Lumpy skin disease (LSD)
Exit Strategy in South East Europe
Possibilities and Challenges

Standing Group of Experts on Lumpy Skin Disease in the South East Europe region under the GF-TADs umbrella

Seventh meeting (SGE LSD7)

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- **Standards and scientific assessments on LSD exit strategy**
- **Current state of play in South East Europe**
- **Objectives of an LSD Exit Strategy in SE Europe**
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- **Concluding remarks**

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Current Standards and Scientific assessments

OIE CODE CHAPTER 11.9. INFECTION WITH LUMPY SKIN DISEASE VIRUS

Article 11.9.3.

Country or zone free from LSD

A country or a *zone* may be considered free from LSD when *infection* with LSDV is notifiable in the entire country, importation of bovines and water buffaloes and their *commodities* is carried out in accordance with this chapter, and either:

1) the country or *zone* is historically free as described in point 1 *a)* of Article 1.4.6.; or

2) for at least three years, *vaccination* has been prohibited in the country or *zone* and a clinical *surveillance* programme in accordance with Article 11.9.15. has demonstrated no occurrence of *infection* with LSDV; or

3) for at least two years, *vaccination* has been prohibited in the country or *zone* and a clinical, virological and serological *surveillance* programme in accordance with Article 11.9.15. has demonstrated no occurrence of *infection* with LSDV.

A country or *zone* free from LSD that is adjacent to an infected country or *zone* should include a *zone* in which *surveillance* is conducted in accordance with Article 11.9.15.

A country or *zone* free from LSD will not lose its status as a result of introduction of seropositive or vaccinated bovines or water buffaloes or their *commodities*, provided they were introduced in accordance with this chapter.

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Current Standards and Scientific assessments

OIE CODE CHAPTER 11.9. INFECTION WITH LUMPY SKIN DISEASE VIRUS

Article 11.9.4.

Recovery of free status

1) When a *case* of LSD occurs in a country or *zone* previously free from LSD, one of the following waiting periods is applicable to regain free status:

   a) when a *stamping-out policy* has been applied;

      i) 14 months after the *slaughter* or *killing* of the last *case*, or after the last *vaccination* if emergency *vaccination* has been used, whichever occurred last, and during which period clinical, virological and serological *surveillance* conducted in accordance with Article 11.9.15. has demonstrated no occurrence of *infection* with LSDV;

      ii) 26 months after the *slaughter* or *killing* of the last *case*, or after the last *vaccination* if emergency *vaccination* has been used, whichever occurred last, and during which period clinical *surveillance* alone conducted in accordance with Article 11.9.15. has demonstrated no occurrence of *infection* with LSDV;

   b) when a *stamping-out policy* is not applied, Article 11.9.3. applies.

2) When preventive *vaccination* is conducted in a country or *zone* free from LSD, in response to a threat but without the occurrence of a *case* of LSD, free status may be regained eight months after the last *vaccination* when clinical, virological and serological *surveillance* conducted in accordance with Article 11.9.15. has demonstrated no occurrence of *infection* with LSDV.

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Current Standards and Scientific assessments

EFSA **Lumpy skin disease: scientific and technical assistance on control and surveillance activities** *[EFSA Journal 2018; 16(10):5452], published 16 Oct 2018*.

With vaccination effectiveness 80-95%

When LSD vaccine coverage ≥ 90% ⇒ 2 years vaccination

When LSD vaccine coverage < 90% ⇒ >2 years vaccination

Abstract

The duration of the vaccination campaign sufficient to eliminate lumpy skin disease (LSD) mainly depends on the vaccination effectiveness and coverage achieved. By using a spread epidemiological model, assuming a vaccination effectiveness of 65%, with 50% and 90% coverage, 3 and 4 years campaigns, respectively, are needed to eliminate LSD. When vaccination effectiveness is 80% to 95%, 2 years of vaccination at coverage of 90% is sufficient to eliminate LSD virus (LSDV). For shorter campaigns, LSD is predicted to persist. When the infection is eliminated by vaccination, two pathways for disease recurrence are possible, (i) by new introduction from a neighbouring affected area, especially by introduction of infected animals, or, less likely (ii) the infection persisting either in the environment, in vectors or in wild animals. For planning surveillance, several elements should be considered: the objectives and related design prevalence, the epidemiological situation, the immunological status of the host population, the geographical area and the season, the type of surveillance (active or passive), the diagnostic methods including clinical detection (considered the most effective method for early detection of LSD), the target population, the sample size and frequency. According to the model, for early detecting new introductions of LSD, it may be needed to clinically check a large number of herds (e.g. 2–3,000 herds) monthly. Lower sample sizes can be considered, when a greater delay in detecting the virus is acceptable. Where vaccination is maintained, active surveillance for verifying the effectiveness of vaccination would be needed. Demonstrating disease absence can rely on serological surveillance, which should consider the test sensitivity, the design prevalence (estimated value: 3.5%), the onset and duration of serum antibodies. Important knowledge gaps on LSD are about within-herd transmission, duration of protective immunity, role of vectors, diagnostic tests, farm location and type in the at-risk countries and the epidemiological status of neighbouring countries.

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Current Standards and Scientific assessments

EFSA **Lumpy skin disease: scientific and technical assistance on control and surveillance activities** *[EFSA Journal 2018; 16(10):5452], published 16 Oct 2018*.

Scenario 1: Areas or countries at risk of LSD (e.g. due to LSD outbreaks in neighbouring countries), where no LSD outbreaks have occurred and no LSD vaccination was carried out

- Objective of the surveillance: early detection of primary infection following LSDV introduction.
- Possible source of infection: introduction from neighbouring infected countries.
- Susceptible population: the whole cattle population is fully susceptible.
- Risk areas: assuming a good level of control of animal transboundary movements and imports of live cattle, the risk areas are only those closer to the infected neighbouring countries, where the infection can propagate by contiguity from the infected territories or introduced through limited local uncontrolled animal movements. According to the model, an area up to 80 km from the borders can be considered (see Chapter 3.3.1), then geographical factors and distribution of cattle population should be considered. Article 11.9.15. of OIE's TAHC considers a distance of at least 20 km from the border with an infected country as the area at risk where surveillance activities should be put in place. Considering the wide range of possible vectors, although as mechanical vectors only, special considerations should be made for the possibility of LSDV introduction through windborne dissemination of infected vectors (see Chapter 3.2.2), especially for those countries sharing close sea borders with infected territories (as, for example, Italy).

Risk areas ⇒ 80 km from the borders of LSD infected countries

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LSD Exit Strategy in SE Europe

Current State of play – LSD occurrence 2017 -2018

LSD outbreaks in 2017

LSD outbreaks in 2018

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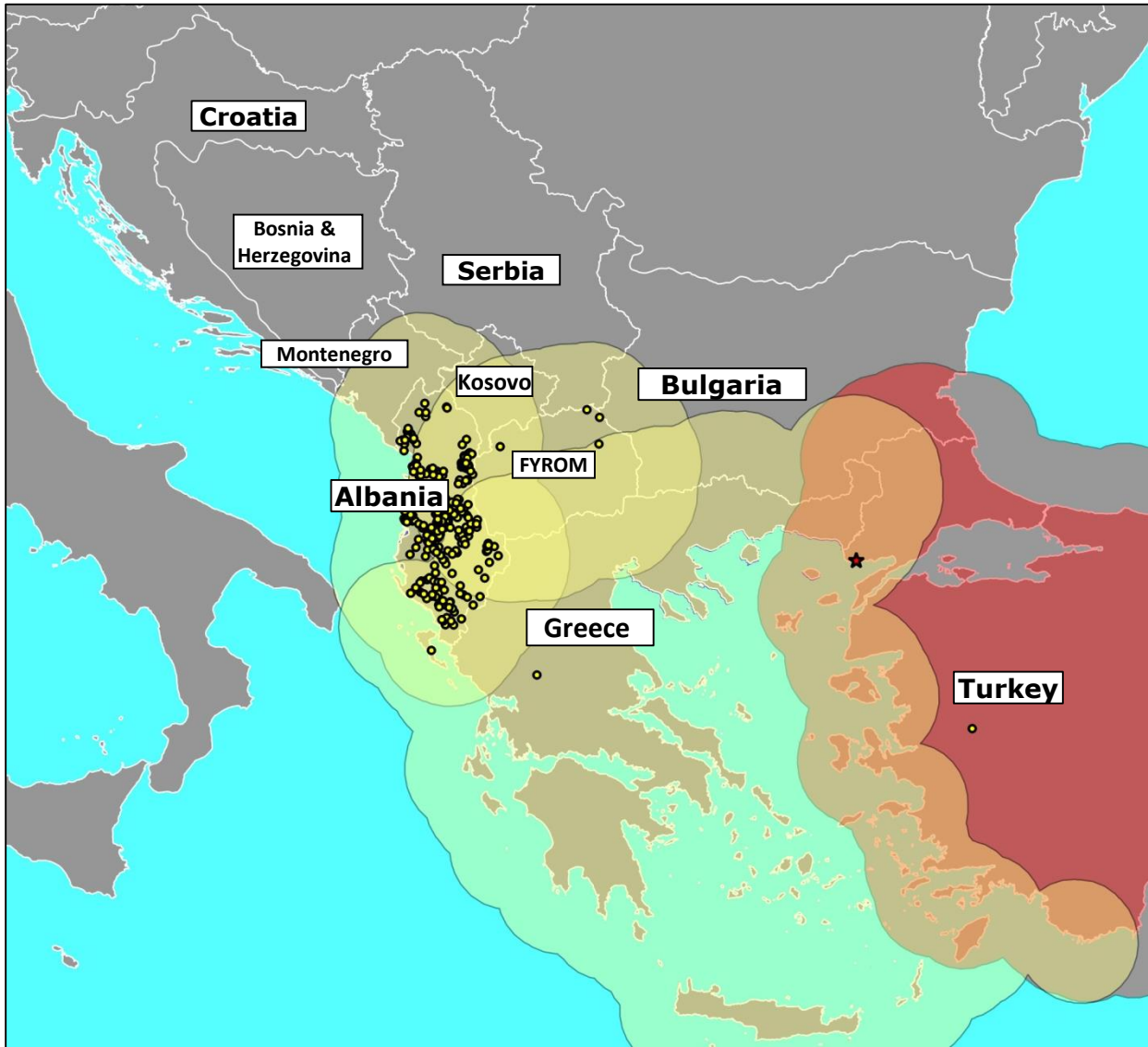
LSD Exit Strategy in SE Europe

Current state of play – High risk areas (according to EFSA report)

EFSA Report : high risk areas
80 km zone around borders of LSD affected countries (zones)

80 km zones around areas where the last LSD outbreaks occurred in **2017 -2018**

80 km zones around areas where the last LSD outbreaks occurred in **2017**



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Objectives of an LSD exit strategy

Strategic Objective: to restore the LSD situation as it was before the occurrence of the LSD outbreaks and the implementation of LSD vaccination.

- **Component 1: Cessation of vaccination where no longer necessary**
- **Component 2: LSD proof of absence / early detection**

Measures (surveillance /restrictions e.t.c.) to :

- Prove disease absence
- Prevent disease recurrence (e.g. From other affected countries/zones)
- Ensure early detection and timely action in case of disease recurrence or new introduction

Final Goal: "No LSD vaccination - no LSD presence"

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Objectives of an LSD exit strategy

Component 1: Cessation of vaccination where no longer necessary

(Where ? – When ?)

Considerations

- **Last occurrence of LSD in the country/zone (year – location - number of outbreaks)**
- **Vaccine coverage achieved in the past years at national level**
- **Risk due to proximity with other countries/zones that had LSD outbreaks**
  - Geographical location
  - Year of the latest outbreaks in the neighbouring countries

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Objectives of an LSD exit strategy

Component 1: Cessation of vaccination where no longer necessary

Possible Methods:

- **Gradually stop all over the country or zone**
  e.g. Annual vaccination /revaccination of certain categories of animals only (e.g. newborn calves, on newly introduced, unvaccinated animals).

- **Completely stop in certain zones while vaccination continues in the LSD high risk areas of the country**
  Easier to implement , addresses possible risks of new introduction.

- **Completely stop all over the country**
  Easiest to implement, but does not fully address risks of new introduction especially if there are specific high risk areas, increased surveillance requirements, best for restoration of status all over the country.

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Objectives of an LSD exit strategy

Component 2: LSD proof of absence / early detection (A)

(What type of surveillance ?)

Considerations (A)

Purpose of surveillance

- Surveillance to prove LSD absence in previously affected areas
- Surveillance for early LSD detection in high risk areas

Diagnostic methods

- Specificity – Sensitivity of tests
- Limitations , e.g.
  - How reliable – effective is clinical inspection in field conditions ?
  - When is the onset of antibodies and how long it will last after LSD infection ?
  - When is the onset of PCR positive (e.g. in blood or skin e.t.c.) and how long will it last after LSD infection ?

LSD vaccination in the previous years

South East Europe: Annual vaccination campaigns in all LSD affected countries in 2016-2017-2018

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Objectives of an LSD exit strategy

Component 2: LSD proof of absence / early detection (B)
(What type of surveillance ?)

Considerations

Surveillance scheme

- Active - Passive
- Clinical - Virological (PCR) – Serological
- All year round – seasonal
- Sampling: representative/ random, targeted to specific types of sentinels ?

LSD seasonality

South East Europe: from ***April*** until ***October/November***

Capacity of the veterinary services (field/lab) to:

- Conduct visits for clinical inspections/samplings
- Perform lab tests (e.g. PCR or serology)
- Keep quality records of all relevant data

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Proposed scheme for cease of LSD vaccination

Countries with vaccine coverage of *90% or more for at least 2 years*

Stop vaccination all over the country (+ passive and active surveillance)

or

Stop vaccination all over the country except for the high risk areas (+ passive and active surveillance)

or

Continue vaccination all over the country (+ passive surveillance + active surv. in high risk areas)

Countries without vaccine coverage of *90% or more for at least 2 years*

Continue vaccination all over the country until full vaccine coverage has been achieved for 2 years or risk disappears (+passive surveillance + active surv. in high risk areas)

A practical approach for LSD affected countries: consider cease of LSD vaccination after 2 consecutive years of LSD absence + full vaccine coverage

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Proposed scheme for LSD surveillance (A)

Passive surveillance
in place everywhere , in all countries , throughout the year

Report of all clinical suspicions to competent authoritie

↓

Sampling

↓

Lab testing (PCR from lesions) to confirm or rule out suspicions
(KEEP RECORDS OF ALL SUSPICIONS INVESTIGATED)

AWARENESS OF ALL STAKEHOLDERS
(VETERINARIANS - FARMERS – ANIMAL WORKERS
SLAUGHTERHOUSES –ANIMAL MARKETS (e.t.c.)

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Proposed scheme for LSD surveillance (B)

ACTIVE SURVEILLANCE

Clinical surveillance *(visits to holdings and clinical examination)*
EFSA Model : 2-3 thousands of holdings (to detect prevalence 0,0045%) about 1ce per month (or every 5 weeks) from April to October . For early LSD detection in high risk areas.

Proposal : *Clinical Visits in 500-600 holdings (to detect prevalence 0,5%) , 2-3 times in total , from April to October (e.g. at the beginning , the middle and the end of the high risk period). Sampling and testing (PCR) of any suspect animal detected during the visits.*
Intensive (active) clinical surveillance in slaughterhouses – animal markets.

Serological surveillance (on non immune animals , **ELISA** more practical than VNT)
EFSA Model : 1 sampling , preferably at the end of the high risk season to detect a prevalence of 3,5 % . For proof of absence of virus circulation after vaccination stops

Proposal : Sampling of non immune animals , 2ce during the high risk period , after cease of vaccination , to serve both proof of absence and early detection

- **1st sampling** around the middle of the high risk period e.g. July-August (~ appearance of first non immune calves)
- **2nd sampling** after the end of the high risk period (e.g. October or November) assuming that abs take about a month to appear and last for at least 5 months

Virological surveillance (PCR e.g. on lesions)
EFSA: More relevant for testing of clinical suspicions

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Proposed scheme for LSD surveillance (C)

PROPOSED SURVEILLANCE

Active surveillance : Clinical visits Sampling of suspicions (PCR)

Active surveillance : Serological testing of non immune animals *(e.g. 5 per holding)*

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			HIGH RISK PERIOD FOR LSD								

Passive surveillance : investigation /testing of all clinical suspicions reported , all-year –round, FARMS, SLAUGHTERHOUSES – ANIMAL MARKETS e.t.c.

Proposed (minimum) scheme for LSD surveillance *(countries where LSD has occurred)*

Areas not in the "high risk zone"

- **Vaccination Continues** → **Passive surveillance**
- **Vaccination Stops** → **Passive surveillance**
  Active surveillance (serological)

Areas within the "high risk zone" [close to countries with LSD outbreaks within the last 1 year, *zone of 80 km from border according to EFSA]*

- **Vaccination Continues** → **Passive surveillance**
  Active surveillance (clinical visits)
- **Vaccination Stops** → **Passive surveillance**
  Active surveillance (clinical + serological)

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Concluding remarks

Any LSD exit strategy in SE Europe should address at least 2 issues :

- The **continuation or cease of LSD vaccination** in that area/country
- The **implementation of the appropriate LSD surveillance** scheme to:
  - Prove disease absence
  - Ensure early disease detection , especially in high risk areas
- When deciding on the **continuation or not of LSD vaccination** in a country or area, consideration must be given to the *history of LSD occurrence* in that country/zone, the *vaccination coverage achieved over the past years* as well as *the epidemiological situation in neighbouring countries.*
- When deciding on the **appropriate LSD surveillance scheme** to be implemented in a country/area consideration must be given to the *continuation or not of LSD vaccination*, the *seasonality of LSD*, the *potentials and limitations of the existing laboratory tests*, the *capacity of the competent authorities* as well as the *epidemiological situation in neighbouring countries/zones.*

THANK YOU !!!!