The status of Foot And Mouth Disease (FMD) in Ethiopia

By

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Introduction

• The dominant economic feature of Ethiopia is the agriculture Based
• of which livestock is an important and essential component.
• It has the largest livestock population in Africa possessing about 43.1 million cattle, 23.6 million sheep 18.4 million goats
• FMD is one of the contagious viral diseases that have great impact on economic development both in terms of direct and indirect losses specially in developing countries including Ethiopia.
**Objectives:**
	♦ To isolate and identify the circulating serotypes and subtypes of FMD Virus
	♦ To describe the status of FMD using sero-surveillance
	♦ To generate epidemiological information of FMD that helps to design control strategies.

**Sample collection**
Three types of samples have been collected
• Retrospective data from MOARD (1999-2006)
• Tissue sample for virus isolation from outbreak areas
• Sera for serological study from the whole parts of the country (4465 sera) and processed with 3ABC ELISA
Result

Figure 1: Sero-prevalence of FMD in different parts of Ethiopia
Table 1: Sero-prevalence of FMD in different regional states of Ethiopia

<table>
<thead>
<tr>
<th>Region</th>
<th>No Village</th>
<th>No Positive</th>
<th>No Negative</th>
<th>Total</th>
<th>P%</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa</td>
<td>20</td>
<td>41</td>
<td>359</td>
<td>400</td>
<td>10.3</td>
<td>0.0147691</td>
<td>0.0734607</td>
</tr>
<tr>
<td>Afar</td>
<td>18</td>
<td>14</td>
<td>343</td>
<td>357</td>
<td>3.9</td>
<td>0.0098821</td>
<td>0.0197777</td>
</tr>
<tr>
<td>Amara</td>
<td>28</td>
<td>17</td>
<td>642</td>
<td>659</td>
<td>2.6</td>
<td>0.0060722</td>
<td>0.0138724</td>
</tr>
<tr>
<td>Benshagul</td>
<td>8</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gembella</td>
<td>8</td>
<td>0</td>
<td>160</td>
<td>160</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oromia</td>
<td>67</td>
<td>286</td>
<td>1,093</td>
<td>1,379</td>
<td>20.7</td>
<td>0.0102244</td>
<td>0.1873386</td>
</tr>
<tr>
<td>SNNP*</td>
<td>33</td>
<td>37</td>
<td>623</td>
<td>660</td>
<td>5.6</td>
<td>0.0082029</td>
<td>0.0399521</td>
</tr>
<tr>
<td>Somali</td>
<td>15</td>
<td>6</td>
<td>284</td>
<td>290</td>
<td>2.1</td>
<td>0.0083721</td>
<td>0.0042081</td>
</tr>
<tr>
<td>Tigray</td>
<td>20</td>
<td>66</td>
<td>334</td>
<td>400</td>
<td>16.5</td>
<td>0.0172072</td>
<td>0.131167</td>
</tr>
<tr>
<td>Total</td>
<td>217</td>
<td>467</td>
<td>3,998</td>
<td>4,465</td>
<td>10.5</td>
<td>0.004159</td>
<td>0.0964375</td>
</tr>
</tbody>
</table>

* Southern Nations and Nationalities People
Table 2: Comparison of prevalence of FMD pastoral and highland mixed farming system

<table>
<thead>
<tr>
<th>Farming system</th>
<th>No Pos</th>
<th>No Neg</th>
<th>Total</th>
<th>Prevalence (%)</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed farming</td>
<td>142</td>
<td>2,082</td>
<td>2,224</td>
<td>6.38</td>
<td>0.0048301</td>
<td>0.073321</td>
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<tr>
<td>Pastoral</td>
<td>325</td>
<td>1,916</td>
<td>2,241</td>
<td>14.50</td>
<td>0.0067592</td>
<td>0.15828</td>
</tr>
<tr>
<td>Total</td>
<td>467</td>
<td>3,998</td>
<td>4,465</td>
<td>10.46</td>
<td>0.004159</td>
<td>0.112745</td>
</tr>
</tbody>
</table>

There is significant variation b/n pastoral and mixed farming system.
Figure 2: Number of FMD outbreaks per year (in different part of the country (1999-2006)

Source MOARD
Figure 3: Map showing No FMD outbreaks recorded in different part of Ethiopia (1999-06)
Figure 4: Status of FMD in Ethiopia
Figure 5: Map showing Serotypes of FMD viruses isolated in Ethiopia 1981-2008
Cont…

- Serotype O isolated almost from all parts of the country with highest frequency, Serotype A central Ethiopia
- SAT1 and SAT2 from Kenya and Sudan bordering areas,
- Serotype C not isolated after 1983,
- SAT1 in 2007 for the first time.
Figure 6: Neighbor-joining tree comparing the complete VPI coding sequence of type O FMD virus
Figure 7: Neighbor-joining tree comparing the complete VPI coding sequence of type A FMD virus
Figure 8: Neighbor–joining tree comparing the complete VPI coding sequence of type SAT 2 FMD virus
Figure 9: Neighbor–joining tree comparing the complete VPI coding sequence of type SAT 1 FMD virus.
Current status

During June-August 2008 study which is funded by EUFMD, FMD outbreak in North-western part of the country was investigated and 20 tissue samples were collected. Tissue cultured and serotype O was isolated. It will be send to IAH for further analysis.

Figure: Area of FMD outbreak in July/August 2008
Conclusion

• The records of MOARD from 1999 to 2006 indicated that FMD outbreak occurred every year with the highest in 1999 with 821 outbreaks

• Serotype O indicates that four distinct topotypes are circulating in East Africa, two in Ethiopia

• **Serotype A** Lay on African topotype,

• **Serotype SAT 2:** Three topotypes IV, XIII & XIV and

• **Serotype SAT 1:** One topotype V (isolated in 2007 for first time)

• Serotype C not isolated since 1983

• In general the mean number of outbreaks, incidence rate and sero-prevalence of FMD showed that Tigray, central and southern part of Ethiopia are highly FMD affected areas.
Recommendations

- The Multivalent vaccine candidates should be formulated containing all serotypes isolated.
- Those areas with highest rate of FMD infection should be considered during control programme.
- The importance of wildlife in the role of FMD should be studied.
Acknowledgements

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- WRL-IAH for sample processing,
- RVC, UK: Allow me to attend GIS course and helping me for data analysis
- EUFMD/FAO for funding the current FMD study project and my participation in this meeting
Thank you!