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Regional representation for the ME

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

**15th REMESA meeting  
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Dead Sea- Jordan**

# INTRODUCTION

*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**

**Morbidity:** 5-45%  
**Mortality:** <10%

**Host range**

- Natural infection: Cattle and Domestic Asian buffalo
- Experimental infection: Buffalo and Impati
- Clinical disease: Arabian Oryx (Saudi Arabia), Springbok (Namibia) and Oryx (South Africa)

**Transmission**

- Principle method: Mechanical transmission by arthropod vector such as mosquitoes and flies
- Minor source: Direct contact or ingestion of contaminated food and water
- Possible route: Experimental inoculation with material from cutaneous nodules or blood

**Prevention and Control**

**Treatment**

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

**Sanitary prophylaxis**

- Free countries: import restrictions on livestock, carcases, hides, skins and semen
- Infected countries:
  - Strict quarantine to avoid introduction of infected animals into safe herds
  - Isolation and prohibition of animal movements (in case of outbreaks)
  - Slaughtering of all sick and infected animals (as far as possible)
  - Proper disposal of dead animals (e.g. incineration)
  - Cleaning and disinfection of premises and implements
  - Vector control in premises and on animals
- With the exception of vaccination, control measures are usually not effective
- Vector control in ships and aircraft is highly recommended

**Medical prophylaxis**

- Heterologous live attenuated virus vaccine (Nodding strain)
  - Immunity conferred lasts up to 3 years.
- Heterologous live attenuated virus vaccine (Sheep or goat pox vaccine)
  - It may cause local or severe reactions.
  - Follow manufacturer's instructions.
  - Not advised in countries free from sheep and goat pox.
- No new generation recombinant capripox vaccines available for commercial purposes.

For more detailed information, please refer to the Chapter 2.4.1.3. Lumpy skin disease in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.

- An infectious, eruptive, occasionally fatal viral disease of cattle, closely related to the pox viruses
- Spread by biting insects and characterized by nodules on the skin and other parts of the body
- Traditionally found in Africa, now spread to several countries in the Middle East and European countries

**Diagnosis**

**Incubation period**

- Not reported under field conditions
- The onset of fever: in 6-9 days from inoculation
- First skin lesion: appeared in 4-20 days at the inoculation site

**Clinical findings**

- Nodules with congestion, haemorrhage, oedema, vasculitis and necrosis
- Enlargement of lymph nodes with lymphoid proliferation, oedema, congestion and haemorrhage
- Pox lesions of mucous membranes of both digestive and respiratory tract
- Oedema and areas of focal lobular atelectasis in lungs
- Pleuritis with enlargement of the mediastinal lymph nodes
- Synovitis and tenosynovitis with fibrin in the synovial fluid

**OIE standards on trade**

**General provisions**

- Incubation period: 28 days
- Susceptible animals: cattle (*Bos indicus* and *B. taurus*) and water buffalo (*Subabius bubalis*)
- Voluntary Authorities should require the conditions relevant to the LSD status of the cattle of the exporting country to authorize import or transit of the commodities.

**LSD free country**

- LSD is notifiable in the country
- No case of LSD has been confirmed for at least the past three years
- No vaccination against LSD has been performed for at least three years
- The commodities are imported in accordance with chapter 11.11 of the Terrestrial Animal Health Code.

For more detailed information, please refer to the Chapter 11.11. Lumpy skin disease in the OIE Terrestrial Animal Health Code.

# LUMPY SKIN DISEASE (LSD) 2016

**Aetiology**  
Classification  
Family Poxviridae – Genus Capripoxvirus – 1 serotype of Lumpy Skin Disease Virus (LSDV)



**Cow, skin lesion:** Early skin lesions of lumpy skin disease. © P. PASC (OIE Atlas of Transboundary Animal Diseases)



**Cow, phlebotomus and papules:** Multiple circular, raised, crusted nodules in the nose. © P. PASC (OIE Atlas of Transboundary Animal Diseases)

**Occurrence in Europe and neighboring areas**



**Diagnostic techniques**

Method	Purpose					Importation in individual animals or populations post-vaccination
	Population freedom from infection	Individual animal freedom from infection prior to movement	Control of eradication policies	Confirmation of clinical cases	Prevalence of infection surveillance	
<b>Agent identification*</b>						
Virus isolation	++	++	+	+++	+	N/A
Antigen detection	++	++	++	++	++	N/A
PCR	++	+++	++	+++	++	N/A
<b>Detection of immune response</b>						
IFA	++	++	++	++	++	++
IFAT	+	+	+	+	+	+

\*A combination of agent identification methods applied on the same clinical sample is recommended. ++ = (recommended method), +++ (suitable method), + (used in some situations, but cost, reliability or other factors severely limits its application), N/A (not applicable). PCR (polymerase chain reaction), IFA (indirect fluorescent antibody test), IFAT (indirect fluorescent antibody test).



# 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



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Contents lists available at [ScienceDirect](#)

Vaccine

journal homepage: [www.elsevier.com/locate/vaccine](http://www.elsevier.com/locate/vaccine)



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



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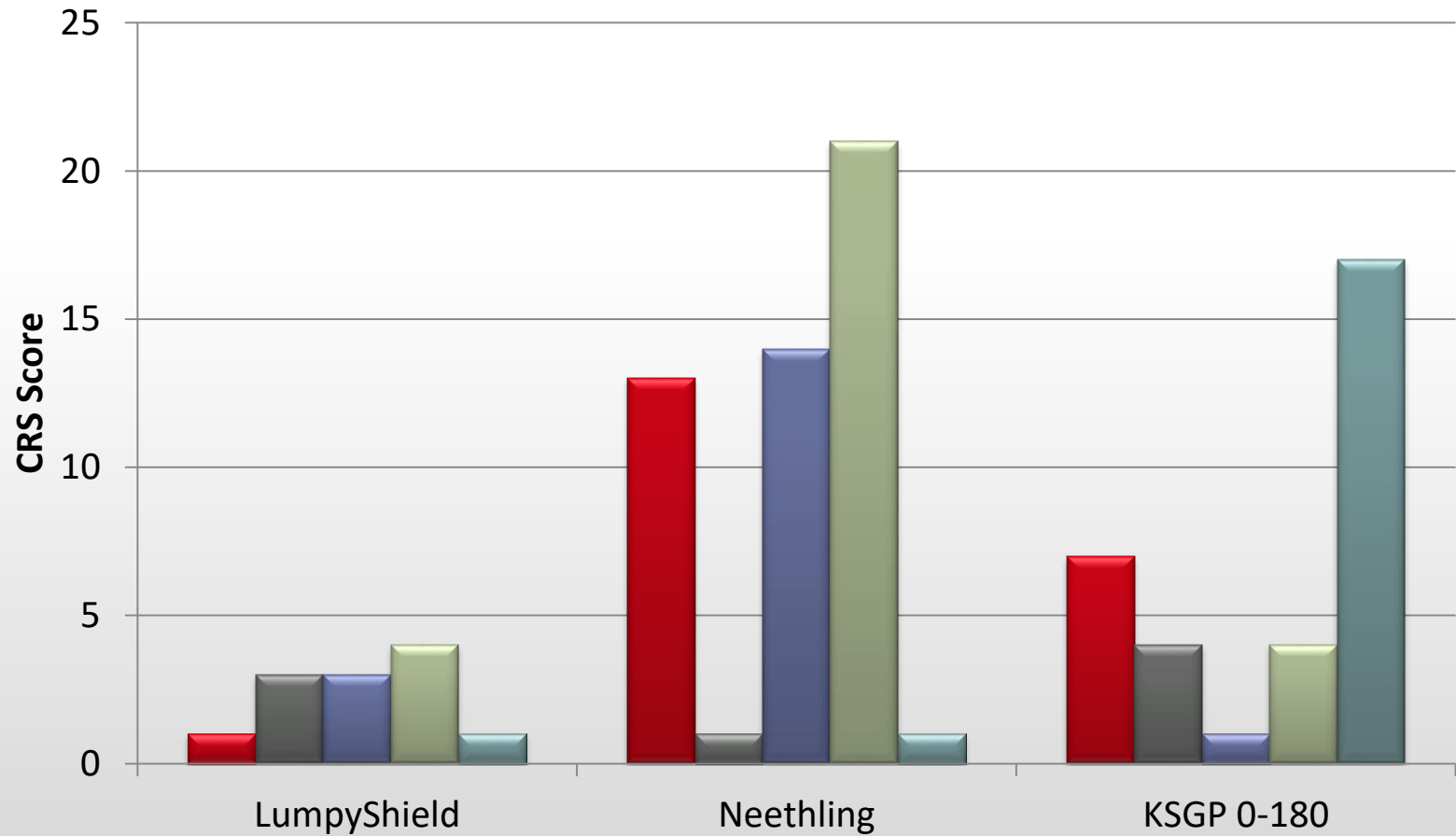
<sup>b</sup> National Veterinary Institute (NVI), Debre Zeit, Ethiopia

<sup>c</sup> International Agricultural Research Center for Development (CIRAD), Montpellier, France

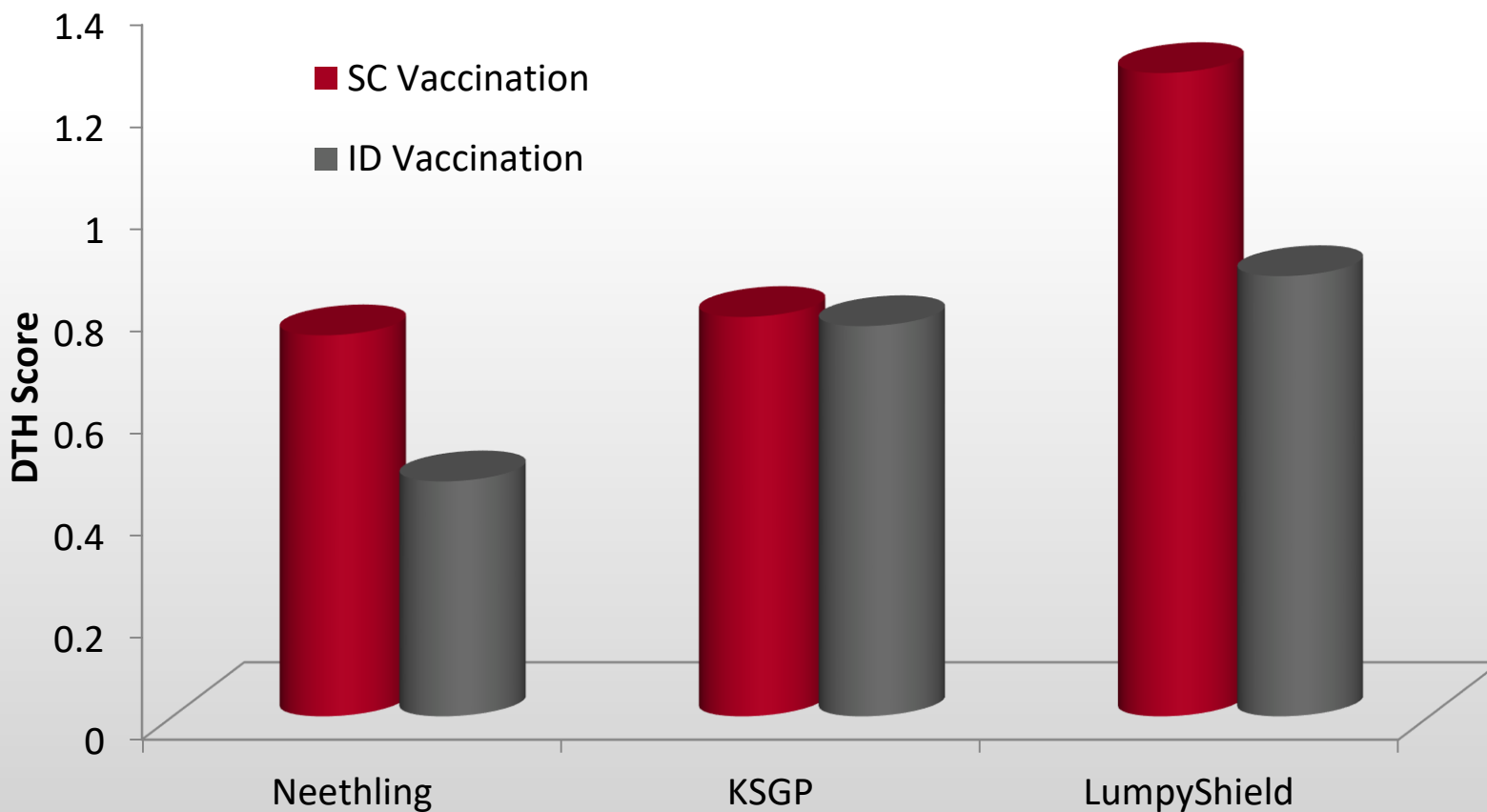
<sup>d</sup> The Pirbright Institute, Ash Road, Pirbright GU24 0NF, Surrey, United Kingdom

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# CRS results

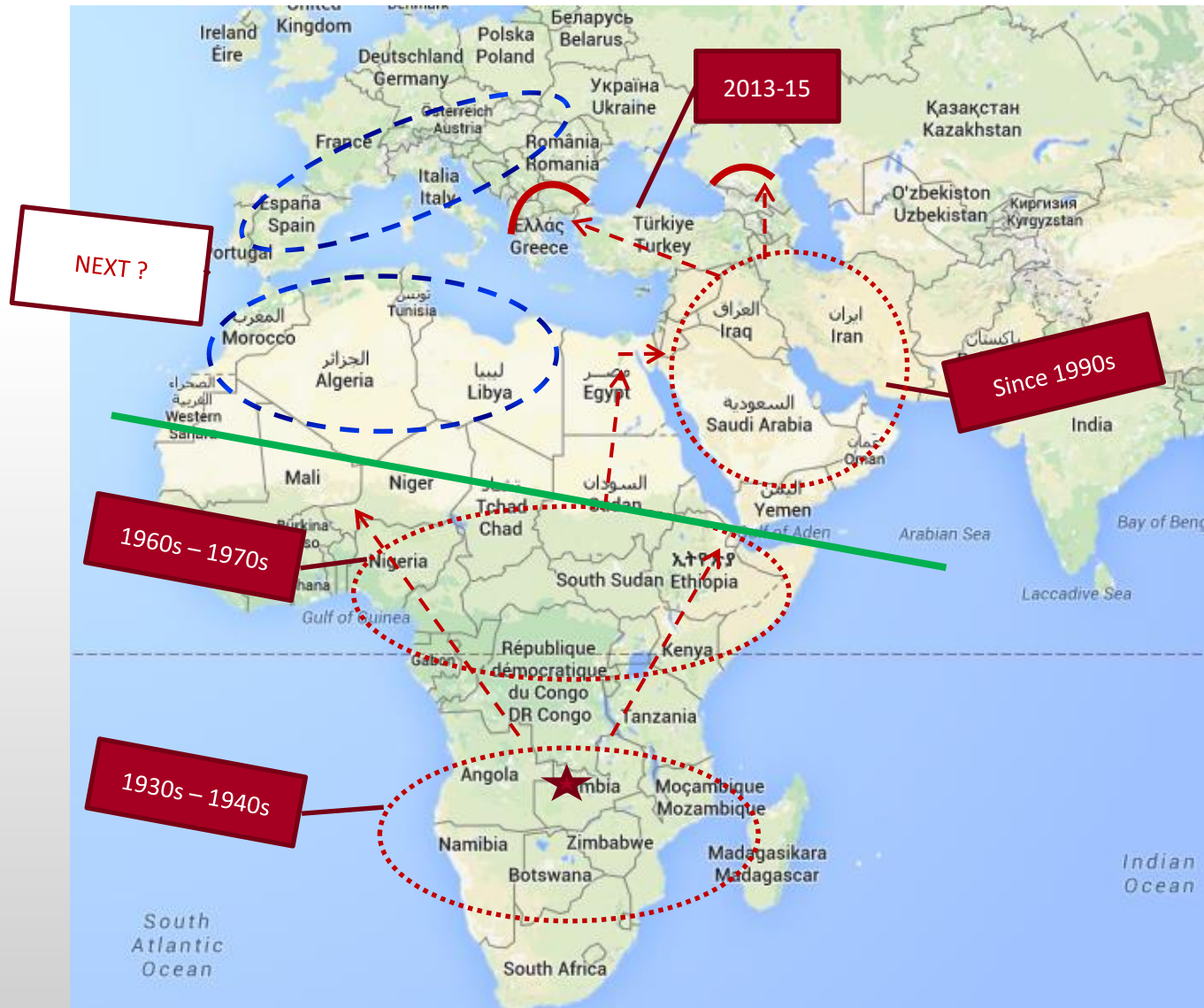


# DTH results





# Global LSD spread

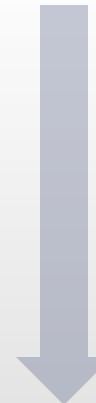


# LSD: from Middle East to Europe

*April 2015 to March 2016 (Source OIE/WAHIS)*

Country	Period	Situation
Lebanon	2012 (Nov)	First occurrence
Jordan	2013 (April)	First occurrence
Irak	2013 (August)	First occurrence
Turkey	2013 (August)	First occurrence
Iran	2014 (May)	First occurrence
Azerbaijan	2014 (July)	First occurrence
Cyprus	2014 (Nov)	Reoccurrence
Kuwait	2014 (Nov)	Reoccurrence
Russia	2015 (July)	First occurrence
Greece	2015 (August)	First occurrence
Armenia	2015 (August)	First occurrence
Bulgaria	2016 (April)	First occurrence
Macedonia	2016 (April)	First occurrence

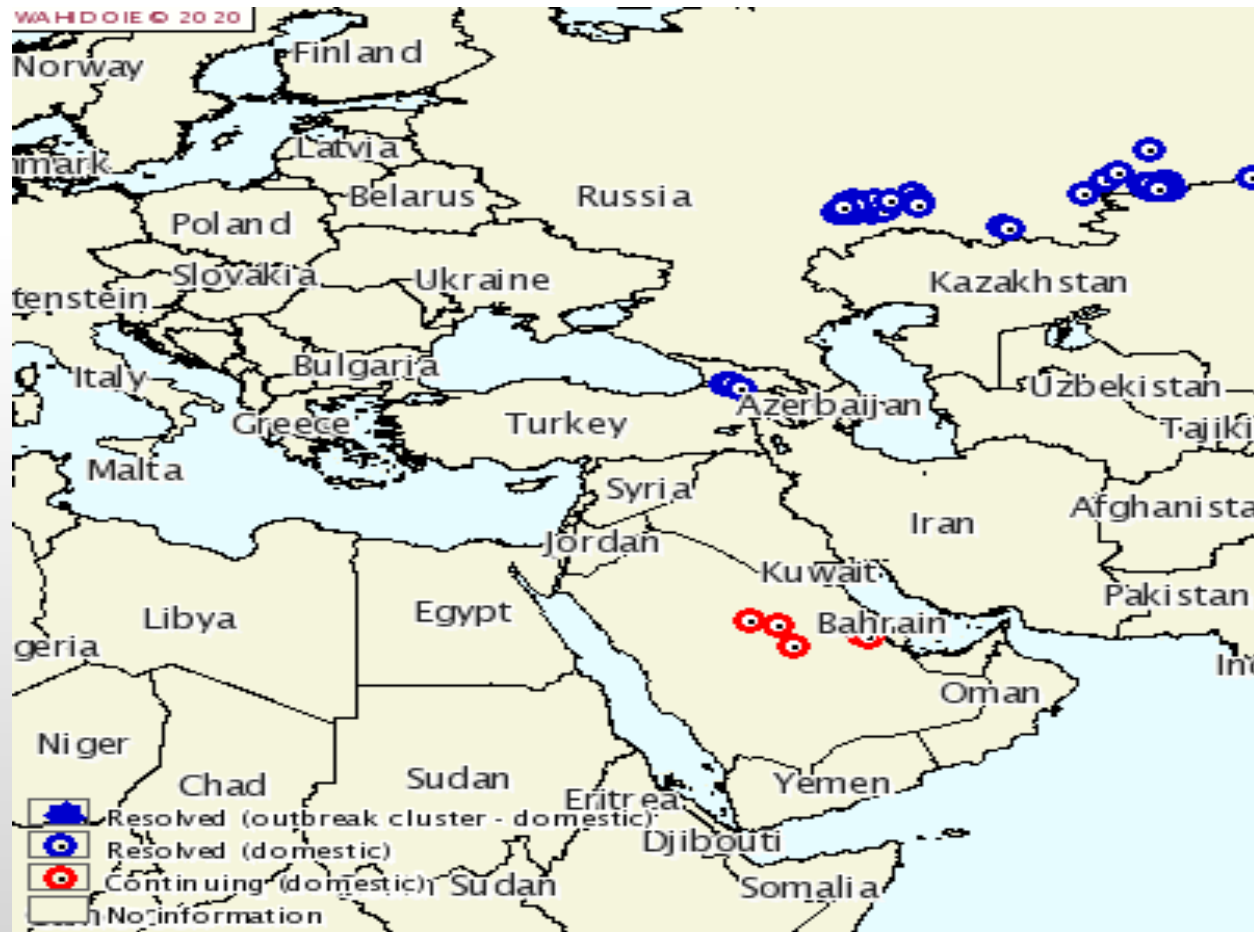
**Middle East**



**Europe**

# LSD: from Middle East to Europe

01/01/2018 to 31/12/2018 (Source OIE/WAHIS)



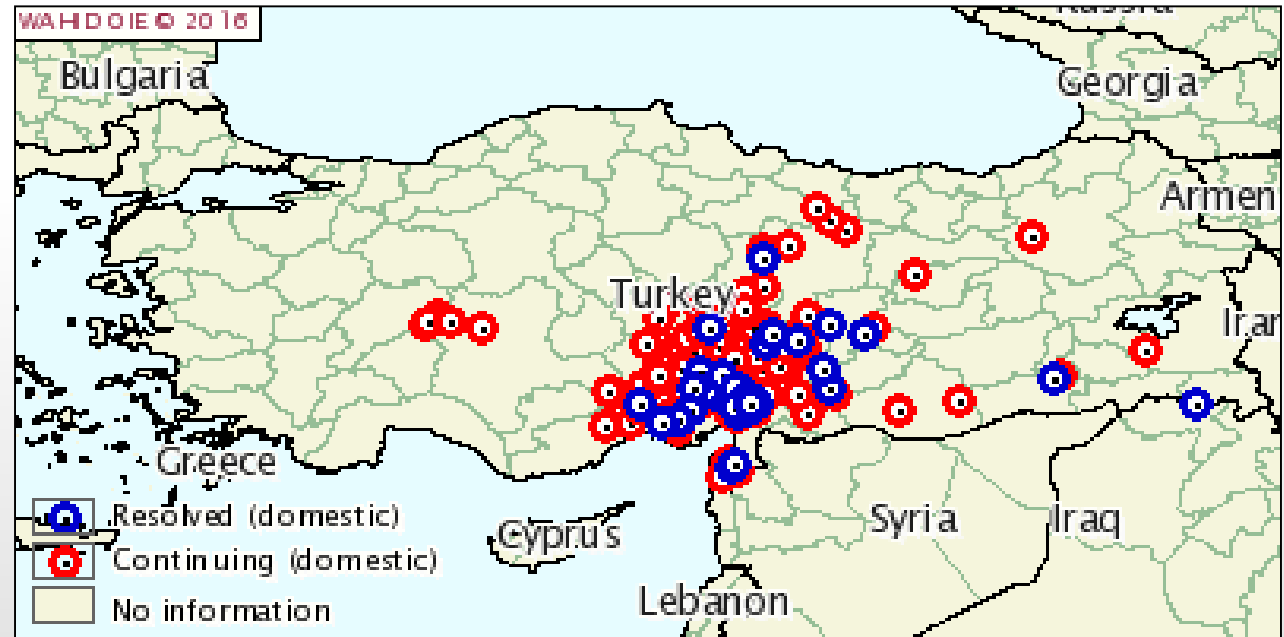


# LUMPY SKIN DISEASE

# LSD outbreaks in Turkey

(Source OIE/WAHIS)

**Start: 06/08/13**  
**> 236 outbreaks**  
**Continuing**

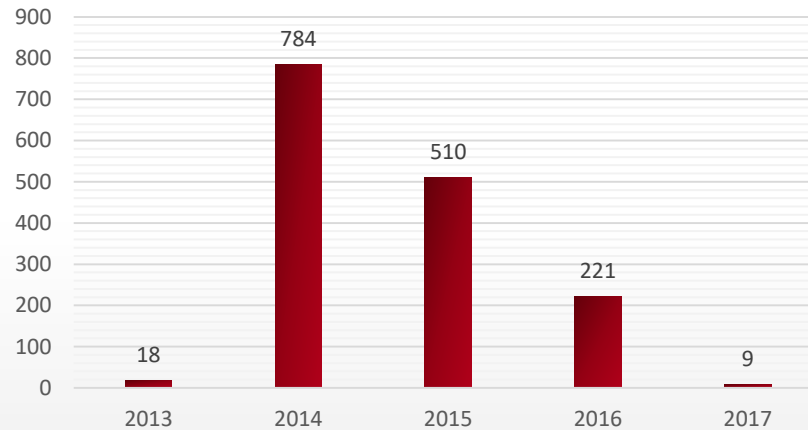


Movement control, disinfection / disinfestation, quarantine, zoning, Control of vectors, No treatment of affected animals

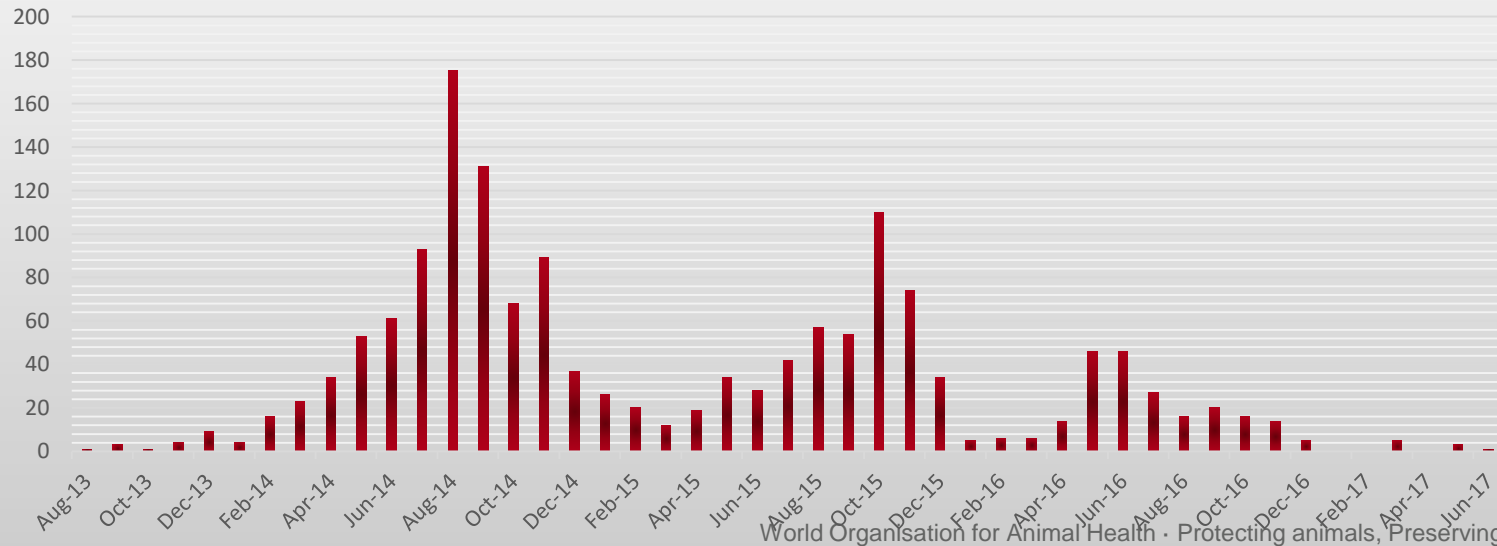
**Vaccination**

## First Outbreak; August 2013

Number Of Outbreaks



Number Of Outbreaks 2013-2017



# LUMPY SKIN DISEASE

2016 year view



In 2017; Regional Mass  
Vaccination was applied before  
vector activity.



9 Outbreaks in 2017





# LUMPY SKIN DISEASE

## 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)

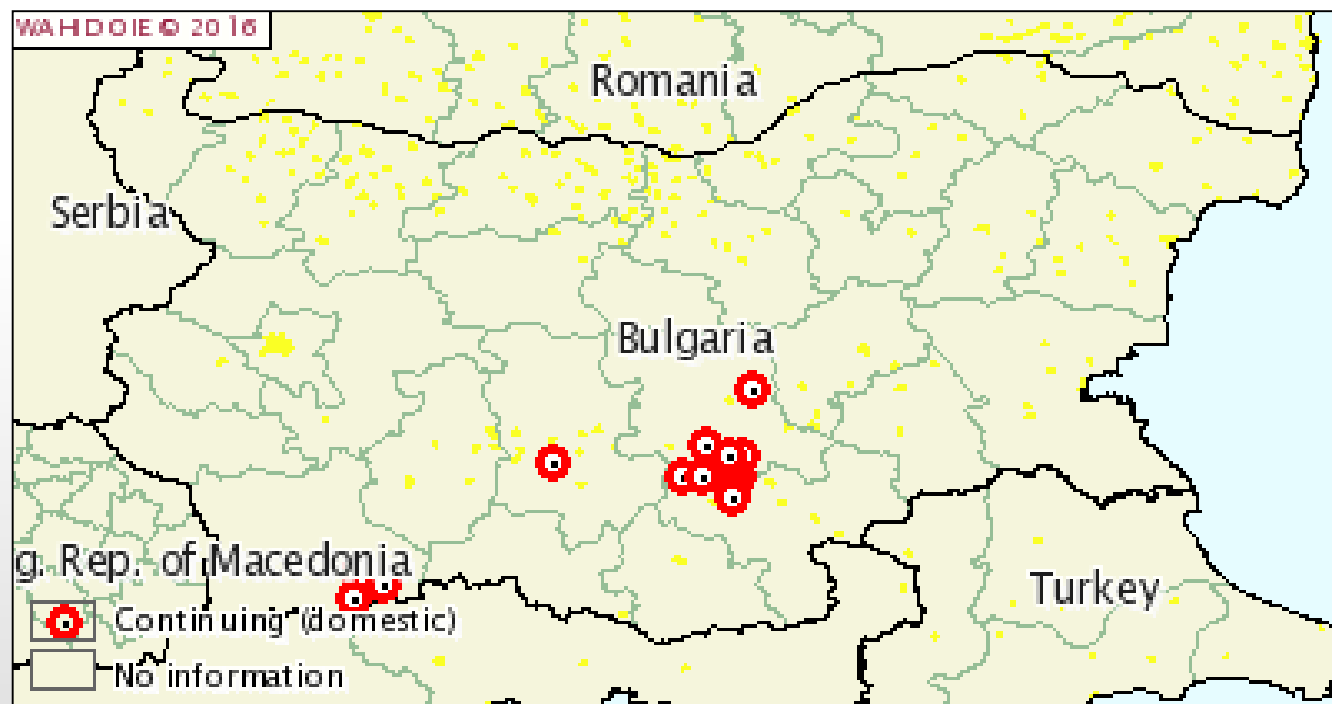
**Start: 18/08/15**  
**131 outbreaks**  
**Continuing**



# 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,  
disinfestation, dipping,  
Spraying, quarantine,  
stamping out, zoning,  
control of vectors, no  
treatment of affected  
animals



# LSD outbreaks in Armenia

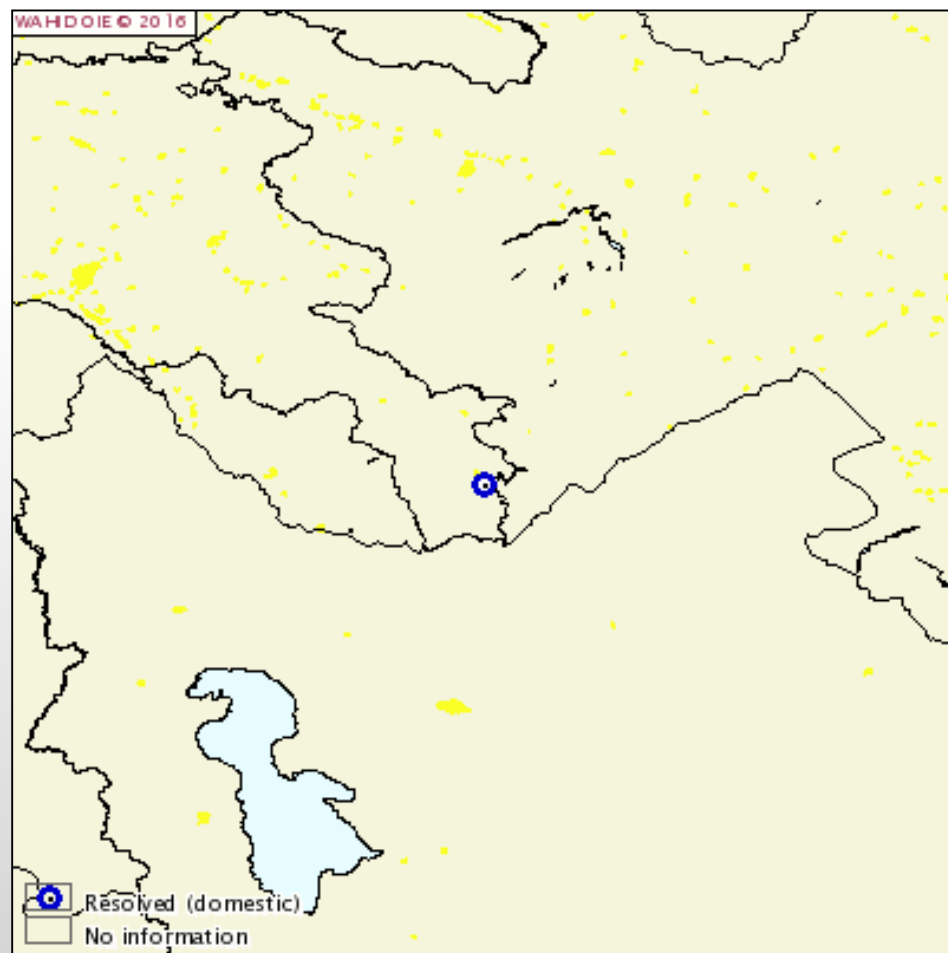
(Source OIE/WAHIS)

**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,

## **conclusion,**

**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.**

## **conclusion,**

**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**