“CAMENET and steering committee“

November Session

Santo Caracappa & Guido R. Loria

Istituto Zooprofilattico Sperimentale della Sicilia

13th - 16th November 2017 – Al Ain-UAE

World Organisation for Animal Health

- l'Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta
- Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna «Bruno Umbertini»
- Istituto Zooprofilattico Sperimentale Lazio e Toscana M. Aleandri
- Istituto Zooprofilattico Sperimentale delle Venezie
- Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata
- Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise
- «G. Caporale»
- Istituto Zooprofilattico Sperimentale Umbria e Marche
- Istituto Zooprofilattico Sperimentale della Sardegna «G. Pegreffi»
- Istituto Zooprofilattico Sperimentale del Mezzogiorno
- Istituto Zooprofilattico Sperimentale della Sicilia «A. Mirri»

SICILY

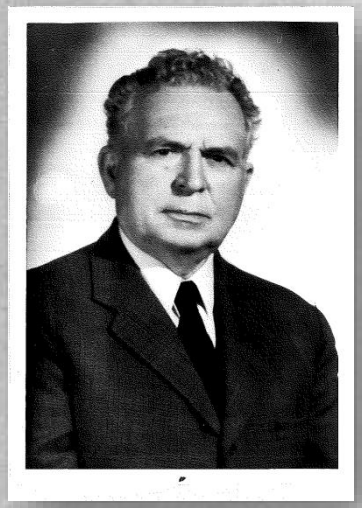
25.711 Km² - 1.637 km coastal extension

500.000 cattle
1.000.000 small ruminants
5.000.000 poultry
30.000 horses

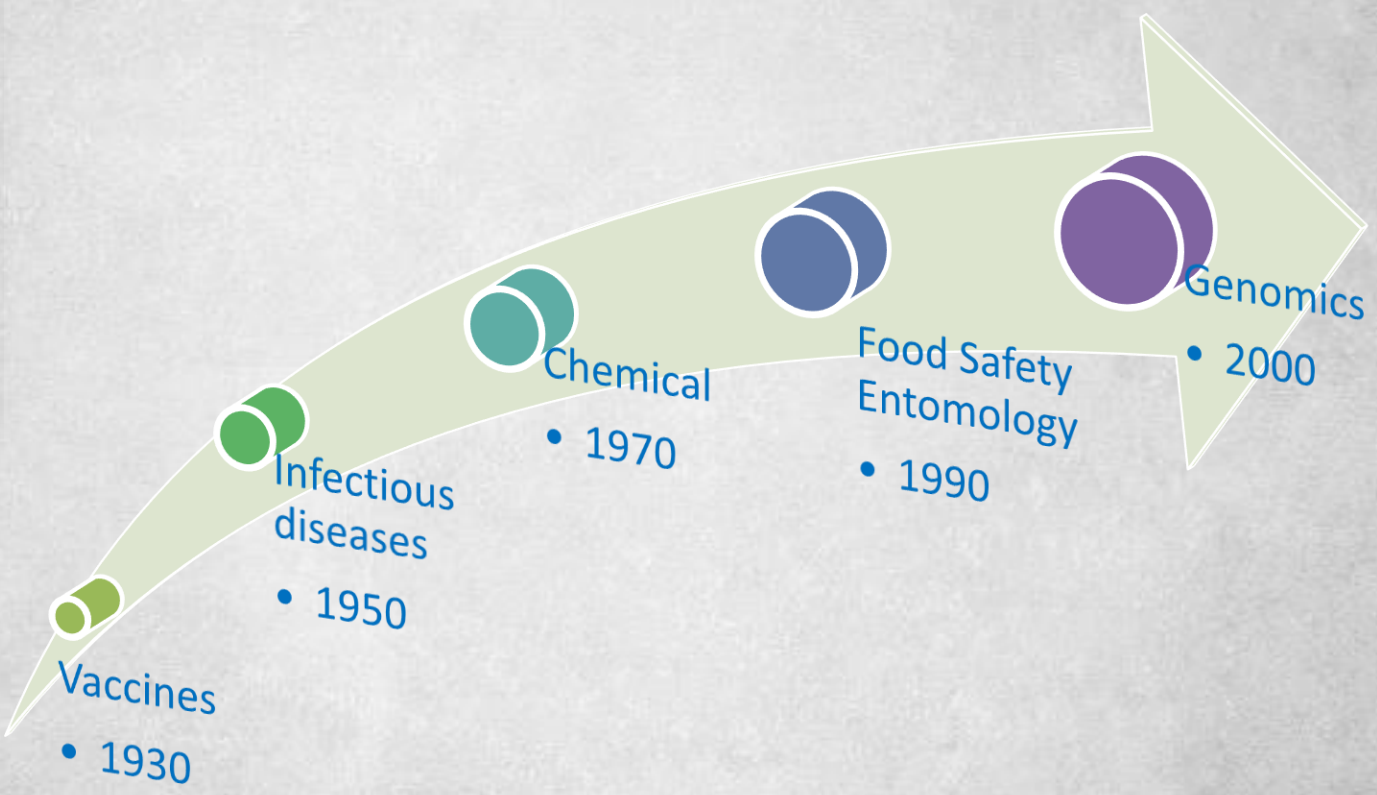
1.000.000 test/ year

History of IZS of Sicily

«Experimental Stations for infectious diseases of livestock»



IZSSi - Prof. A. Mirri (1930-1970)



Scientific activities

Staff	
Senior Veterinary managers	37
Veterinary and Biologist Managers	17
Laboratory technicians	88
Administrative assistants	75
Techinical role	80

Collaborations:

Italian Univerisities
ISS
IRCCS
International Research Centers

Research activity:

Progetti di Ricerca Corrente
Progetti di Ricerca Finalizzata (National funding)
Progetti PON, PRIN, etc. (International projects)

Transboundary projects

Impact Factors 2012-2014

I. F. ***466,9***

IZS Sicilia: Reference Centers

National Reference Centers are excellences for the whole National Health System.

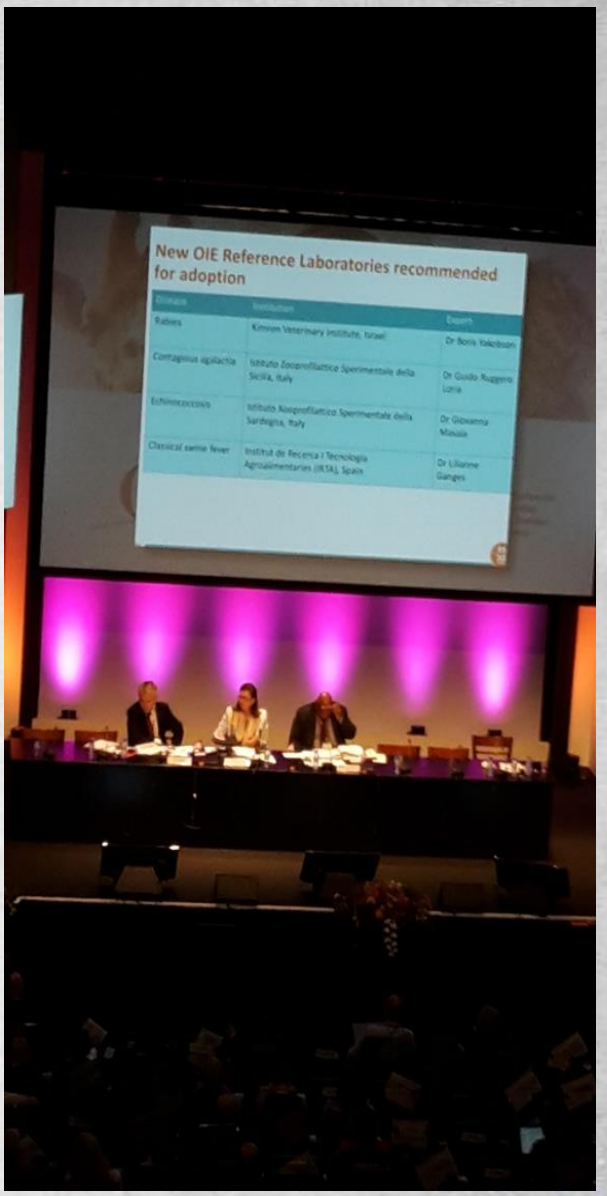
- **C.R.A.Ba.R.T.** National Reference Center for Anaplasma, Babesia, Rickettsia and Theileria
- **C.Re.Na.L.** National Reference Center for Leishmaniosis
- **Ce.Tox.** National Reference Center for Toxoplasmosis
- **C.Re.N.A.** National Reference Center for Anisakiasis

National Reference Center for Rescue and Monitoring of sea turtles and cetaceans.

OIE Reference Laboratories for:

- ✓ **Leishmaniosis**
- ✓ **Babesiosis**
- ✓ **Theileriosis**
- ✓ **Biobank**

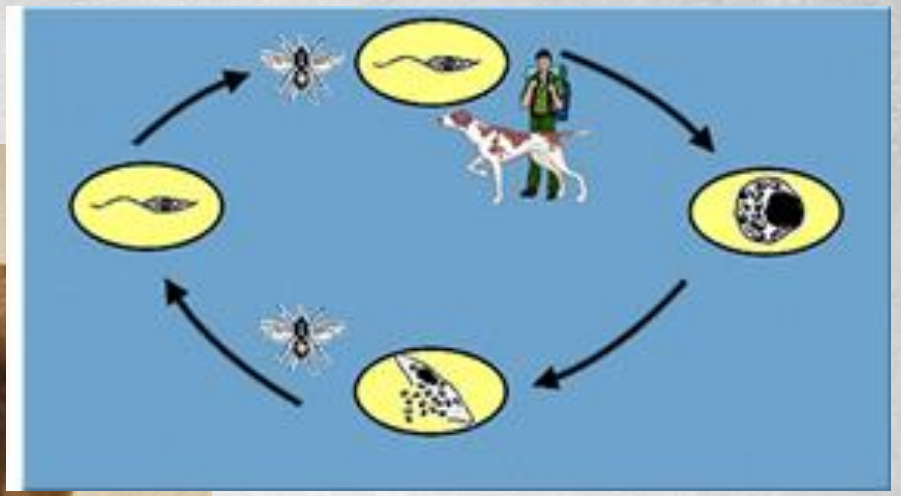
WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future



World Organisation for Animal Health

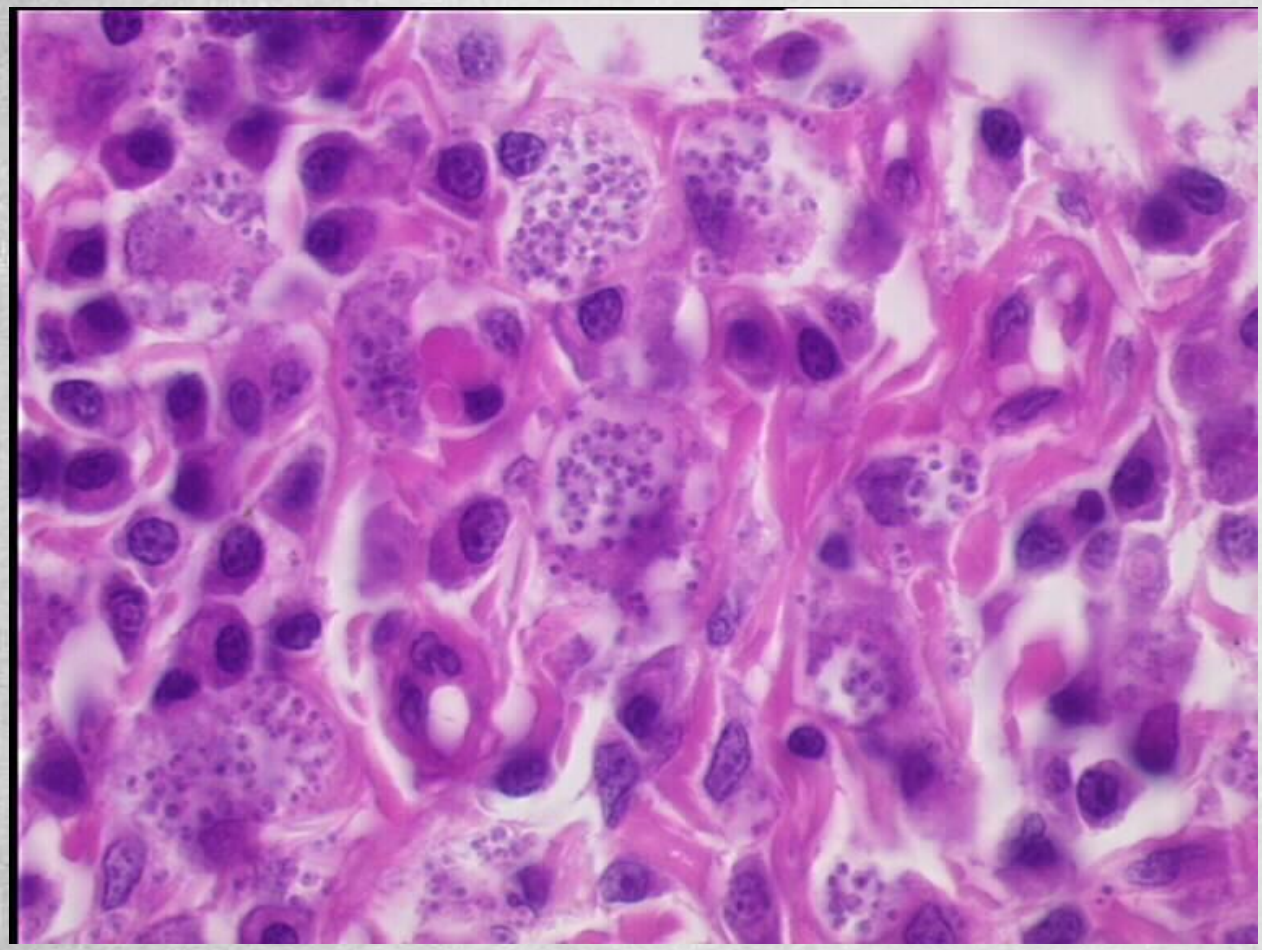
Endemic diseases (companion animals)

Leishmaniosi



Leishmaniosis clinical signs

The protozoan

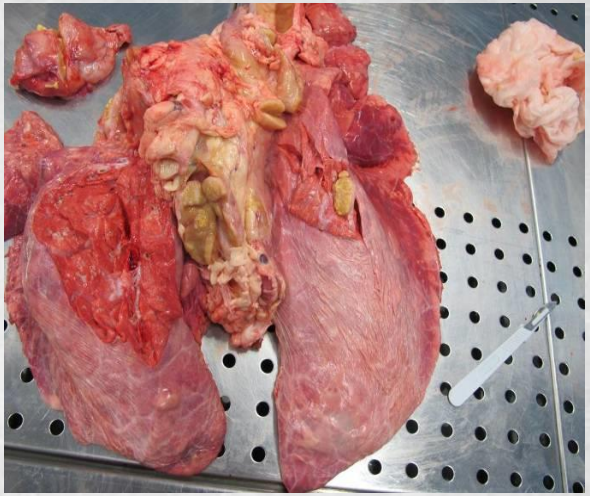


Endemic diseases
Livestock

Risk factors of Mediterranean Livestock (Foglini 1997)

Extensive management
Common grazing
Dairy breeds
Prolonged lactations
Manual milking
Mixed flocks - herds
Uncontrolled trades

Bovine TB

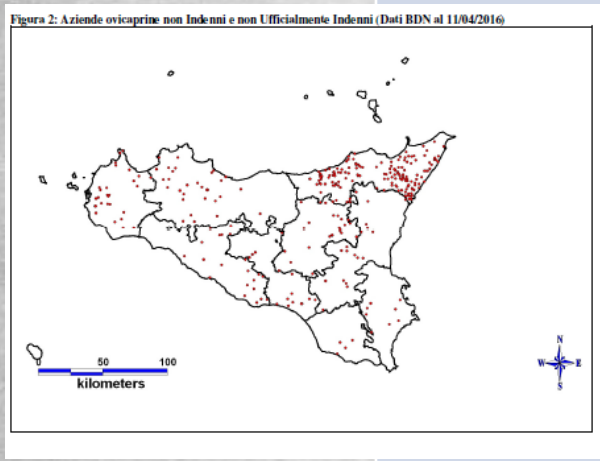


Brucellosis

Ram of Belice Valley breed

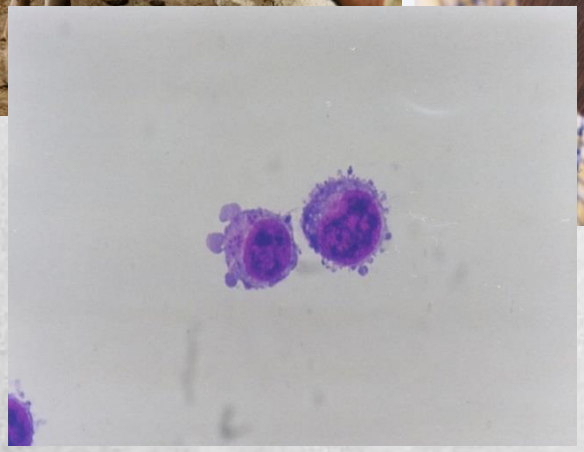
Brucella strains circulating in the region

year	B. species	Origin	N° outb.	Tot.
2013	B. MELITENSIS 3	OVINA-BOVINA-CAPRINA	58 + 8 + 5	71
	B. ABORTUS 3	BOVINA	10	10
2014				
	B. MELITENSIS 3	OVINA-BOVINA-CAPRINA	29 + 2 + 9	40
	B. ABORTUS 3	BOVINA	2	2
2015	B. MELITENSIS 3	OVINA-BOVINA-CAPRINA	20 + 3 + 3	26
	B. ABORTUS 3	BOVINA	17	17
	B. REV 1	OVINA	1	1
	B. OVIS	OVINA	3	3

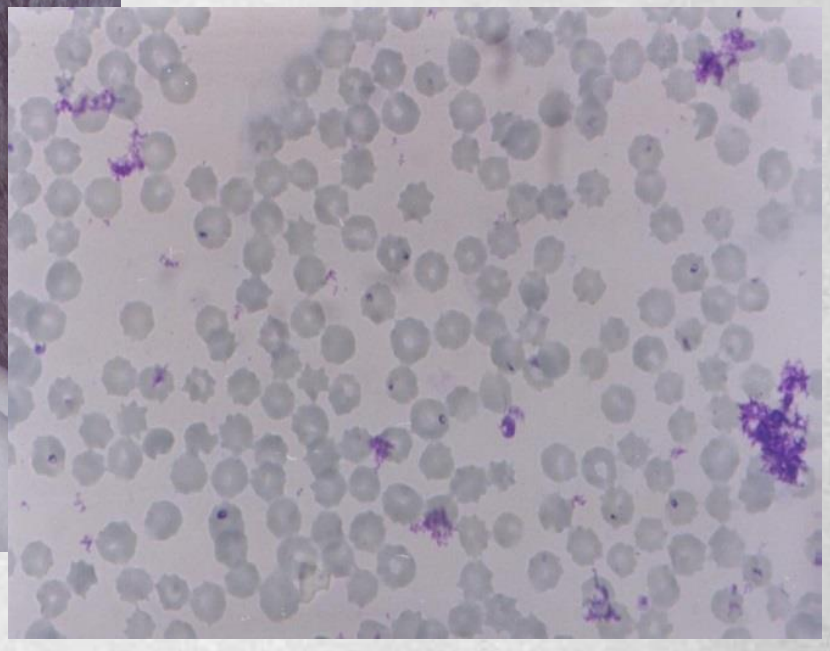


B.ovis

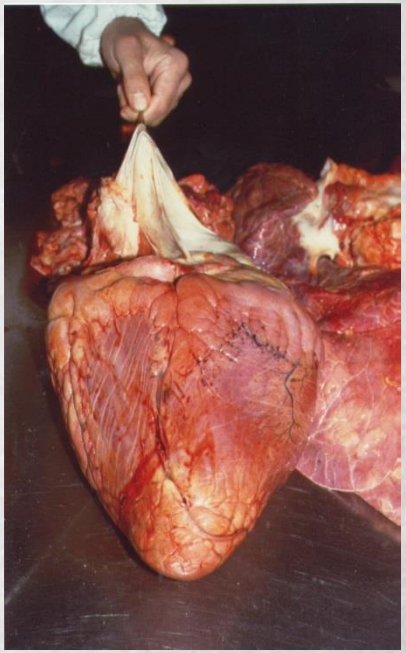
Theileriosis (*Theileria annulata*)



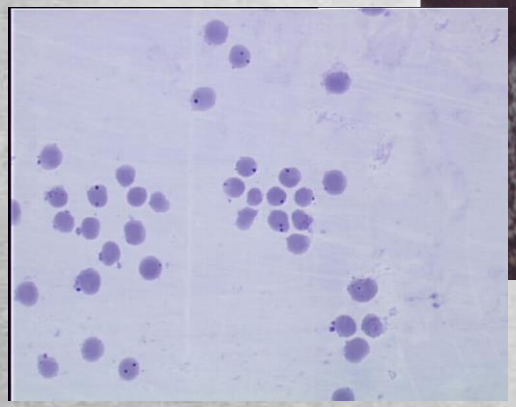
Theileriosis



Babesiosis



Anaplasmosis



Importance of vectors monitoring

Disease caused by vectors

Diseases caused by arthropods (protozoa, bacteria, virus, worms) are a Public Health problem.

For the onset and the spread of this disease, it's important the simultaneous presence of:

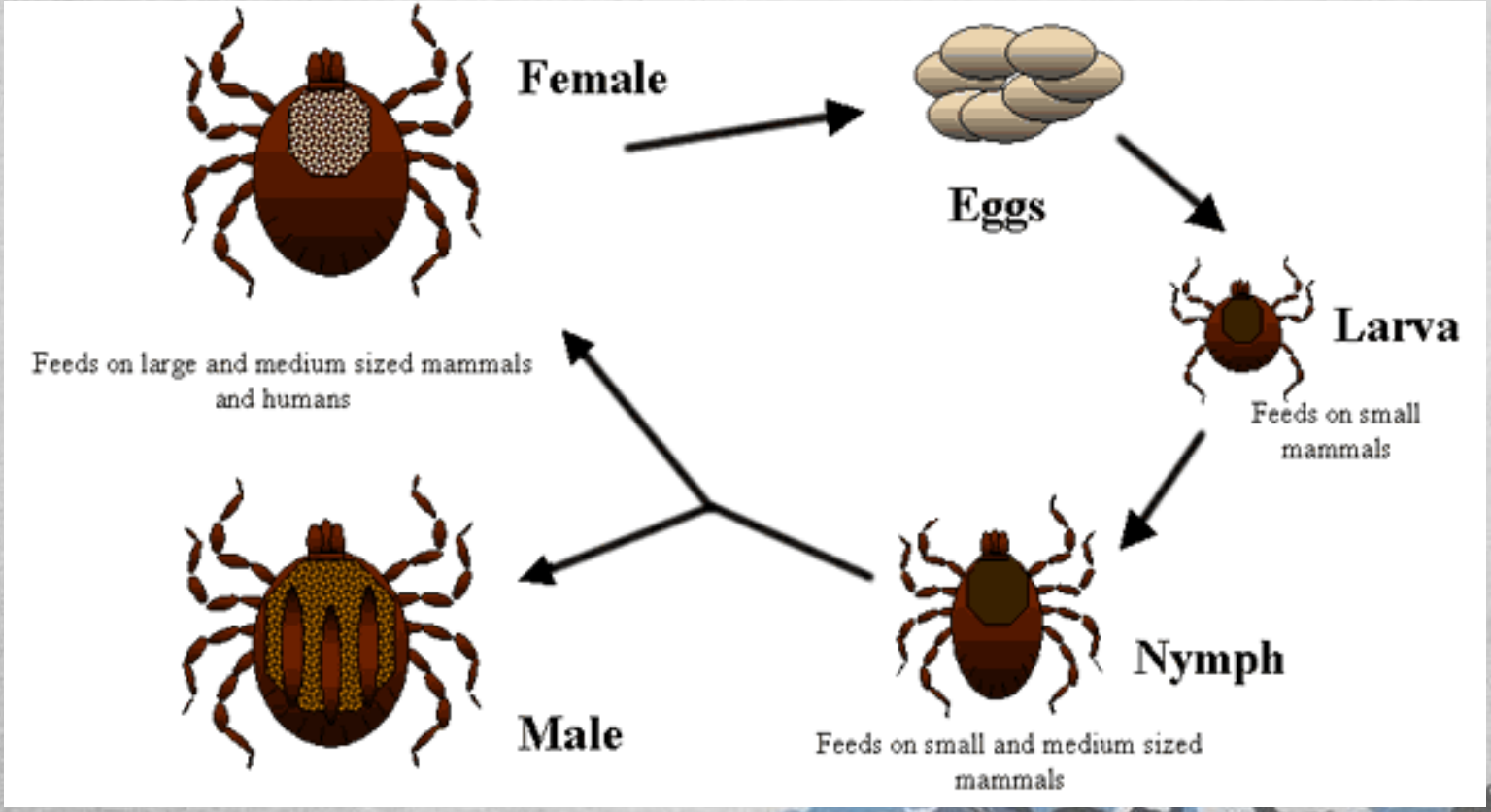
- **Etiologic Agent**
- **Vector**
- **Susceptible animal**

To control diseases caused by vectors, we have to consider 2 factors:

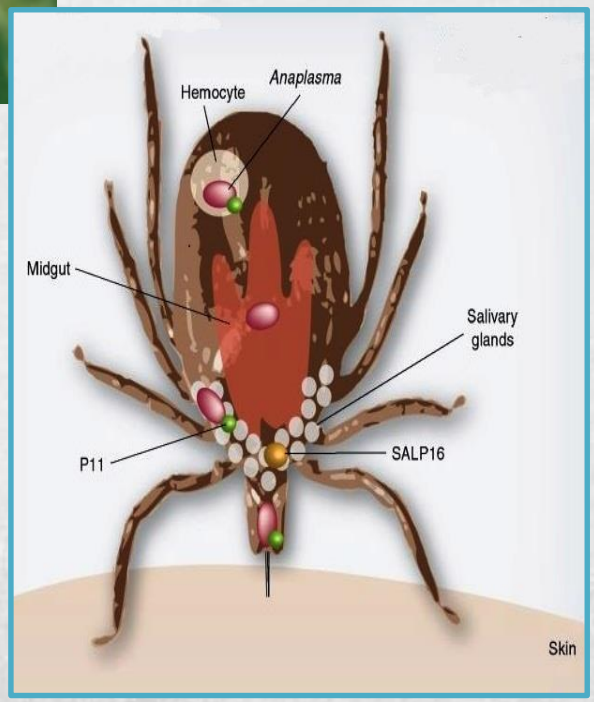
- epidemiology of the etiologic agent
- know vector biology and its spreading

TICKS

Ticks (Ixodidae) are ectoparasites, highly specialized, haematophagous, they feed upon mammals, birds, reptiles and amphibious all over the world.



TICKS – vector of pathogenic agents



During blood suction, ticks release toxic and pathogenic agents (if present) to the host.

Protozoa

- *Babesia*
- *Theileria*

Bacteria

- *Anaplasma*
- *Rickettsia*
- *Ehrlichia*
- *Coxiella*
- *Borrelia*

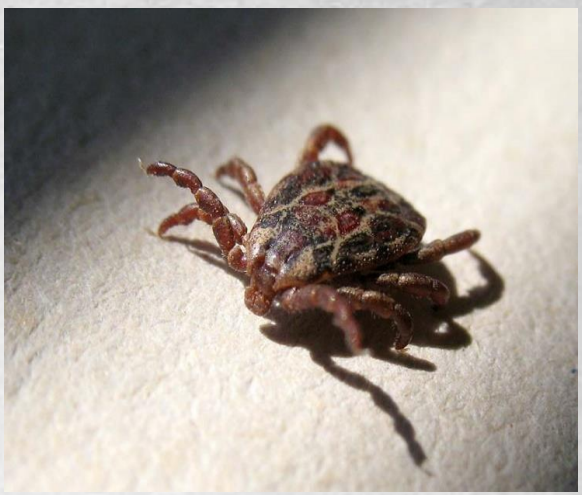
Virus

- TBE

Nematodes

Some of them are zoonotic agents

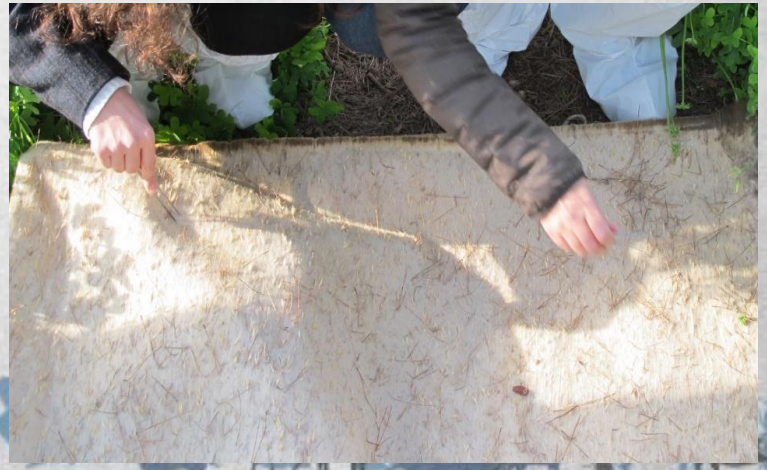
TICKS COLLECTION



DRAGGING SAMPLING

Ticks collection FREE-Living

A piece of whool of $1m^2$ is passed over vegetation for 5 minutes to cover the interested area. If ticks are present, then they stick to the whool and collected.



FLAGGING SAMPLING

Tick collection FREE-Living

A whool-flag is passed over vegetation.

In this way, tick is attracted by movement.

CO_2 TRAPS

Ticks are collected by traps that release dry-ice as source of CO_2.

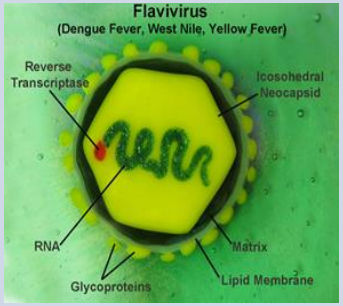
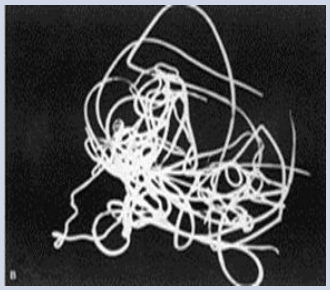
TICKS FROM ANIMALS AND HUMANS

Direct collection from infested animals or humans.

It’s possible to use twezzers to collect ticks form the host.

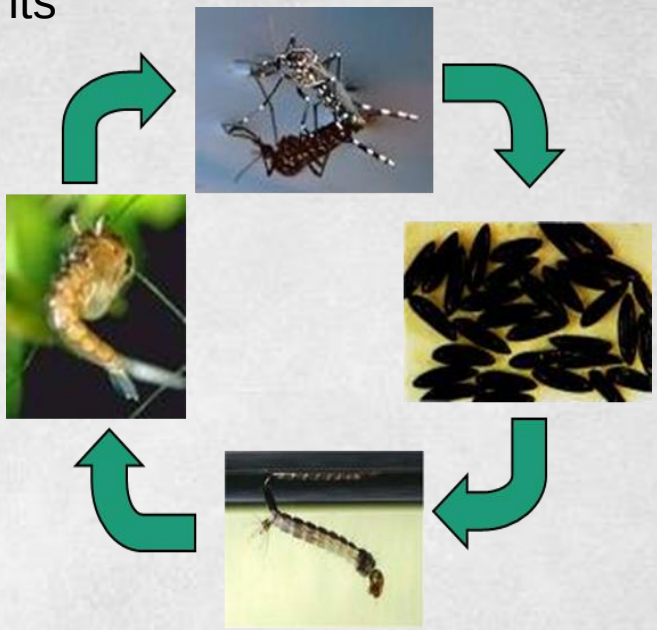
MOSQUITOS

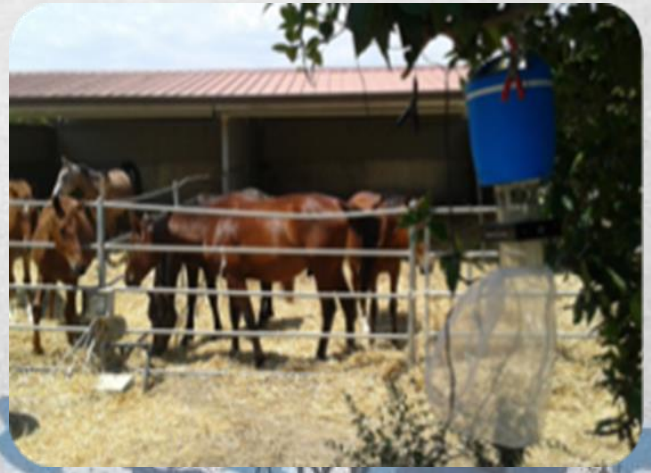
MOSQUITOS – Vector of several pathogens

Vectors		Disease	Pathogenic agent
Culex pipiens		West Nile Disease	
Aedes albopictus		Dengue e Chicungunyia	
Aedes aegypti		Dirofilariosi	
Anopheles		Malaria	

MOSQUITOS COLLECTION

Collection could be managed on different phases of its biological cycle



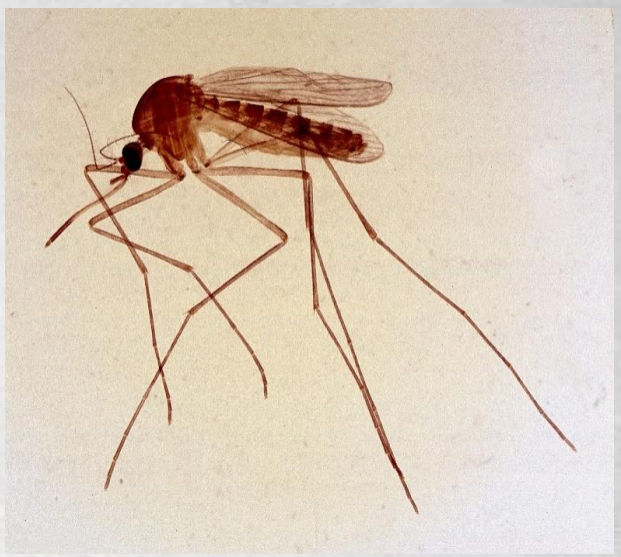


COLLECTION OF ADULT MOSQUITOS

CDC light Trap

WHITE LIGHT

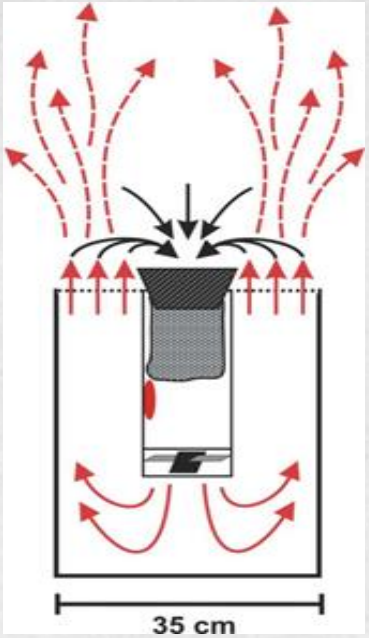
In this way we can collect NOCTURNAL mosquitos



COLLECTION OF ADUL MOSQUITOS

CHEMICAL ATTRACTIVE

BG sentinel Trap



Attractive smell that trap release, is spread in all over the area throgh a gauze that cover the trap. In the center of the gauze, there is a hole in which is insert a black funnel.n In this way, mosquitos are collected in the caption area under the hole. The trap can be located on the ground or on the wall.

Lurex

Collection of DIURNAL AND NOCTURNAL MOSQUITOS

COLLECTION OF ADULT MOSQUITOS

Universal Trap

UV LIGHT + CHEMICAL ATTRACTIVE

Collection of DIURNAL AND NOCTURNAL MOSQUITOS

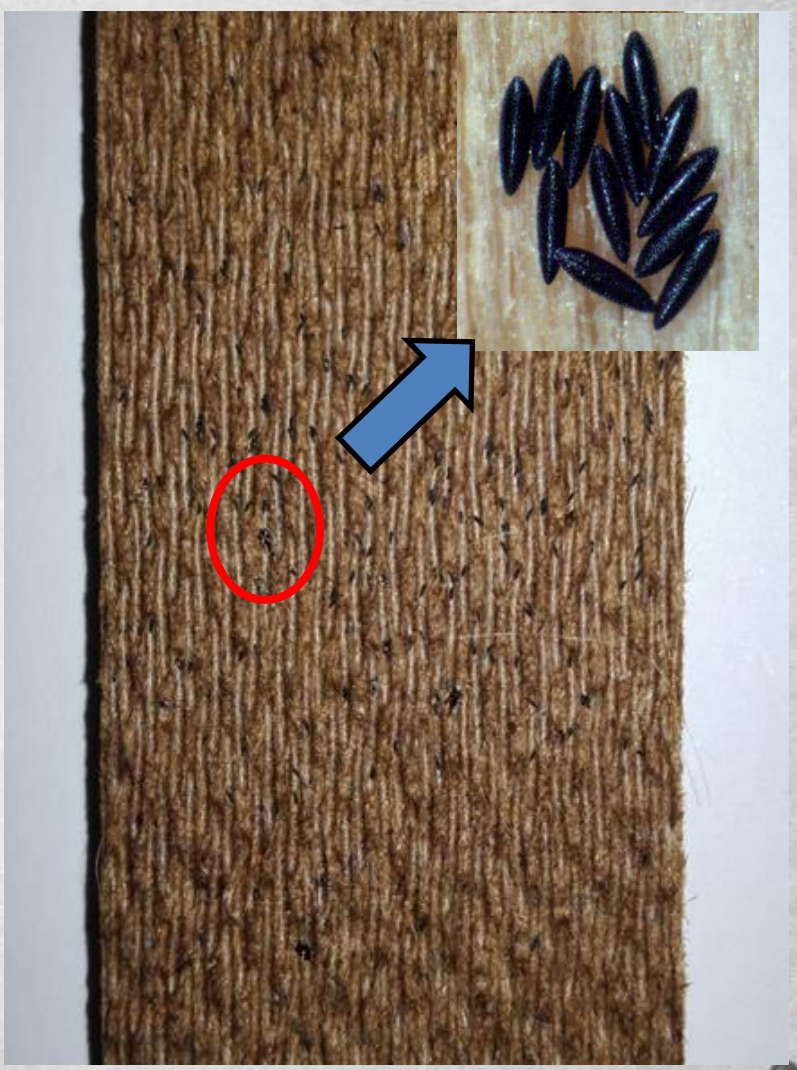
+

Lurex

Very efficient trap, it works with UV light and chemical attractive.

EGGS COLLECTION (*Aedes albopictus)*

MASONITE STIKS WITH ROUGH SURFACE



***Aedes albopictus*, delivers its eggs on a wet surface that is in conctat with water.**

Eggs open when they are submerged by water, such as in a rainy day.

Collection of *CULICOIDES* SPP. and SANDFLIES

Culicoides

Regnum:	*Animalia*
Phylum:	*Arthropoda*
Class:	*Insecta*
Order:	*Diptera*
Family:	*Ceratopogonidae*
Genus:	*Culicoides*

AS VECTORS

- ***BLUETONGUE***
- FILARIASIS (*Onchocerca* e *Dipetalonema*)
- PROTOZOA (*Eucoccida* e *Kinetoplastida*)
- VIRUS

BLUETONGUE - Symptoms

ECOLOGICAL CHARACTERISTICS

- Very active during sunset, sundown and the night
- Low range of action, but they can be carried away by the wind

Sandflies

- **Sandfly** is name for any species or genus of flying, biting, blood sucking Dipteran encountered in sandy areas.

- Taxonomic classification
  - Phylum:Arthropoda
  - Class:Insecta
  - Order:Diptera
  - Family:Psychodidae
  - Subfamily:**Phlebotominae**

- Phlebotominae subfamily contains more than 600 species.

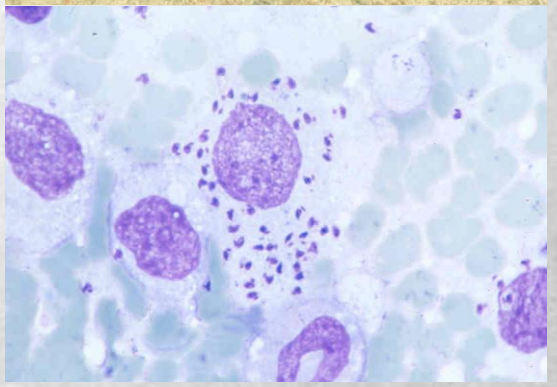
- Important of these are ***P. argetipes,*** *P. papatasii, P. sergenti* and *S. punjabensis*

Health relevance of sandfly

Haematophagous, ectoparasites

Vectors of pathogens (virus, *Bartonella*, *Leishmania*)

Allergic reaction



COLLECTION OF *CULICOIDES* SPP. AND SANDFLIES

Sticky - trap

Adesive bands, with ricinus oil.

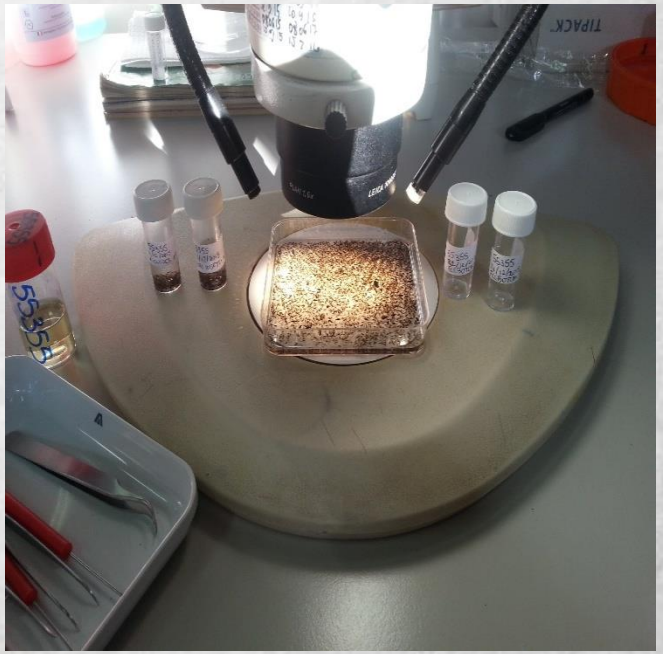
Traps are not attractive but capture mosquitos because they often use to rest on surface during flight.

Traps are located on farms walls and then collected after 2 days.

COLLECTION OF *CULICOIDES* SPP. AND SANDFLIES

Blacklight trap

Ultraviolet light that attracts insects in the trap through a net used as a filter for smaller insects.



Local production

Regional biodiversity (Cattle)

Modicana breed and caciocavallo “ragusano” Italian DOP

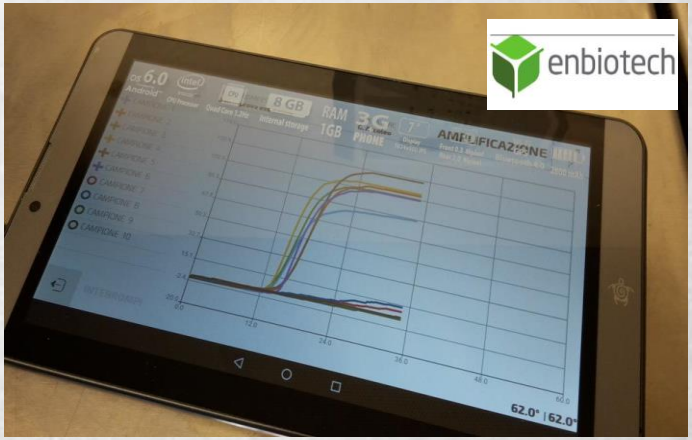
Regional biodiversity (sheep)

Group of Valle del Belice sheep at milking point and pecorino cheese

Regional biodiversity (Goats)

Typical "long horned" Girgentana breed and ricotta cheese "in the oven"

New tests/improvement of methods



In conclusion….

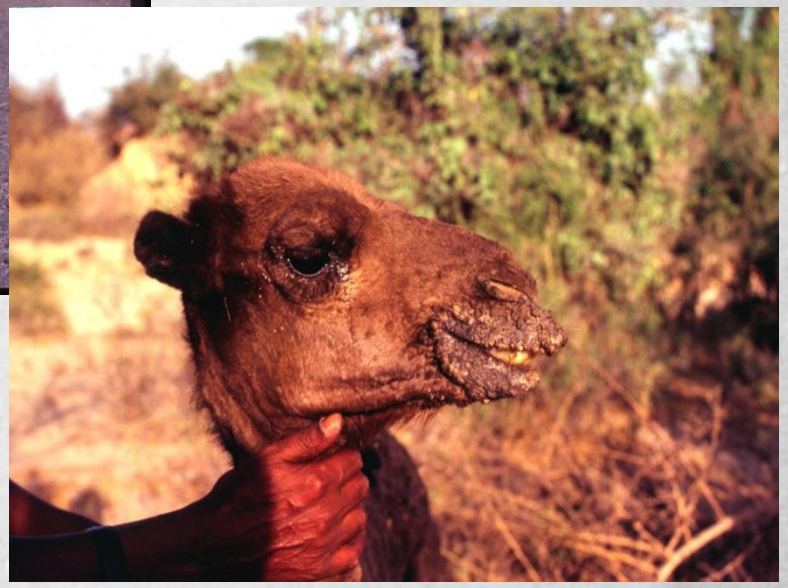
To plan a efficient monitoring activity we need:

- Knowledge of vector ecology and behavior
- Vectors' period of activity
- Susceptible hosts
- Number of hosts
- Biological cycle
- Habitat

The study of vector spread it's important to know risk areas and to control the epidemic evolution

“ADDITIONAL” COMMENTS

- Support the importance of camel husbandry
- Improve laboratory tools for herd screening
- Improve laboratory tools (MLST, Immunoblotting) for traceability of strains and trade certification
- Develop rapid “field test” (Lamp test) for endemic diseases
- Recommend responsible use of Veterinary antibiotics
- Improve the availability of vaccines in at risk/endemic areas



Thank You For Your Attention!