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# Emergence and spread of FMDV Serotype O

Mohamed Sirdar

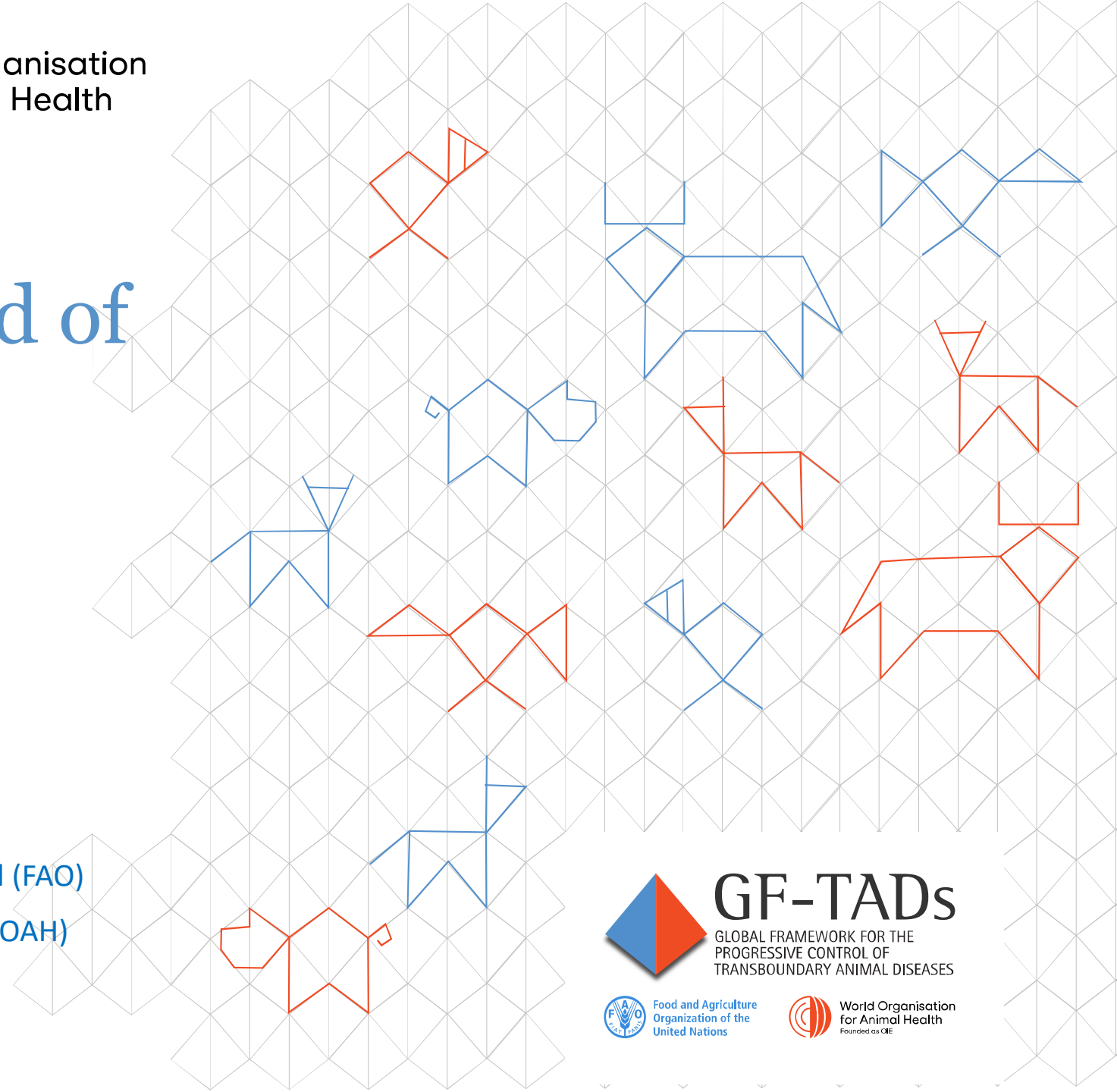
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GF-TADs FMD Working Group

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Neo Mapitse, Bolortuya Purevsuren, Mohamed M. Sirdar (WOAH)

Fabrizio Rosso (EuFMD)



**GF-TADs**

GLOBAL FRAMEWORK FOR THE  
PROGRESSIVE CONTROL OF  
TRANSBOUNDARY ANIMAL DISEASES



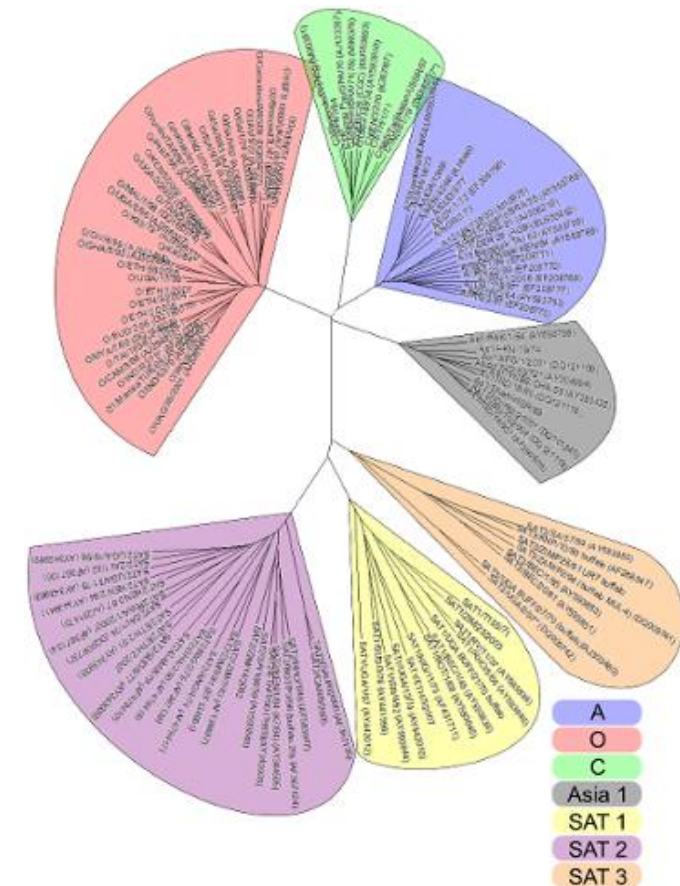
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## Foot-and-mouth Disease serotypes

- ❑ There are 7 different (serotypes) of FMDV: Serotypes O, A, C, O, Asia 1, SAT 1, SAT 2 and SAT 3
- ❑ One serotype does not confer immunity against another
- ❑ The O serotype is divided into eleven topotypes
- ❑ Serotype O is the most widely distributed of all the 7 serotypes
- ❑ Serotype O is the most prevalent and distributed form of FMDV spreading across all the 7 epidemiological pools
- ❑ Serotype O is highly transmissible between susceptible hosts and might present with severe clinical signs in affected animals based on several factors



Genetic relationship (using VP1 sequences) between FMDV serotypes

# FMDV Serotype O (Africa)

EAST AFRICA 1 (EA-1)				
LINEAGE	SUB-LINEAGE	ISOLATE NAME	ACCESSION NO.	REFERENCE
-	-	O/K83/79* (Kenya)	AJ303511	Samuel and Knowles, 2001
-	-	O/K40/84* (Kenya)	KY091280	Knowles <i>et al.</i> , 2016a
-	-	O/UGA/5/96	AJ296327	Samuel and Knowles, 2001

EAST AFRICA 2 (EA-2)				
LINEAGE	SUB-LINEAGE	ISOLATE NAME	ACCESSION NO.	REFERENCE
-	-	O/MAL/1/98	DQ165074	Knowles <i>et al.</i> , 2005a
-	-	O/UGA/3/2002	DQ165077	Knowles <i>et al.</i> , unpub.
-	-	O/KEN/5/2002	DQ165073	Knowles <i>et al.</i> , unpub.
-	-	O/TAN/2/2004	KF561679	Kasanga <i>et al.</i> , 2015

EAST AFRICA 3 (EA-3)				
LINEAGE	SUB-LINEAGE	ISOLATE NAME	ACCESSION NO.	REFERENCE
-	-	O/SUD/2/86	DQ165075	Knowles <i>et al.</i> , 2005a
-	-	O/ETH/3/2004	FJ798109	Ayelet <i>et al.</i> , 2009
-	-	O/ETH/2/2006	FJ798127	Ayelet <i>et al.</i> , 2009
-	-	O/ETH/1/2007	FJ798137	Ayelet <i>et al.</i> , 2009

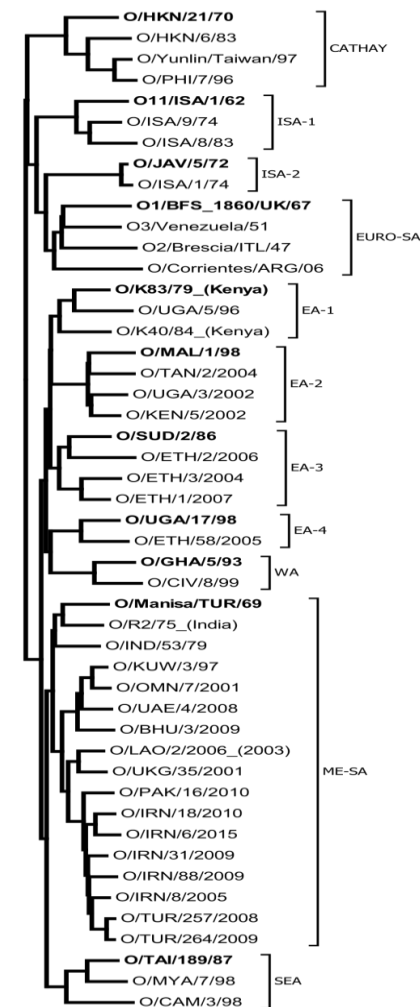
EAST AFRICA 4 (EA-4)				
LINEAGE	SUB-LINEAGE	ISOLATE NAME	ACCESSION NO.	REFERENCE
-	-	O/UGA/17/98	HM211075	Ayelet <i>et al.</i> , 2009
-	-	O/ETH/58/2005	FJ798141	Ayelet <i>et al.</i> , 2009

WEST AFRICA (WA)				
LINEAGE	SUB-LINEAGE	ISOLATE NAME	ACCESSION NO.	REFERENCE
-	-	O/GHA/5/93	AJ303488	Samuel and Knowles, 2001
-	-	O/CIV/8/99	AJ303485	Samuel and Knowles, 2001

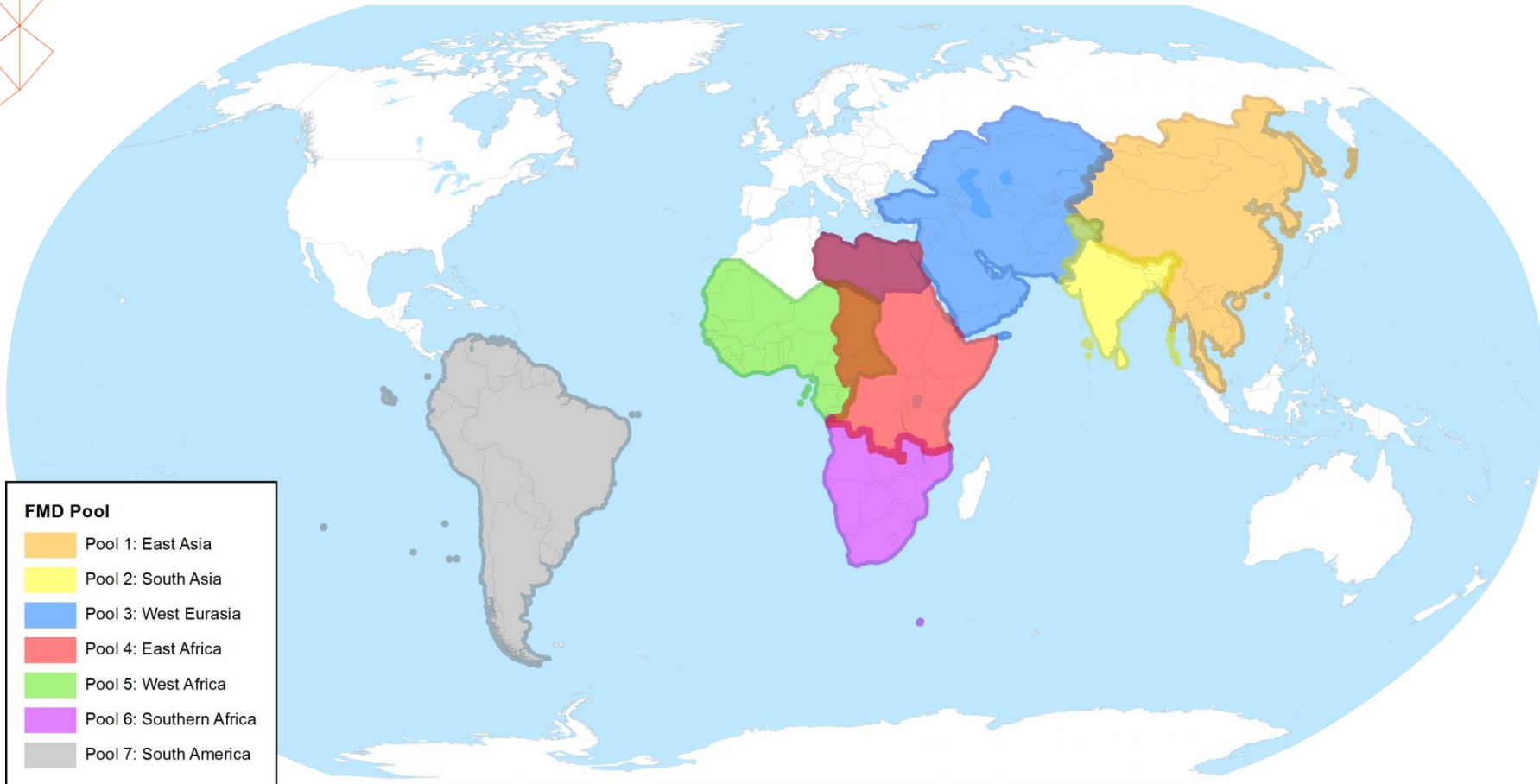
Report on FMDV O in Algeria in 2022  
Batch: WRLFMD/2022/000009



Virus sample name: TUN/1/2022  
 Sender reference: O/TUN/22ZZ745/22  
 Location of origin: n/a  
 Country of origin: Tunisia  
 Date of collection: 04/01/2022  
 Host species: cattle  
 Serotype: O  
 Topotype: EA-3  
 Lineage:  
 Sublineage:

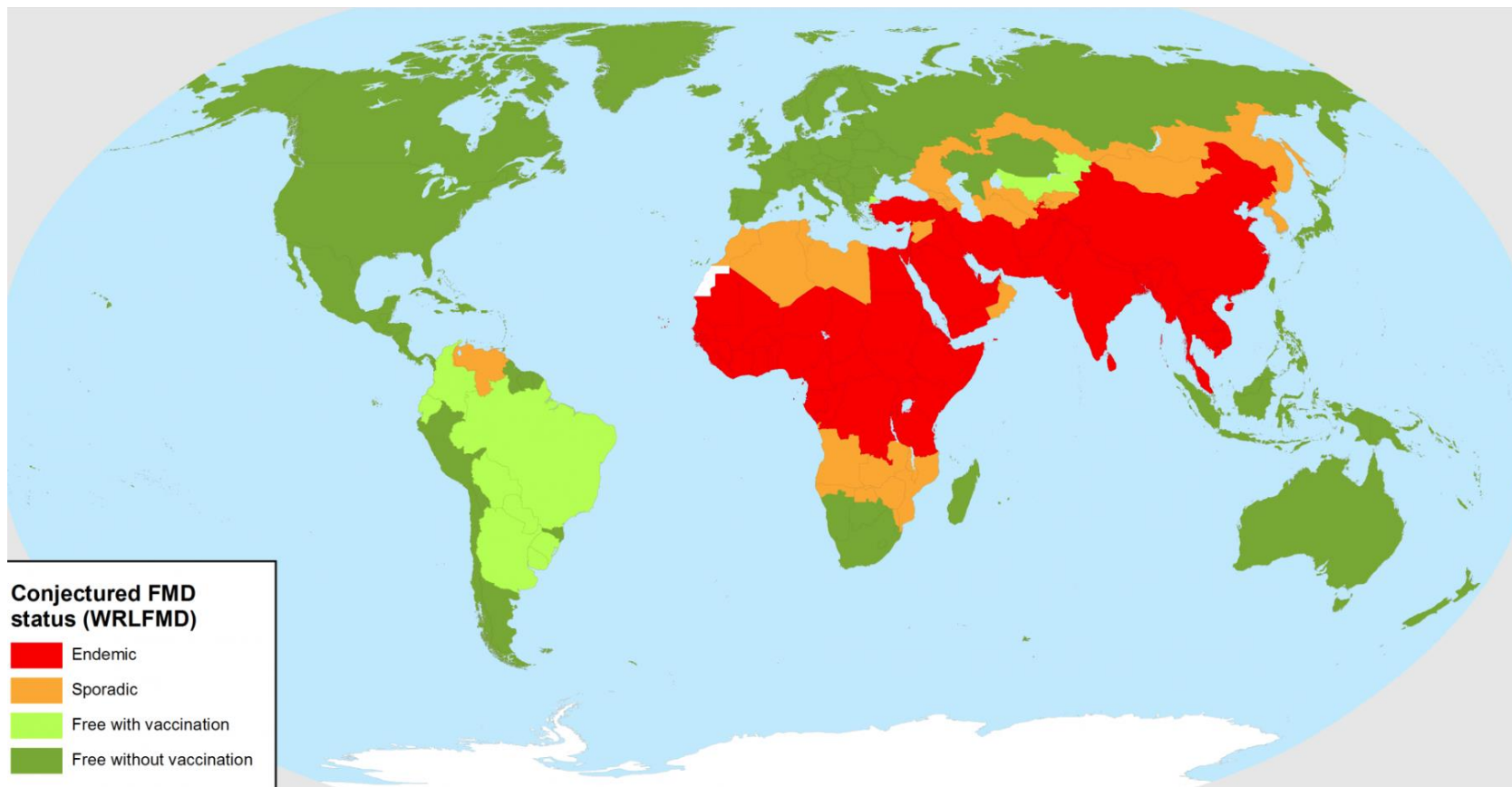


# FMD Pools

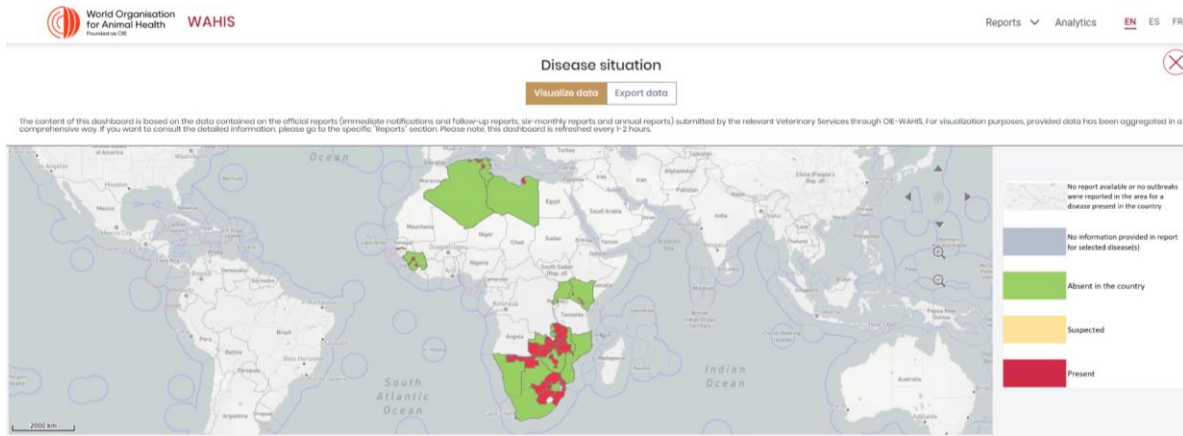


POOL	SEROTYPES PRESENT
1	O, A, Asia-1
2	O, A, Asia-1
3	O, A, Asia-1
4	O, A, SAT 1, SAT 2, SAT 3
5	O, A, SAT 1, SAT 2
6	SAT 1, SAT 2, SAT 3
7	O, A

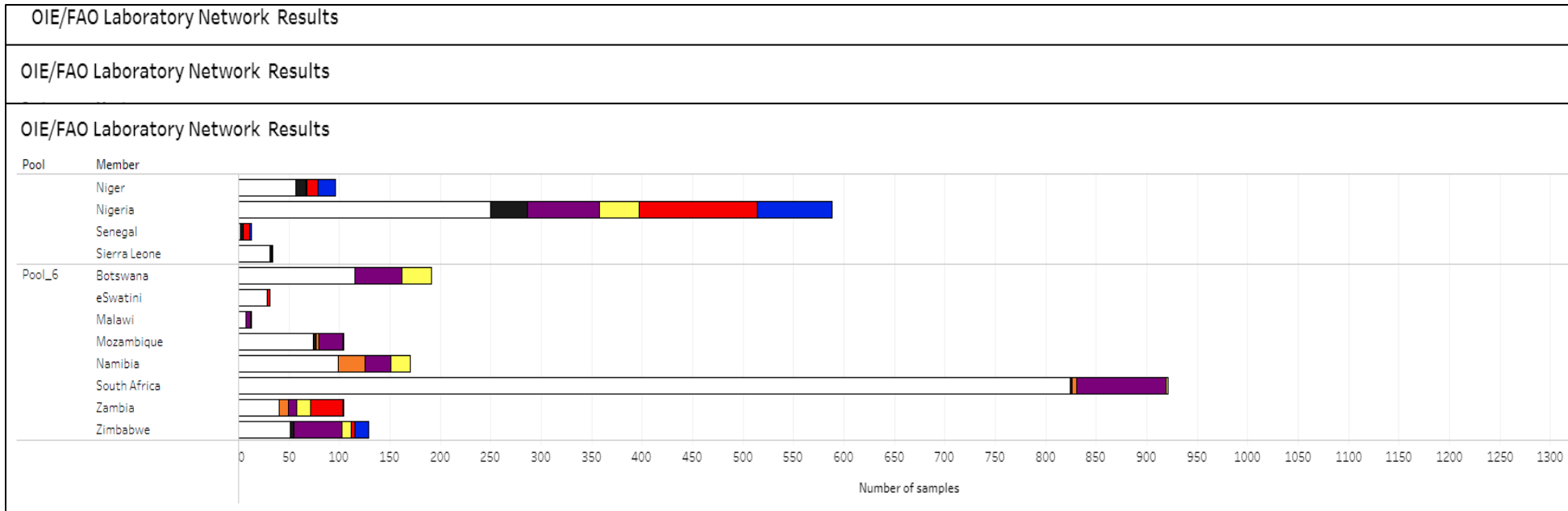
## FMD status



# FMD Status 2022 (Africa)



# FMDV Surveillance



Year  
(All) ▼

RMM  
(Multiple values) ▼

Pool  
(Multiple values) ▼

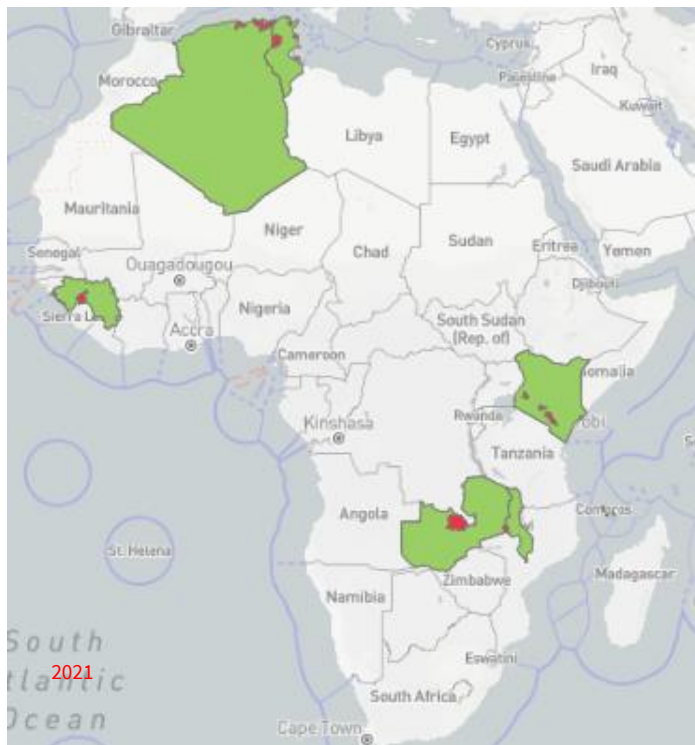
Serotypes/Test results

- A
- O
- SAT1
- SAT2
- SAT3
- Untyped
- NVD

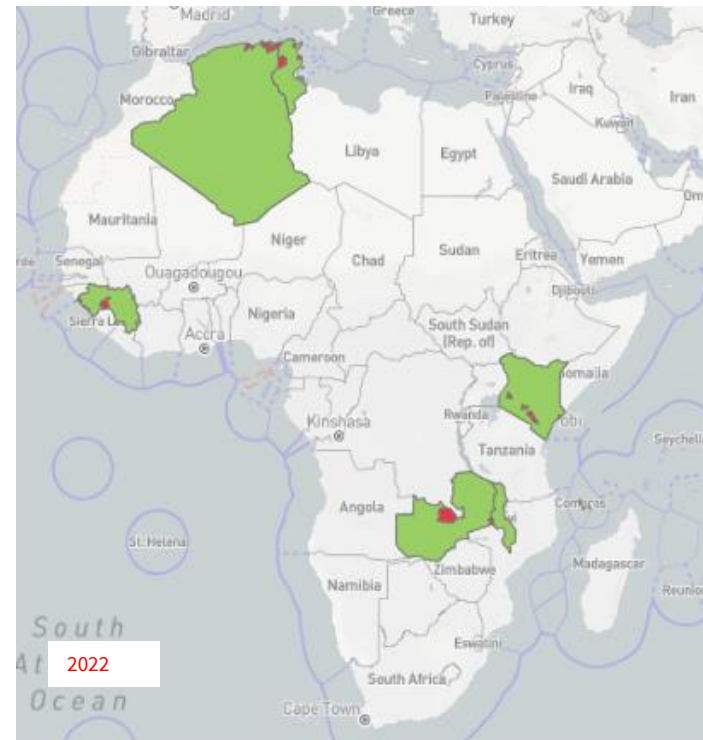
# FMD Serotype O outbreaks 2020-2022 (Africa)



Comoros  
Guinea  
Kenya  
Zambia



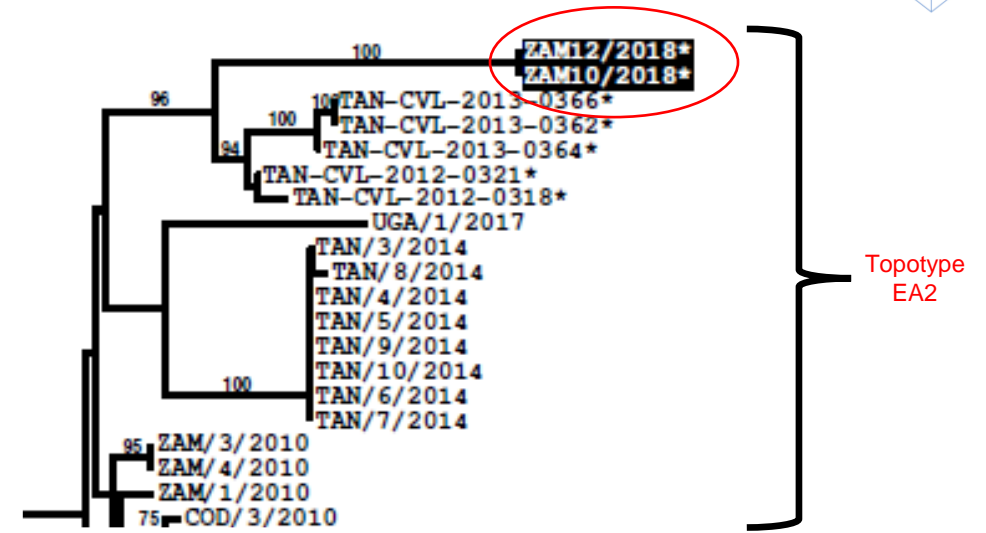
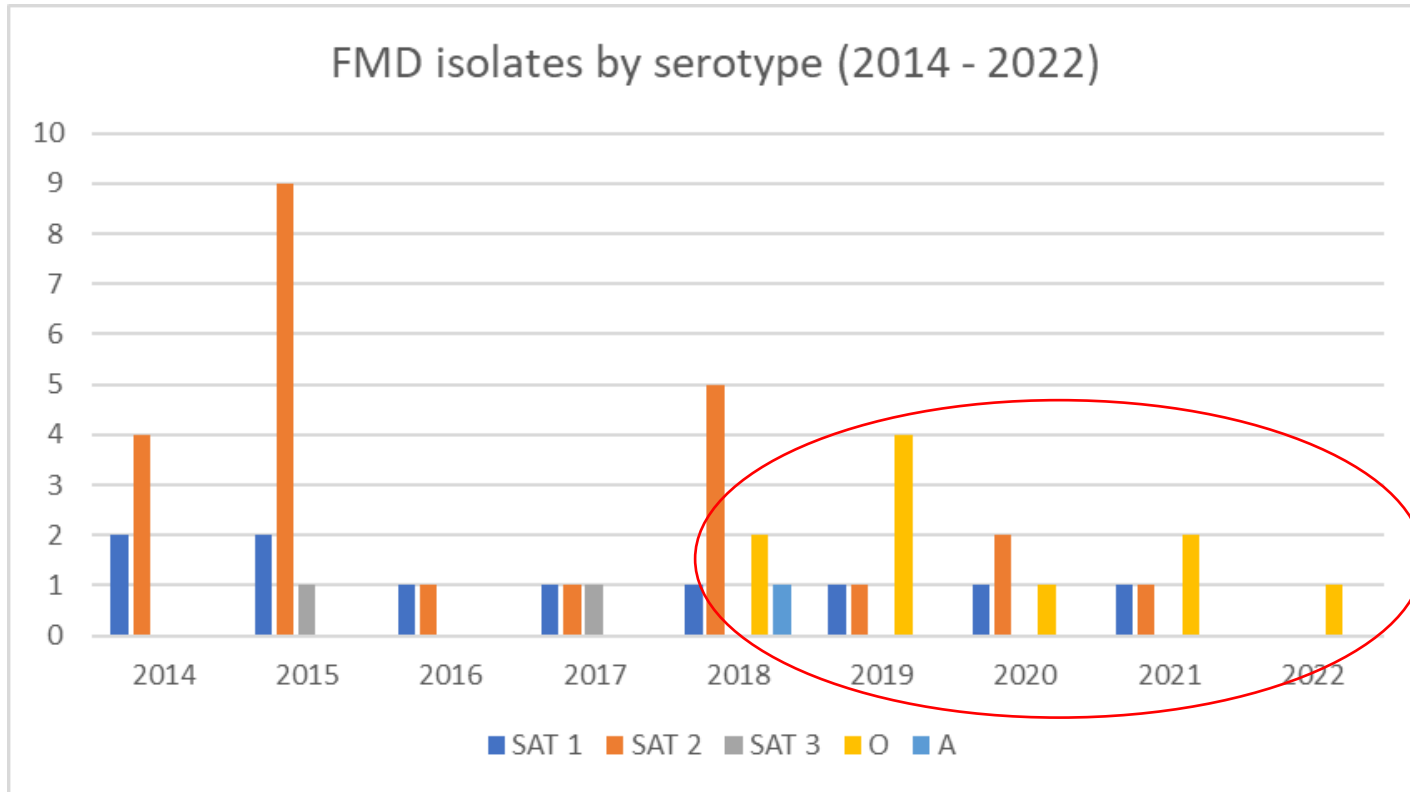
Comoros  
Guinea  
Kenya  
Mauritius  
Namibia  
Zambia



Algeria  
Comoros  
Guinea  
Kenya  
Malawi  
Tunisia  
Zambia



# FMD Serotype O outbreaks/isolates 2020-2022 (Southern Africa)



Accelerated progression and spread between 2018 & 2021

Botswana Vaccine Institute (BVI) is acknowledged for sharing this information

# FMD Serotype O in Namibia 2021 (first report)

Received: 19 January 2022 | Revised: 27 March 2022 | Accepted: 11 April 2022

DOI: 10.1111/tbed.14561

SHORT COMMUNICATION

Transboundary and Emerging Diseases WILEY

## The first detection of a serotype O foot-and-mouth disease virus in Namibia

Frank Banda<sup>1,2</sup> | Albertina Shilongo<sup>3</sup> | Emmanuel H. Hikufe<sup>3</sup> | Siegfried Khaiseb<sup>4</sup> | Juliet Kabajani<sup>4</sup> | Beatrice Shikongo<sup>3</sup> | Paul Set<sup>3</sup> | Joseph K. Kapapero<sup>3</sup> | Kenneth K. Shoombe<sup>3</sup> | Georgina Zaire<sup>4</sup> | Swithine Kabilika<sup>5</sup> | Melvyn Quan<sup>2</sup> | Elliot M. Fana<sup>6</sup> | Mokganedi Mokopasetso<sup>6</sup> | Joseph M. K. Hyera<sup>6</sup> | Jemma Wadsworth<sup>7</sup> | Nick J. Knowles<sup>7</sup> | Antonello Di Nardo<sup>7</sup> | Donald P. King<sup>7</sup>

<sup>1</sup>Central Veterinary Research Institute, Lusaka, Zambia

<sup>2</sup>Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, Pretoria, South Africa

Animal movement??



**FIGURE 2** FMD outbreaks caused by the O/EA-2 topotype that have occurred in Southern African countries since 2018. Locations represent outbreaks from which FMD viruses were sequenced during 2021 (●) and 2018–2020 (○), where (◆) denotes the location of the FMD report in Zambezi Region, Namibia. NB: All FMD outbreaks due to the O/EA-2 topotype that have been detected in Zambia since 2018 are plotted on the map, although multiple samples and sequences have been collected at some of the locations. Namibia and Botswana maintain FMD-free zones

## What are the possible implications for Southern Africa and the continent

- ❑ FMD Serotype O is likely to establish itself in the Southern Africa region unless rapid and effective measures are taken
- ❑ The countries neighbouring Zambia, Namibia & Malawi are at higher risk
- ❑ Vaccines and vaccinations
- ❑ Impact on livelihood and trade



## Highlighted challenges for efficient prevention and control?

- Delayed reporting/confirmation of disease occurrence
- Samples not submitted to Reference Laboratories for vaccine matching
- Potentially infectious material (e.g. tissue samples) handled and manipulated at low biosafety level (1 & 2) laboratories
- Insufficient availability and access to vaccines
- Weak or no enforcement of movement control and lack of biosecurity measures



## Next Steps and Conclusion

- ❑ Capacity enhancement and development (laboratories, surveillance, risk analysis...etc)
- ❑ Collaboration between reference laboratories and national laboratories
- ❑ Technical assistance
- ❑ Investment in vaccine and vaccination
- ❑ Development of Risk-based approaches to control FMD through the FMD PCP process Risk Assessment Plans (RAP), Risk-based Strategic Plans (RBSP) and Official Control Programs (OCP)
- ❑ Development of a harmonized regional action proposals/plans/strategies to prevent the spread to at higher risk and free zones and eventually control FMD (i.e. SADC FMD Proposal)

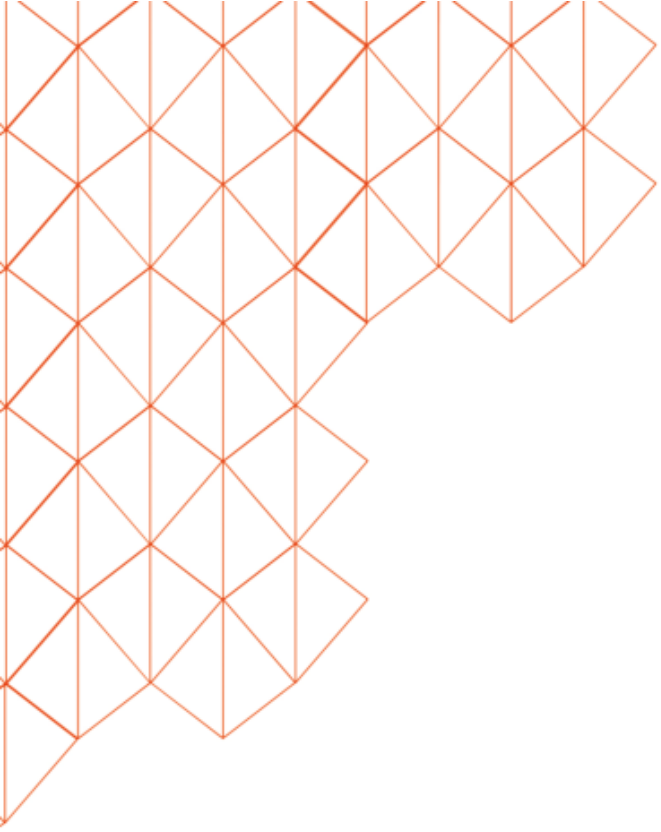
### Rapid risk assessment to:

- determine current extent of spread
- pathways for onward transmission (including animal movement patterns),
- to identify measures to prevent further spread

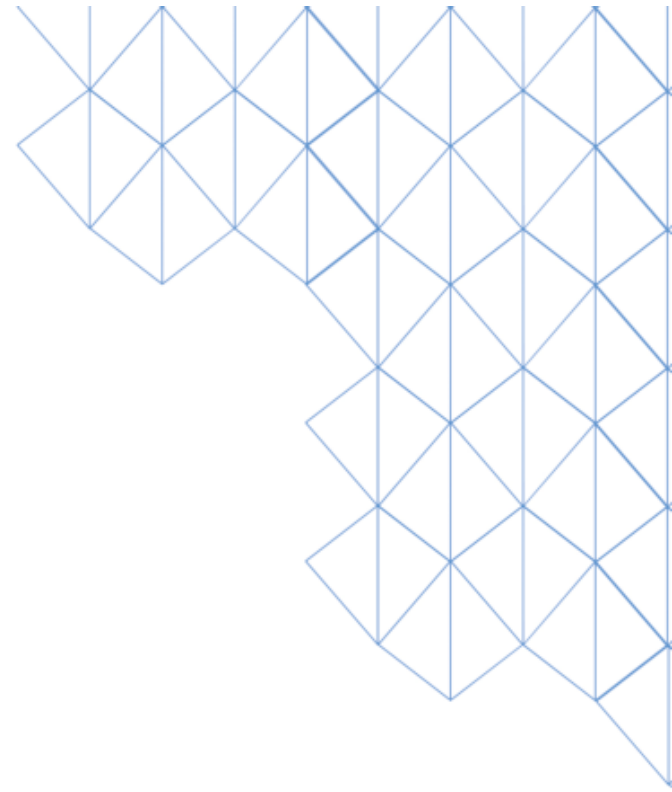
More resources  
& efforts are  
needed to  
respond to  
challenges

## References

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THANK YOU



Thank you