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Lumpy skin diseaseLSD –
Indirect protection

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Нодулярный Дерматит (LSD)
Неспецифическая профилактика заболевания

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Профилактика заболевания с помощью прерывания путей передачи вируса кровососущими насекомыми

Роль членистоногих в передаче вируса нодулярного дерматита

Timeline/timeframe

Role of vector control

Direct & Indirect protection

- **Blocks transmission**

Reduce vector population

=Reduce biting

= Reduce transmission

LSD- Role of vectors

- Little is known about the importance of different arthropod vectors for LSDV in the field.
- So far, there is **no evidence of biological arthropod vectors for LSDV**.
- Circumstantial evidence suggests that LSDV **can be mechanically transmitted** by a variety of blood-feeding vectors.

LSD- Role of vectors

Mechanical mode of transmission=

The virus is transmitted via contaminated mouth parts of vectors **without actual replication of the virus** in arthropod cells or tissues.

LSD- Role of vectors

- **Mechanical transmission** of LSDV has been experimentally demonstrated to occur by:
- ✓ *Aedes aegypti* mosquito (Chihota et al., 2001)
- ✓ *Rhipicephalus appendiculatus* male ticks (Tuppurainen et al., 2013a)
- Experimentally *Rhipicephalus (Boophilus) decoloratus* was able to transmit the virus via eggs to larvae which infected susceptible animal – doesn't mean that virus necessarily multiplies in ticks - contamination of the environment may occur
- ✓ Birds?

LSD- Role of vectors

- Another relevant nematocera tested for LSDV transmission was *Culicoides nubeculosus*, with **unsuccessful results** (Chihota et al., 2003).

LSD- Role of vectors

- In Israel, the stable fly (*Stomoxys calcitrans* - *Осенняя жигалка*) is considered as the most important vector candidate (Muller et al., 2011), but an experimental attempt to transmit the virus between cattle by *Stomoxys* flies failed (Chihota et al., 2003).
- The role of the horn fly (*Haematobia irritans*), which was highly abundant on beef cattle during the 2012–2013 outbreaks in northern Israel, needs to be investigated.

Pest control

Reduce vector population

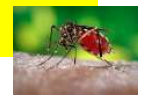
=Reduce biting

= Reduce transmission

Pest control

Cover the animal corpse after using repellent-containing insecticides.

Борьба с вредителями



Pest control

- Use of insecticides on animal
- Use of insecticides to control vectors in the environment.

Diptera control

- **<u>In the environment (dairy farms):</u>**

✓ Use ***neonicotinoids*** once a month around dairy farm compounds.

✓ After cleaning the farm and the disposal of animal wastes- disinfection of the soil with both neonicotinoids **and IGRs** (insect growth regulator - to prevent larval growth).

✓ Spraying animal wastes with IGRs before clearing it from the farm.

✓ Biological control- use of parasitic wasps to reduce flies in the dairy farms.

Diptera control

- **<u>On the animals:</u>**

✓Spraying the animals with both ***Permethrin*** and its synergistic ***Piperonyl Butoxide*** on both back and the belly of the animals.



Ticks control

- **<u>For cattle</u>**:
- Spraying the animals with **Amitraz** on both back and the belly of the animals.
- Administrating ***Ivermectin*** to the animals.

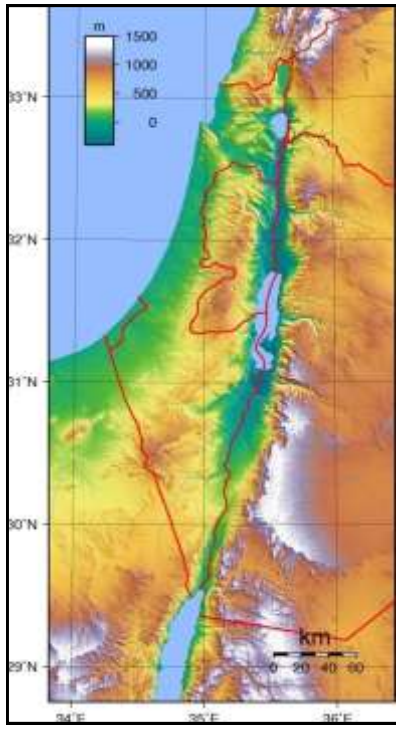
Transmission- know & don't know

- More than one vector ?
- Varies in region, season, housing type
- Slow spreading (vs Ephemeral fever BEF)
- With and without cattle movement
- No effective insect control
- Cattle movement: legal (un dx) & illegal

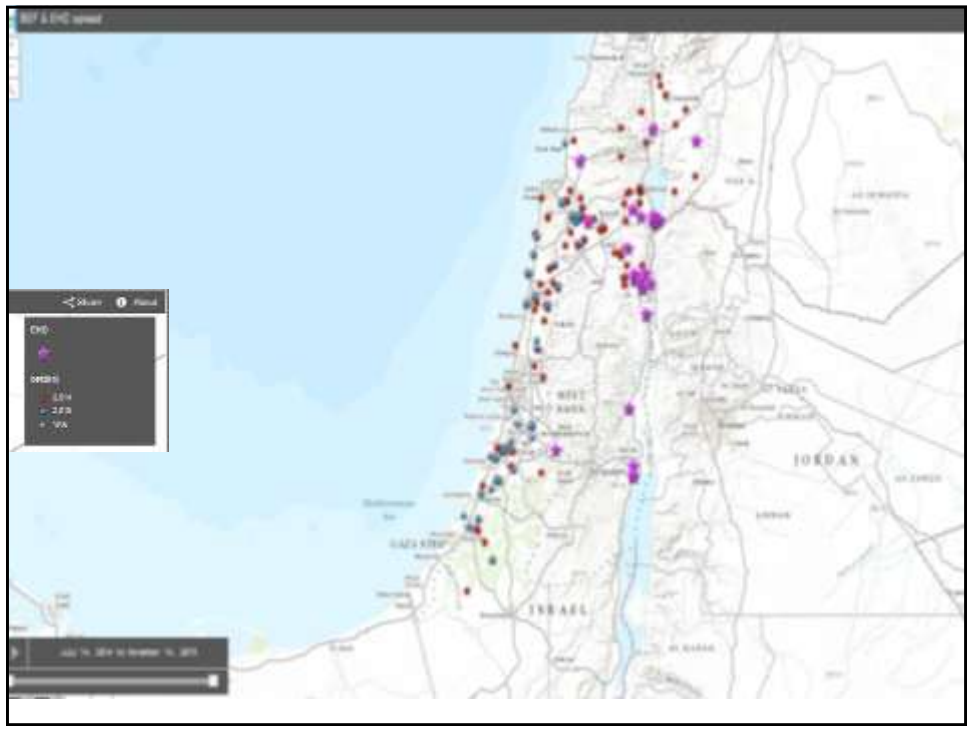
(Transit permit is required prior to moving)

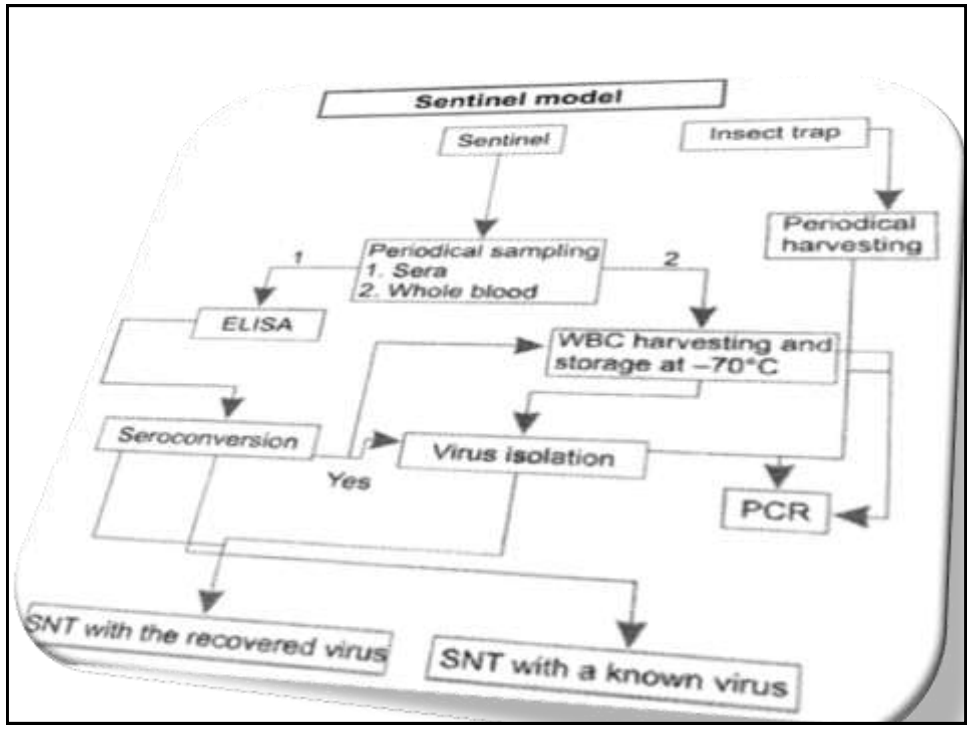
Diverse climate

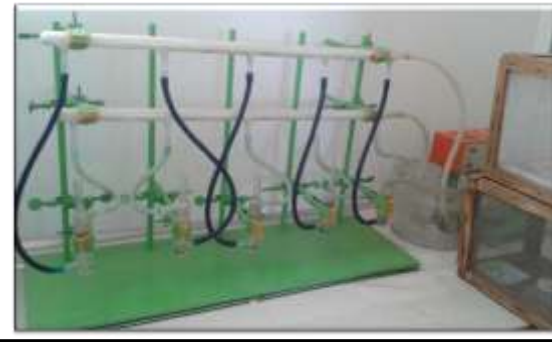
Long summer short winter



- 50% Desert
- Coast densely populated
- Altitude: -390- +2,200 m
- Mediterranean climate
- Temp: Jan. 4-21 C
  Aug. 29- 39 C
- Humidity: 20%- 80%
- Rainfall: 20-1000 mm
- Limited water




Sentinel model
Sentinel
Insect trap
Periodical harvesting
Periodical sampling
1. Sera
2. Whole blood
1
2
ELISA
WBC harvesting and storage at –70°C
Seroconversion
Yes
Virus isolation
PCR
SNT with the recovered virus
SNT with a known virus



Thank you for your attention !

Any questions?