



World Organisation
for Animal Health
Founded as OIE



25th SEACFMD National Coordinators Meeting

3-5 October 2022, Bali, INDONESIA

Pakchong FMD Laboratory

KINGKARN BOONSUYA SEEYO

Regional Reference Laboratory for FMD in South East Asia

NIAH ,DLD, Pakchong, Nakhonratchasima THAILAND

Pakchong FMD Laboratory Activities in 2022

1. Diagnostic work

2. Quality management

3. Laboratory Improvement

4. Research & collaboration

Pakchong FMD Laboratory Activities in 2022

1. Diagnostic work

Antigen detection

PCR

ELISA

Virus Isolation

Antibody detection

LP ELISA

NSP ELISA

SN test

Strain characterization

Sequencing

Vaccine matching

ELISA

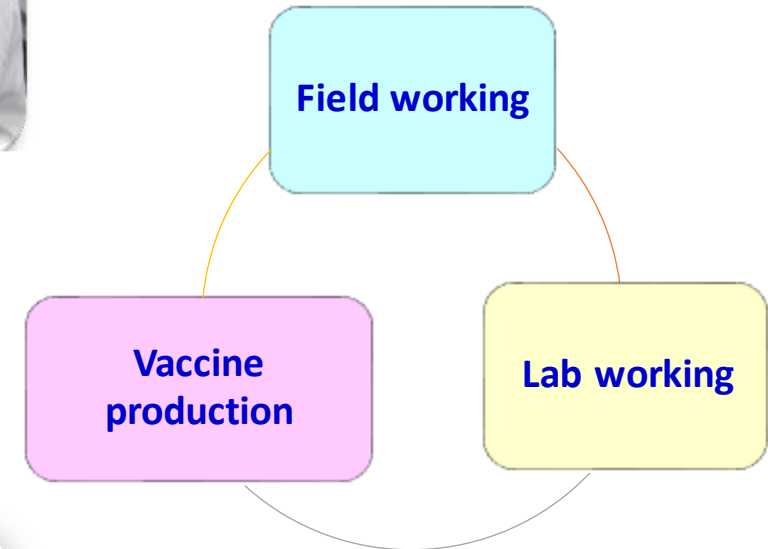
VNT

Reagent production

Rb

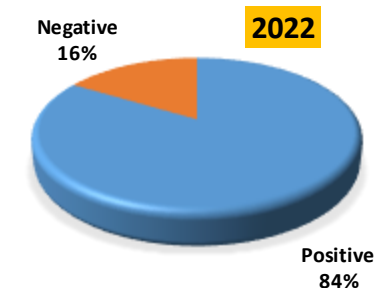
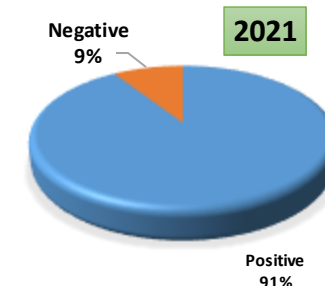
GP

Inactivated Ag

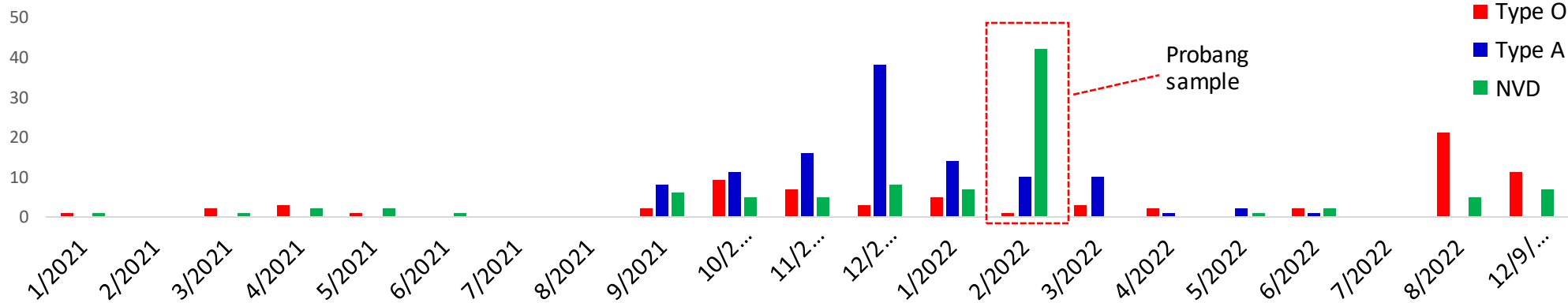


FMD Situation 2021-2022

Country of origin	FMDV detection						
	Total	Serotype by ELISA Typing and One step multiplex RT-PCR				real-time RT PCR	
		O	A	Asia-1	No Virus Detected	Positive	Negative
THAILAND (2021)	132	28	73	-	31	120	12
LAO PDR (Probang sample)	20	-	-	-	20	-	20
THAILAND (Jan- 12 Sep 2022)	94 (Tissues)	44	28	-	22	88	6
	53 (Probang samples)	1	10	-	42	35	18

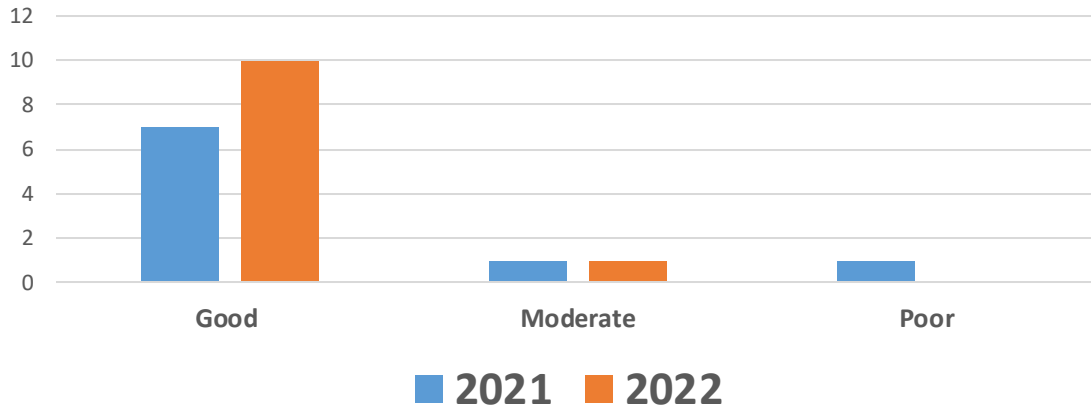


FMD suspected samples and identification

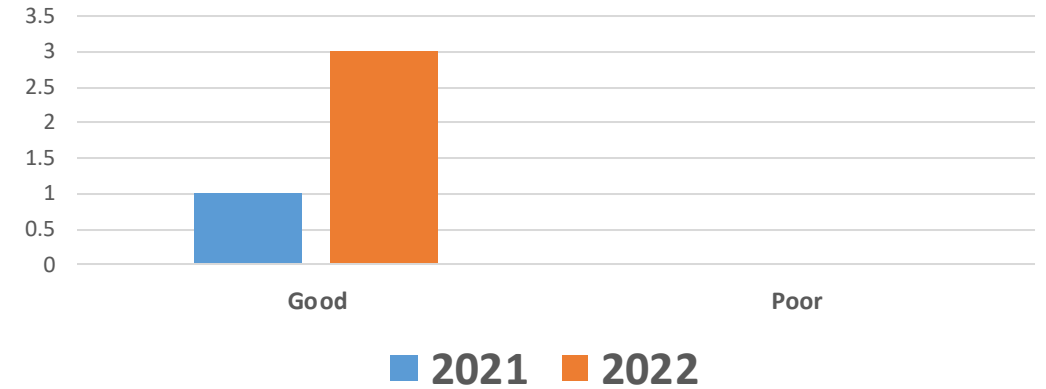


❖ r-value by Vaccine matching test

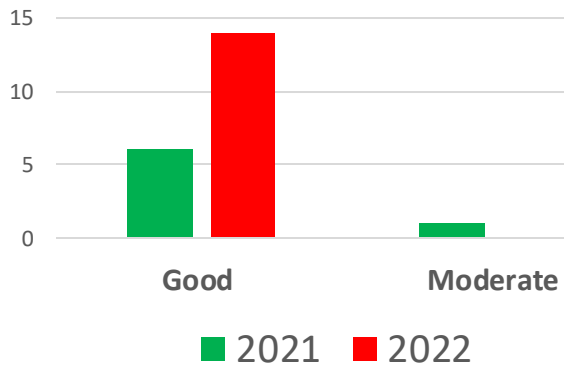
r-value of serotype O compare with O/189(Thai strain) by LPB ELISA



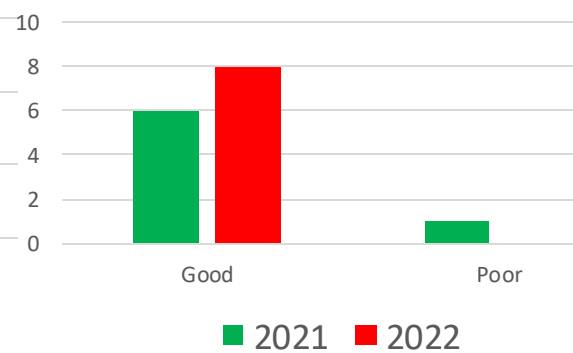
r-value of serotype O compare with Thai vaccine strain by VNT



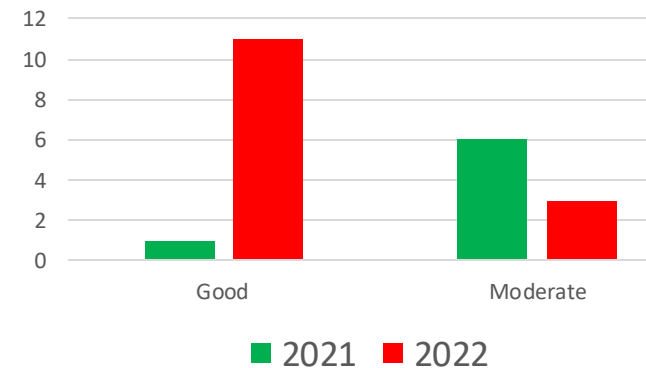
r-value of serotype A compare with A/Sakol/Thai vaccine strain by LPB-ELISA



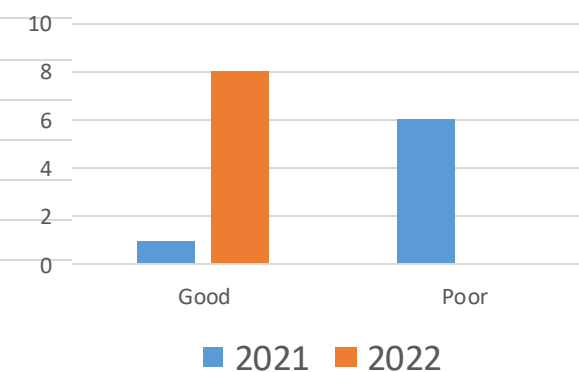
r-value of serotype A compare with A/sakol/Thai vaccine strain by VNT



r-value of serotype A compare with A/Lopburi/Thai vaccine strain by LPB-ELISA



r-value of serotype A compare with A/Lopburi/Thai vaccine strain by VNT



Thailand

Date of sample collected: 2021-2022



FMD Vaccine Matching Strain Differentiation Report

FMD Vaccine Matching Strain Differentiation Report - Final

Lab Reference Batch Number: WRLFMD/2022/000016 Report Date: 02/09/2022
Report Number: 392
Date Tests Completed: 01/09/2022 Country of Origin*: Thailand

2dm VNT r, RESULTS

	A TAI/5/2021	A TAI/6/2021	O TAI/15/2020	O TAI/21/2020	O TAI/2/2021
A22 Iraq, Boehringer Ingelheim	0.39, 1.94	0.32, 1.85			
A GVII 2015, Boehringer Ingelheim	0.46, 1.49	0.50, 1.52			
A Iran 05, Boehringer Ingelheim	0.07, 1.48	0.07, 1.52			
A Malaysia 97, Boehringer Ingelheim	0.33, 1.82	0.39, 1.88			
A/TUR/20/06, MSD Animal Health	0.11, 0.90	0.08, 0.75			
O1 Campos, Biogénesis Bagó			0.62, 2.57	0.55, 2.51	0.37, 2.34
O-3039, Boehringer Ingelheim			0.69, 1.86	0.69, 1.85	0.51, 1.73
O Campos, Boehringer Ingelheim			0.35, 2.12	0.14, 1.70	0.16, 1.79
O Manisa, Boehringer Ingelheim			0.56, 2.32	0.32, 2.08	0.32, 2.08
O Panasia 2, Boehringer Ingelheim			0.43, 2.13	0.35, 2.03	0.45, 2.15
O/TUR/5/09, MSD Animal Health			0.94, 2.32	0.57, 2.10	0.62, 2.15

LAO PDR

Date of sample collected: 2020

Submitted: 2021



FMD Vaccine Matching Strain Differentiation Report

NOTE: Vaccines from different manufactures may perform differently although the vaccine strains are the same.

2dmVNT r_1 RESULTS

Vaccines:

Field Isolates:	O 3039	O Campos	O Manisa	O Tur 5/09	O1 Campos
O/LAO/1/2020	0.65 / 1.92	0.28 / 1.81	0.47 / 2.10	0.50 / 2.07	0.48 / 2.48
O/LAO/5/2020	0.39 / 1.70	0.32 / 1.87	0.62 / 2.22	0.76 / 2.25	0.55 / 2.54

Cambodia

Date of sample collected: 2018

Submitted: 2020



FMD Vaccine Matching Strain Differentiation Report

NOTE: Vaccines from different manufactures may perform differently although the vaccine strains are the same.

2dmVNT r_1 RESULTS

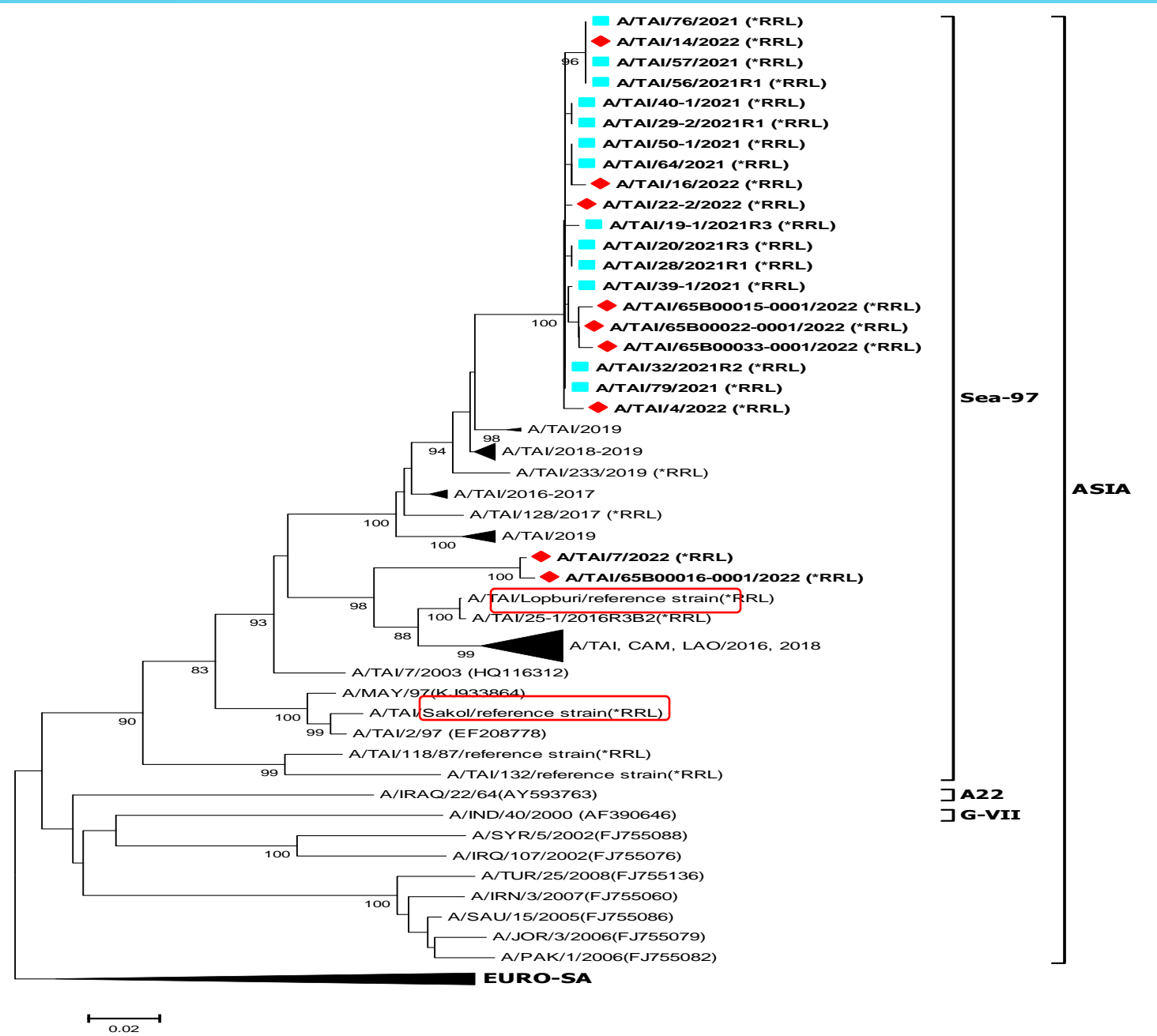
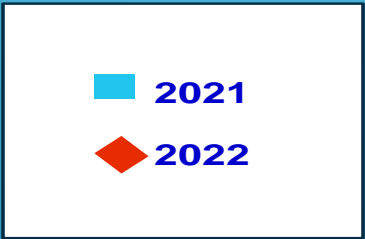
Vaccines:

Field Isolates:	O 3039	O Campos	O Manisa	O Tur 5/09	O1 Campos
<u>O/CAM/1/2018</u>	0.33 / 1.63	0.25 / 1.91	0.29 / 1.91	0.46 / 2.01	0.43 / 2.37
<u>O/CAM/6/2018</u>	0.40 / 1.71	0.32 / 2.05	0.33 / 1.97	0.59 / 2.12	0.49 / 2.43

Sequencing Result: Phylogenetic tree of serotype A

FMDV serotype A in 2021-2022

Strain: Sea-97, Topotype: ASIA

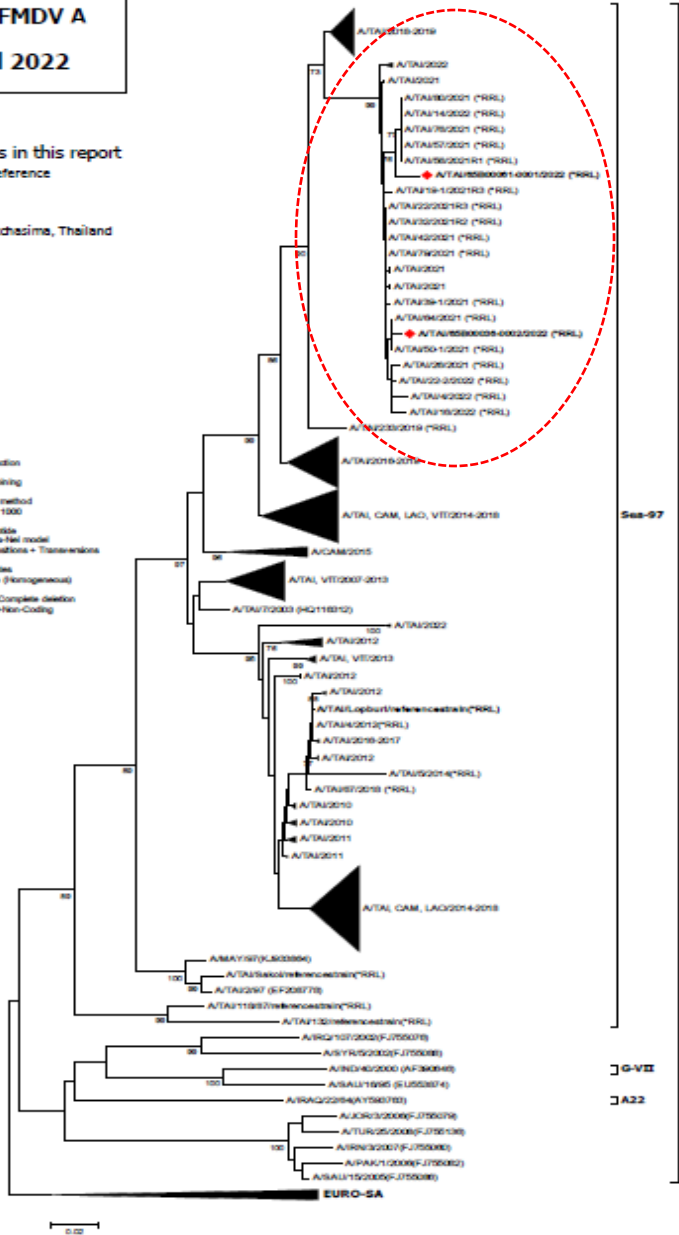


❖ Phylogenetic trees of serotype A
Update: July 2022

Report on FMDV A
in Thailand 2022

◆ Indicates viruses in this report
Report by Regional Reference
Laboratory For FMD
in South East Asia
Pakchong, Nakhonratchasima, Thailand

Software - MEGA 7.0.14
Analysis
Analysis - Phylogeny Reconstruction
Scope - All Selected Taxa
Statistical Method - Neighbor-joining
Phylogeny Test
Test of Phylogeny - Bootstrap method
No. of Bootstrap Replications - 1000
Substitution Model
Substitutions Type - Nucleotide
Model/Method - Tamura-Nei model
Substitutions to Include - C, Transitions + Transversions
Rates and Patterns
Rates among Sites - Uniform rates
Pattern among Lineages - Same (Homogeneous)
Data Subset to Use
Gap/Missing Data Treatment - Complete deletion
Codons Included - 1st+2nd+3rd Non-Coding



Sea-97

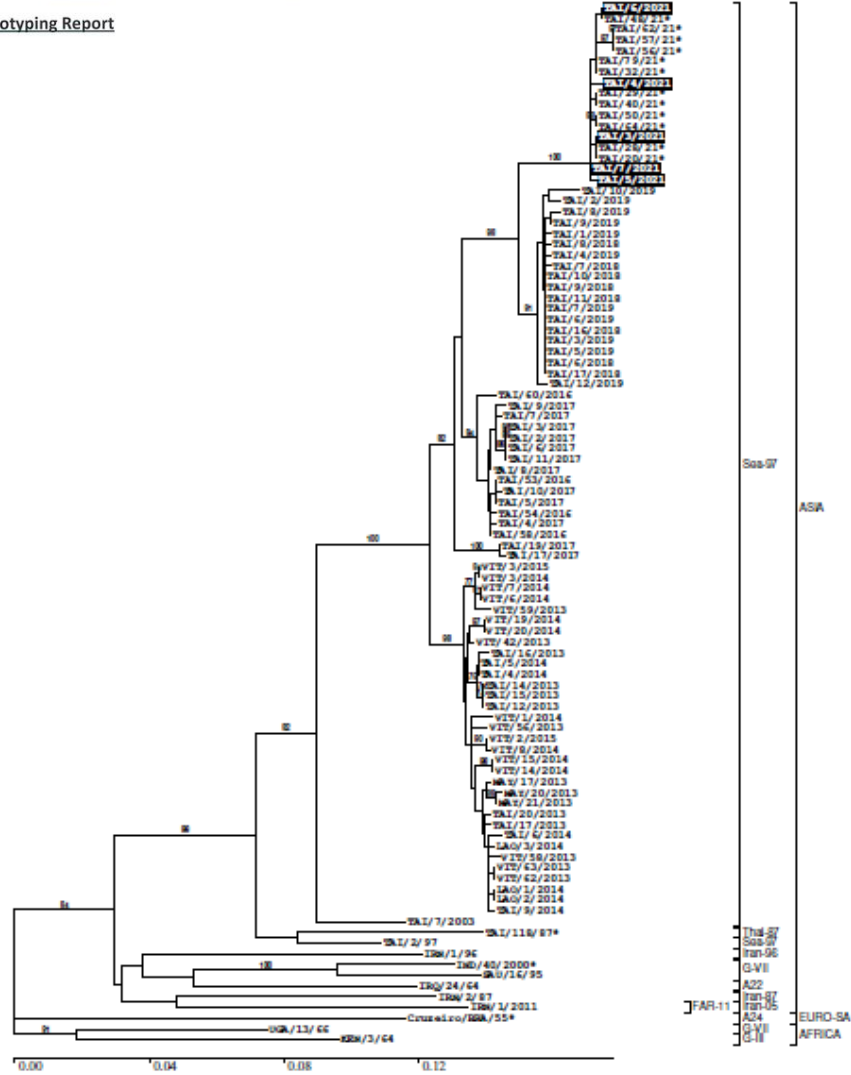
ASIA

G-VI

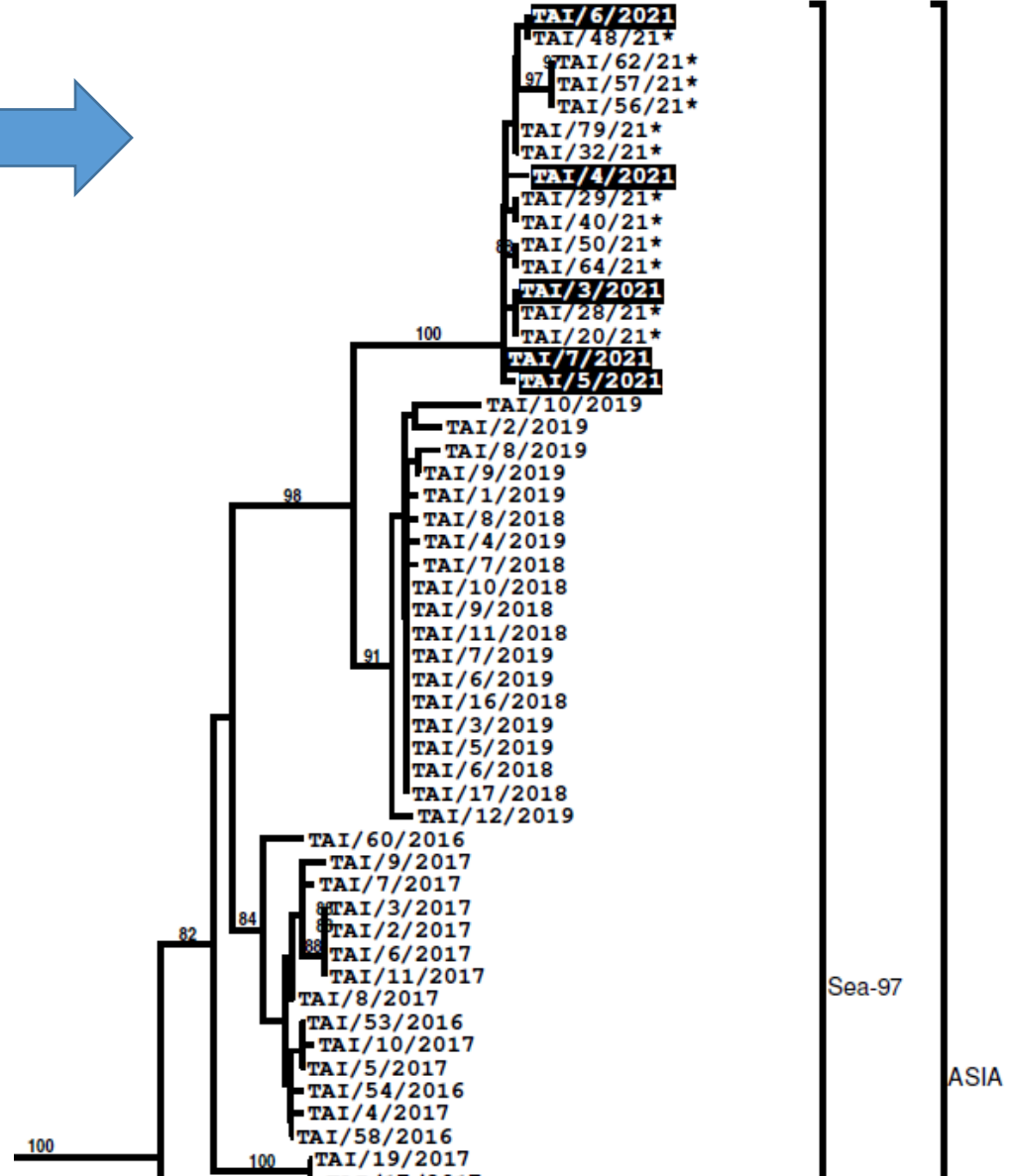
EURO-SA



FMD Genotyping Report



*, not a WRLFMD Reference Number



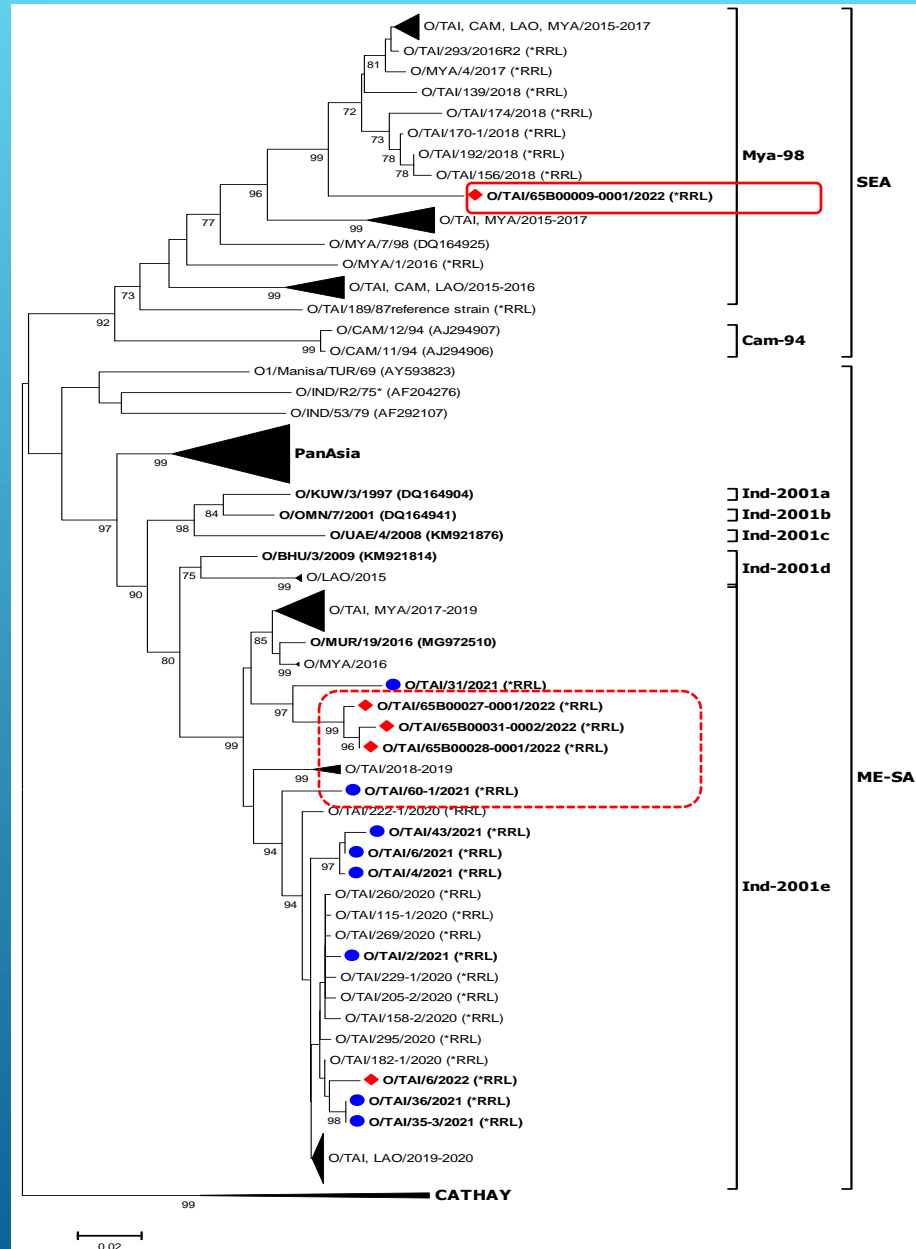
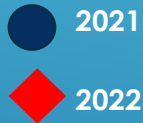
Sequencing Result: Phylogenetic trees of serotype O

FMDV Phylogenetic tree

FMDV serotype O in 2021-2022

Strain: Mya-98, Topotype: SEA

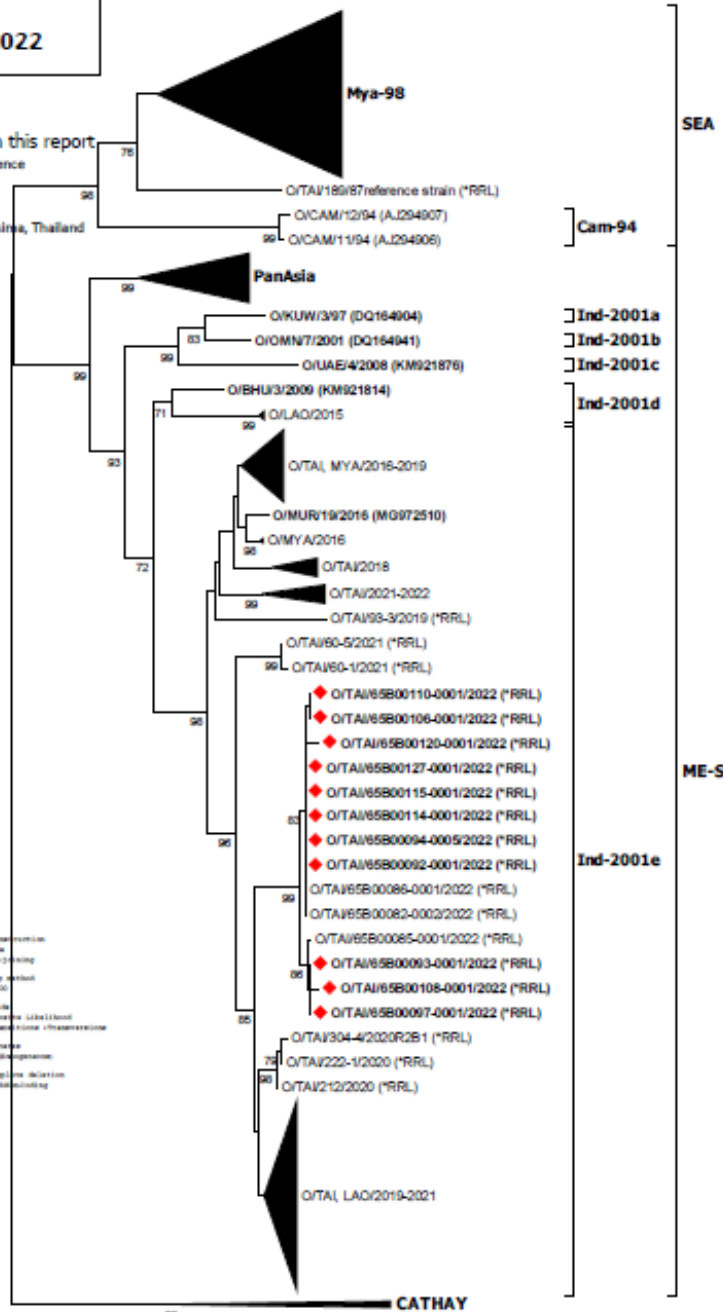
Strain: Ind-2001e, Topotype: ME-SA



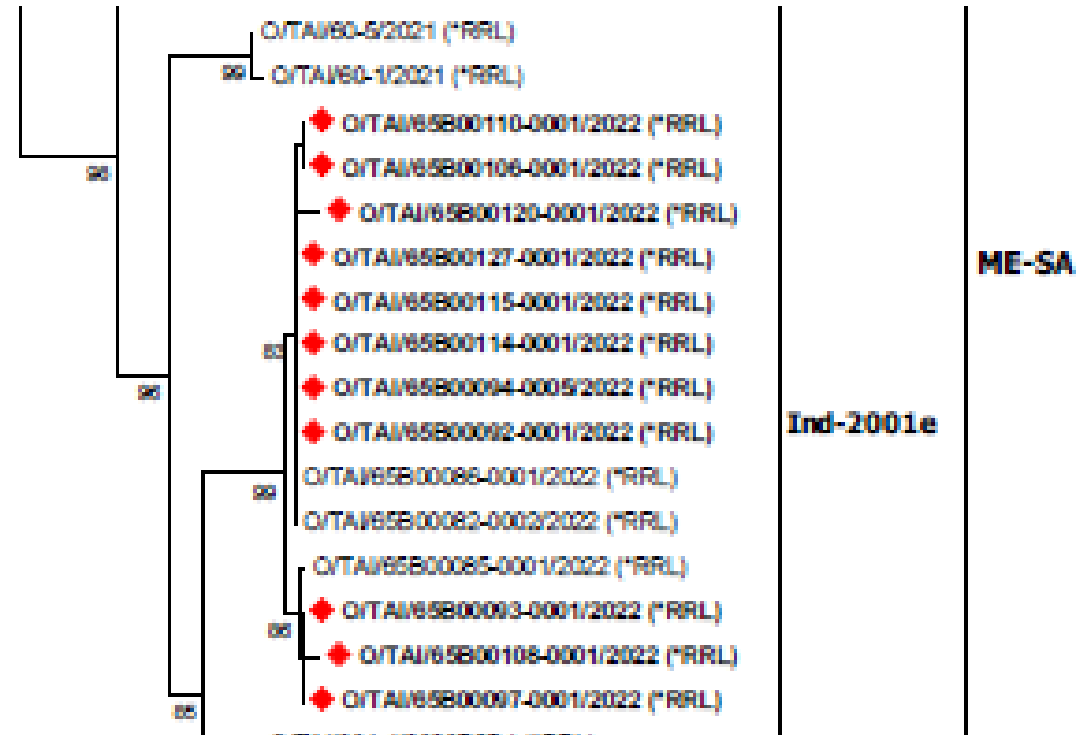
**Report on FMDV O
in Thailand 2022**

◆ Indicates viruses in this report
Report by Regional Reference
Laboratory For FMD
in South East Asia
Pakchong, Nakhonratchasima, Thailand

Analysis
Analysis: Phylogeny Reconstruction
Model: GTR+I+G4
Statistical Method: Maximum Likelihood
Phylogeny Test: Bootstrap
Type of Bootstrap: Nonparametric
Number of Bootstrap Replications: 1000
Substitution Model
Substitution Type: Nucleotide
Model: GTR+I+G4
Substitutions to include: All
Model and Output
Save along with: All
Output along with: All
Site Report to file
Uploading Site Treatment: None
Indices Included: Ambiguous Coding

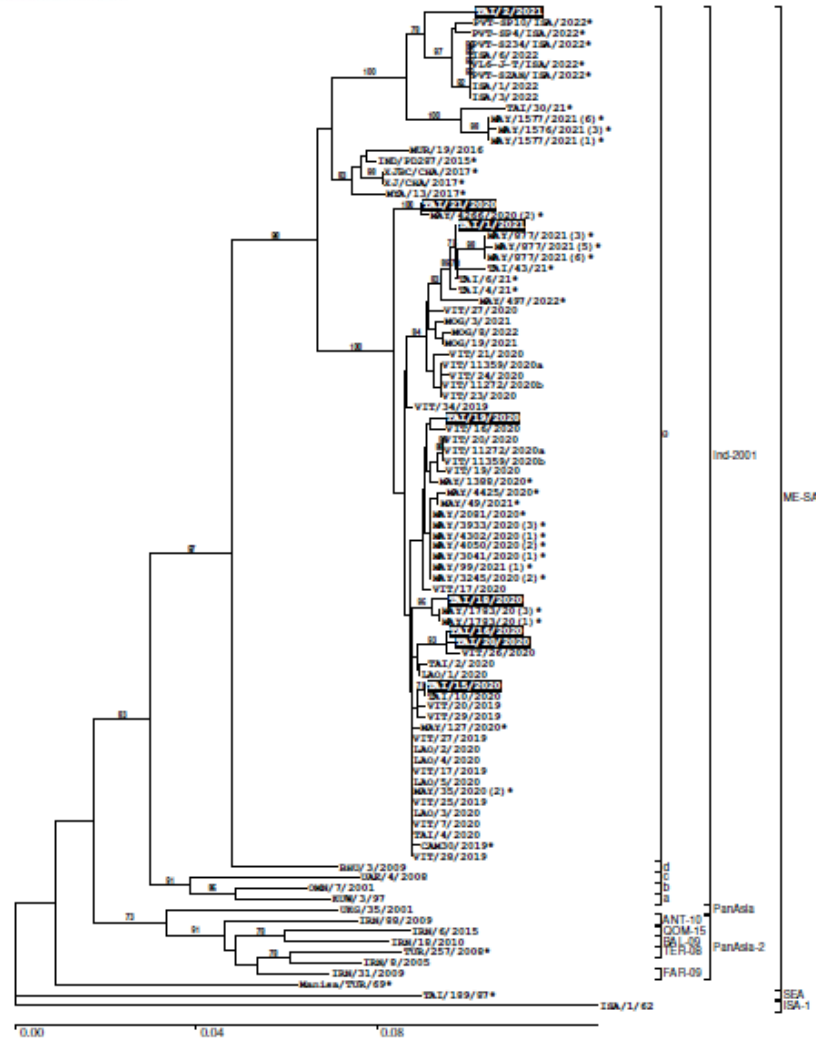


◆ Phylogenetic trees of serotype O
Update: September 2022



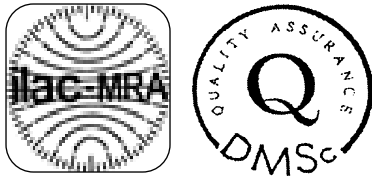


FMD Genotyping Report



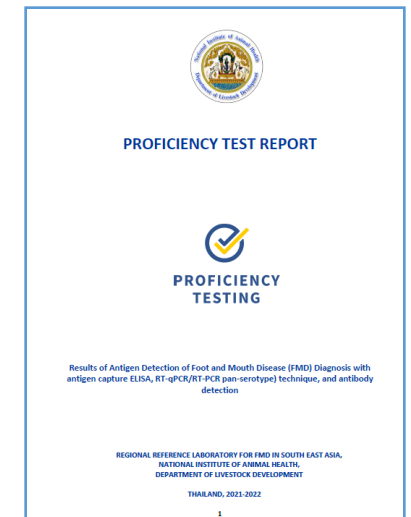
*, not a WRLFMD Reference Number

Pakchong FMD Laboratory Activities in 2022



2. Quality management

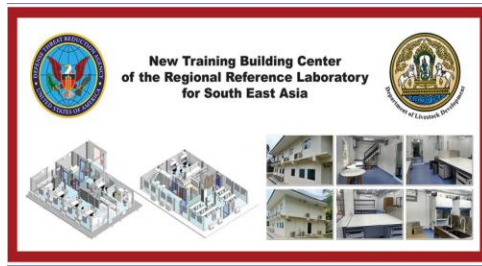
- **Maintain** ISO 17025:2017; Audit, Calibration, Review management, ...
- RRL has accredited by ISO/IEC 17025:2017
 - Antigen typing test by ELISA technique
 - Antibody measurement by LP ELISA
 - 3ABC Non structural protein (NS) test
- **Proficiency testing Provider** for National lab and lab interested participating
- Participating FMD PT Program organized by **WRL, UK**
- **Refresh Training** for national lab
- **BSL2 Certification** from DTRA-MORU
- **Biosafety and Biosecurity** management



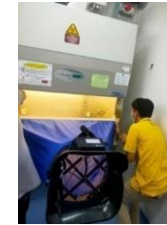
Pakchong FMD Laboratory Activities in 2022



3. Laboratory Improvement



- Human Resource
 - Human Resource Planning
 - Recruitment and staffing
 - Human Resource Development
 - Intensive Training and refresh for RRL staff
 - Onsite and Online

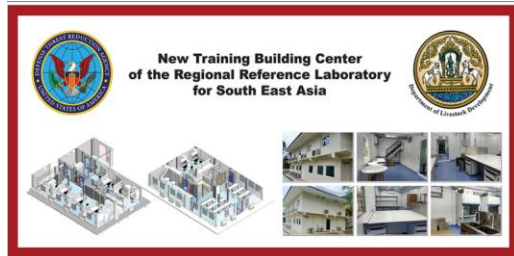


- Renovation
 - Phase 1
 - Phase 2



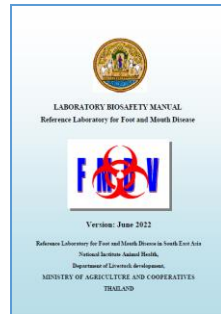
RRL-Renovation Project:

- **Phase 1:** Training building Center (BSL2+) will be a temporary lab for RRL and Training Building; **Finished status**
 - External Biosecurity
 - Include isolation of animals experiment, quarantine procedures, test method, preventive measures, and hygiene.
 - Antigen Detection (ELISA and PCR), Antibody detection, Reagent Preparation



Biosafety Training Activity

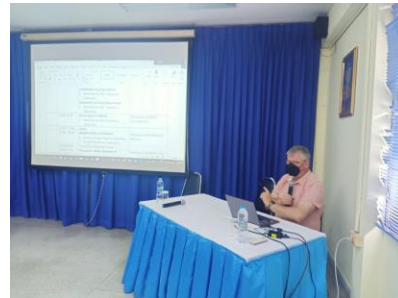
Introduction



Workshop

- ✓ RISK ASSESSMENT
- ✓ The operations the BSL 2 enhanced laboratories for foot and mouth disease diagnostic (BSL 2 containment but BSL 3 practice)
- ✓ Standard operating procedures for BSL-2+ facility

Presentation and Discuss



Phase 2: BSL3 facility building, will be finished in 2023; Ongoing status.



FMD RRL Upgrade/Renovation Project.
At Pak Chong, Nakhon Ratchasima, Thailand.

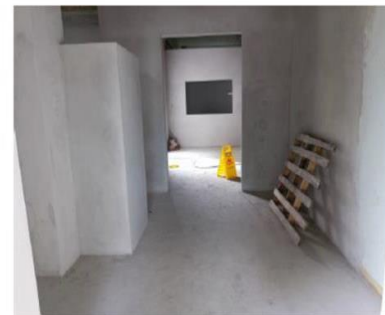
Safety Statistic ณ 22/07/22

DATE of	22/7/22	
TARGET (hrs)	26,000	MAN HOUR
NUMBER OF DAYS SINCE LAST DAFC	00:00	Day
MAN HOUR SINCE LAST RECORDING	1,055.6	MAN HOUR
USAC (hrs)	00:00	MAN HOUR
MONTH (hrs)	00:00	MAN HOUR
TOTAL (hrs)	00:00	MAN HOUR
CLOSE (hrs)	00:00	MAN HOUR



SAFETY STATISTIC UNTIL 22/07/22

98% PROGRESS OF INTERNAL WALL PLASTERING



98% PROGRESS OF INTERNAL WALL PLASTERING

WOAH-OIE RRLFMD → Diagnosis, Network Collaboration, and Sustainable standard laboratory

Pakchong FMD Laboratory Activities in 2022



4. Research & collaboration



- SATREPS Project (JICA-JAPAN) (2021-2024)
- Kasetsart University; Thailand (Rapid test kit)
- Monoclonal establishment project (DLD Funding)
- NIAH Japan: Scientific meeting and research collaboration
- Collaboration research with WRL-WOAH as OIE to support and improve technical skill
- Collaboration research with ACDP, Australia; Collaboration research with AAHL, Australia: Potential of Reduction of Ag Path Reagent used in FMD real-time TagMan PCR, Vaccine matching in SEA will be continue soon (Covid-19 situation interruption)
- Collaboration with MORU to develop C-ELISA (Ongoing process)

- Publications important and process for joint publication with partners needs to be easy
- Collaborations & Training with International laboratories
- Use of New Training Facility for Thailand & ASEAN

- Reference lab/ National Lab and Provincial Officer
- University
- Sharing FMD diagnosis information

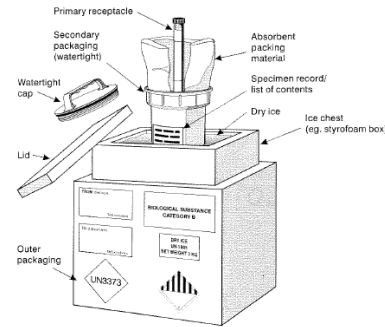


- Routine to Research Vaccine selection, Evaluation for NSP test kits,..

■ Sample submission

- Sample submission: At the border of Thailand to RRL-FMD

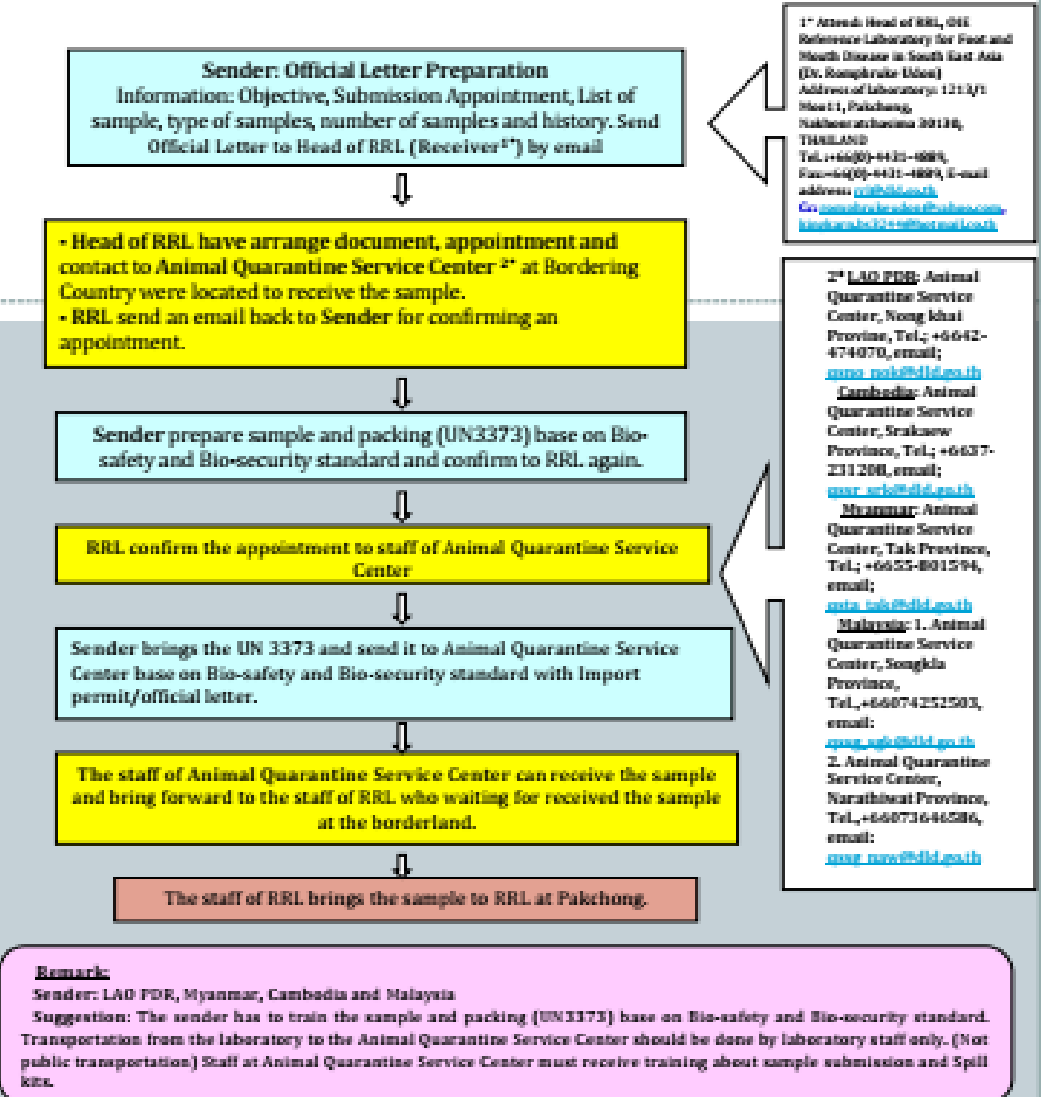
- LAO PDR
- Cambodia



Guideline for Exotic Samples Submission to Reference Laboratory for FMD diagnostic in South East Asia (RRL) via Bordering Country at Animal Quarantine Service Center



Guideline for Exotic Samples Submission to Reference Laboratory for FMD diagnostic in South East Asia (RRL) via Bordering Country at Animal Quarantine Service Center





**Acknowledgment: RRL, NIAH, DLD ,and all partner collaboration
Thank you for your attention**