

Report of Workshop

Enhancing the Preparedness and Awareness of the Concerned Governmental Authorities and Farmers on the Spread and Control of Foot and Mouth Disease (FMD) in Egypt, Algeria, the Palestinian State (PS) and Jordan,

**Jordan University of Science and Technology
Jordan,
January 17-19, 2016**



Executive Summary:

Twenty-four key scientists from universities and governments in 6 countries gathered in Irbid, Jordan on January 17-19th, 2016, to present and discuss various aspects of Foot and Mouth Disease (FMD) Epidemiology, Pathology and its control in the region. Through scientific presentations, different videos, and targeted discussion sessions, they gained valuable information on the prevention and control of this important animal health problem. Each country discussed their control program and their Progressive Control Pathway (PCP), and developed a list of specific changes or approaches in their FMD control program as a result of this conference. Gap analysis of the main obstacles for controlling FMD was also discussed. The experts from EU-FMD announced the Webinar sessions that was conducted by EU-FMD-FAO for the North Africa and Middle East countries after this conference. Also, the entire group worked together to develop a consensus plan on greatest needs for the region. These needs focused on having a cooperation projects for disease diagnosis and control and creation of a regional center for FMD control that would organize training for farmer education and awareness, and to coordinate animal research.

For the agenda, see Appendix A

For a full list of attendees, see Appendix B

Certificate and Press news

Questionnaire

Tuesday, January 17-19th, 2016

In this report, each presentation is summarized and then comments and discussions are highlighted in blue.

Opening Ceremony:



Dr. Mustafa Al-Doumy, Director of the Consultative Center, welcomed the participants on behalf of JUST University.

Dr. Nabil Hailat, conference organizer (**Jordan**), thanked the participants for taking time away from their work and their families to attend the workshop.

Dr. Dr. Ashraf Nazem, Dean of the Veterinary Faculty at Alexandria University, **Egypt**, thanked the organizers and said he was looking forward to the workshop.

Dr. Samir Al-Fuqaha, from the Ministry of Agriculture the **Palestinian State**, He has participated in several regional workshops and he is looking for the future and expects to increase regional cooperation in control of FMD and other transboundary animal diseases.

Prof. Benallou Bouabdellah, From **Algeria** thanked JUST for organizing this important workshop and said that he is very interested and looking forward to this workshop.

Prof. Mohammad Aljlouni, Executive Secretary, **AARINENA**.



This is a group picture which was taken after the opening ceremony and shows different colleagues from different participating countries (Egypt, Algeria, Palestine, EU-FMD, Turkey, Bahrain and Jordan).

Session 1: Keynote Speaker on Foot and Mouth Disease – Overviews and International Perspectives

Chair: Prof Ashraf Nazem;

Co-chair: Dr. Abdalla Ahmed

Dr. Kees van Maanen, FAO, Italy-EUFMD, first speaker:



An EuFMD expert and international consultant presented his first lecture in the first day explaining the fundamentals of FMD and FMD control, and why

understanding FMD risks are critical to progressive control and effective vaccine use. He presented The Three Pillars of FMD control:

- 1) Improve readiness for FMD crisis management by member states.
- 2) Reduce risk to members from the FMD situation in the European Neighbourhoods.
- 3) Greater implementation of the Global Strategy for the control of FMD.

Dr. Maanen said that FMD is highly contagious with acute vesicular disease of cloven-hoofed animals and produces direct production losses, and considered a major barrier to trade in animals and products and has economically significant impact as shown in the following figures:

- Taiwan 1997: US\$1.6 billion
- UK 2001: £8 billion
- UK 2007: no official figure yet; ~£100m estimate (Defra)
- Japan 2010: ? (~£1.7 billion)

Regarding the transmission of the disease, Dr Maanen explained that FMD requires a very low infective dose, and virus is produced in very large quantities by infected animals; Virus is present in all excretions and secretions.

FMD has high morbidity and low mortality, therefore infected animals remain alive to infect others; the virus is capable of persisting in the environment for long periods of time:

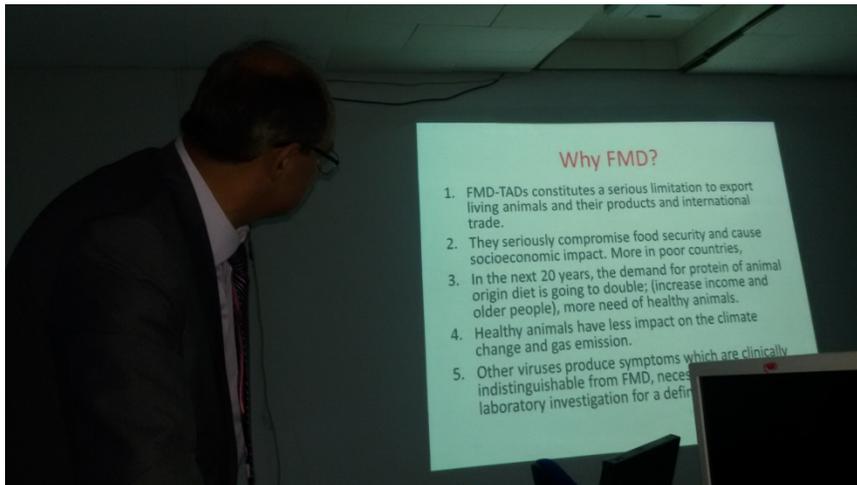
- Most contagious viral disease ever known
- Transmission by air over long distances,
250 km by wind, 10 km in temperate areas
- Short incubation period (>24 hrs) with explosive spread
- Large amounts of virus are shed by sick animals;
even before clinical signs
- Tremendous economic losses – estimated in tens of BILLIONS of dollars for some countries to recover from an outbreak

Dr. Maanen Linked FMD to other Transboundary animal diseases (TADs) and said

1. FMD-TADs constitute a serious limitation to export living animals and their products and international trade.
2. They seriously compromise food security and cause socioeconomic impact. More in poor countries,
3. In the next 20 years, the demand for protein of animal origin diet is going to double; (increase income and older people), more need of healthy animals.
4. Healthy animals have less impact on the climate change and gas emission.
5. Other viruses produce symptoms which are clinically indistinguishable from FMD, necessitating laboratory investigation for a definitive diagnosis.

At the last part of his presentation, he discussed the effectiveness of the vaccines, the types of vaccines, time of vaccination and differentiation between vaccine animals and naturally infected animals.

The second speaker was **Dr. Nabil Hailat** where he discussed the Prevalence and the Pathology of FMD in the Middle East and North Africa. He emphasized the circulation of the different serotypes in the region and their impacts on the



Dr. Nabil Hailat

economical situation of the farmers and the impacts on trades. They were addressed as follows:

1. FMD-TADs constitute a serious limitation to export living animals and their products and international trade.
2. They seriously compromise food security and cause socioeconomic impact. More in poor countries,

3. In the next 20 years, the demand for protein of animal origin diet is going to double; (increase income and older people), more need of healthy animals.
4. Healthy animals have less impact on the climate change and gas emission.
5. Other viruses produce symptoms which are clinically indistinguishable from FMD, necessitating laboratory investigation for a definitive diagnosis.
6. UK FMD 2001 cost about 3.1-8 Billion UK bound.
7. Taiwans FMD 1997 cost about 15 billion US\$.
8. In Italy FMD 1993 cost 120 million US\$.
9. In China FMD produced a decrease in trade of about 1600-2400 million US\$.
10. FMD in Netherland = 15 million US\$
11. FMD in Korea in 2000 ended its trade with Japan -300 million US\$ losses

A review regarding the pathogenesis and the main pathological findings seen in FMD infected animals was presented in both cattle and small ruminants. The samples needed for diagnosis and the diagnostic tests were also presented and discussed.

The third speakers were **Dr. Shereen Khlouf / Nabil Hailat** of JUST who presented videos regarding the clinical signs and clinical presentations of FMD in cattle, sheep and pigs. These were produced experimentally in Plum Island, Department of agriculture, New York USA. The speakers explained the course of the disease, pathogenesis and the main clinical signs and complain of animals with the disease as induced experimentally.

Dr. Majed Hawawsheh, MoA-Jordan, was the fourth speaker who presented the role of the Ministry of Agriculture in the control of animal diseases and its strategic plan to control FMD. Dr. majed reported that the last occurrence of FMD in Jordan was 2006 and the main serotypes were A Iran O5 and O Pan Asia in the middle of Jordan. He said that the Ministry vaccinate cattle three times and two times for small ruminants a year with a Russian imported

A and O vaccine for both groups of animals. Presently the Ministry use a vaccine contains (Liquid inactivated of O Pan Asia 2, O1 Manisa, A22, A Iran 2005). The

total number of vaccine was; 297000 doses for cattle, 2958729 doses in small ruminants. Information regarding vaccination registered at central level paper based and computerized. At the end he described the position of Jordan in the Progressive Control Pathway PCP as Jordan is in Stage 2.



Dr. Majed hawawsheh-Jordan

Session 2: Foot and Mouth Disease – Overviews and National Perspectives (cont.)

Chair: Dr. Kees van Maanen

Co-chair: Dr. Majed Hawawsheh

Dr. Naglaa Hassan, General Manger of Preventive Medicine, Govs-Min of Agri, Egypt, presented the Epidemiology of FMD in Egypt. Dr. Hassan introduced her presentation by talking about FMD surveillanc including active and passive surveillanc; reaching serotype determination and vaccine implementation and effectiveness. The passive surveillanc included Case finding, early detection and understanding the epidemiological status of the disease (circulating serotypes and sub- types). The active surveillanc included sampling and reporting as performed in governorates and districts and post vaccination monitoring. When a notification is made to governmental veterinarians through their vet. Clinics, owners, hotlines ,. etc), immediately responses carried out by vets from (preventive medicine, epidemiology department) These responses as:-examination of cases, isolation, outbreak investigation team (OIT), sampling (sampling protocol), bio-security measures, quarantine, targeted active surveillanc in place (for more case finding), vaccination, entrance the collected data via the national data base TAD info, and sending the field isolates (new subtypes) from diagnostic lab (AHARI) to vaccine production lab (VSVRI) for further testing.

The number of notifications for FMD for the year 2014 and 2015 was 699 and 540 respectively. For the year 2014, out of the 699 samples notification, 414 were

sampled and 384 were accepted and the rest were rejected. Out of the 384 accepted samples 117 were positive for FMD and the rest were negative. The serotypes were as follows: 18 serotype A (A/Iran), 61 serotype O and (12 O/sudan, 1 O/PanAsia2), 6 Pan FMD and (32 SAT2). SAT 2 was confirmed mainly from January to May 2014. For the year 2014, out of the 540 samples notification, 365 were sampled and 290 were accepted and the rest were rejected. Out of the 290 accepted samples 97 were positive for FMD and the rest were negative. The serotypes were as follows: 19 serotype A and 2 (A/Iran), 71 serotype O and (14 O/EA3) and 7 Pan FMD.

For the active surveillance, collection of serum sample from different species (cattle, buffalo, sheep and goat) in 162 Villages near the western and southern borders which are considered at high risk was made. The overall percentage of positive samples was 10%; 84% from positive NSP was recorded in female while 16 % in male , 63% from positive NSP was in dairy production and 14% in beef. This was followed by control measures including vaccination using trivalent vaccine locally and imported vaccine, awareness campaigns (symptoms and economic losses, reporting to authorized clinic, importance of vaccination, dealing with diseased animals), and biosecurity measures.



Dr. Naglaa Hassan-Egypt

Dr. Emad Alabshehey, from the Faculty of Vet. Med. Alexandria University, Egypt who presented the molecular epidemiology of FMDV in Egypt. He reviewed the history of FMD in Egypt and discussed the possible causes of the recent outbreaks indicating that illegal trade and smuggling play a major role, local markets and uncontrolled movements of animals, lack of awareness among farmers and small-scale breeders, unsatisfactory vaccination programs and climatic conditions. Dr. Emad described the plan of work as 1-surveillance study and isolating FMDV from persistently infected cattle, 2-comparing between virus isolation and real time RT-PCR for detection of FMDV and 3-molecular characterization of FMDV from persistently infected cattle in comparison to those isolated from recent outbreaks. He also suggested that preparation of effective

vaccination program by including newly identified viruses in vaccine preparations is needed and establishment of genetic data base of FMD in Egypt as a reference for tracing the transmission route between historical and recent outbreaks and determine the origin of the virus in any future outbreaks.



Dr. Emad Alabshehey with the black suit in round table discussion-Egypt

Dr. Abdalla Azrug, Central Veterinary Laboratory, CVL, Head, Bahrain, presented FMD situation in Bahrain. He explained the epidemiology of FMD Bahrain and said that FMD is an endemic disease in Bahrain. The understanding of disease epidemiology provides a basis to estimate threats of new virus incursions. The government implements an annual vaccination program since 2010 and phylogeography analysis is underway. Fifteen samples were analysed and serotype O was detected in 2015.



Dr. Abdalla Azrug-Bahrain

Dr. Samir Al-Fuqaha, Ministry of Agriculture, Palestinian Authority, reported that FMD occurs sporadically: 0-30 cases identified every year and serotype O is the most common involved, serotype A also has been detected regularly. Molecular epidemiology shows that the strains detected are closely related to strains isolated from Israel and FMD is more commonly identified in small ruminants than large ruminants. Dr. Samir talked about hotspots of the FMD in Palestine as follows starting from high to low: uncontrolled animal movement from Israel to Palestine, uncontrolled animal movement within Palestine, animal markets, spreading from existing outbreaks, common grazing, feed transport, wild life and uncontrolled animal movement from Jordan and animal movement from Israel to Palestine

uncontrolled. He also stated that there are insufficient vaccinations and proper biosecurity measure and late an effective reporting-surveillance program. Palestinian veterinary services do its effort to vaccinate the livestock yearly against FMD, but there are many hardships which prevent them from achieving the intended target, like nonexistence of the vaccine regularly, political problems, which lead to decrease vaccination coverage. Thus ring vaccination is implemented.



Dr. Samir Al-Fuqaha-Palestine

Session 3: Foot and Mouth Disease – Discussion on Biorisk Management

Chair: Dr. Keith Sumption

Co-Chair Dr. Nabil Hailat

Monday, January 17-19th, 2016

Session 4: FMD Epidemiology and Diagnostics

Chair: Dr. Naglaa Hassan,

Co-Chair: Samir Al-Fuqaha

Dr. Nedret ÇELİK, Deputy Director of SAP Institute, Turkey was the first speaker in the second day of the workshop, explained and showed the different departments and functions in the FMD institute and said that they produced 76 and 133 million monovalent doses in 2014 and 2015.

The main serotypes that found in testing samples in 2015 were (22) O, (27) A and (28) Asia 1 and those which were sequenced were (17) O, (52) A, and (20) Asia 1.

Below are some points raised by Dr. celik:

- Turkish part of Thrace has been maintaining FMD free status w/vaccination
- FMD virus lineages circulating
- A05/SIS-10, As1/Sindh-08, O FAR-09 and A NEP-84/BAN-12 (Genotype VII)
- the patterns of FMD virus distribution changed end of 2015

- Circulation of type O is reduced compared to 2014 and 2013.
- A NEP-84/BAN-12 (Genotype VII) is most likely to change the paradigm.
- Are there any new risks?
 - We do not know due to limited information in West Eurasia (WELNET).
 - A new strain of type A occurred in Van Turkey at September 29, 2015.
 - Typing and genotyping results showed that the virus homologue to A Nepal 84.
 - Vaccine produced and released for A Nepal 84 at November 23.
 - From now on, 12 million cattle doses of multivalent vaccine produced includes this strain.
- Neither vaccine shortages nor a delay in vaccination program
- Improved cover: >85 % of bovine population (12million) twice a year
- Ring vaccination response to outbreaks.
- Improved antigen content: 6PD50 vaccines
- Booster dose for calves
- Sheep & goat vaccination when farmer request

The national risk based strategic plan was developed and presented to Minister. The main goal is to achieve OIE status of FMD free with vaccination by 2023, while maintaining FMD free status with vaccination in Thrace.



Dr. Nedret ÇELİK, the lady with the brown suit, from Turkey.

Prof. Benallou Bouabdellah and Dr Hemida Houari University of Tiaret, **Algeria**

Dr. Houari presented the animal population in Algeria and the distribution of diagnostic laboratories in the country. Then he introduced the first case reported to the OIE in 2014 after the case which was reported in 1999 which was in fattening cattle introduced to Algeria from Tunisia. The measures taken to control the outbreak were as closing of livestock markets in the affected wilayah and the neighboring wilayahs, ban on movement of animals within the

infected wilayah, and movement control in the neighboring wilayah. Then more cases appeared in cattle, sheep and goats and the serotype was O. There were deaths in cattle (162), and 413 cattle were destroyed. In 2015, FMD appeared again in different areas including cattle which were vaccinated in 2014 and the total number of outbreaks in 2015 reached 22 outbreaks. The vaccination program includes the A and O serotypes and conducted twice a year.



Dr. Hemida Houari, the young fellow in the left side and his colleague from Algeria **Dr. Bouabdellah** the third person in the right row.

Dr. Keith Sumption, Executive Secretary, (EUFMD) Animal Health, **FAO talked about** FMD infection - Fundamentals for Risk Assessment and Trade. Dr. Keith addressed why FMD is so contagious and why it affects the animal health which is summarized as follows:

- Exceptionally High viral shedding by multiple routes
- Pigs shed very high quantities of virus
- Infect via aerosols, ingestion, percutaneous
- Medium Environmental persistence
- Wide host range
- High morbidity but low mortality
- Virus shedding before clinical signs
- Subclinical infections (small ruminants)
- Very short incubation, extremely infectious – “hit and run”
- the only disease of cattle and small ruminants that is so infectious
- Severe impact on dairy units – beyond milk loss
- Regional epidemics every year in mid-east
- Each epidemic affects a high proportion of national flocks (up to 90%, every year in some parts of MENA)
- Therefore epidemics almost impossible to control – without extreme measures
- Affects livelihoods
- Disrupts trade
- The mode of diseases transmission was also reported as - Direct Contact between animals
Animal products (milk, meat), Mechanical/fomites and Winds

Dr. Keith explained the basic concept of risk management with these basic points:

1. Everything has a risk , 2.there is nothing without risk, 3. Risk is manageable
4. Everyone HAS to do risk assessment – and risk management. 5. Risk perceptions matter – “feelings about acceptable risks”, 6.Perception (Fear of the risk) reduces as individuals take control of decisions

The perception of risk varies with the individual who is considering the risk. And said it is/ Risk = probability x consequences

Consequences/impact of unwanted event should it occur

- socio-economic and epidemiological criteria

Consequence depend on :

- amplification of infection (size of any resulting outbreak);
- spatial spread (especially spread to new geographic areas);
- spread across species (e.g. spread from cattle to pigs, sheep);
- economic losses (as a result of the outbreak itself and of the control measures);
- humanitarian losses (loss of livelihoods, human lives, etc.).

I. Examples of Applications of Risk analysis:

A. Everyday

- Purchase of animals for entry into herds
- Use of common watering pastures
- Use of common vehicles to transport animals to grazing
- Risks to dairy enterprise
- Change in biosecurity practises in a laboratory handling infectious material from the field
- Change in the FMDV strain in the neighbouring country

B. Outputs from risk assessment processes

- ““thinking”” guidance to assist decisions
- Evidence to defend decisions that can cost money and reputations

II. Examples of risk based outputs:

A. Herd level

- Risk based herd biosecurity programmes for prevention of FMD
- reduces the risk of FMD entry and reduces consequence if it occurs

B. National level

B.1. Risk based Strategic Plans for the Control of FMD (RBSP)

- Document required to progress from PCP Stage 1 to PCP Stage 2
- Sets out the national strategy to address identified risks
- Sets out how the impact upon risk will be monitored (e.g. impact of vaccination)
- RBSP are assessed by Regional Roadmap Advisory Groups (Middle-East) under OIE and FAO system (GF-TADS).

B.2. Risk based vaccination programmes

- Greater efficiency by targeting the higher risk categories of livestock

B.3. Risk based surveillance programmes

- Greater efficiency by focus on the animals most likely to be showing signs/infectious

Dr. Keith explained and discussed the PCP process: From Risk assessment to Risk based Management:

1. Risks are defined by Probability to occur AND Consequence of event
2. Risk pathway outlines steps by which unwanted outcome could occur
 - a. Together with value chains, developing risk pathways helps to understand epidemiology
3. Estimate probability at each step and aggregate overall across pathway
4. Overall assessment of risk based on

- a. Probabilities along pathway
 - b. Degree of exposure (how common is the pathway?)
 - c. Impact of unwanted event
 - 5. Rank and prioritize risks, using a method of risk estimation
 - 6. From identified risk hotspots and risk pathways, define component objectives for the risk-based control strategy
 - a. Component objective, tactic, activity
 - 7. Set indicators, targets and means of verification to monitor and evaluate impact and implementation of component activity
- Dr. Keith explained issues relating to trade between FMD infected countries; How does the OIE Code relate to trade between countries that are NOT free of FMD? Vaccination of animals as a tactic of risk based strategy plan.
 - **Step 1 in assessment: is there a HAZARD?**
 - NO HAZARD
 - Unless the importing country has an OFFICIAL control or ERADICATION programme
 - Or strains in the importing country are LESS VIRULENT than in the exporter
 - Or there are OIE recognised zones of different health status
 - THUS:
 - Importer has to prove it has an official control policy or has less virulent strains than in the exporter
 - If NO HAZARD then then risk assessment is CONCLUDED (no justification for the next stages).
 - **Hazard identified: proceed to Step 2 of risk assessment**
 - Principles set out in the Code, Chapter 2.1
 - *Or: it can apply the sanitary standards recommended in the Code (avoiding risk assessment)*



Dr. Keith Sumption, EU-FMD

Prof. Samy Abdelsalam Salem Khalil, Alexandria University, Egypt, talked about the Immune Response of Cattle to FMDV in Egypt: With the isolation of the serotype SAT2 Trivalent vaccine is prepared from O Pan Asia-2, A Iran O5 (*FAO, 2012*) and SAT2/2012.

It was highlight that highly potent FMDV vaccine is important to keep high titer of antibodies, thus a vaccine which contains a high antigenic mass of the 146S was used to provide early and long protective immunity post vaccination, and to reduce the number of vaccinations and its cost. Four groups of calves were used in the vaccination study using different concentration of 146S particles, and found that there is a correlation between the concentration of 146S and protection when the three strain serotypes were used; O Pan Asia-2, A Iran O5 (*FAO, 2012*) and SAT2/2012. Thus it was concluded using of a highly potent FMDV vaccine (6.2µg/serotype/ml) resulted in:

- 1) Early protection and
- 2) Long term protective immunity
- 3) Estimation of 146S alone or in combination with SNT can be used as alternative methods to the in vivo test for evaluation of the potency of FMDV vaccines; therefore this can avoid the problems associated with in vivo potency tests (PD₅₀ and PG).

Dr. Shifa Jaradat and Nabil Hailat, JUST presented the OIE regulations for importation of animals from countries with FMD. Dr. shifa explained and discussed the different scenario when to import meat and meat products from different countries according to their status and sumariesed them in the following recommendations and cases:

1. Direct transfer of FMD susceptible animals from an infected zone for slaughter in a free zone (whether vaccination is practiced or not),
2. Recommendations for importation from FMD free countries or zones where vaccination is not practiced or FMD free compartments,
3. Recommendations for importation from FMD infected countries or zones where an official control program exists,
4. Recommendations for importation from FMD free countries or zones where vaccination is not practiced or FMD free compartments,
5. Recommendations for importation from FMD free countries or zones where vaccination is practiced,
6. Recommendations for importation from FMD infected countries or zones,
7. Procedures for the inactivation of FMDV in meat and meat products.

Dr. Misa AL Ameer, Ministry of Agriculture, Jordan

Tuesday, January 17-19th, 2016

Session 5: FMDV and food and virus transmission

Chair: Prof. Akram Alboudi

Co-chair: Dr.Emad Mahmoud Alabshehey

Dr. Mohamad Obeidat, JUST talked in the first presentation about the status of FMD virus in fresh and frozen meat and meat products in relation to trade.

Dr. Obeidat started his lecture by comparing ante-mortem with postmortem lesion of FMD and said the postmortem show:

1. Necrosis of heart muscle (tiger heart), usually only in young acutely infected animals.
2. Ulcerative lesions on tongue, palate, gums, pillars of the rumen and feet.
3. Compared to ante-mortem inspection, post-mortem inspection has an enhanced probability of detecting macroscopic lesions but a reduced probability of detecting non-specific signs of illness such as lameness and depression that are the main, albeit poor, indicators at the onset of illness due to FMD.

Judgment on FMD animals in regards to meat consumption and handling

- **In countries or in zones within a country free or nearly free of FMD:**
 1. Diseased or suspect animals are *prohibited to be admitted in an abattoir* or slaughtered.
 2. If FMD is suspected on postmortem examination the carcass and viscera are *condemned* and appropriate action recommended by the regulatory authorities of the country must be taken.
- **In countries where this disease is present,**
 1. the judgment should be in accordance with the current animal health requirements, and consisted with effective public health protection.
 2. Sanitary measures should be taken to comply with national animal health policy.
- **The successful removal of potentially infected tissue (e.g. head, feet, pharynx, etc), will reduce the risk of contamination of the final product.**
- **The risk that these tissues will not be removed completely depends entirely on the meticulous execution of this step of the slaughtering process**
- **In order to prevent the spread of the virus in the abattoir:**
 1. The equipment and room should be disinfected with 2 % NaOH (caustic soda). In some countries sodium carbonate (Na_2CO_3) is used.
 2. The vehicle conveying diseased animals should also be disinfected
 3. Abattoir personnel leaving the abattoir should pass through a footbath with 1 % solution of NaOH.

Then Dr. obeidat discussed how long the virus can survive in the meat and under which conditions:

- The most important factor for post-slaughter inactivation of the virus in the carcass is pH.
- Virus might be present in muscle tissue at slaughter as a result of viraemia or conditions exist where the desired pH to inactivate virus might not be reached.
- Measuring the pH in the middle of both *Longissimus dorsi* muscles, as described in the OIE Code, will ensure that the muscle pH has decreased sufficiently to inactivate FMDV. The pH in lymph nodes and bone marrow often does not reach the required value to inactivate virus.
- Therefore, the risk of virus surviving in a carcass at this point of the slaughter process is still significant.
- Since the amount of residual lymph node and bone tissue is unclear, and even though FMDV in bone tissues would most likely be found in the bone marrow rather than the bone itself, the risk of viable virus still being present at this point of the slaughter process is thus not negligible.

- When clean product or packing materials come in contact with contaminated blood, other fluids, etc., the clean product can be contaminated with virus and have the potential to transmit disease.
- The risk of this happening depends on the hygiene procedures of the slaughtering process and the virus concentrations on the contaminated materials.

Then he discussed the different conditions affecting the infectivity of the virus:

- The virus of FMD can survive in meat and meat products for a considerable length of time.
- Outside the pH range of 6 – 9, viral infectivity is destroyed.
- A bovine carcass matured at above +2 °C produces a drop in the pH of muscle tissue to between 5.3 – 5.7 within 24 hours of slaughter.
- This is caused by the formation of sarcolactic acid.
- Quick freezing of the meat arrests acid production and consequently the virus remains infective for about 6 months.
- In salted meat at 4°C, the virus is still infective in bone marrow and lymph nodes for 6 months.
- In blood clots in large vessels of cattle and swine, the virus is infective for 2 months.
- FMDV is infective for 6 weeks in urine and for 20 weeks on hay dried at 22°C.
- The virus can be destroyed with 0.5 % citric or lactic acid, by cooking meat to an internal temperature of 69°C and by pasteurization processes of milk.
- FMDV in bone tissues would most likely be found in the bone marrow rather than the bone itself.

Dr. Shereen Khlouf and Dr. Nabil Hailat, JUST, talked about Diagnosis of Transboundary Animal Diseases.; Immunohistochemistry (IHC) as a tool for disease diagnosis.

Dr. Khlouf showed the results that we have in our laboratories where we use IHC in diagnosing transboundary animal disease; Pest Petit Ruminants (PPR), Brucellosis, Rabiesetc. she emphasized the importance of this technique as it is safe, cheap and can localize the causative agent in association with the pathological lesions. It showed also that PCR is too sensitive and can give false positive results compared to IHC.



Dr. Shereen Khlouf is the one to the right.

Main Recommendations:

1. Enhancing Farmers education and Awareness; recording of cases, recognition of early signs of disease.....etc.
2. Economic Losses Cost of the disease National and at herd levels.
3. Early, Rapid Detection and Notification of Cases of Diseases.
4. Biosecurity and biosafety measures; dead animals, transportation, farmers, personnel... etc.
5. Awareness of vaccination-cold chain, post vaccination.
6. Strengthening legislations to control animal diseases
7. Clear procedures for sample collections and handling
8. Knowledge attitude Practice.
9. Developing a website for the participating countries.
10. Develop a control program in Arabic to be used by farmers and vets.
11. Develop a contingency plan in case of entrance of a new strain.
12. Conduct a training course on sampling, field investigation and biosecurity measures.

This a view of the closing ceremony:





This is to certify that **Dr. Amaar Hanbali** has completed a training workshop in "**Enhancing the Preparedness and Awareness of the Concerned Governmental Authorities and Farmers on the Spread and Control of Foot and Mouth Disease (FMD)**" the period of *January 17-19,2016*.

<p>Prof. Dr. Nabil Hailat,Prof.of Pathology Jordan University of Science and Technology</p>	<p>Dr. Keith Sumption EUFMD/FAO</p>
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This is the press news which is now located at the university site

ورشة عمل اقليمية حول مرض الحمى القلاعية في "العلوم والتكنولوجيا"

اختتمت في جامعة العلوم والتكنولوجيا الاردنية فعاليات الورشة التدريبية التي نظمها المركز الاستشاري في جامعة العلوم والتكنولوجيا بعنوان: "رفع جاهزية الكوادر البيطرية التي تتعامل مع مرض الحمى القلاعية في منطقة الشرق الاوسط وشمال افريقيا " بحضور مدير المركز الدكتور مصطفى الدومي، حيث ركز الخبراء والمحاضرون على وبائية وامراضية مرض الحمى القلاعية الذي يعتبر من أهم الامراض المعدية العابرة للحدود والذي يحدث خسارة اقتصادية ووفيات في الحيوان بالإضافة الى انخفاض في الانتاجية.

وقال منسق الورشة أستاذ علم الامراض في كلية الطب البيطري في الجامعة الاستاذ الدكتور نبيل هيلات انه تم خلال الورشة مناقشة (18) ورقة علمية وتقارير وطنية من ثمانية دول بحضور خبراء من منظمة الفاو (FAO) العالمية.

ومن اهم المحاور التي نوقشت في الورشة القوانين والانظمة الدولية والمحلية التي تحكم تجارة الحيوانات الحية ومنتجاتها بين الدول في الشرق الاوسط وشمال افريقيا اضافة الى طرق التشخيص والوقاية والسيطرة المعتمدة عالمياً وطرق التعامل والاستجابة السريعة للحد من انتشار المرض.

كما تطرق المشاركون أيضاً الى سلالات فايروس الحمى القلاعية البازغة حديثاً في المنطقة وخاصة في الهند والسعودية وتركيا، الامر الذي يطلب استجابة سريعة لتحضير المطاعيم النوعية التي تساعد على السيطرة على المرض والحد من انتشاره قبل أن يحدث خسائر فادحة عند المزارعين.

وشارك في الورشة اطباء بيطريون واكاديميون من مصر والسودان وتركيا والجزائر والبحرين وفلسطين بالاضافة الى الاردن.

واشادوا المشاركين بالقدرات والامكانات العلمية والتنظيمية في جامعة العلوم والتكنولوجيا الاردنية وقدرة الجامعة على قيادة مشاريع اقليمية ودولية في هذا المجال.

ومن اهم التوصيات التي خرجت بها ورشة العمل هو الاستمرار في عقد ورش بناء القدرات حول موضوع الامراض العابرة للحدود وبناء شبكة للخبراء والمختصين في مجال الامراض الحيوانية العابرة للحدود حيث شارك الدكتور محمد العجلوني السكرتير التنفيذي لجمعية المعاهد الزراعية البحثية في الشرق الادنى وشمال افريقيا واكد على اهتمام الجمعية بهذه الأمراض والشبكات العلمية الخاصة بها.

Names of the participants in the FMD workshop-17-19th of January, 2016

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9. Dr. Keith Sumption	Executive Secretary (EUFMD) Animal Health, FAO		
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23. Dr. Fatmeh Algbary	Jordan-JUST		
24. Dr. Shefaa Jaradat	Jordan-JUST		

Agenda



Enhancing the Preparedness and Awareness of the Concerned Governmental Authorities and Farmers on the Spread and Control of Foot and Mouth Disease (FMD) in The Middle East and North Africa,

**Jordan University of Science and Technology
Irbid-Jordan**

17-19th of January 2016

Sunday, January 17th

Coordinator and PI of the Conference: Nabil Hailat, DVM,Ph.D, Jordan University of Science and Technology

TIME	ACTIVITY	SPEAKER
8:30-9:00	Registration	
9:00-9:30	Opening Ceremony – 5 minutes, 6 welcoming speeches (max 5 minutes each)	Director of the Consultation Center- JUST Dean of Alexandria Veterinary Medicine, Egypt Dean of Tiaret University, Algeria Ministry of Agriculture, Palestinian Authority Executive Secretary, AARINENA .
9:30-10:00	Coffee and Tea break	
<i>Session 1: Foot and Mouth Disease – Overviews and International Perspectives</i>		
Chair: Prof Ashraf Nazem;		Co-chair: Dr. Abdalla Ahmed
10:00-10:40	The fundamentals of FMD and FMD control; why understanding FMD risks are critical to progressive control and effective vaccine use.	Dr. Kees van Maanen Virologist/EuFMD consultant EuFMD, FAO
10:40-11:00	Occurrence of FMD in the Middle East and North Africa, an Overview;	Prof. Nabil Hailat, JUST Dr. Fatima Ryad, JUST

Agenda



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10:40-11:00	Occurrence of FMD in the Middle East and North Africa, an Overview;	Prof. Nabil Hailat, JUST Dr. Fatima Ryad, JUST

11:00-11:30	Clinical and Pathological Presentation of Experimentally Induced FMD in pigs, cattle and small ruminants (Video Show)	Dr. Shereen Khloff and Dr. Nabil Hailat, JUST
11:30-12:00	Prevention and control program of FMD and Progressive Control Pathway in Jordan	Dr. Majed Hawawsheh, MoA-Jordan
12:00-1:00	Lunch, University Restaurant	
Session 2: Foot and Mouth Disease – Overviews and National Perspectives (cont.)		
Chair: Dr. Kees van Maanen		Co-chair: Dr. Majed Hawawsheh
1:00-1:30	Epidemiology of FMD in Egypt	Dr. Naglaa Hassan General Manger of Preventive Medicine Govs- Min of Agri, Egypt
1:30-2:00	Molecular Epidemiology of FMDV in Egypt	Dr. Emad Alabshehey Faculty of Vet. Med. Alexandria University, Egypt
2:00-2:25	FMD situation in Bahrain	Dr. Abdalla Fadlalla Azrug AHMED , Central Veterinary Laboratory, CVL, Head, Bahrain
2:25-2:40	Coffee break	
2:40-3:00	FMD Situation in Palestine; occurrence and vaccination strategy	Dr. Samir Al-Fuqaha , Ministry of Agriculture, Palestinian Authority
Session 3: Foot and Mouth Disease – Discussion on Biorisk Management		
Chair: Dr. Keith Sumption		Co-Chair Dr. Nabil Hailat
3:00-3:45	Discussion Training on Biorisk Management , Steps Forward;	
4:00	Leave to the hotel	
7:00	Group Dinner	

Monday, January 18

TIME	ACTIVITY	PERSON RESPONSIBLE
Session 4: FMD Epidemiology and Diagnostics		
Chair: Dr. Naglaa Hassan,		Co-Chair: Samir Al-Fuqaha
9:00-9:30	FMD status in Turkey	Dr. Nedret ÇELİK Deputy Director of SAP Institute,

		Turkey
9:30-10:30	Epidemiology of FMD in Algeria Research on FMD in Algeria	Prof. Benallou Bouabdellah and Dr Hemida Houari University of Tiaret, Algeria
10:30-11:20	FMD infection - Fundamentals for Risk Assessment and Trade	Dr. Keith Sumption Executive Secretary (EUFMD) Animal Health, FAO
11:20-11:35	Coffee Break	
11:35-12:00	Immune Response of Cattle to FMDV in Egypt	Prof. Samy AbdElsalam Salem Khalil, Alexandria University, Egypt
12:00-1:00	Lunch, University Restaurant	
Session 5: FMD Epidemiology and Diagnostics		
Chair: Dr. Nedret ÇELİK Co-Chair: Dr. Prof. Benallou Bouabdellah		
1:00-1:20	OIE regulations for importation of animals from countries with FMD.	Dr. Shifa Jaradat and Nabil Hailat, JUST
1:20-1:40	Control Strategy and Progressive Control Pathway of FMD in Algeria	Dr Hemida Houari. University of Tiaret, Algeria
1:40-2:10	Immune Response of Cattle to FMDV in Egypt	Prof. Samy AbdElsalam Salem Khalil, Alexandria University, Egypt
2:10-2:30	Laboratory Diagnostics of FMD	Dr. Hazar Shawas, JOVAC Jordan
2:30-2:50	Laboratory Diagnosis of FMD	Dr. Misa AL Ameer Ministry of Agriculture, Jordan
2:50-3:10	Discussion and Coffee Break	
3:10 Bus to Umm Qais	Trip to Umm Qais and Golan Heights If the weather helps	Come back to the hotel at 5:00 PM
7:00 evening	Dinner, in Yarmouk University Street	

Tuesday, January 19th

Session 5: FMDV and food and virus transmission		
Chair: Prof. Akram Alboudi Co-chair: Dr. Emad Mahmoud Alabshehey		
9:30-10:0	Status of FMD virus in fresh and frozen meat and meat products in relation to trade	Dr. Mohamad Obeidat, JUST
10:00-10:30	Diagnosis of Transboundary Animal	Dr. Shereen Khoulouf and

	Diseases.; IHC as a tool for disease diagnosis	Dr. Nabil Hailat, JUST
10:30-10:50	Discussion and Coffee Break	
10:50-11:30	Closing Ceremony and Certificate	
11:30-12:30	Taking pictures, Lunch at University Restaurant	

