FMD VIRUS POOL 3
WEST EURASIA AND MIDDLE EAST

H. Haluk AŞKAROĞLU and Gazi YAHIA
Network involves 14 countries:

- Turkey
- Iran
- Pakistan
- Afghanistan
- Azerbaijan
- Armenia
- Georgia
- Turkmenistan
- Uzbekistan
- Tajikistan
- Kyrgyzstan
- Kazakhstan

In addition:

- Syria and Iraq
DISEASE DYNAMICS IN WEST EURASIA (1)

- FMD is currently circulating in the region (Types A, O and Asia-1)

- Field strains:
  - **TYPE O: O PanAsiaII**
    - ANT-10
    - AFG-09
  - **TYPE A: A Iran05**
    - AFG-07
    - BAR-08?
    - HER-10
    - SIS-10
    - USK-10
  - **TYPE ASIA-1: ASIA**
    - Sindh-08
DISEASE DYNAMICS IN WEST EURASIA (2)

- Three major regional epidemics in the past 3 years:
  - A Iran-05 (BAR-08) 2008-2010
  - O Panasia-II (ANT-10) 2009-2011
  - New type Asia 1 2011-2012

- Two sublineages have replaced formers:
  - O Panasia II/AFG-09
  - A Iran 05/SIS-10

- Spread from Pakistan and Afghanistan to Turkey

- Occasional incursions into Central Asia and Middle East (Israel and Libya)
DISEASE DYNAMICS IN WEST EURASIA (3)

Factors affecting disease dynamics:

- Trade patterns
  - All of the epidemics travelled from east to west

- Involvement of Central Asian countries
  Tajikistan, Kyrgyzstan and Kazakhstan and
  Middle East countries, Israel and Libya

- Meat prices
Direction of Potential Threat

Source: FAO/ EUFMD
FMD IN TURKEY
and in the Region
Disease Dynamics in Turkey over Time

DISTRIBUTION OF NUMBER OF OUTBREAKS BY YEAR (1993-May/2012; )

- TYPE O/?
- Asia-1 Shamm
- A Iraq?
- A Iran 96/99
- O PanAsia I Alfa05/beta 05
- A Iran 05
- O PanAsia II
- A Iran 05/2nd wave
- O PanAsia II/2nd wave
- Asia-1 sindh

YEARLY OUTBREAKS

- TOTAL
- ASIA-1
- O
- A

YEARS

Distribution of Type O viruses in Turkey in 2010
O PanAsia – II ANT-10 Distribution in West Eurasia Region
Worldwide Distribution of O\textit{Panasia II} ANT-10 in 2011 (WRL)

- Afghanistan
- Pakistan
- IR Iran
- Turkey
- Bahrain
- Israel
- Georgia
- Kuwait
- Bulgaria
- Libya
TRANSMISSION OF TYPE A IN THE REGION FMDV A A/IRN/05 SIS-10
April 2010 - October 2011
Spread of Asia-1 (Group-VII) FMDV within EuroAsia
# GENETIC DIVERSITY IN TURKEY (2011-2012)

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>SEROTYPES-2011</th>
<th>Total</th>
<th>SEROTYPES-2012</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A (IRN 05)</td>
<td>0 (PanAsia II)</td>
<td>Asia 1</td>
<td>A (IRN 05)</td>
</tr>
<tr>
<td>AFG-07</td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIS-10</td>
<td>230</td>
<td>230</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>HER-10</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USK-11</td>
<td>14</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANT-10</td>
<td>46</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAL-10</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>FAR-09</td>
<td></td>
<td></td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>ASIA-1/Sindh-08</td>
<td>36</td>
<td>36</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>237</strong></td>
<td><strong>54</strong></td>
<td><strong>36</strong></td>
<td><strong>327</strong></td>
</tr>
</tbody>
</table>
ANTIGENIC DIVERSITY-
INADEQUATE VACCINE MATCH-POOR IMMUNITY

- Frequent appearance of new antigenic strains in the region due to poor preventive measures
- Delayed and insufficient vaccine matching studies
- Use of unsuitable vaccine strains resulting in poor immunity and poor protection

- O Manisa $\rightarrow$ O Panasia II (O Tur 07)
- A 22 Iraq $\rightarrow$ A Iran 05 (A Tur 06)
- Asia-1 Shamir $\rightarrow$ Asia Tur11
## Recent FMD Vaccine Strains Used in Turkey

<table>
<thead>
<tr>
<th>Vaccine Strain</th>
<th>Genotype</th>
<th>Start of use</th>
<th>End of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>O Manisa</td>
<td>?</td>
<td></td>
<td>07/2011</td>
</tr>
<tr>
<td>O TUR 07</td>
<td>O PanAsia II</td>
<td>01/2011</td>
<td>Current</td>
</tr>
<tr>
<td>A 22 Mahmatli</td>
<td>?</td>
<td></td>
<td>1998</td>
</tr>
<tr>
<td>A Aydin 98</td>
<td>A Iran 96</td>
<td>1998</td>
<td>02/2006</td>
</tr>
<tr>
<td>A Nevsehir</td>
<td>A Iran 05</td>
<td>02/2006</td>
<td>03/2007</td>
</tr>
<tr>
<td>A 22 Iraq 24/64</td>
<td>?</td>
<td>03/2007</td>
<td>11/2008</td>
</tr>
<tr>
<td>A TUR 06</td>
<td>A Iran 05</td>
<td>11/2008</td>
<td>Current</td>
</tr>
<tr>
<td>Asia 1 Shamir</td>
<td>?</td>
<td>2008</td>
<td>08/2011</td>
</tr>
<tr>
<td>Asia 1 TUR 11</td>
<td>Sindh-08</td>
<td>08/2011</td>
<td>Current</td>
</tr>
</tbody>
</table>
### Vaccine Matching Studies for FMDVs isolated from Eurasia in 2010

<table>
<thead>
<tr>
<th>Vaccine Strain</th>
<th>Total Tested 2dmVNT</th>
<th>Total Matched</th>
<th>% Matched</th>
</tr>
</thead>
<tbody>
<tr>
<td>O Manisa</td>
<td>30</td>
<td>13</td>
<td>43</td>
</tr>
<tr>
<td>O Ind R2/75</td>
<td>30</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>A TUR 06</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>A 22 Iraq</td>
<td>10</td>
<td>3</td>
<td>30</td>
</tr>
</tbody>
</table>
## Vaccine Matching Studies for FMDVs isolated from Eurasia in 2011

<table>
<thead>
<tr>
<th>Vaccine Strain</th>
<th>Total Tested 2dmVNT</th>
<th>Total Matched</th>
<th>% Matched</th>
</tr>
</thead>
<tbody>
<tr>
<td>O Manisa</td>
<td>29</td>
<td>22</td>
<td>76</td>
</tr>
<tr>
<td>O TUR 09</td>
<td>29</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>A TUR 06</td>
<td>15</td>
<td>12</td>
<td>80</td>
</tr>
<tr>
<td>A 22 Iraq</td>
<td>15</td>
<td>5</td>
<td>33</td>
</tr>
<tr>
<td>A Iran 2005</td>
<td>15</td>
<td>7</td>
<td>46</td>
</tr>
</tbody>
</table>
Background of West Eurasia Roadmap

- Recommendation of the Open Session of the EuFMd Research Group (Sicily-October 2008)

- Workshop to develop the PCP approach (Shiraz-November 2008)

- 1st Regional workshop for the review of the progress of the West Eurasia FMD network (İstanbul)
  
  - Advisory Body
  - EpiNetwork Group
  - WELNET Group

- 2nd and 3rd meetings held in İstanbul in 2010 and 2012.
West EurAsia FMD Control Roadmap-2020 was initiated by the FAO/EUFMD Commission/OIE to achieve freedom from clinical FMD cases by 2020.

The Progressive Control Pathway for FMD (PCP-FMD) is a set of control program activity stages leading to FMD freedom.

Regional Roadmaps (RR) describe the anticipated progress along the PCP at national and regional level over longer term.
PROGRESS BY THE ROADMAP (1)

PCP Stage Assessment

- New assessment tools developed in 2011 by EuFMD consultants
  - Checklist for self assessment by each country
  - Manual and glossary to explain checklist
  - Form for external assessment via review of documentation or country visit

- Evaluation of the disease situation and control policy of each member country

- Encouragement of countries
  - to report serological findings
  - to systematically improve their control policy and surveillance system

Surveillance activity

- Led by the EuFMD and funded by international donors (FAO, EC, Italy etc.)
PROGRESS BY THE ROADMAP (2)

Diagnosis and Laboratory Capacity

- Since 2009, diagnosis of threat and laboratory capacities of member countries improved by assistance of WELNET and international reference laboratories.

Communication and Sharing Disease Information

- Good communication established
- Share of disease information and surveillance data improved under leadership of EuFMd and with assistance of WELNET and EpiNetwork

Vaccine coverage and monitoring

- There is still a big gap in supplying the entire population of the region, yet vaccination coverage, monitoring and activities on vaccine matching have been improved by means of the roadmap.
Preliminary Assessment of country PCP Stage following 2012 W. Eurasia Roadmap meeting
### Results of PCP-Stage assessment for W. Eurasia, 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakh</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Kyrgyz</td>
<td>0</td>
<td>0</td>
<td>1 (new)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tajik</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Turkmen</td>
<td>0</td>
<td>0</td>
<td>1 (new)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Uzbek</td>
<td>0</td>
<td>0</td>
<td>1 (new)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>AFG</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>IRN</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAK</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>East Anatolia (TR)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Thrace (TR)</td>
<td></td>
<td></td>
<td></td>
<td>new</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Marmara Aegean (TR)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Central Anatolia (TR)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Syria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Iraq</td>
<td>1</td>
<td>1</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Armenia</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>pending</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

* No Roadmap Meeting in 2011, therefore 2010 Stages continue to apply...

... until 2013:

→ Turkey plans further zoning
→ all countries or zones min. stage 2

= 12 PCP progressions in countries or zones

13x stage 2 (9x new)
3x stage 3 (all new)
1x stage 4

develop & implement risk based control plans

.....eliminate circulation
DISEASE DYNAMICS IN MIDDLE EAST(1)

- FMD is circulating in the region (Types A, O and Asia-1)
  - Latest threat detected as SAT-2 in several ME countries.

- The Middle East region is much more complex than other regions as it is:
  - Located at the crossing of three continents
  - A high risk area for the spread of FMDV to neighbouring regions (ie. Europe)
Main driving risk factor is trade in live animals

In ME, trade in live animals is much greater than trade in meat due to:
- local traditions for the slaughter of live animals for consumption
- substantial inflow of small ruminants for major Muslim festivals (Hajj, Ramadan, Eid ul-Fitr and Eid ul-Adha)

FMD has serious impact,
- Food security,
- Rural income generation,
- National economy by impairing livestock trade

Implementation of a harmonized and coordinated long-term program to control FMD shall be a priority.
FMD and the Middle East

- There is no Middle Eastern country free from FMD with or without vaccination

- **Middle East countries are not involved in a FMD-PCP program yet.**

- A workshop was held in Dubai in March 2012 to discuss roadmap development and regional action plan.
Main Objective(s)

- Assessing current country strategy to manage the disease:
  - Surveillance,
  - Prevention,
  - Diagnosis,
  - Control measures,
  - National budget,
  - Vaccination strategies.

- Training technical staff to carry out prevention and control.

- Identifying FMD strains circulating in the region and potential introduction of others, in collaboration with the international reference laboratory.
- The project will be based on **most of the PVS critical competencies**.

- The OIE and the FAO Progressive Control Pathway tool (PCP) will be used to assess the progress in each beneficiary country.

- **Project objective**: All beneficiary countries will have to move up two stages of the PCP within at least the end of the second phase (2017) and at least level 4 at the end of the final phase (2020).
WEST EURASIA LESSONS
LEARNT AND CONCLUSIONS
LESSONS LEARNT (1)

- The disease is widespread in the region due to:
  - weaknesses in control of animal movements
  - new sub-lineages

- Genetically distinct lineages of FMDV serotypes A, O and Asia-1 circulate within parts of the region
  - with potential for further emergence and spread throughout the region

- Potential threat for other countries of Europe and Asia
LESSONS LEARNT (2)

- No regular outbreak investigation and sampling in many countries.
  - This causes lack of proper threat identification and early detection.

- Gaps in preventive measures
  - Biosecurity

- Quarantine measures

- Poor preventive measures let complete the virus evolution cycles
  - which results in genetic and antigenic diversity.

- Genetic diversity and antigenic change complicate vaccination policy and vaccine availability
LESSONS LEARNT (3)

- Limited quantity of vaccine available restricts progress in FMD control.

- Recent epidemic waves show that an early warning system to allow countries to adapt their control measures is not in place.

- There is delay on the diagnosis of the threat and vaccine matching testing because of gap in the laboratory capacity of some countries.

- Success cannot be achieved if FMD control policy does not gain attention at high political level and without stakeholder awareness.

- Most countries do not have a national contingency plan for FMD.

- Some countries in the region remain at an early stage of the PCP.

- Most countries have demonstrated their commitment to the Roadmap by undertaking PCP activities, with evidence of monitoring and control actions being applied.
Conclusions and Recommendations (1)

- A self budgetary system is needed to reach the targets of the roadmap.
  - Donor coordination should be put in place with country contributions to ensure ownership.

- **Awareness**
  - To ensure continuous national support to this process, decision makers and stakeholders should be better informed and better aware of the socio-economic consequences of FMD and the cost-benefit ratio of controlling of the disease.

- **Early Detection**
  - A mechanism for early detection and prompt identification of novel virus strains and threats in the region should be maintained.
Endemic countries should be encouraged to maintain systematic preventive measures:
- Quarantine
- Restriction of animal movements
- Biosecurity

Better surveillance and serosurveillance system according to OIE standards should be established for monitoring control policy and effective PCP stage assessment.
Middle East countries have similarities with the ecosystem of virus pool 3. Considered as a separate cluster of West Eurasia countries to avoid complexity of regional roadmap.

PCP-FMD and the PVS pathway offer the necessary conceptual frameworks for countries in the region to progressively reduce the virus load.

A thorough assessment of the countries based on the PCP-FMD principles is currently being undertaken.

A specific regional project is under development relating to the ME.
Turkey

Simply to feel good. Holiday in Turkey. The lively culture of Istanbul welcomes you. The magical lighting of the Ortaköy Mosque greets your eyes with an unforgettable panorama. Explore the city and discover the attractive shopping possibilities and, be sure to rest in the comfortable atmosphere of one of the innumerable hotels. We will welcome you with all this and more. www.reisland-tuerkei.info

Turkey
what a feeling