1. Introduction for LSD

2. Control measures - emergency vaccination and LSD vaccines

3. Requirements to emergency vaccination programmes

4. Experiences gained from implementation of emergency vaccination programmes

6. Challenges and restrictions
Introduction

- Capripoxvirus-genus within the Poxviridae-family), other members of the genus are Sheeppox virus and Goatpox virus
- Characterized by fever, nodules on the skin, and it may lead to severe production losses;
- Vector-borne LSD;
- Difficult to eradicate without vaccination
- Stable virus, survives well in the environment such as wintertime and drought
- Most disinfectants are effective but disinfection of the environment is difficult as the virus remains well protected inside scabs shed by infected animals;
- Substantial economic impact – direct and indirect cost
Geographical spread
LSD epidemiological situation January - Dec 2015
(ADNS + country reports)

- Greece: 117 (Aug-Dec 2015)

Greece: 1st occurrence of LSD

Greece Aug 2015,

LSD outbreaks in SE Europe (Jan – Dec 2015)

LSD outbreaks
01.01-31.12.2016 (ADNS)
LSD epidemiological situation January - Dec 2016 (ADNS + country reports)

- **Greece**: 104 (ADNS) (last on Nov 2016)
- **Bulgaria**: 217 (ADNS) (last on Aug 2016)
- **FYROM**: 1.591 (Sep. report)
- **Serbia**: 225 (ADNS) (last on Oct 2016)
- **Kosovo**: 1.415 (EFSA report)
- **Montenegro**: 436 (EFSA rep.)
- **Albania**: 3.647 (EFSA report)

( * This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence).
LSD epidemiological situation January - 30 Sep 2017 (ADNS + country reports)

- **Albania**: 494 (ADNS, 160 with a suspicion date in 2017)
- **Greece**: 2 (ADNS)
- **FYROM**: 4 (ADNS)

**LSD outbreaks in SE Europe (Jan – Sep 2017)**

Map by European Commission
LSD control strategies

- Stamping-out policy (total or partial) of the affected herds;
- VACCINATION (only live attenuated vaccines);
- Movement restrictions;
- Vector control
Vaccines against LSDV

- **Commercial available** - Only live vaccines currently available against LSDV, no DIVA – none of them authorised for use within the European Union:
  
  sheep pox strain (RM-65) at usual dose;
  sheep pox strain (RM-65) 10-times dose;
  Homologous strain (Neethling) LSDV-based.

- Superiority of live attenuated vaccines compared to the killed ones;
- A replicating poxvirus generates better immunity than inactivated vaccines.
Choosing a vaccine against LSD

- Only vaccines with demonstrated efficacy should be used – vaccine challenge experiment at CODA CERVA;

- Live attenuated LSDV containing vaccine provides best protection;

- Protection provided by attenuated SPPV vaccines is not as good for LSDV;

- Other appropriate control measures such as movement restrictions are in place.
LSD vaccines on the market

**LSDV vaccines:**
- LSDV Neethling strain by Onderstepoort Biological Products (OBP)
- Attenuated LSDV field strain Lumpyvax by MSD Animal Health (South-Africa)
- Bovivax (MCI, Morocco + Huvepharma, Hungary)

**Sheeppox virus (SPPV) vaccines against LSDV:**
- Yugoslavian RM65 SPPV vaccine (at a 10 times stronger dose than used for sheep) is commonly used for cattle in the Middle East
- Romanian SPPV vaccine for cattle in Egypt
- Bakirköy SPPV (3 times sheep dose) used in cattle in Turkey

**Gorgan goatpox vaccine (Lumpyshield, Jovac, Jordan)**

Confusing exception: Kenyan SGPV O-240 and 180 strains are used for cattle in some African countries - despite the name these strains are LSDV
Requirements for vaccination programme

✓ Regional vaccinations preferred over ring-vaccination (radius > 50 km diameter);

✓ Annual vaccinations with >80% vaccination coverage (all animals), at least three consecutive years;

✓ All animals are vaccinated including pregnant females and young calves;

✓ New animals should be immunized before introduction to affected farms;

✓ Calves from vaccinated mothers should be immunized at the age of 4 months – individually;

✓ Domestic buffaloes should be vaccinated as well
Adverse reactions

 ✓ Attenuated LSDV vaccines may cause a general reaction in a minority of vaccinated animals (Neethling disease).
Technical specification for LSD Vaccine

✓ to have live, attenuated, homologous strain of LSDV;

✓ to provide immunity against LSD;

✓ to be sterile, safe and effective;

✓ to be applicable for bovines of all ages the expiry date of the batch;

✓ to be at least 12 months since the production date;

✓ to be produced in accordance with the OIE Diagnostic manual;

✓ the leaflet for use to have text in the language of the country where vaccination is to be applied.
Vaccination against LSDV

The best is to vaccinate before the start of the vector activity

Subcutaneous application of the vaccine in accordance with the instructions from the manufacturer

- In non previously vaccinated herds - Vaccination of bovines of all ages
- Vaccination of calves from previously vaccinated mothers 3 - 4 months of age
- Annual vaccination (at least three years)
Storage of vaccine

- The vaccine must be stored at 2°C - 8°C;
- Temperature must be recorded with calibrated thermometer twice a day (once in the morning and once in the afternoon);
- Once the bottle is opened the vaccine must be used the same day;
Vaccination against the diseases listed in Annex I may not be carried out except as a supplement to control measures taken when the disease in question broke out, in accordance with the following provisions: 

- **the decision to introduce vaccination as a supplement to control measures shall be taken by the Commission, in cooperation with the Member State concerned**
No veterinary medicinal product may be placed on the market of a Member State unless a marketing authorization has been issued by the competent authorities of that Member State in accordance with this Directive or a marketing authorization has been granted in accordance with Regulation (EEC) No 2309/93.
LSD vaccination in SE Europe 2015-2017

2015
• LSD vaccination in the North – Eastern Provinces of Greece

2016
• All LSD affected countries (Greece, Bulgaria, the former Yugoslav Republic of Macedonia, Serbia, Kosovo*, Albania, Montenegro) implemented mass vaccination of all their cattle against LSD in their entire territory.
• Croatia, not affected by LSD, became the 1st country to implement preventive vaccination of its entire country population against LSD (August 2016)

2017
• All countries in SE Europe that vaccinated against LSD in 2016 repeat vaccination in 2017 (annual revaccination + vaccination of newborn animals);
• Bosnia and Herzegovina, not affected by LSD, began implementing preventive vaccination against LSD since 2017 (2nd country to implement preventive vaccination after Croatia).
In all cases the vaccines used in the above countries were live, homologous vaccines against LSD imported from outside the EU.

In most cases occurrence of new LSD outbreaks in affected countries as above stopped within 1 month following proper completion of their vaccination campaign.
Andrey Gogin; Alessandro Broglia; Representatives from veterinary services of Albania, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Greece, Kosovo*, Montenegro, Serbia and Turkey
Two weeks after completion of vaccination no new outbreaks in the vaccination area.
Restrictions in EU

LSD zoning (Dec. 2016/2008)

☑ movement allowed under conditions
Vaccination – a tool for disease control

Types:
- Emergency
- Preventive
- Prophylactic

Advantages
- Successful tool to prevent stop and control disease spread;

Disadvantages
- Cost;
- Trade restrictions;
- Adverse reactions;
- Free status

Take home messages........
Take home messages

✓ Vaccination is found to be the only effective means to reduce the spread of LSD;
✓ No single country eradicate LSD without vaccination
✓ Calculation of all direct and indirect costs for all the different control strategies for different scenarios and the consequences;
✓ Finalized tender procedure/contract for immediately supply of all vaccine needed or vaccine bank available;
✓ Preventive vaccination or emergency vaccination immediately after the first outbreaks
THANK YOU
FOR YOUR ATTENTION

ALEKSANDRA MITEVA

Animal Health & Welfare
Bulgarian Food Safety Agency