World Organisation for Animal Health

Launch of the Regional AquaticAnimal Health Laboratory Network for Africa (RAAHLN-AF)

5 – 7 December 2023 Pretoria, South Africa

ARC • LNR

UNION AFRICAINE
BUREAU INTERAFRICAIN DES RESSOURCES ANIMALES

FishGov 2 Project

THE EXPERIENCE OF AQUALMA

(Aquaculture company of Unima Group)

Production system based on sustainable approach, & quality; and respecting social & environmental needs







Aqualma (Unima group) operations

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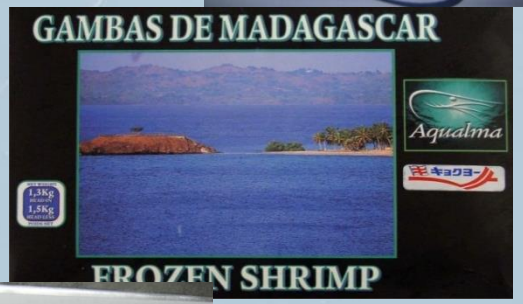
Aqualma Finished Products :

HOSO/Cooked/Peeled
Body Peeled
Skewers
Raw/cooked
Tail on peeled



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Production Process : Fully Integrated

Domestication Center and Broodstock production: Moramba

Hatchery : Moramba

Larval Rearing: Ambatomifoko

Grow-out farms: Mahajamba & Besalampy

Processing plant: Besakoa & Besalampy

Cooking: Besakoa

Aquafeed Mill : Nutrima

Cooking: Unima Frais Boulogne sur mer

Distribution : Unima Europe

Final consumers

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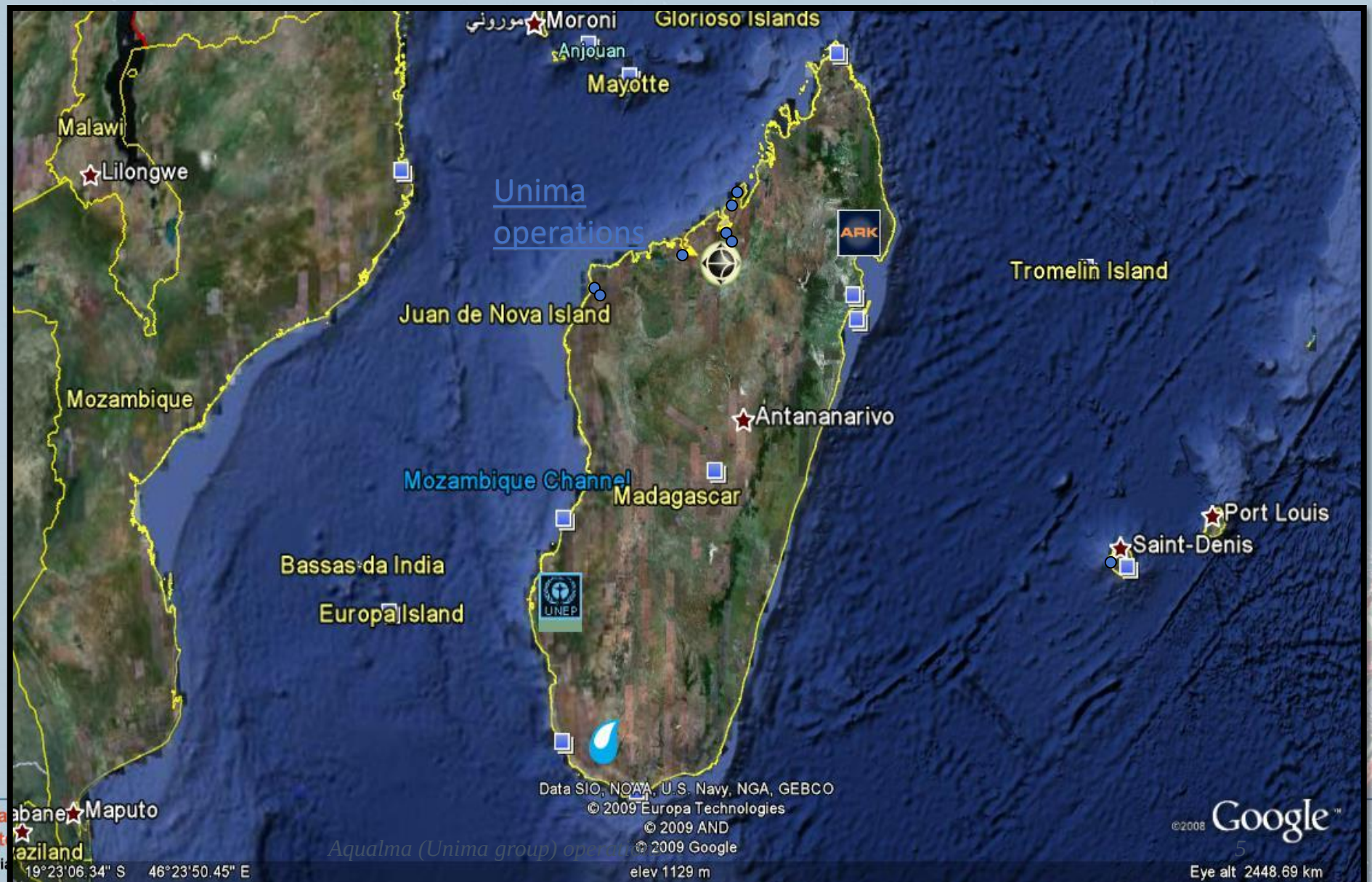
Indian Ocean Operations of UNIMA



Aqualma (Unima group) operations

Domestication Center at Moramba

Domestication & selection of Breeders
Production of Nauplii

First Pathology Laboratory for Aquatic Animals in Madagascar in 1999

Pathology laboratory

- ✓ Origins of Aqualma's Pathology Laboratory
  - Embarking into long term vertically integrated shrimp aquaculture project in a country with unknown sanitary records.
  - Ambition to develop an SPF domesticated P. monodon population, kept in a biosecure compartment, requiring broodstock screening from all internationally known diseases, and potentially from endemic diseases.
- ✓ Evolution after 2003: becoming the Central Pathology Laboratory for all production sites
  - Achievement of the SPF domesticated P. monodon population
  - Requirements for all production sites to benefit from the laboratory services.
  - Transfer of the pathology laboratory in the closest city, where samples logistic is easier.
- ✓ Reorganized towards client-oriented services
  - Limited time to process samples (asap for Ethanol fixed and even Davidson fixed samples).
  - Working on Saturdays and Sundays, and night shifts when necessary.
  - Transfer of the pathology laboratory in the closest city, where samples logistic is easier.

A Private Laboratory Point of View, needs and aspirations Aqualma/Unima

Pathology Laboratory for Aquatic Animals with three aisles:

- Histology
- Bacteriology
- Molecular Biology

Other activities: water parameters (spectrometer, DBO_5), quality control of major inputs, etc..

Pathology laboratory

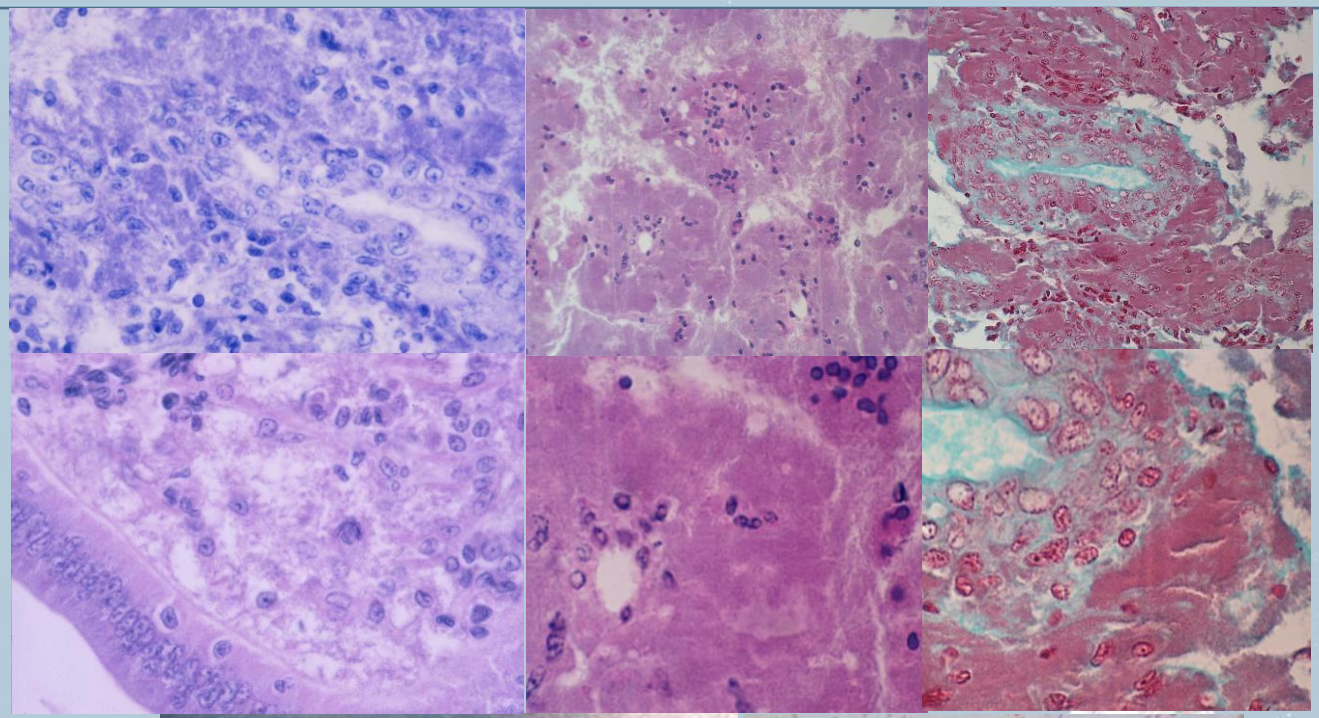
Level I Diagnostic

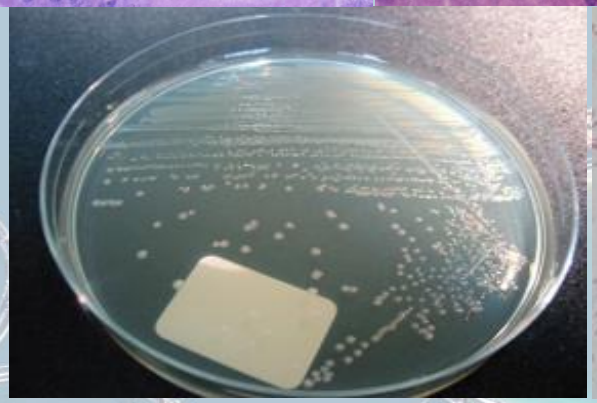
- ✓ Clinical signs and behaviour
- ✓ First dissection and observations of organs
- ✓ Fresh mounts

Pathology laboratory

Level II Diagnostic

- ✓ **Histology laboratory**
- ✓ **Microbiology laboratory**
  - Live shrimp or other aquatic animal
  - Finished products for food safety
- ✓**Precise identification of bacteria**
- ✓ **when necessary**





Isolated colonies on Petri dish

Gram Staining

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Histology laboratory




Pathology laboratory

Level III Diagnostic

- ✓ PCR and RT-PCR
- ✓ Real-Time PCR (Taqman)
- ✓ In-situ hybridization

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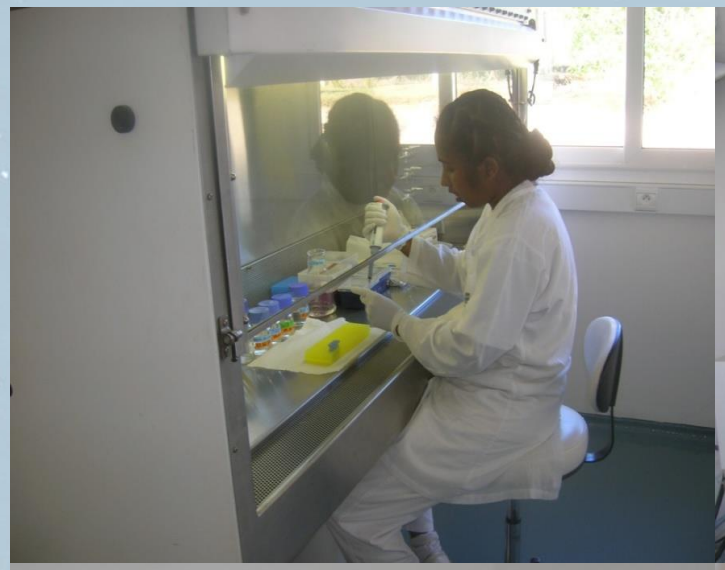
Molecular biology laboratory



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Molecular biology laboratory / recent upgrade

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Pathology laboratory achievements

- ✓ Diagnostic of all WOAH listed crustacean diseases, regularly updated through the TAA (Technical Assistance Agreement).
- ✓ Identification of 12 new Madagascan endemic pathogens for aquatic animals (mostly crustaceans).
  - ✓ 3-4 viruses (local strain of HPV, Iridovirus, baculovirus in crabs)
  - ✓ 1 shrimp genome integrated sequence containing viral DNA genes (IHHNV integrated form)
  - ✓ 1 intracellular bacteria (RLB)
  - ✓ 1 pathogenic Gram positive bacteria (*Streptococcus iniae*)
  - ✓ 3 new parasites (*Perezia spp., etc.)*
  - ✓ First laboratory to have detected WSSV in Mozambique, and first WSSV case in Madagascar (another farm south)
- ✓ Technical Assistance Agreement with APL at UAZ, for technology transfer and research activities to identify etiological agents of new diseases and rapidly develop sensitive and specific diagnostic tools.
- ✓ Publications with UAZ to inform other farmers in the region and international organizations.
- ✓ Participation to Proficiency tests (Ring Tests organized by WOAH Reference Laboratory at UAZ.
- ✓ Submitted to third parties certifications, ISO 17025 and COFRAC projected.
- ✓ Routine management of Aquatic Animal Health in Aqualma facilities since 2000, in parallel with samples sent to UAZ.

Pathology laboratory achievements

- ✓Providing service to internal clients (the priority, since it is involved in the biosecurity plan and contingency plans.
- ✓Providing services to external clients (mostly shrimp farmers, but also some fish), capacity to add more diagnostic tests with the existing platform if there is a demand.
- ✓Contribution to the financing of the National Reference Laboratory for Aquatic Animals for Madagascar through the Shrimp Fishermen and Farmers Association and French Agency of Development (AFD), located at Pasteur Institute in Antananarivo.
- ✓Contribution to launching the National Surveillance Program for WSSV, TSV and YHV in 2009

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Current roles of private pathology laboratory : providing services to internal clients

Origin of samples: Quality Control Department and Site Pathologists at Broodstock Centre, hatcheries, Farms, Processing Plants:

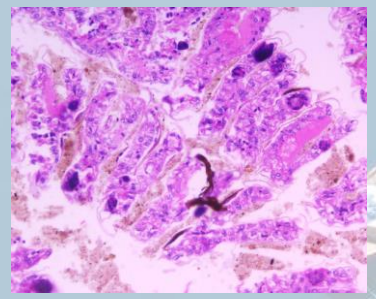
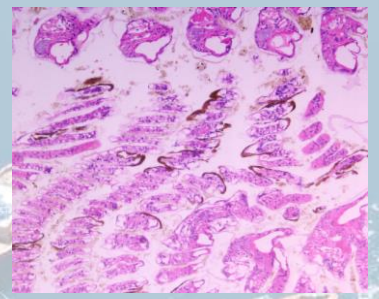
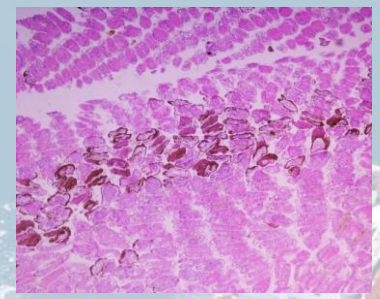
Level I Diagnostic activities, field observations, sampling collection and fixation.

Trained by veterinarian, who can come to the site, if urgent or observations out of routine cases.

Pathology Laboratory

- **Level II Diagnostics**
- **Level III Diagnostics**

Providing results to the veterinarian

The veterinarian is:

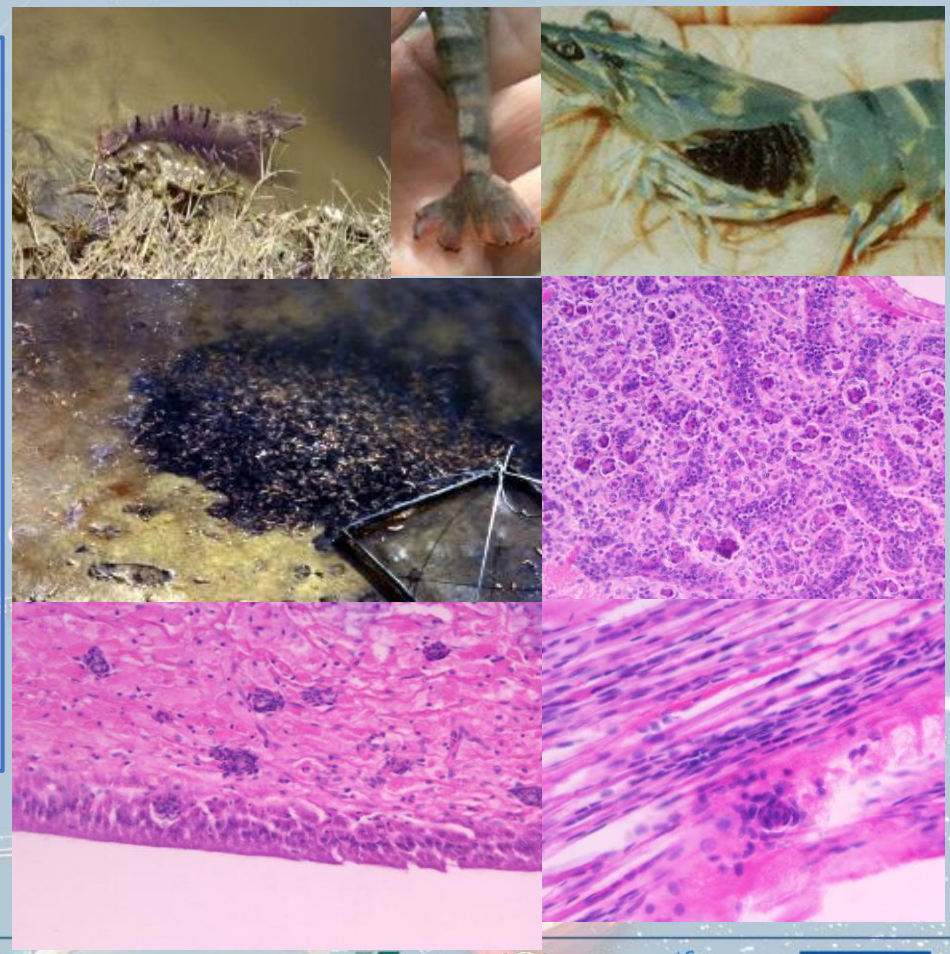
- **Interpreting laboratory results**
- **Checking consistency between all diagnostic information (levels I,II, III) Asking for additional tests when needed**
- **Asking for more samples collection when needed**
- **Taking decision according to Biosecurity Plan and to Contingency Plan when needed**

Current roles of pathology laboratory in Madagascar:

Private laboratory providing services to external clients:

- ✓ **Other Private Clients oriented services:**
  - **Benefiting from short delays prior to results delivery (and interpretation with specialized veterinarian)**
  - **Complete diagnostic techniques**
  - **Confidentiality of the results (signed contract)**

- ✓ **Public Private Partnerships**
  - **Surveillance programs**
  - **Rapid diagnostic tests for all types of aquatic animals**
  - **Expertise in diagnostic in case of mass mortality in aquatic animals (both in aquaculture and in the environment) –Central Competent Authority based inland, in the Capital Antananarivo, with limited logistical means.**



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Current roles of pathology laboratories: a synergic approach

Private Laboratory:

- Located in the field, or very close.
- Very reactive, optimal time to deliver results to the Veterinarian / final clients.
- Optimal reliability, with levels I, II and III diagnostic capacity.
- Delegation and PPP possible if needed.

National Reference Pathology Laboratory:

- Providing service for Public Sector: Competent Authority Sampling.
- National Surveillance Programs.
- Third Party Certifications, notably for aquatic animal movements, or imported aquaculture inputs, or aquatic animal products.
- Proficency tests within the country.
- Providing services to small stakeholders who don't want to get services from private laboratories.
- But usually less reactivity, sometimes no level I diagnostic capacity.

WOAH Reference Laboratory:

- Providing research capacities when needed (EM, ultracentrifugation, NGS, ISH, ELISA, Etc. and risky analysis (experimental infections).
- Providing PCR test consumables (positive tests) for countries where the diagnosed disease is not present in the country.
- Preparing and supervising Ring Tests.
- Capacity to run genetic epidemiology on pathogens, identify the origin of contamination.
- Working in collaboration on emergency cases: mass mortality with unknown etiology

Expectations from a Laboratory Network

- Access to a reliable pathology laboratory ; necessary, but not enough for efficient AAHS
- Need for an effective health legislation (policy) in the field.
- A network must be in place to:
  - Detect or suspect outbreaks of disease,
  - A specialist must be able to take the proper samples and guide the client and the laboratory what to look for.
  - Interact with the laboratory to interpret the laboratory results,
  - Ask for complementary analysis when necessary
  - Complete the diagnosis by checking whether the field data are consistent with the laboratory data
  - And above all, take charge of the actions that need to be taken to limit the impact of the disease if it is confirmed (treatment, disease prevention (vaccination, biosecurity), contingency plan with emergency fishing and complete drying up if necessary, etc.).
- Hence, laboratory interaction with specialists, whether veterinary or para-professional, is essential. The laboratory should feel fully involved in an operational network, with a huge responsibility to deliver rapidly reliable results, and apply continuous improvement when satisfaction of the clients is not total.
- Communication must be fluid and enable decision-making chains (and sometimes even command chains) to function smoothly.

This could be an interesting topic to consider when building a network.

Expectations from a Laboratory Network

- Continuous improvement with PDCA process is key for a laboratory network. Systematic questioning of the results obtained should be part of the laboratory quality system.
- When diagnostic tests at levels I, II and III are not consistent, additional analyses or even fundamental research must be done to understand what is happening.
- This may require to sollicitate other laboratories in the network, with no competition feelings.
- On several occasions in the past, I have observed that some laboratories find it hard to accept that they have made a mistake... This should not happen, and is to be included in the « chart » of the network. All stakeholders are looking for actual truth, but they might have different points of view depending on information available.
- A mechanism for continuous improvement, intercalibration and a strong link with Reference Laboratories (WOAH, FAO recommended), Research Laboratories.
- In particular when emerging diseases are concerned and diagnostic techniques are not yet well proven reliable in the field.
- Special effort should be done when a mass mortality or major symptoms are observed, of an unknown cause, to:
  - Stop all animal movements in this particular zone / region
  - Organize a team work involving experts and laboratory network to determine as soon as possible if this is infectious, and what is the etiological agent(s).

Thank you very much