The Global System OIE/FAO FMD Reference Laboratories Network: Activities and Directions IAH, Pirbright, WRLFMD®-India 2012





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Outline

- The network aims
- Members
- Activities
- Future work
- Where to for the network on global control



The OIE/FAO FMD Reference Laboratories Network

The Network of OIE/FAO FMD Reference Laboratories has been established with two principal goals:

1/ To understand global virus distribution and patterns and provide vaccine recommendations

and

2/ To Improve the quality of laboratory testing carried out by international and national reference laboratories.

This requires sharing and joint evaluation of surveillance information from laboratory diagnosis, serotyping, genetic characterisation and vaccine matching tests and harmonisation of standards for diagnostic procedures.



Members: OIE/FAO Lab network

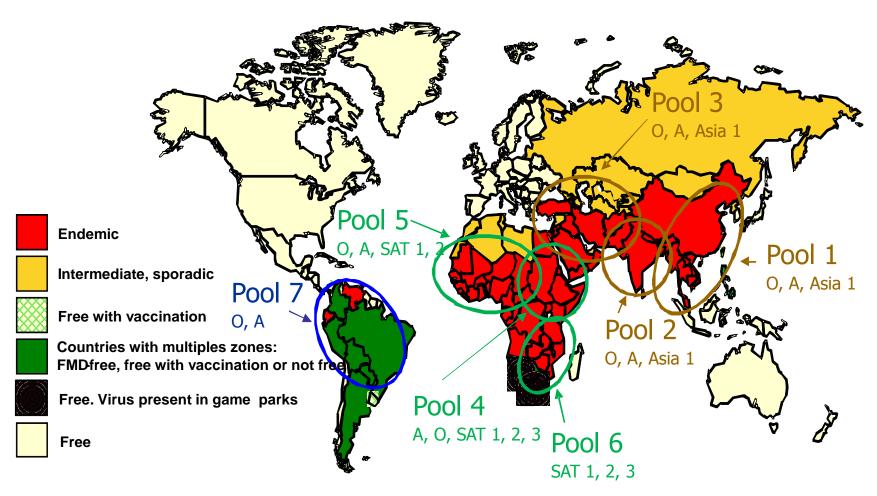
- WRLFMD: Pirbright, UK
- RRLSEA: Pakchong, Thailand
- LVRI: Lanzhou, China
- FGI ARRIAH: Vladimir, Russia
- PDFMD: Mukteswar, India
- RRLSSA: Gabarone, Botswana
- FMD-Laboratory: Embakasi, Kenya
- PANAFTOSA: Rio de Janeiro, Brazil
- LFADLCT: Argentina
- ARC-OVI: Onderstepoort, RSA
- PIADC: Plum Island, USA
- CODA-CERVA-VAR: Ukkel, Belgium



Approximately ~2300 samples tested during 2010

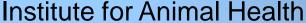


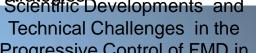
Conjectured Status of FMD



Pool positions are approximate and colours indicate that there are three principal pools, two of which can be subdivided into overlapping areas

Each pool may need tailored vaccines and strategies Developments and





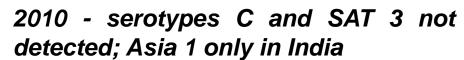


Samples and virus isolates made by region in 2010.

38 different countries submitted 2,338 samples to OIE/FAO FMD Network Laboratories

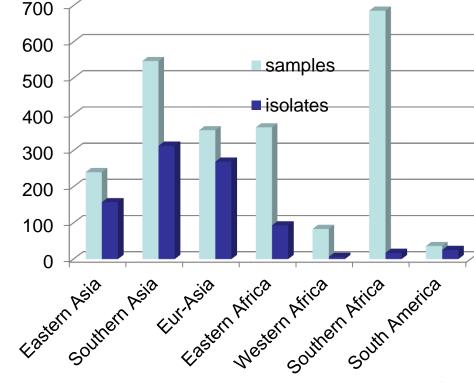
OIE/FAO FMD Reference Laboratory Network				
Annual Report 2010				
Editor: Dr Jef Hammond, IAH, Pirbright, UK.				

	Collected in 2010		Collect	Collected earlier	
Laboratory	Samples	Countries	Samples	Countries	
WRLFMD	760	26	458**	14	
PANAFTOSA	10	1			
FGI-ARRIAH	15	4			
RRLSSA	24	3			
ARC-OVI	642	10			
PIADC-	5	1			
FADDL					
LVRI	34	1			
PDFMD	244	1			
RRLSEA	98	4	10*	2	
LFADLCT	22	1			
	1854	52#	468	16#	



2011 - serotype Asia 1 epidemic in Middle East Scientific Dev

Scientific Developments and

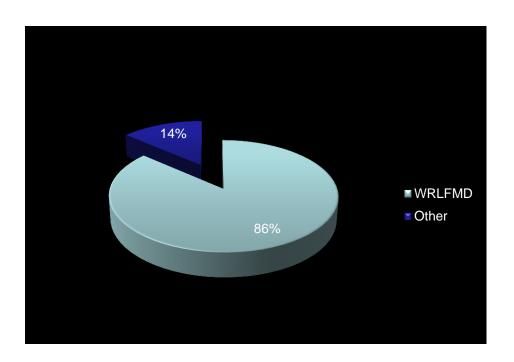


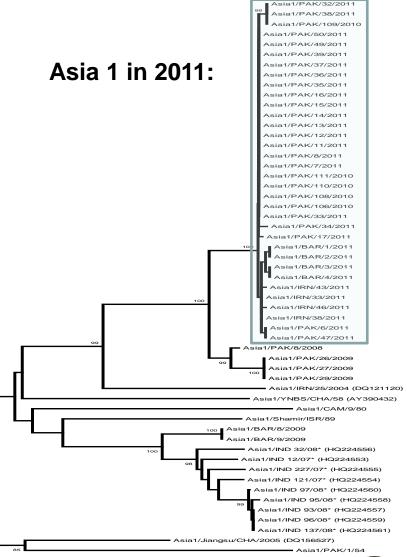


FMD Reference Laboratory Network Control of FMD in

Network outputs- VP1 sequence analysis

750 VP1 sequences generated in 2010 648 (86%) from WRLFMD



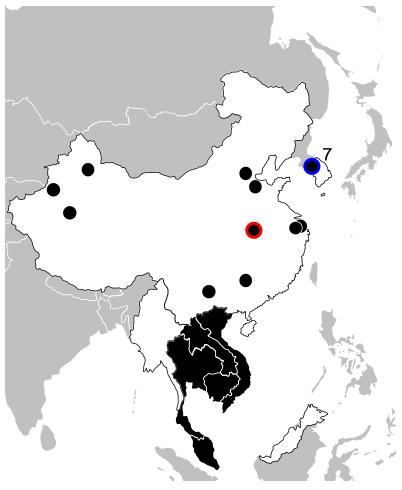




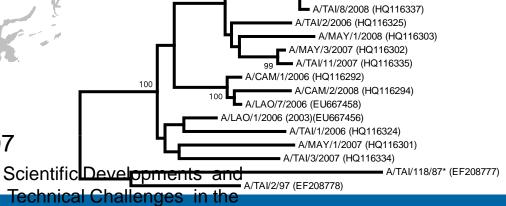


East Asia 2010-11

A/VIT/2/2009 (HQ116378)
A/VIT/8/2009 (HQ116378)
A/VIT/4/2008 (HQ116372)
A/VIT/5/2008 (HQ116373)
A/TAI/18/2008 (HQ116346)
A/TAI/17/2008 (HQ116345)
A/TAI/10/2009 (HQ116353)
A/VIT/8/2008 (HQ116376)
A/VIT/8/2008 (HQ116374)
A/VIT/3/2009 (HQ116379)



2009-2010: A/ASIA/SEA-97





Progressive Control of FMD in

A/MAY/9/2009 (HQ116306)
A/VIT/1/2009 (HQ116377)

A/VIT/2/2008 (HQ116370)

A/MAY/2/2009 (HQ116305)

A/LAO/4/2008 (HQ116295)

A/TAI/16/2008 (HQ116344)

A/TAI/19/2008 (HQ116347)
A/TAI/15/2008 (HQ116343)

A/TAI/6/2009 (HQ116349)

A/VIT/3/2008 (HQ116371)

A/VIT/5/2009 (HQ116381)

A/VIT/6/2009 (HQ116382)

A/VIT/7/2008 (HQ116375) A/TAI/13/2008 (HQ116341)

A/TAI/8/2009 (HQ116351) A/TAI/7/2009 (HQ116350) A/VIT/1/2010

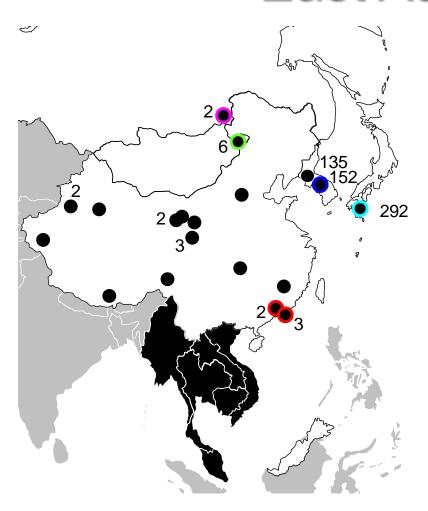
A/TAI/4/2008 (HQ116336)

A/SKR/2/2010

aa A/Pochun/KOR/2010* (GU441855)

A/TAI/14/2009 (HQ116354)

East Asia 2010-11



O/MOG/7/2010 O/MOG/77/2010* (ARRIAH) O/MOG/6/2010 O/MOG/9/2010 O/MOG/66/2010* (ARRIAH) O/TAI/12/2009 (HQ116260) O/TAl/13/2009 (HQ116261) O/MAY/20/2009 (HQ116218) O/TAV19/2009 (HQ116266) - O/TAV23/2009 (HQ116270) O/LAO/1/2009 (HQ116182) - O/TAV3/2009 (HQ116258) O/MAY/8/2009 (HQ116216) O/TAV18/2009 (HQ116265) O/MYA/2/2008 (HQ116226) O/TAV4/2009 (HQ116259) O/TAV5/2008 (HQ116252) O/TAl/2/2008 (HQ116250) O/TAV6/2008 (HQ116253) O/TAV2/2009 (HQ116257) O/LAO/2/2008 (HQ116180) O/MAY/5/2009 (HQ116213) O/LAO/1/2007 (HQ116175) - O/MYA/3/2008 (HQ116227) O/MYA/12/2009 O/TAl/20/2009 (HQ116267) O/VIT/5/2010 O/MYA/2/2006 (HQ116225) 100 O/MYA/3/2009 O/MYA/1/2006 O/HLJOC12/03 (China) (DQ119643) O/MOG/2004 (ARRIAH) O/MYA/11/2009 (HQ116232) O/MYA/5/2009 (HQ116228) O/TAV22/2009 (HQ116269) • O/HKN/1/2010 - O/HKN/6/2010 O/HKN/19/2010 O/NC/CHA/2010† (HQ652080) O/MY/CHA/2010† (HQ652079) O/SKR/4/2010 O/VIT/NCVD-8/2010 (NVRQS) O/HKN/7/2010 **1** ● O/HKN/9/2010 O/HKN/1/2011 O/HKN/2/2011 O/DY/CHA/2010† (HQ652078) O/CHA/31/2010* (JF792356) O/TZ/CHA/2010† (HQ652081) 1 O/JPN/2010 (NIAH) O/RUS/Jul 2010 (ARRIAH) O/SKR/5/2010 O/TAI/189/87* (TRRL)

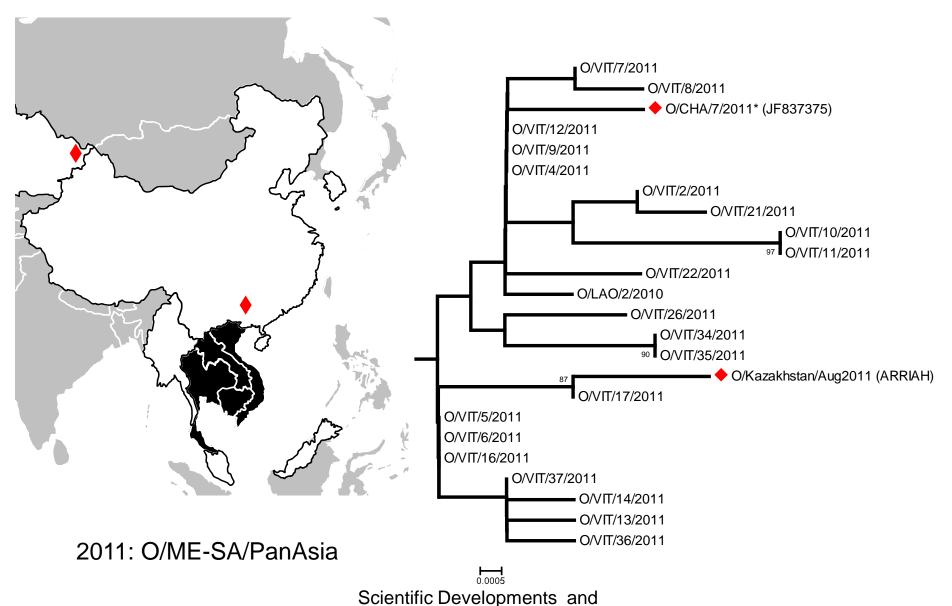
O/MOG/3/2010
O/MOG/4/2010
O/MOG/56/2010* (ARRIAH)
O/MOG/1/2010
O/MOG/2/2010
O/MOG/2/2010
O/MOG/2/2010
O/MOG/C03/2010* (ARRIAH)
O/MOG/C03/2010* (ARRIAH)

2010-2011: O/SEA/Mya-98

Scientific Developments and

Technical Challenges in the

Recent incursions - E Asia





Technical Challenges in the Progressive Control of EMD in

BBSRC

Full genome analysis

Data Generated by IAH-Pirbright and DTU-Lindholm 19/03/2011 TCS analysis of complete genome BUL/11/11 Kirovo sequences: 30/12/2010 BUL/1/2010 01/04/2011 Wild boar BUL/32/2011 Momin Tsakva 26/07/2010 Closest Turkish virus (Bursa) 40 nt changes 01/04/2011 BUL/20/2011 BUL/30/2011 Goliamo Bukovo Fakia 14 28/03/2011 BUL/26/2011 12 Granichar 28/03/2011 12LPN3 Rezovo Putative common ancestor 16/01/2011 Bulgarian (wild boar included) outbreaks 12LPN1 First phase of Bulgarian outbreaks in livestock Kosti Second phase of Bulgarian outbreaks in livestock 14/01/2011



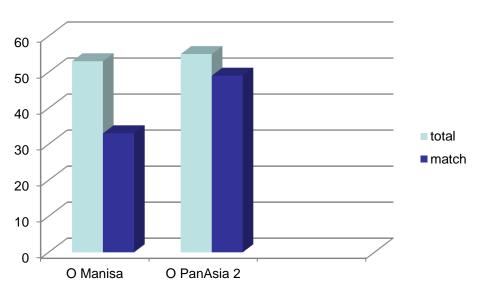


- OIE/FAO FMD Reference Laboratory Network
- FMD Vaccine Bank Holders Network

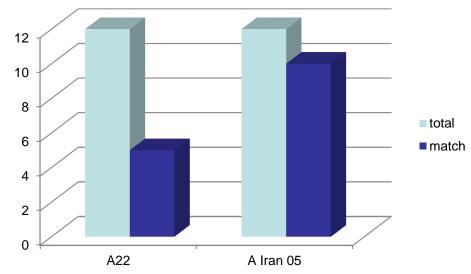


Vaccine matching by VNT 2011

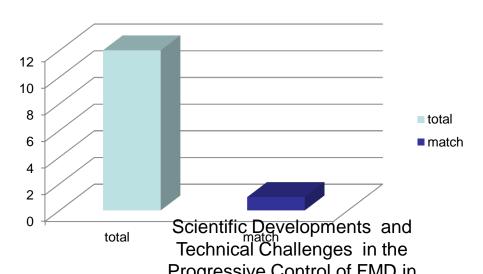




A22 vs A Iran 05



Asia 1 Shamir



Outputs

Current

- Detailed analysis of virus
 - Origin
 - Serotype, genotype, strain
 - Possible source
 - Vaccine matching by serology
 - Animal experiments
- Detailed reports

Progress

- Complete genome analysis
- P1 sequence analysis and epitope mapping

Next steps

- Estimating weight of infection from molecular epidemiology
- Combine data from all inputs to provide a more comprehensive analysis
- More consideration of vaccine potency in strain selection



Network Activities: Harmonisation of Vaccine Matching Tests for Network Laboratories 2008-2011

Process:

- Coordinated by WRLFMD 11 labs in total
- •Live (for VNT) and inactivated viruses and rabbit, guinea pig (for LPBE) and bovine sera provided from WRLFMD to each lab
- Instructions, reporting templates and protocols for all tests provided from WRLFMD
- •Participants asked to test the samples for "r₁" values using their 'inhouse' protocols and those provided from WRLFMD



Harmonisation of Vaccine Matching Tests for Network Laboratories

Findings:

- •VNT: 4 out of 8 labs gave the same results for all 9 viruses.
- LPBE: 3 out of 4 labs gave similar results

Contributing factors for differences

- •Cells and systems are different
- Interpretation of CPE is different
- Blocking regents for ELISA are different
- Not all labs repeat tests
- Further work needed to harmonise assays



Network Activities:

The 1st OIE/FAO FMD Reference Laboratories Vaccine Matching Technology Training Workshop

Institute for Animal Health, Pirbright, 7-11 November 2011

- Hands-on experience with both the VNT and LPBE for FMD vaccine matching studies and subsequent data analysis.
- An opportunity for participants to exchange views on technique issues and have broad informal discussions on key issues and concerns relating to vaccine matching and diagnostic tests



Participants: Russia, Thailand, Nigeria, Kenya, Botswana, Belgium, Germany

Scientific Developments and

Harmonisation of Vaccine Matching Tests for Network Laboratories

Future work

- Next Inter-laboratory matching exercise in 2012
 - Vaccine challenge test at Pirbright in Feb 2012
 - Asia 1 Shamir vaccination followed by heterologous Asia 1 TUR 2011 virus challenge.
 - o BVS at 21dpv will be collected and pooled.
 - Panel of 3-4 field viruses including the challenge virus with a range of high,
 medium and low r₁ values will be prepared and distributed to network labs.
 - \circ r₁ values will be generated by each lab and compared with one another and with the *in vivo* protection results/PD₅₀
- A second FMD vaccine matching training course will be organised



Network Activities: OIE/FAO FMD Reference Laboratories Meeting-November 2011 IAH, Pirbright- Major issues identified

•FMD global problem

- Some information gaps lack of sampling and of exchange
- o Much of the work reported by the network comes through Pirbright WRLFMD
- How can we divide workload especially with an expected increasing workload following Bangkok meeting?

Regional labs to identify where they might increase throughputs

- Screening samples
- o RT PCR- serotype specific?
- Ag ELISA and use of LFDs
- VP1 or P1 sequencing
- oTraining/reagent supply

Vaccine matching comes up repeatedly as a problem area

- Reagent access
- Methodologies and Interpretation
- Delivery of results and advice to decision makers
- Need to address this as a network of experts

Scientific Developments and

Network Workplan for 2012

- Prepare network report for 2011
- Collate and publish vaccine matching harmonisation work
- Prepare a presentation on role of network for the Bangkok meeting
 Labs to identify areas for potential increase in throughputs and requirements to do so
- Set up subgroups to carry out specific tasks identified



Workplan for 2012

- Subgroup 1: Carry out comprehensive review of vaccine matching
 - Literature
 - Methodologies
 - Interpretation
 - Prepare report for the next network meeting
- Subgroup 2: Vaccination and assessing herd immunity
 - Tests and sampling strategy
 - Quality of vaccine
 - Prepare report for the next network meeting
- Subgroup 3: Training/reagents needs
 - Current state of Proficiency testing for FMD diagnosis and vaccine matching
 - Prepare report for the next network meeting
- •6 month review of progress- possibly during Bangkok meeting 2012
- •The 2012 network meeting should focus on these actions and the outcomes of the Bangkok meeting



Global Activities for Network

- What roles for Network in Global control plan?
- We can offer
 - regional focus
 - knowledge and experience
 - training
 - coordination through networks



Resourcing Issues to be Addressed

- Increased workload- samples
- Increased demand for
 - Training
 - Proficiency testing
 - Accreditation
- •Ref Labs need to receive dedicated funding from the Global initiative





- The network provides the basis for a global 'real time virus map' for the implementation of better informed control measures for FMD
- A major combined effort both National and Global is needed for control

The FMD Reference Laboratory Network is the Engine Room of the Global Control Initiative





