

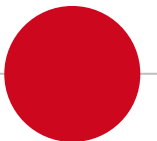
# Capacity building for rabies diagnosis: efforts to achieve the Zero by 30 global goal

**Morgane Gourlaouen, PhD**

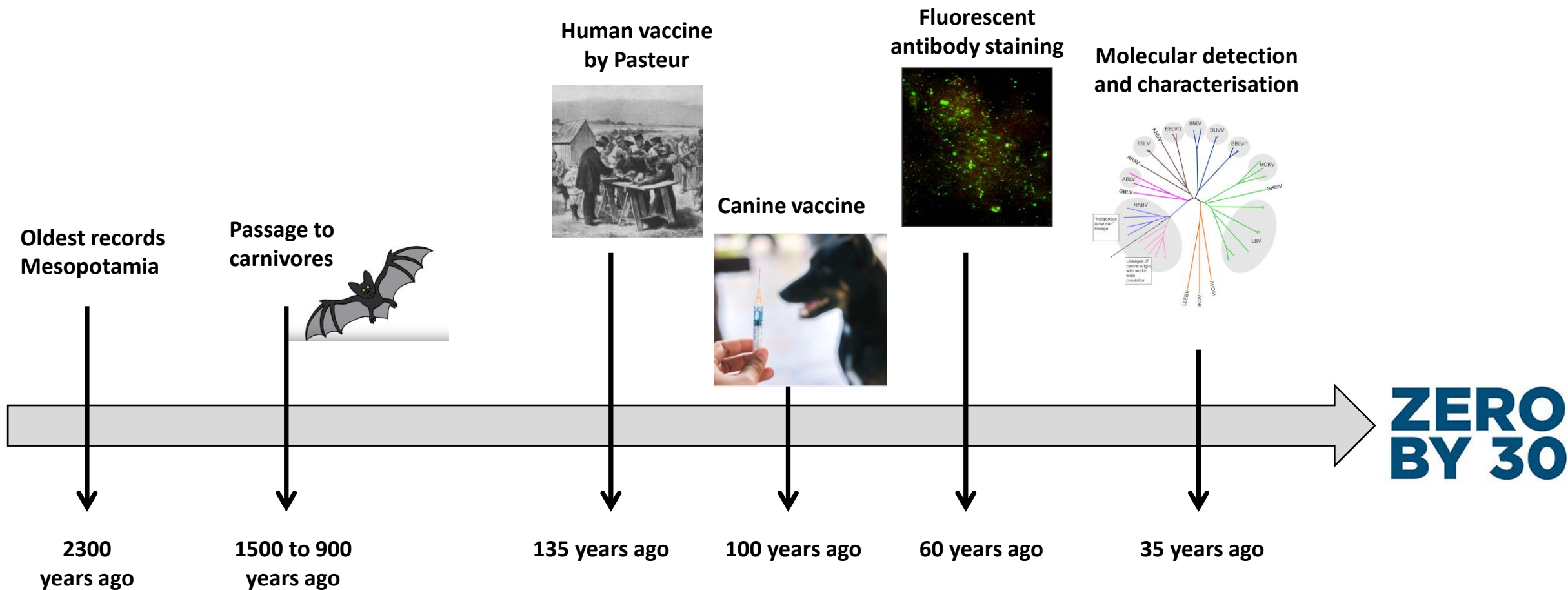
*IZSve*, National and FAO Reference Centre for Rabies  
[mgourlaouen@izsvenezie.it](mailto:mgourlaouen@izsvenezie.it)

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Regional workshop on the epidemiological surveillance of rabies and canine vaccination  
Padova, February 16th and 17th, 2021



# A touch of history



# ● Control and elimination of rabies

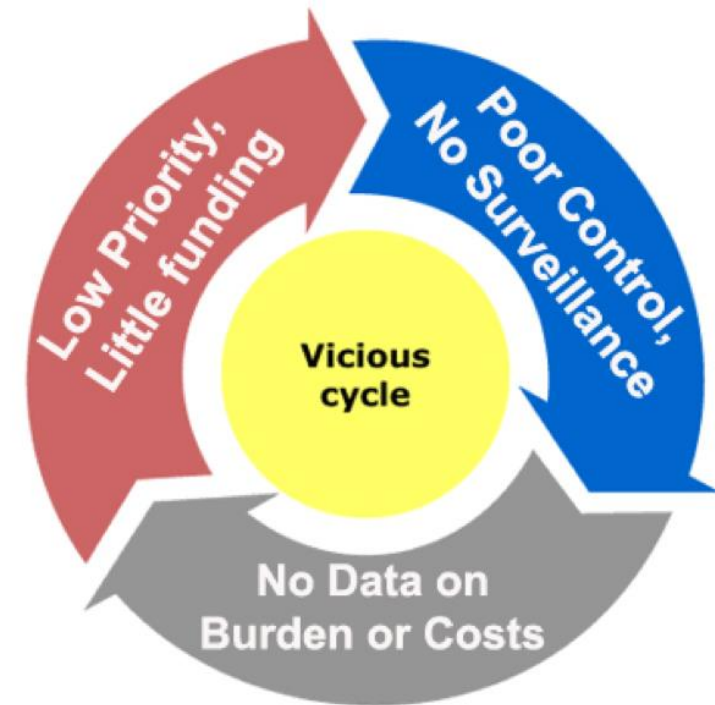
The elimination of canine rabies is both epidemiologically and practically feasible

- Access to vaccination
- Responsible ownership
- Enhanced laboratory capabilities
- Enhanced public education and awareness

# ● Control and elimination of rabies

The elimination of canine rabies is both epidemiologically and practically feasible

- Access to vaccination
- Responsible ownership
- **Enhanced laboratory capabilities**
- Enhanced public education and awareness



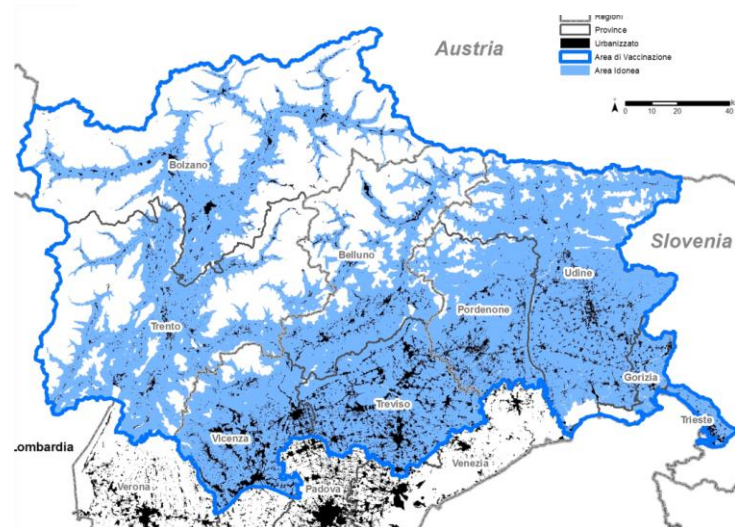
## ● Our role as Italian National Reference Centre

- Management of fox rabies epidemics (2008 – 2011 and earlier)
- Skills in oral vaccination campaigns
- Management of control plans



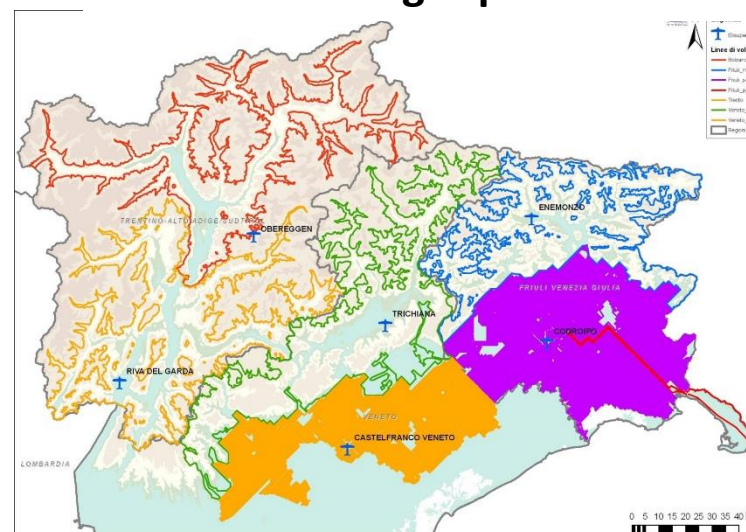
# ● Aerial Oral Fox Vaccination campaigns against rabies (2009 – 2014)

## Definition of Vaccination areas



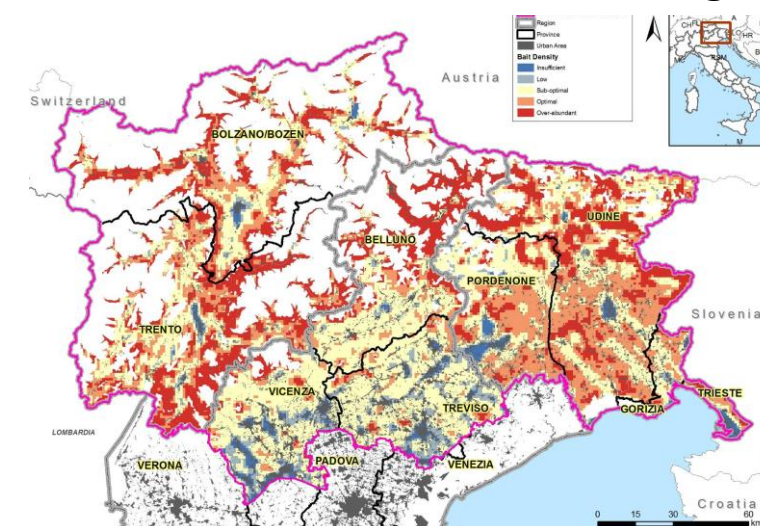
- Exclusion of urban areas
- Exclusion of river/water bodies
- Exclusion of areas above the freezing point

## Definition of flight paths



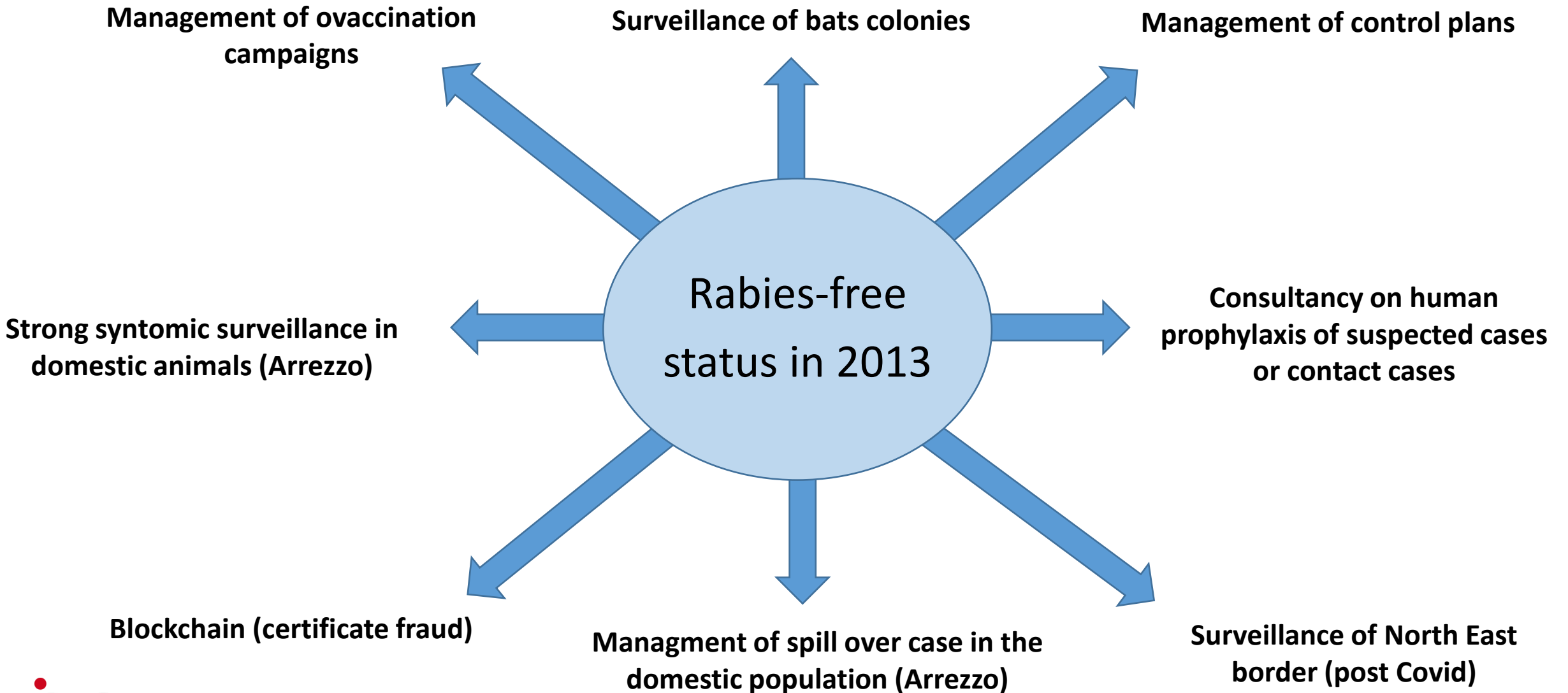
- Locations of airports/airfields
- Length of the flight paths (according to the autonomy of the aircraft)
- Number of turning points (according to the gps device to be used)

## Assessment of territorial coverage



- Geocoordinates of released baits
- Estimation of number of baits released per squared km
- Definition of bait coverage and of areas where manual OFV was needed

# ● National Reference Centre

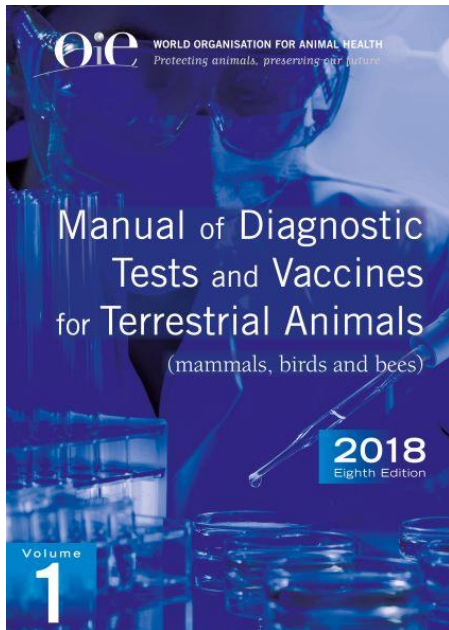






## ● Expertise on the diagnosis of rabies

- Important role/responsability as RC is the implementation of technical skills and recommended protocols (gold standard technique as provided by the OIE)



# ● Our responsibilities and commitment go beyond!

- Assistance in strains characterisation
- Diagnostic confirmation
- Troubleshooting
- Evaluation/validation of new reagents or diagnostic test
- Supply of reagents and reference material
- Proficiency test provider
  
- Trainings & Technical support (from remote since 2020)



## PLOS NEGLECTED TROPICAL DISEASES

OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

### An inter-laboratory trial as a tool to increase rabies diagnostic capabilities of Sub-Saharan African Veterinary laboratories

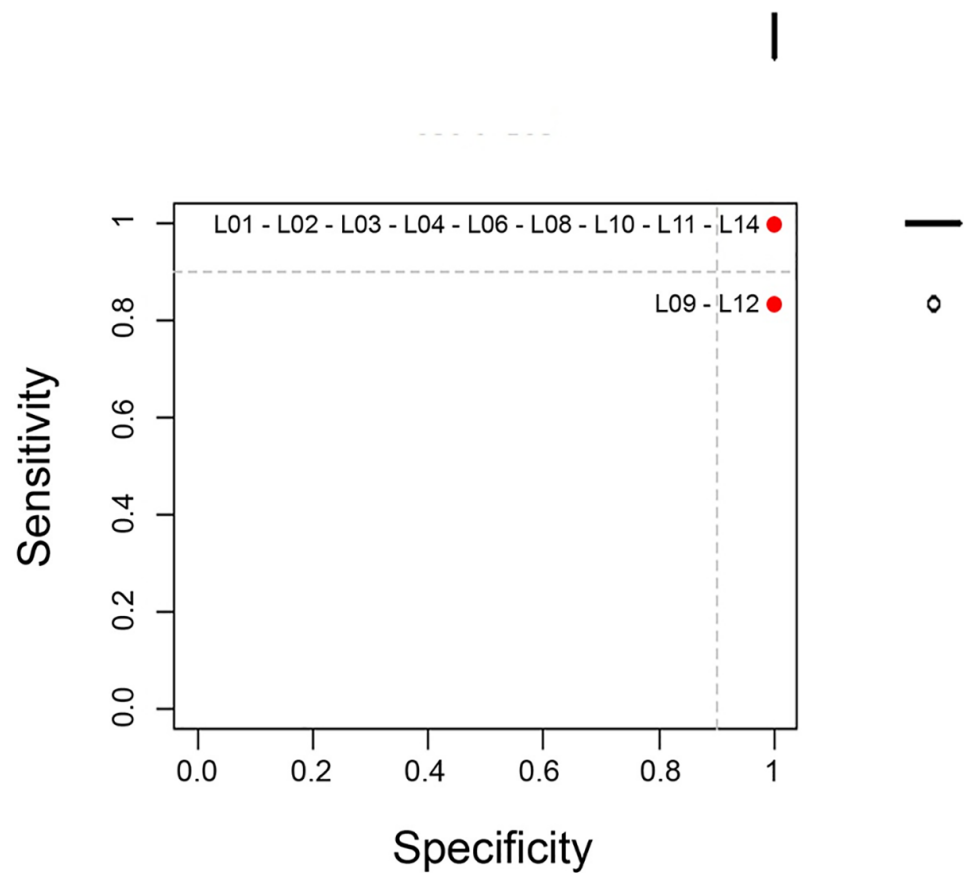
Morgane Gourlaouen, Angélique Angot, Marzia Mancin, Charles Bebay, Baba Soumaré, Francesca Ellero, Barbara Zecchin, Stefania Leopardi, Cristian De Battisti, Calogero Terregino, Paola De Benedictis ✉

Latest revision of the ISO 17025:2017 requires frequent participation to Pts sessments



# Proficiency test 2017/18

## IMPLEMENTATION OF A VALIDATED CONVENTIONAL RT-PCR IN 8 CENTRAL VETERINARY LABORATORIES

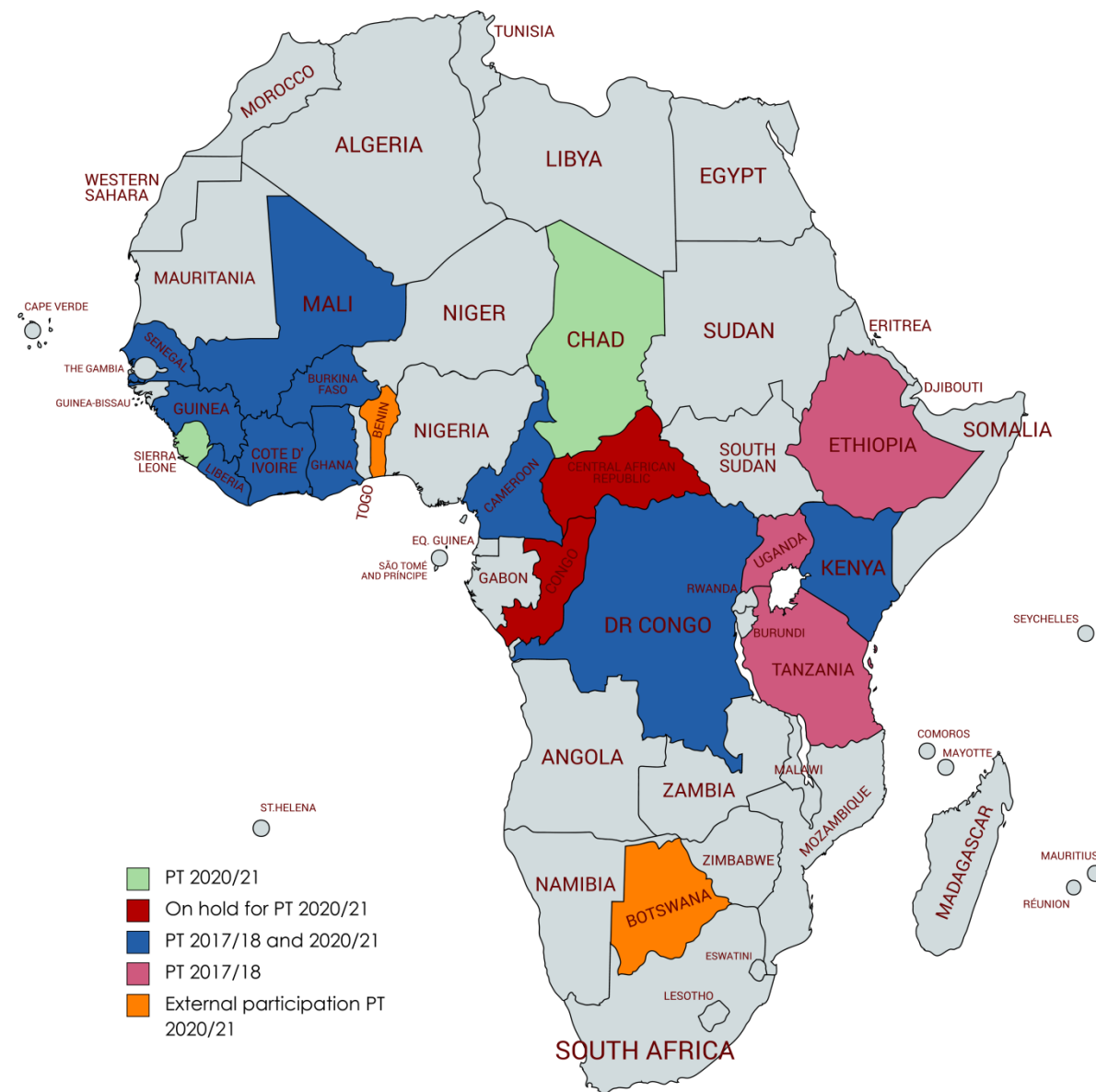


Specificity	100
Sensitivity	96.7
Overall success rate	98.2

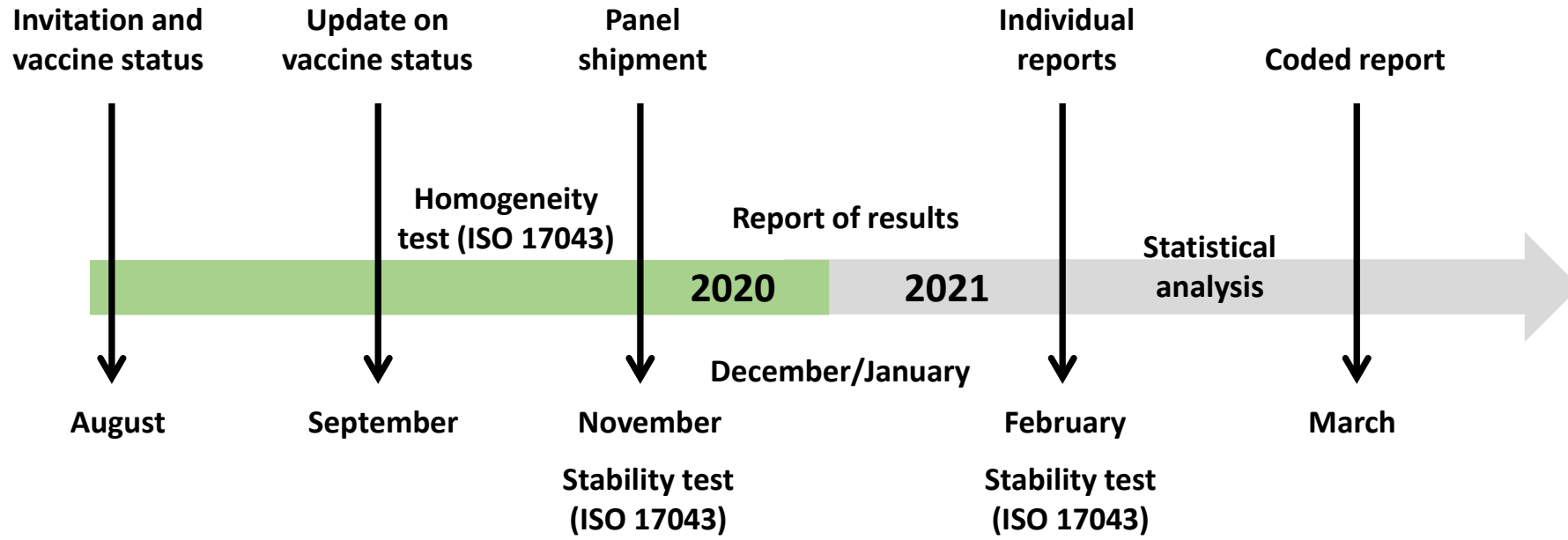


# Proficiency test 2020/21

Countries	Name of the laboratory
Benin	Laboratoire de Diagnostic Vétérinaire et de Sérosurveillance de Parakou
Botswana	Botswana National Veterinary Laboratory
Burkina Faso	Laboratoire National d'Élevage (LNE)
Cameroon Garoua	Laboratoire National Vétérinaire (LANAVET)
Cameroon Yaounde	LANAVET Annexe Yaoundé
Ivory Coast	Laboratoire central vétérinaire de Bingerville (LCVB)
Chad	Institut de Recherche en Elevage pour le Développement (IRED)
DRC	Laboratoire Vétérinaire (Labovet) de Kinshasa
Ghana	Accra Veterinary Laboratory
Guinea (1)	Laboratoire Central de Diagnostic Vétérinaire (LCVD) Conakry
Guinea (2)	Laboratoire Régional Vétérinaire de Kankan
Guinea (3)	Laboratoire Régional Vétérinaire de Labé
Kenya	Central Veterinary Laboratories- Kabete
Liberia	Leon Quist Ledlum Central Veterinary diagnostic Laboratory (CVDL)
Mali	Laboratoire Central Vétérinaire du Mali, Bamako
Sierra Leone	Central Veterinary Laboratory Teko, Freetown
Senegal	Laboratoire National de l'Élevage et de Recherches Vétérinaires (LNERV)



# Proficiency test 2020/21 - Timeline



➔ Currently, results analysis and reports

# Proficiency test 2020/21 - Results

	DFA test	RT-PCR
Specificity	83.9	97.6
Sensitivity	87.5	93.7
Overall success rate	86.3	94.6

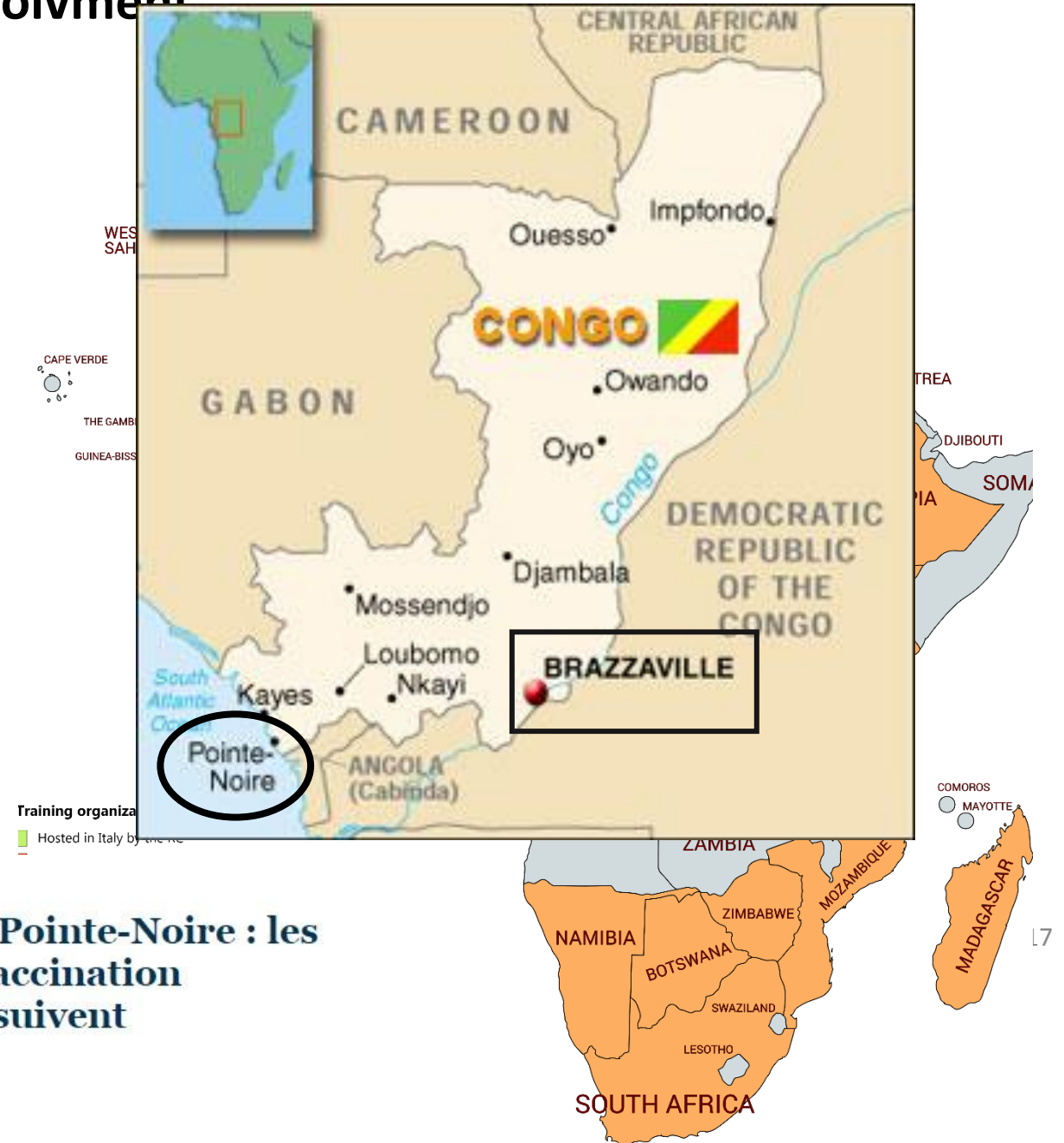
## ● Actual outcomes of the PT 2020/21

- Assess the diagnostic performance of the methods routinely applied
- Update of the staff vaccine status
- Provision of reference material for further validation step
- Collection of data (routine field samples analysed, protocols applied)
- Collection of data on alternative testing methods (not recommended)
- Laboratories can share on the main faced constraints (lack of reagents, staff, samples)
- Overall analysis of the diagnostic performance of African labs (coded reports)
- Technical support for the laboratories with low success rate



# Congo – Importance of stakeholders involvement

- Training in Brazzaville DFA (2012)
- Epidemic in Pointe Noire (2013)
- Laboratory confirmation
- Rapid response from the authorities
- Vaccination campaigns
- Lack of support + political instability



Société  
**Lutte contre l'épidémie de rage à Pointe-Noire : les captures de chiens errants et la vaccination d'animaux de compagnie se poursuivent**

Mardi 24 Décembre 2013 - 14:30

# Liberia – CVL Leon Q. Ledlum (2018)

- Years without diagnostic activities
- Renovation of the facilities
- Recruitment of staff
- Training for rabies diagnostic
- Samples sent to the IZSve for confirmation
- Publication of sequences (GenBank)
- Participation to proficiency test

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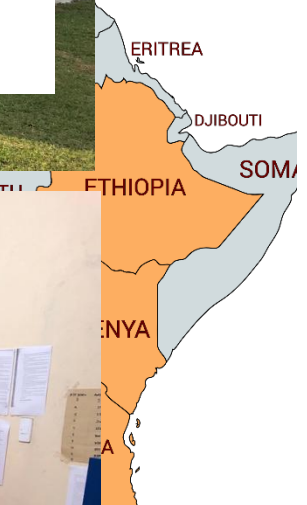
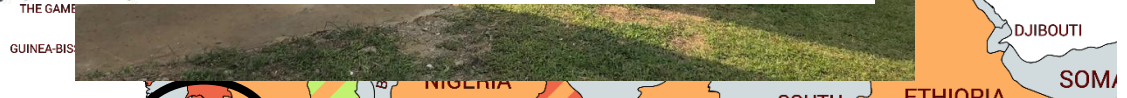
## Rabies lyssavirus isolate IZSve\_18RD/666-4 nucleoprotein gene, complete cds

GenBank: MH481713.1

[FASTA](#) [Graphics](#)

Go to:

LOCUS MH481713 1353 bp cRNA linear VRL 17-OCT-2018  
 DEFINITION Rabies lyssavirus isolate IZSve\_18RD/666-4 nucleoprotein gene, complete cds.  
 ACCESSION MH481713  
 VERSION MH481713.1  
 KEYWORDS .  
 SOURCE Rabies lyssavirus  
 ORGANISM [Rabies lyssavirus](#)  
 Viruses; ssRNA viruses; ssRNA negative-strand viruses; Mononegavirales; Rhabdoviridae; Lyssavirus.  
 REFERENCE 1 (bases 1 to 1353)  
 AUTHORS Kamara,V.M., Leopardi,S., Marciano,S., De Benedictis,P., Gourlaouen,M., Zecchin,B., Anthony,W., Voupaow,G., Gweh,R.G., Flomo,M. Jr., Angot,A. and Sow,A.



IZSve





# Guinea – LCVD Conakry (2018)

- Years without diagnostic activities
- Renovation of the facilities
- Recruitment of staff
- Training for rabies diagnostic
- Samples sent to the IZSve for confirmation
- Publication of sequences (GenBank)
- Participation to proficiency test

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GenBank

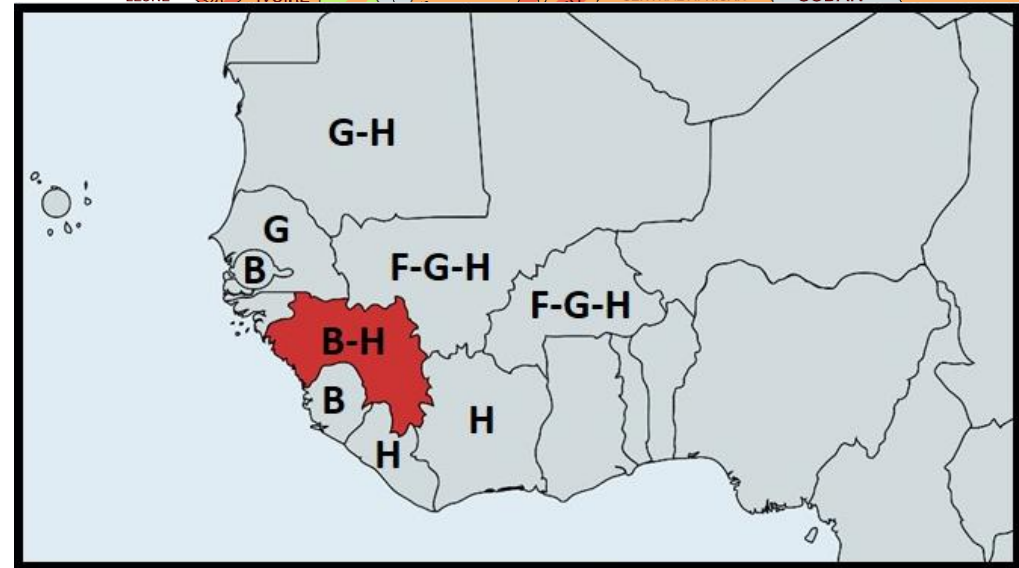
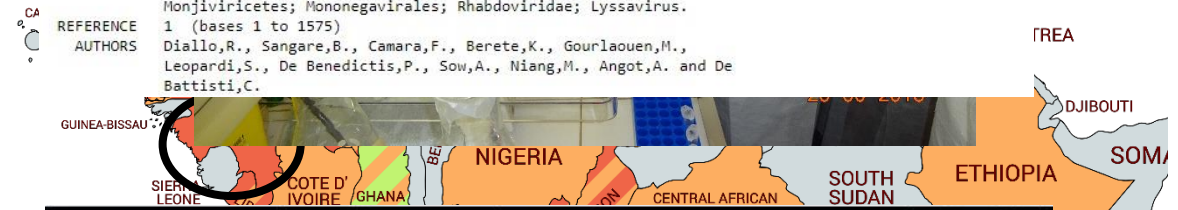
## Rabies lyssavirus isolate IZSve\_1557-5 glycoprotein gene, complete cds

GenBank: MK471251.1

[FASTA](#) [Graphics](#) [PopSet](#)

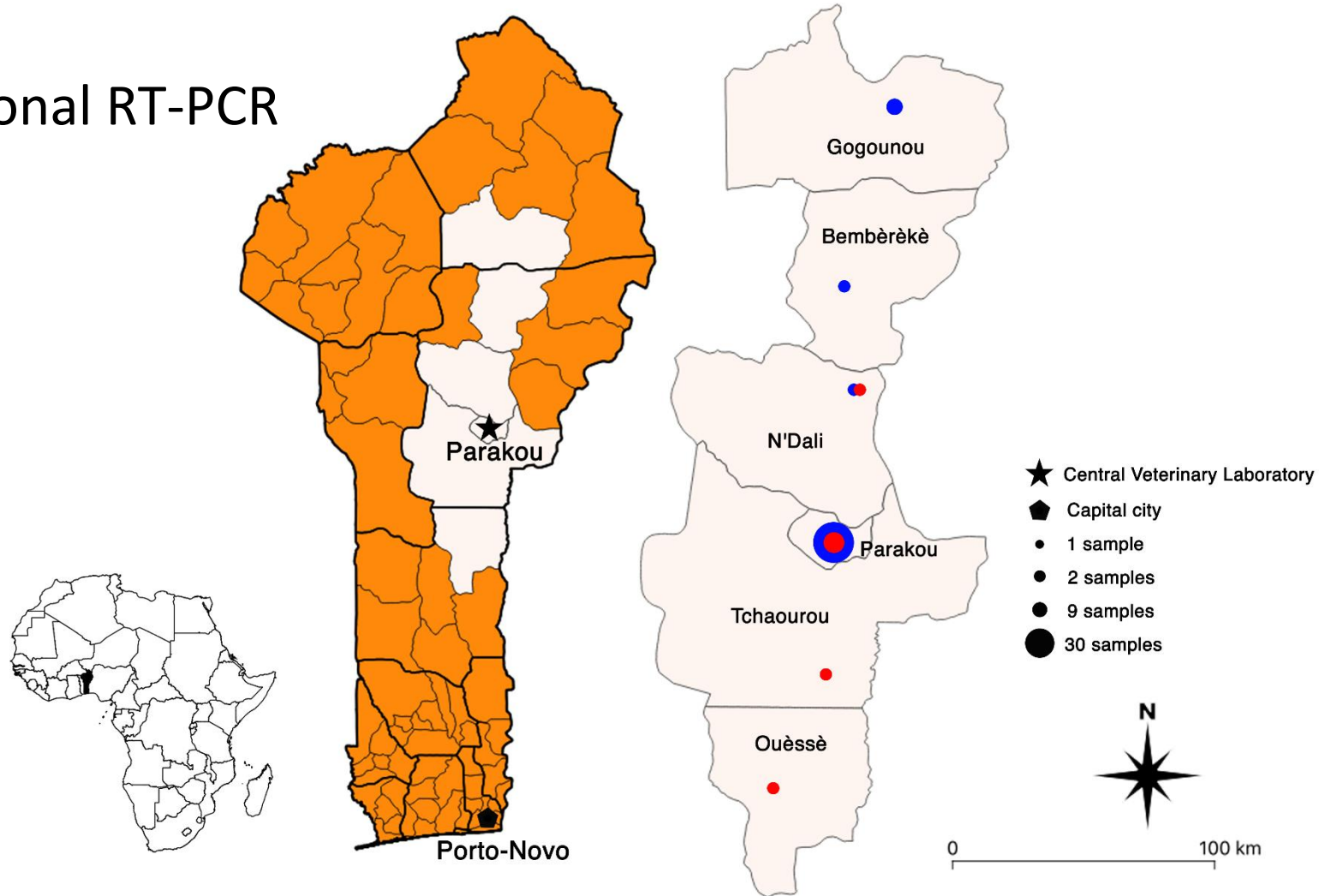
Go to:

LOCUS MK471251 1575 bp RNA linear VRL 26-MAY-2019  
 DEFINITION Rabies lyssavirus isolate IZSve\_1557-5 glycoprotein gene, complete cds.  
 ACCESSION MK471251  
 VERSION MK471251.1  
 KEYWORDS .  
 SOURCE Rabies lyssavirus  
 ORGANISM *Rabies lyssavirus*  
 Viruses; Riboviria; Negarnaviricota; Haploviricotina; Monjiviricetes; Mononegavirales; Rhabdoviridae; Lyssavirus.  
 REFERENCE 1 (bases 1 to 1575)  
 AUTHORS Diallo,R., Sangare,B., Camara,F., Berete,K., Gourlaouen,M., Leopardi,S., De Benedictis,P., Sow,A., Niang,M., Angot,A. and De Battisti,C.



# Benin – Laboratoire Vétérinaire de Parakou (BENIN) (2020)

- Assistance in strains characterisation
- Diagnostic confirmation
- Implementation of a conventional RT-PCR
- Proficiency test 2020/21
- Remote support





## Conclusions

- Elimination of rabies requires a solid network of efficient diagnostic facilities
- Proficiency testing to evaluate diagnostic performances
- Proficiency testing to collect valuable data
- Necessity to share the data within the scientific community
- Access to several recommended tests (implementation of RT-PCR)



# Acknowledgment

## IZS<sup>Ve</sup> & FAO Colleagues

Francesca Ellero

Stefania Leopardi

Marzia Mancin

Angélique Angot

Mamadou Niang

Joshua Kimutai

## Collaborators responsible for Rabies PT in Africa

Fidelia Djegui

Habibata Ouermi

Simon Dickmu

Abel Wade

Cyprien Yapi

Richard Bongo

Fayiz Alhilou

Serge Tshipambe

Teophilus Odoom

Mamadou Ramadan Diallo

Wilson Kuria

Ouattara Lassina

Josephine Tommy

Alpha Amadou Diallo

Thank you very much for your attention

