Overview on Lumpy skin disease in the Mediterranean region: From Middle East to Europe

15th REMESA meeting
20-21 November 2017
Dead Sea- Jordan
a significant spread of **lumpy skin disease (LSD)** occurred in 2016/2017, particularly in the Middle East and Europe. The disease is reported present in around 30% of reporting countries and territories. The percentage of Members notifying the presence of this disease has significantly increased since 2005, mainly due to the spread of the disease in Europe, which is now considered a new LSD-affected region in addition to its traditional range in Africa and the Middle East. The significant movement of this vector-borne virus northwards is thought to be influenced by environmental and climatic conditions.
Epidemiology

- **Host range:** Natural infection: Camel and Domestic Asian buffalo
- **Experimental infection:** Grifos and impala
- **Clinical disease:** Arabics Org (Saudi Arabia), Springer (Namibia) and Org (South Africa)

Transmission
- **Principle route:** Mechanical transmission by arthropod vectors such as mosquitoes and flies
- **Water source:** Direct contact or ingestion of contaminated feed and water
- **Precaution:** Experimental inoculation with material from cadavers nodules or blood

**Prevention and Control**

Treatment
- **No specific treatment**
- **Strong antibiotic therapy to avoid secondary infection**

Sanitary prophylaxis
- **Free zones:** Import restrictions on livestock, carcasses, hides, skins and semen
- **Infested zones:** Strict quarantine to avoid introduction of infected animals into small herds
- **Isolation and prohibition of animal movements**
- **Slaughtering of all sick and infected animals**
- **Proper disposal of dead animals**
- **Cleaning and disinfection of premises and implements**
- **Water control in premises and on animals**

Medical prophylaxis
- **Vaccination:** Live attenuated virus vaccine (Non-Lumpy strain)
- **Vaccination:** Viruses vaccine (Slow and high pot vaccine)
- **Follow manufacturer’s instructions.**
- **Not animal in countries free from sheep and goats.**

No new generation of recombinant canine vaccine available for commercial purpose.

Diagnostic techniques

- **Clinical signs:** Early skin lesions of Lumpy Skin Disease
- **PCR:** OIE Abnormal Transmissible Disease

Diagnosis

Inoculation period
- **Not reported under field conditions**
- **The onset of lesions is 6-10 days from inoculation**
- **First skin lesions appeared in 4-20 days at the inoculation site**

Clinical findings
- **Nodules with congestion, haemorrhage, oedema, vesicles and tumours**
- **Enlargement of lymph nodes with lymphoid proliferation, oedema, congestion and haemorrhage**
- **Fur loss of maxillary, mandibular and other teeth swelling from the affected teeth.**
- **Cortisone treatment in horses**

Lumpy Skin Disease (LSD) 2016

**Aetiology**

- **Family:** Poxviridae
- **Genus:** Capripoxvirus
- **1 serotype of Lumpy Skin Disease Virus (LSDV)**

OIE standards on trade

- **Inoculation period:** 28 days
- **Susceptible animals:** Camel (Camelus) and Grabo (Camelus) and water buffalo (Bubalus bubalis)
- **Vaccination:** OIE guidelines for the conditions to the LSF status for the export of animals to countries of the country to authorize import or transit of the commodities.

LSD free country:
- **LSD to report in the country**
- **No case of LSD has been confirmed for at least five years**
- **No vaccination against LSD has been performed at least three years.**
- **The certificates are import in accordance with chapter 1.11.**

Occurrence in Europe and neighboring areas
Lumpy Skin Disease Virus

- Family Poxviridae
  - Genus Capripoxvirus
- Closely related to sheep and goat pox
- Cannot be differentiated with routine serology
Economic Impact

• Major economic importance due to loss of production
  – Severe emaciation
  – Lowered milk production
  – Abortion
  – Secondary mastitis
  – Loss of fertility
  – Extensive damage to hides
  – Loss of draft from lameness
Morbidity/ Mortality

- Morbidity
  - 3% to 85%

- Mortality
  - 1% to 2% usually
  - 20% to 85% in some cases
Animal Transmission

- Primary route: Mosquitoes and flies
- Minor route:
  - Direct contact via cutaneous lesions, saliva, nasal discharge, milk, semen, muscles,
- Virus can survive up to 35 days in desiccated crusts
- No carrier state
- Spread related to movement of cattle
Clinical Signs

- Incubation period
  - 5 days to 5 weeks
- Inapparent to infection
  - worse in young cattle
- Fever
- Decreased milk yield
Clinical Signs

- Raised, circular firm nodules coalescing into plaques
  - Anywhere on the body
  - May harden into “sitfast” and be shed

- Swollen/tender udder or testicles

- Tongue, gum and hard palate lesions

- Abortion and sterility
Post Mortem Lesions

- Characteristic skin nodules
- Lesions in the mucous membranes throughout the GI tract
- Nodules in lungs
- Hemorrhages in spleen, liver or rumen
Diagnosis

- Clinical
  - Suspect with characteristic skin nodules ("sitfast"), fever and low mortality

- Laboratory Tests
  - Virus isolation and identification
  - Electron microscopy in combination with history
  - Serology, cross reactions with other poxviruses may occur
Control and Eradication

- **Endemic areas**
  - Vaccinate cattle

- **Non-endemic areas**
  - Keep free with import restrictions and proper quarantine

- **Insect control**

- **Outbreak in LSD free area: Small scale**
  - Quarantine, slaughter infected and exposed, clean and disinfect
  - Consider ring vaccination

- **Outbreak in LSD free area: Large scale**
  - Vaccination
  - Consider slaughter
Vaccination

- Successful in endemic areas
- Neethling strain vaccine
- Sheep and goat pox vaccine is used but may cause local, severe reaction
- Gorgan strain (a new vaccine)
Efficacy and safety of different Lumpy Skin Disease (LSD) Vaccine

Evaluation of the safety, immunogenicity and efficacy of three capripoxvirus vaccine strains against lumpy skin disease virus


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b National Veterinary Institute (NVI), Debre Zeit, Ethiopia
c International Agricultural Research Center for Development (CIRAD), Montpellier, France
d The Pirbright Institute, Ash Road, Pirbright GU24 0NF, Surrey, United Kingdom
e School of Veterinary Medicine, Faculty of Medical Sciences, University of the West Indies, Champ Fleurs, Saint Augustine, Trinidad and Tobago, West Indies
CRS results

- LumpyShield
- Neethling
- KSGP 0-180
DTH results

- SC Vaccination
- ID Vaccination

Neethling
KSGP
LumpyShield
Global LSD spread
LSD: from Middle East to Europe
April 2015 to March 2016 (Source OIE/WAHIS)

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Situation</th>
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<tbody>
<tr>
<td>Lebanon</td>
<td>2012 (Nov)</td>
<td>First occurrence</td>
</tr>
<tr>
<td>Jordan</td>
<td>2013 (April)</td>
<td>First occurrence</td>
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<tr>
<td>Irak</td>
<td>2013 (August)</td>
<td>First occurrence</td>
</tr>
<tr>
<td>Turkey</td>
<td>2013 (August)</td>
<td>First occurrence</td>
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<tr>
<td>Iran</td>
<td>2014 (May)</td>
<td>First occurrence</td>
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<tr>
<td>Azerbaijan</td>
<td>2014 (July)</td>
<td>First occurrence</td>
</tr>
<tr>
<td>Cyprus</td>
<td>2014 (Nov)</td>
<td>Reoccurrence</td>
</tr>
<tr>
<td>Kuwait</td>
<td>2014 (Nov)</td>
<td>Reoccurrence</td>
</tr>
<tr>
<td>Russia</td>
<td>2015 (July)</td>
<td>First occurrence</td>
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<tr>
<td>Greece</td>
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<tr>
<td>Armenia</td>
<td>2015 (August)</td>
<td>First occurrence</td>
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<tr>
<td>Bulgaria</td>
<td>2016 (April)</td>
<td>First occurrence</td>
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<tr>
<td>Macedonia</td>
<td>2016 (April)</td>
<td>First occurrence</td>
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</tbody>
</table>
LSD: from Middle East to Europe
01/01/2018 to 31/12/2018 (Source OIE/WAHIS)
LUMPY SKIN DISEASE
LSD outbreaks in Turkey
(Source OIE/WAHIS)

Start: 06/08/13
> 236 outbreaks
Continuing

Movement control, disinfection / disinfestation, quarantine, zoning, Control of vectors, No treatment of affected animals
Vaccination
LUMPY SKIN DISEASE

First Outbreak; August 2013

Number Of Outbreaks

Number Of Outbreaks 2013-2017
In 2017; Regional Mass Vaccination was applied before vector activity.
LUMPY SKIN DISEASE

9 Outbreaks in 2017
**Vaccination:**
3 sheep-goat doses of Sheep and Goat Pox Vaccine are applied.
Target Population; All Cattle Population

**In case of an outbreak:**
Destroying the animals with clinical signs
Ring Vaccination
Restriction of animal movements
Cleansing and disinfection
LSD outbreaks in Greece
(Source OIE/WAHIS)

Start: 18/08/15
131 outbreaks
Continuing
LSD outbreaks in Bulgaria
(Source OIE/WAHIS)

Start: 12/04/16
17 outbreaks
Continuing

Disinfection / disinfestation, dipping / Spraying, quarantine, stamping out, zoning, control of vectors, no treatment of affected animals
LSD outbreaks in Macedonia
(Source OIE/WAHIS)

Start: 18/04/16
7 outbreaks
Continuing

Disinfection, disinfection, dipping, spraying, quarantine, stamping out, zoning, control of vectors, no treatment of affected animals
LSD outbreaks in Armenia
(Source OIE/WAHIS)

Start: 08/12/15
1 outbreak
Resolved

Disinfection / disinfestation, dipping / Spraying, quarantine, stamping out, zoning, control of vectors, no treatment of affected animals
LSD: from Middle East to Europe

Challenges:

1- The East Mediterranean region, is facing a new wave of the spread of the LSD virus beyond its current geographical area where previous outbreaks have been reported and that new vector-borne diseases, such as bluetongue, are now occurring for the first time in Mediterranean Basin,

2- The increasing volume of international and inter-regional trade within the Middle East, and the global trends, combined with changes in animal husbandry, urbanization, modern transportation and globalization, have resulted in a global emergence or re-emergence of epidemic vector-borne diseases affecting both humans and animals over the past 30 years
3- The control of the overall vector capacity of vector species which is influenced by other biological and behavioral characteristics of the arthropod population, and the relatively long incubation period of LSD that may delay the symptoms of the disease during shipping period of exported animals, have been impeded by the lack/absence of entomological research to deal effectively with the pivotal transmitting factor,

4- The proper vaccine against LSD is not yet well performed and that the vaccination process with the Pox Vaccine needs to be clarified.

5- The socioeconomic impact of vector borne diseases on animal production and small scale farmers, is growing
Pillars of a regional control strategy:

A- Notification

• Countries in the region should enhance information sharing on LSD and vector-borne diseases.

• Countries ensure compliance with their obligations on transparent animal disease information by promptly reporting all outbreaks of LSD and other vector-borne diseases to the OIE.

• Countries under the threat of spread of LSD and other vector-borne diseases in the Middle East join the regional emergency control plans though they are not currently affected (or though these diseases have not been officially reported within their territories),
B- Surveillance

- A regional network of national epidemiologic teams on LSD and other vector borne diseases as well as vectors to be developed including the international OIE collaborating centers and the results of these activities be shared to support early warning efforts of regional Members,

- Laboratory network be established to support disease surveillance and early warning activities regarding the introduction and circulation of LSD and vector-borne viruses,

- Vaccine production and vaccination activities against LSD and vector-borne diseases comply with OIE standards and on quality control procedures,

- Research on vaccines efficacy and efficiency be promoted with the support of OIE reference and collaborating centers. It would benefit everybody to disseminate the research data on the vaccine efficacy as soon as possible.
C- Control and communication

• A value-chain approach that includes livestock keepers, animal health authorities and other stakeholders be adopted to engage all key players in the control efforts of animal diseases,

• Middle East countries establish a cross-border disease monitoring system that considers the complexity of the risk factors for the introduction/persistence of LSD and vector-borne diseases,

• Exporting and importing countries follow the standards, guidelines and recommendations of the OIE regarding international trade of ruminants and products with respect to LSD and other vector-borne diseases with particular attention to the application of diagnostic tests, quarantine and use of vaccines
D- Governance and coordination

The implementation of the above activities be governed by the establishment of a Middle Eastern Working Group to manage issues relevant to vector-borne diseases and to develop advocacy for improve political commitment and investment in the prevention and control of these diseases,

10. Proposals for a regional control and research activities be drafted and presented to the forthcoming conference of the OIE Regional Commission for the Middle East to be held in September 2017.

11- Proposal for a regional contingency plan through a complete risk based surveillance, be designed and supervised by REMESA, so to enhance coordination and early prevention measures.
E- Support

• The OIE continues to develop surveillance guidelines for vector-borne diseases taking into consideration the effect of climatic changes on the global spread of these infections
• Training and technical assistance are provided to countries by OIE and its reference laboratories and other appropriate organizations and development partners to support countries within the risk areas in the Middle East for rapid diagnostic of the diseases and to undertake predictive epidemiological studies for contingency planning,
• The OIE continues its efforts within the Middle East countries to promote and develop good veterinary governance to enable countries to effectively prevent and control LSD and vector-borne diseases,
The commitment of the Veterinary Services is fundamental for the successful control of LSDV. A contingency plan should be in place and risk factors for LSD should be identified. Appropriate conditions should be set for the importation of live domestic and wild ruminants from countries considered infected with LSDV.

Every effort should be made to enhance the diagnostic capacity in the local and regional laboratories. Accurate and swift reporting on a disease outbreak should be considered as a priority.

Further efforts are still required to enhance constructive and transparent communication within the region. Interdisciplinary collaboration and communication in all aspects of health Contingency plans be strengthen for humans, animals and the environment.
Entomological surveys and ecological studies and research be developed at the regional level to support regional and inter-regional efforts and plans with focus on monitoring the disease cycle and minimizing the impact of vectors on the patterns of disease spread.

The complexity of the interrelationship between animal movements, hosts densities and vector distribution needs a multidisciplinary approach and international surveillance networks to properly face the new challenges

Inter-regional collaboration is critical for the success of the control strategies.
Thank you for your Attention