

THE ROLE OF BVI WOAAH-FMD REFERENCE LABORATORY IN SUPPORTING THE ACTIVITIES OF FMD CONTROL IN AFRICA

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**Workshop on FMD Epidemiology, Surveillance, and
Diagnostics to Strengthen Control Efforts in Eastern Africa**

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OUTLINE

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1. BACKGROUND

- World Organisation for Animal Health (WOAH) founded as Office International des Epizooties (OIE) is the global body responsible for animal health, formed on the 25th Jan 1924.
- WOAH has several designated Reference labs in different parts of the world.
- The FMD diagnostic and research lab at BVI was the first WOAH Reference Laboratory for FMD in southern Africa from May 1985 to date.



2. Diagnostic capacity

- **Antigen Detection**

- Virus isolation on primary lamb kidney cells
- Antigen typing ELISA

- **Antibody detection**

- Structural Protein (SP); LPBE; SPCE & VNT
- Non-Structural Protein antibody detection (NSP-Ab-ELISA (PrioCheck))

- **Molecular detection**

- RT-PCR
- Sequencing & Genome typing

- **Serotypes Tested For:**

- SAT 1, 2 & 3
- Type A
- Type O



3. ACCREDITATION STATUS

- Tests for confirmation of FMD outbreaks are accredited by SADCAS under the BNVL-NARDI QMS (ISO 17025).
- Accredited tests;
 - Virus isolation on primary lamb kidney cells
 - Antigen typing ELISA
 - PCR and Sequencing
- The laboratory participates on PT/ILCs.
- Accreditation of BVI QMS is underway .





4. MANDATE

- Conduct testing for confirmatory diagnosis of FMD
 - Virus isolation and antigen typing
 - Virus characterization by molecular diagnostics (RT-PCR, Sequencing and genotyping)
 - FMD antibody detection (Structural and non structural)
- Conduct testing for vaccine matching to validate fitness for purpose of the FMD vaccines.
- All definitive diagnostic tests are accredited against ISO 17025 by SADCAS.
- Conduct applied research on FMD and publish in peer reviewed journals.
 - New and improved diagnostic tests
 - Molecular virology and epidemiology of FMD
 - Develop 2nd Generation FMD vaccines
- Produce and supply FMD diagnostic reagents.
- Provide training on FMD diagnostics to staff from NVLs.
- Update the WOA (OIE)/FAO on FMD situation annually.





5. SUPPORT OF FMD CONTROL ACTIVITIES

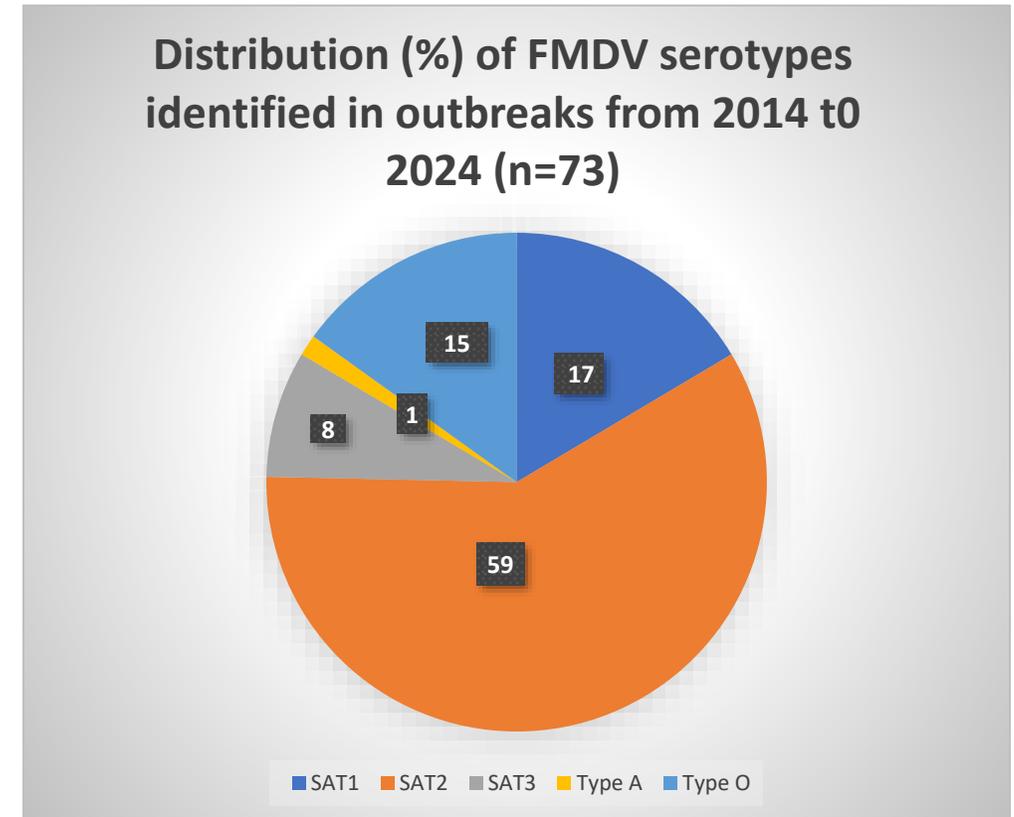
5.1. FMD VIRUS IDENTIFICATION SADC

- BVI produces livestock vaccines of which 80% is FMD.
- WOAHA lab generates data on FMD virus serotypes circulating in sub-Saharan-Africa which vaccine manufacturers (e.g. BVI) can use the data strategically to formulate fit for purpose vaccines.
- WOAHA lab confirmed several FMD virus serotypes isolated over the past 10 years in the SADC region (SAT1, SAT2, SAT3, A & O)
- WOAHA generates scientific data to support efficacy of these vaccines through vaccine matching studies as shown in the following slide (Figures 1).



NUMBER OF POSITIVE FMD CASES IDENTIFIED IN OUTBREAKS FROM 2014 TO 2024, IN SOUTHERN AFRICA

Serotype	Total positive cases
SAT1	12
SAT2	43
SAT3	6
Type A	1
Type O	11
Total	73



5.2. FMD VIRUS IDENTIFICATION: OUTSIDE SADC

Country	Year	Serotype	Topotype
Uganda	2015	SAT2	IV
Uganda	2017	O	EA-2
Uganda	2024	O	EA-2
Ghana	2016	O	WA
Ghana	2016	A	G-IV
Niger	2015	O	WA
Sudan	2023	O	EA-3
Sudan	2023	A	G-IV



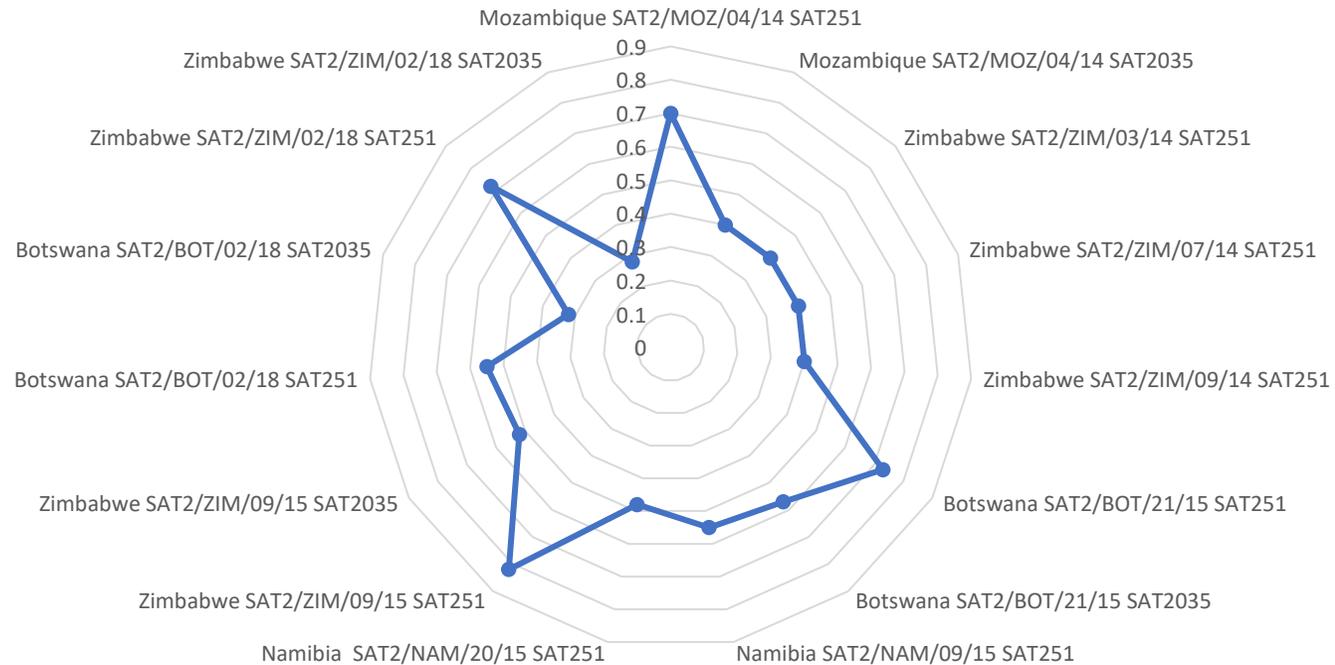
5.3. VACCINE MATCHING TESTS

- WOAHL Lab investigates the antigenic similarity between the BVI vaccine virus strains and each of the field virus isolates are confirmed by the laboratory.
- The vaccine matching test expressed in relationship-coefficient values ($r1$ values at a threshold of ≥ 0.3) ensures that the vaccine produced will more like elicit an immune response to the virus that caused the field outbreak of FMD as represented for SAT2 isolates in the following slide.



VACCINE MATCHING RESULTS (R1 VALUES) ON REPRESENTATIVE FIELD FMD VIRUSES (SAT2) ISOLATED FROM CATTLE ORIGINATING FROM VARIOUS COUNTRIES IN THE SADC REGION, 2014 – 2020

SAT2 Vaccine Matching (2014 - 2020)





5.4. TECHNICAL SUPPORT

- Training at WOAHA lab of SADC lab staff to enhance serological testing capacity for FMD; especially PVM serology.
- Advanced training through R&D at WOAHA lab (MSc, PhD).
- Production of homologous antigens and antisera for PVM in SADC states.
- Participate with SADC labs in testing sera for PVM.
- Post-training surveillance missions to FMD labs in the SADC region (Malawi, Mozambique, Namibia, Zambia & Zimbabwe).
- Conduct R&D projects targeting improvement of FMD diagnostics and vaccines (rapid virus serotype detection by RT- qPCR ; second generation FMD vaccines: MSc & PhD).





6. CONCLUDING REMARKS

- Operations of the WOAHA Lab at BVI are funded fully by BVI.
- Allow me to use this opportunity to acknowledge greatly the commitment of the BVI Board of Directors and the BVI Executive Management (Mr Andrew Madeswi, CEO) for the sustaining smoothly the operations of the WOAHA Ref Lab at BVI.
- Funds allowing, the Lab could do more, especially organizing and implementing ring-tests/ILC schemes for FMD serology (NSP & SP antibody detection). It would be much appreciated if WOAHA in collaboration with other international agencies such as FAO could look into possibilities for such funding.
- Directorates of Veterinary Services (DVSs) from several SADC countries (especially southern African countries) have been submitting samples to the WOAHA lab in BVI for confirmatory diagnosis of FMD in the past 10 years. Looking forward towards future support and cooperation from all directorates (DVSs) within the SADC region as all of you are represented in this FMD workshop.





**THANK YOU FOR
YOUR ATTENTION**

