. Joseph Adongo Awuni)*
13. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - (Dr. Ularamu Hussaini)
14. 42a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa, Quito, Ecuador, 16-17 April, 201.http: //ww2.panaftosa.org.br/cosalfa42/
15. OIE/FAO FMD Reference Laboratory Network, Annual Report 2013