# FMD Reference Laboratories Network Meeting,

**Botswana, 20 – 24 June 2007**

## Minutes

**Present:**

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| David Paton,<br>John Bashiruddin (Rapporteur)<br>Yanmin Li | OIE and EC Reference Laboratory and FAO World Reference Laboratory for FMD, IAH-Pirbright, UK |
| George Matlho,<br>Gaolatlhe Thobokwe<br>Lindani Mozola | OIE FMD Regional Reference Laboratory for the Sub-Saharan continent, Botswana |
| Vladimir Borisov,<br>Natalia Zhdanova | OIE Regional Reference Laboratory for FMD for Eastern Europe, Central Asia and Transcaucasia, FGI-ARRIAH, Russia |
| Ingrid Bergman | FAO/OIE Reference Laboratory for FMD, Centro Panamericano de Fiebre Aftosa OPS/OMS, Rio de Janeiro, Brasil |
| Wilna Vosloo | FAO FMD Reference Laboratory, Exotic Animal Health, ARC-Onderstepoort Veterinary Institute, South Africa |
| Samia Metwally | FAO FMD Reference Laboratory, Foreign Animal Disease Diagnostic Lab, Plum Island Animal Disease Center, Greenport, USA |
| Xuepeng Cai<br>Hong Yin (Observers) | National FMD Laboratory, Lanzhou Veterinary Laboratory, Gansu, China |
| Divakar Hemadri (Observers) | ICAR, Mukteswar, Nainital (Uttarakhand), India |
| Keith Sumption | Animal Health Division, FAO, Rome, Italy |
| Gideon Bruckner | Scientific and Technical Department, OIE, Paris, France |
| Bonaventure Mtei (Observer) | OIE sub-regional office, Gaborone, Botswana |

The RRL, Packchong, Thailand and Alf-Eckbert Füssel, EC DG SANCO, were invited to this meeting and apologies for absence were taken for their absence.

The programme was discussed and agreed:

**Day 1**

## 1. Introduction

George Mathlo (GM) welcomed the participants to Botswana and especially to Chobe because FMD was in that district where there are buffalo.

Gaolathle Thobokwe (GT) presented a brief history of the BVI from its beginnings as Rhone Merial, in a small portable unit in 1978, to 2001 when there was no FMD in Botswana. SAT2 was detected in Boswana in 2002, SAT1 in 2003 and these types have recurred in 2005 and 2006. BVI is expanding with the commencement of the construction of a new facility dedicated for FMD vaccine production. With new technology a better vaccine quality and more capacity are expected benefits of this expansion.

David Paton welcomed all participants and thanked GM and GT. He explained the coordination efforts made by the CA and the network of FMD laboratories whose aim was to have better appreciation of the FMD status in the world and the vaccine requirements. Up to now the network has met together and written 2 joint reports, but there are opportunities to build trust and relationships and work towards common goals. One of these is harmonisation of vaccine matching and tomorrow he was looking for strong participation from the meeting in the production of a workplan towards this goal.

## 2. Expansion of network.

Keith Sumption added his welcome to all the participants. He explained the the WRL laboratory at IAH provided support and information for control decisions made for FMD. This was required because Europe was a large importer and FMD was a threat. But there were 2 main constraints on information being the lack of samples and the lack of sharing. Now ‘reference laboratories’ and called ‘Reference centres’ and that implies a rethink of the requirements of the OIE/FAO/WHO and long term plans and networking. FAO will support TADs and the WRL has a budget for sample submission and thus disease monitoring in Europe and the World. FAO will also fund sample shipment from around the world to the WRL to gather information about the status of FMD. EQA is also important and programmes should include laboratories from further afield than Europe. FAO will also support this Network. The GF-TADs agreement also supports regional animal health in SADC and will monitor progress and feed back information to decision makers for use in vaccine programmes and transboundary control.

Wilna Vosloo introduced the FAO FMD Reference Labboratory at ARC-Oonderstepoort Veterinary Institute (OP), RSA. The Exotic Disease Division conducted research and diagnoses (and limited vaccine production). It had 60 employees and about 24 technicians and students. Its BSL3 laboratory was built 23 years ago and has animal accommodation. Research was done mainly on

SAT topotypes with a view towards functional studies and chimeric viruses. NSP ELISA for SATs was under development. Phage display for MAbs and cell receptor mRNA expression were also areas of interest. Funding was mainly from the Dept. of Agriculture Science and Technology and Intervet. Training was a significant activity of the laboratory.

Samia Metwally introduced the FAO FMD Reference Laboratory at PIADC, USA. FADDL was responsible for providing diagnostic capability for OIE Notifiable diseases. PIADC was shared by APHIS, ARS and DHS and the budget was from NVSL. It employed 43 persons in 3 groups concerned with Diagnostics, vaccines and validation. Activities included development and validation of tests, training of technicians and veterinarians and the vaccine bank was sited there. A proficiency programme was undertaken every year that included ten network laboratories that provided FMD diagnostic cover with RT-PCR tests. The vaccine bank covered USA, Canada and Mexico. Research on chip-based microarray, multiplex NSP – Luminex, 3D blocking ELISA and handheld PCR were ongoing. Molecular epidemiology was done on samples from Afganistan and Israel. USA wildlife such as bison, elk, pronghorn are susceptible to FMD.

A short presentation from the Regional Reference Laboratory for FMD in the South East was presented by John Bashiruddin on behalf of Wilai Linchongsubonkoch. This laboratory's vision is to serve as the OIE and ASEAN Reference Laboratory for FMD diagnosis in South East Asia; to serve as the central or national lab for FMD diagnosis within the country and be a training center and technology transfer in the region. It is a BSL-3 facility and the work programme includes FMD diagnosis by ELISA typing, virus isolation, LP ELISA, NS test and PCR, strain differentiation for selection of seed vaccine strain or vaccine matching and molecular epidemiological study by nucleotide sequencing. The laboratory also FMD diagnostic reagents, undertakes a Quality assurance control programme for the region and has numerous collaborative research activities with other institutes and international organizations such as OIE, WRL, FAO, IAEA, AAHL & JICA.

On behalf of Xuepeng Cai, Yin Hong presented an overview of FMD work done at the Lanzhou Veterinary Laboratory in the Peoples Republic of China. Prof Liu was in charge of the FMD programme in which 16 scientists, 37 junior technicians and 40 students were engaged. The activity was divided into 6 groups – Diagnostics, basic research, Epidemiology, vaccine development, pre-warning and modelling. LVL is the national FMD reference Laboratory and as such it provides the final diagnosis for new outbreaks, epidemiology and overall surveillance, new outbreak investigations and screening for vaccine matching. It is also a repository for virus strains. Research activities include functional genomics, mechanisms of infection, pathogenesis, ecosystems and novel vaccine delivery. Other activities included training for students and advise to local authorities and central government.

Divkar Hemadri provided the overview of activities of the ICAR, Mukteshwar, India, a laboratory that belongs to the Ministry of agriculture. Mukteshwar is in North India and Delhi which is the nearest airport is about 400 km away. India

is the world's largest producer of milk at about $92x10^6$ tonnes; it has about $1.85x10^8$ cattle. About 4000 FMD outbreaks are reported every year and are caused by the O, A and Asia1 serotypes. Disease is controlled by vaccination but is no systematic campaign and there are no cattle movement restrictions. At this laboratory there are 2 head scientists and 7 other staff and it is not a biosecure facility. Activities range from confirmatory serotyping, isolation in BHK cells, vaccine matching, strain bank, molecular characterization and validation of new tests. The dependant eight regional laboratories and 15 coordinated units are capable of serotying. Over 800 VP1 sequences are produced a year. Future prospects are a BSL laboratory, large scale sequencing capacity, penside tests leading to self sufficiency in FMD diagnosis and perhaps OIE reference laboratory status.

Gideon Bruckner (GB) explained the OIE Twinning concept which was initiated in 2002 but not pursued. In 2006 in the OIE meeting in Florianopolis, Brasil this concept was revisited and put forward as a way of establishing more OIE reference laboratories and collaborating centres. In effect an applicant laboratory that may aspire to reference centre status would be partnered in the first instance by an existing OIE reference laboratory and nurtured into competence in diagnostic capacity allowing it to attain reference laboratory status. In fact any competent laboratory may become the 'senior' partner. The partnership must be on a specific disease or topic. This is a medium to long term commitment from both laboratories that has to be approved by the heads of laboratories and official country delegates. The candidate reference laboratory will ultimately be fast tracked by the Biological Standards Commission for acceptance. The OIE will not enter into the specifics of the arrangements except for the budget, which is entirely for the applicant laboratory. Funding for equipment is not envisaged by the budget.

## 3. Network Annual Report

David Paton (DP) revisited the format of the Network report. Essentially the same format has been used for the previous two reports. DP asked participants to think about the title (the OIE approves of the existing title), the inclusion of addition information such as resolved outbreaks and a summary samples tested table.

The discussion continued on the second day and agreed to retain the current title. To understand the requirements of information to be included in the report a discussion followed on the end users of these report. The report was recognised widely. FAO used the report in meetings of the EUFMD, and on its website. The report was disseminated to all delegates by the OIE and used in official meetings of the Scientific Commission. GB explained that this report should not be confused with the Annual Report of the Reference Laboratories.

**Day 2**

## 4. Official Opening of the Meeting

George Mathlo (GM) welcomed all participants and explained that he has invited members of the Board of BVI and Government official to this meeting because they support the activities of the laboratory on FMD. He Welcomed the Chairman of BVI Dr. Martin Mannathoko.

Dr Mannathoko welcomed all on behalf of BVI. BVI, formed under stressful conditions in 1978 as a section of the Animal Health Services was now a company owned by the Government of Botswana. It is in the process of privitization. The company is a technical partnership with Merial (or Merieux) who founded it. Dr Mannathoko thanked OIE and FAO for holding the meeting that encourages collaboration between Government, reference and other laboratories working on FMD to exchange ideas and technology. This should ultimately enable better world trade.

GT asked the Permanent Secretary, Mr Nkatla Carter Morupisi, to endorse our activity.

Mr Morupisi welcomed all especially those from the UK, Russia, America and China to Botswana. He also welcomed the OIE, FAO and SADC representatives. He explained that the creation of BVI was an emergency project to control FMD after the 1977 outbreak in Northern Botswana. The outcome of the project was commercialised as a company with the Botswana Government as the sole shareholder. From 1978-1980 production was increased to 10-12 million doses and it gained Regional Reference Laboratory status in 1983. Its aim now is to collaborate internationally and regionally, analyse veterinary information and increase expertise. In Botswana it supports the livestock industry in the control of FMD with high quality vaccines. FMD is a major constraint that impact on the marketing of livestock products and there is need for potent vaccines and accurate diagnosis.

BVI has always been the main contributor to FMD control and the only laboratory capable of large scale FMD vaccine production and has enhanced capacity as required. It is again undergoing expansion with the installation of the latest technologies that will increase capacity, quality and purity to enable DIVA testing in Botswana. It will develop vaccine banks to address emergencies and increase its diagnostic capabilities.

He welcomed all participants and wished them a fruitful meeting.

DP thanked our hosts and the opportunity to meet in Botswana and that it would take full advantage of the situation. It was appropriate to meet in Botswana because it had taken strides to control FMD with the support of BVI. It also provided the opportunity to bring people from around the world who worked on a similar subject to work synergistically and the meeting would work hard to achieve its goals.

## 5. Summary of Vaccine Matching activities

John Bashiruddin (JB) gave an overview of vaccine matching activities currently undertaken by participating reference laboratories. A summary of the results of a survey was presented. Briefly, breakdowns by laboratory of sera and clinical materials received were shown. All positive clinical material was serotyped by ELISA, CFT, VNT nd RT-PCR with reagents from IAH or those produced in house. All positive samples were sequenced (VP1) by OIE reference laboratories and amounted to over 300 each year. Other laboratories sequenced a total of about 150 per year. Panaftosa by far did the most vaccine matching experiments but all reference laboratories were engaged in this activity. Lists of strains used for vaccine matching were shown. Bvs of various preparations and guinea pig serum was used. Other activities and pursuits were also listed.

## 6. Reports from Workgroups

The meeting was divided into two working groups who were asked to produce a workplan to test vaccine matching methods. The 'Asia' workgroup set out the aim to be to test similarities of vaccine testing methodologies. If the aim was to look at individual reagents (e.g. bvs) then the work could be done in one laboratory. The challenge was to overcome the propriety nature of vaccines. To overcome this it was suggested that each participant could supply an old Type A vaccine and homologous 21 day bvs of a sufficient titre (say 2.0 logs by VNT) and provide information on the bvs. Pirbright (IAH-P) would provide field isolates. IAH-P would collect these reagents and send them to each party.

Steps in the activity would be:

- Formalize plan
- Get permission to supply vaccine
- Prepare field isolates
- Send materials
- Do tests; send methodology and results
- Integrate
- Draft report

On account of the problems with the release and importation problems with vaccines and isolates the 'Africa' group suggested bilateral comparative testing e.g. between IAH/BVI and IAH/OP. The use of type A viruses was suggested. Serological ring trials and NSP ELISA validation was also suggested.

Discussions followed and it was decided to use Type A for these tests and to make a vaccine out of an old field strain that would have no commercial value. This would make the vaccine easy to release and distribute. Bvs would be produced from this vaccine from 5 cattle. About 6 field isolates could be provided by IAH-P. These reagents could be sent and shared. Given sufficient funding OP offered to produce the vaccine and bvs. DP would write a detailed

plan. The meeting agreed that this was the preferred method for this worthwhile activity.

Other joint activities that could be pursued were: external quality control with more SAT strains, coordination of sequencing and population of ReLaIS with network data. It would be useful for the network to know what EQA was planned for 2008 by members.

## 7. Display and access to Common Data

JB presented a live update on ReLaIS, a web based FMD information system. Mapping tools and phylogenetic analysis tools were demonstrated that used a live database as its information source. Subscribers to the system will be able to use the information from the sample and sequencing database from the WRL and contribute to the information repository. The system was functional but not released yet because of issues over access security and were being addressed. It is our intension to make this system widely available.

## 8. Future Direction and Developments of the Network

Keith Sumption (KS) reminded participants that this Network was formerly endorsed by the OIE in the 74$^{th}$ session and is documented in Appendix 1 of SCAD, May 2005. FAO will support the Network and make funds available to the Secretariat. The role and responsibilities of OIE reference laboratories in terms of participation in networks and the governance of OIE networks remained unclear. These required clarification and should be stated in the OIE manual. Work was required for better definition of topotypes and should be the work of this network. DP gave a short presentation of work done at IAH-P on topotypes of Type O and the evaluation of the PanAsia topotype. A system for generating meaningful strain names was required.

## 9. Any other business

It was agreed that the next meeting should be around June 2008 and China kindly offered to host it.

John Bashiruddin

September 2007