



PPR diagnosis and the role of the EURL

Webinar of PPR situation in Europe region under GF-TADs regional approach

4th September 2024 – 9h30 am – 12h30 pm CEST , Virtual meeting

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EU Reference laboratory for Peste des Petits Ruminants



Funded by
the European Union

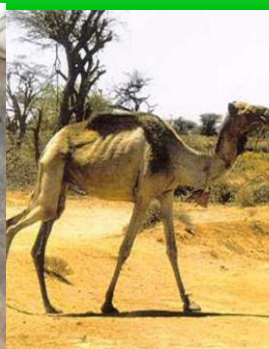


WOAH Reference Laboratory
for peste des petits ruminants



Peste des Petits Ruminants (PPR)

- Most widespread and devastating infectious disease of domestic small ruminants (goats, sheep), with on-going global eradication effort
- Virus of genus *Morbillivirus*, transmitted by contact (excretions, droplets)
- Mucopurulent ocular and nasal discharges, erosion of the mucosa, acute diarrhoea (mortality up to 100%)
- Camels, suids and some wild Artiodactyls also susceptible, but exact role in PPR epidemiology unknown (main hypothesis: spill-over from livestock)

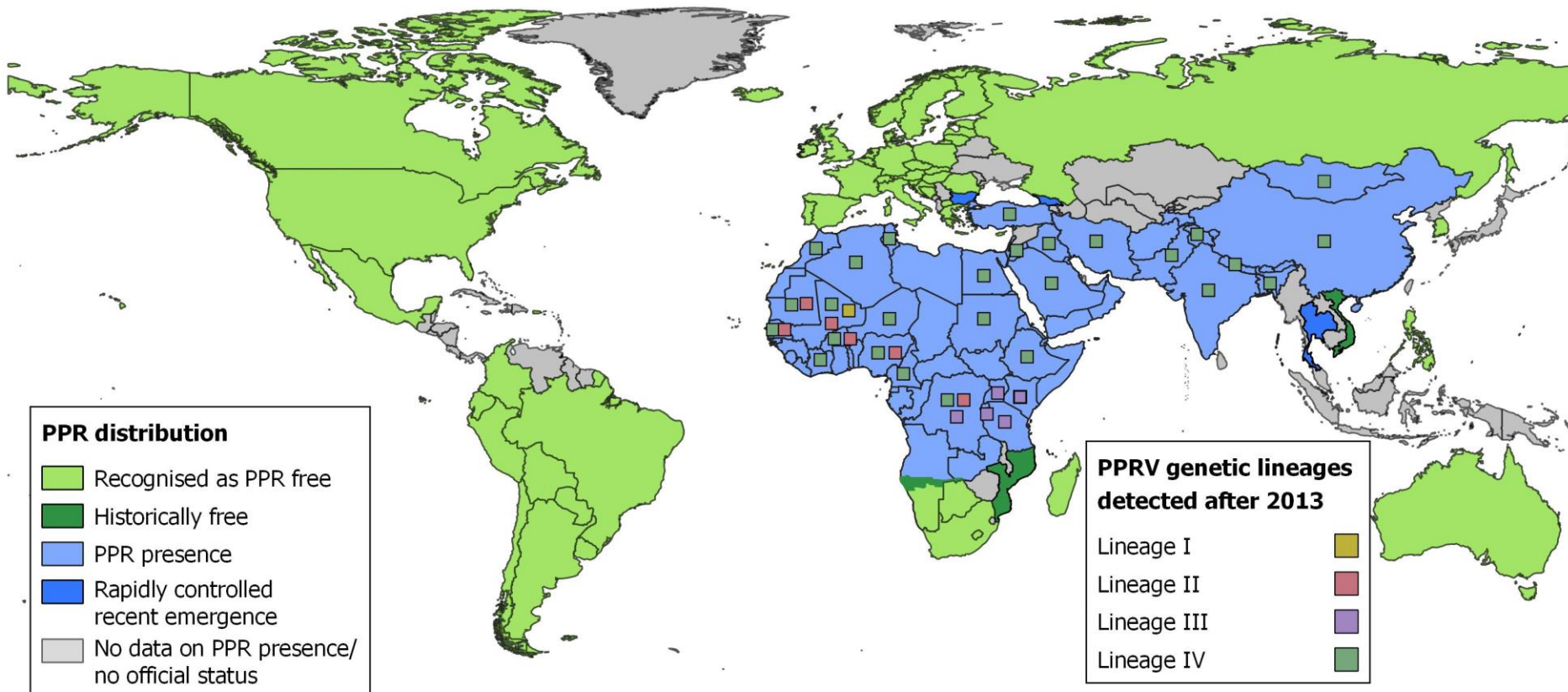


Schulz et al. (2018), EID

Pictures 1-3: H. Salami

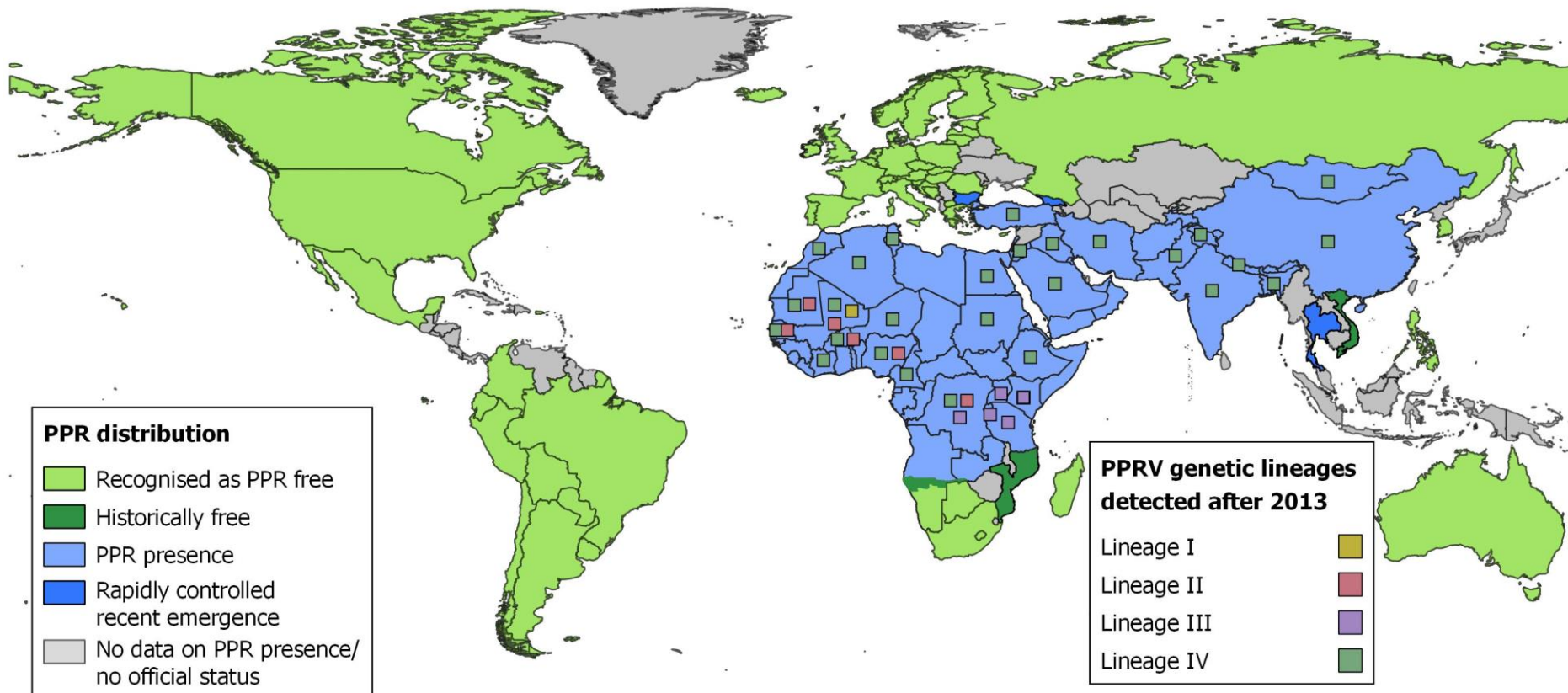
PPR distribution

- Widespread in Africa, Middle East and Asia
- Four distinct phylogenetic lineages with lineage IV most widely distributed



PPR global eradication programme

- 68 / 78 countries with a PPR national strategic plan
- Reduction of outbreak reports between 2015 and 2019
- But no country affected by PPR reached PPR-free status



EUURL-PPR activities

CIRAD : EU Reference laboratory for PPR since 2017

To ensure availability and use of high quality methods and high quality performance by NRLs

- Distribution of Standard Operating Procedures
- Production and supply of reference materials
 - For serology analysis
 - For Molecular Biology analysis
 - For Virus neutralization test
- Organisation of PT annually since 2017 :
 - 22 EU countries participate on average every year as well as some non-EU countries (Albania, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kosovo, Moldova, Montenegro, North Macedonia, Serbia, Turkey and Ukraine)
 - Goal is to evaluate and demonstrate the performance of the participants in performing measurements (§ 5.9 of the NF EN ISO standard IEC17025)
 - Three essential criteria for a good evaluation are monitored (detectability, sensitivity and specificity) to have complete confidence in the results provided by the NRLs

EURL-PPR activities

To provide scientific and technical assistance to NRLs

- Training course on PPR diagnostic methods, open to EU and non-EU NRLs
- Organisation of annual workshop :
 - Hosted alternatively by Sciensano (EURL-Capripox) and CIRAD (EURL-PPR)
 - Present and discuss results of Proficiency Tests
 - Share new information on the epidemiology and diagnostic methods
 - Foster networking among EU-NRLs and non EU-NRLs also invited
- Maintenance of website (<https://eurl-ppr.cirad.fr/>)

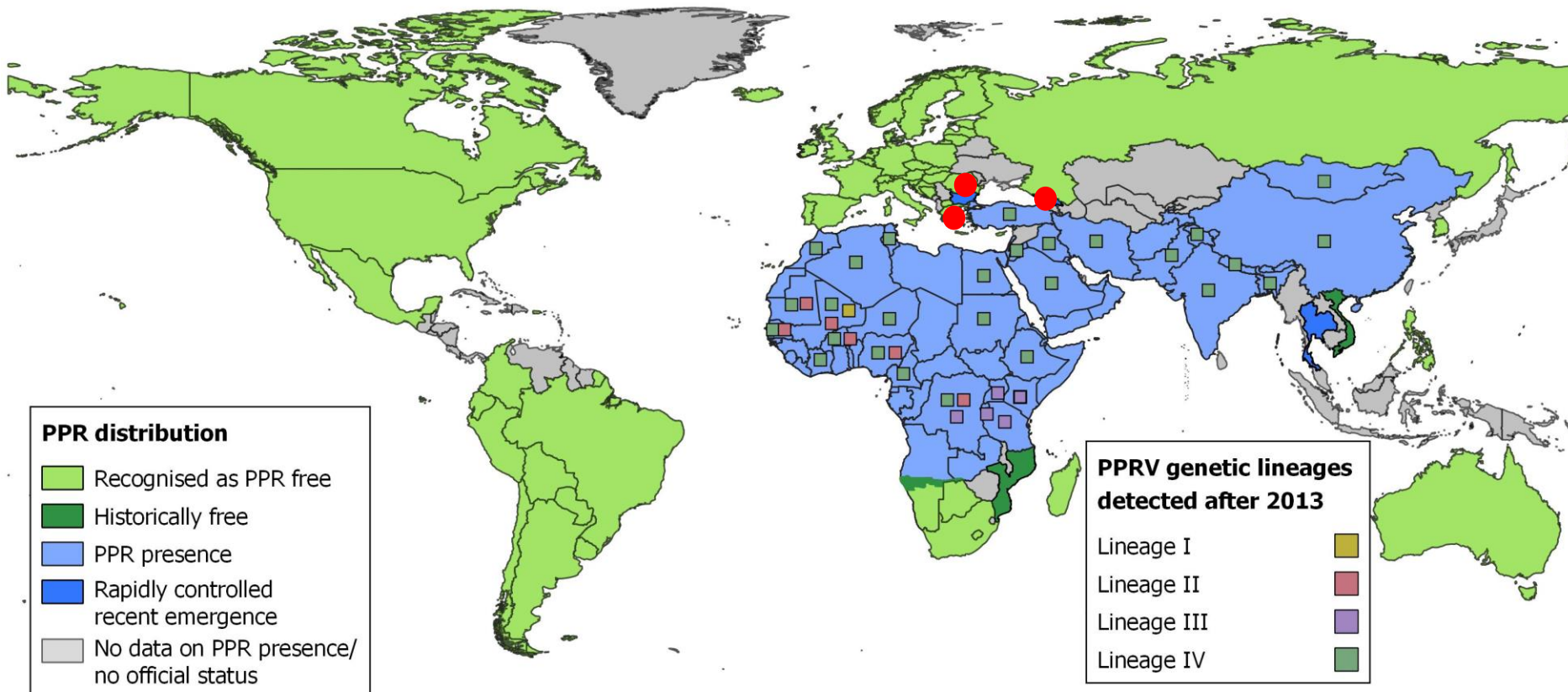
EURL-PPR activities

To provide scientific and technical assistance to the European Commission and other organisations

- Availability of trained staff for emergency situation (all skills)
- Active assistance in the diagnosis of PPR outbreaks, under the ISO 17025 accreditation system
- Implementation of full quality control of the EU PPR vaccine bank every three years
- Maintenance of relationships with laboratories and agencies working on PPR (PPR-GREN, GF-TADs, other WOAHA ref labs)

New PPR emergences

- Recent outbreaks (●) in Georgia (feb 2024), Greece and Romania (July 2024)



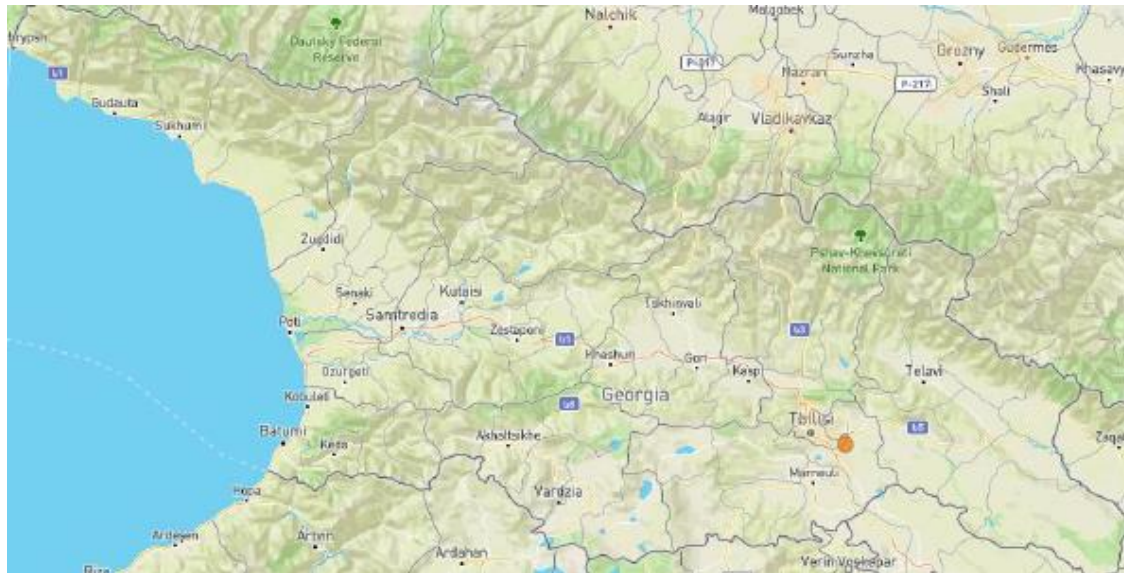
New PPR emergences

Georgia

Outbreak in one farm close to Tbilisi on 22/02/2024, confirmed on 01/03/2024, rapidly controlled

On-going vaccination campaign with support of FAO

Genetic analysis on-going at national ref lab



New PPR emergences

Greece

First outbreak in farms in the region of Thessaly confirmed on 11/07/2024 (first symptoms observed on 24/06/2024)

Measures taken rapidly following EU regulations, including culling of infected farms and bans of animal movement

A total of 59 farms reported as infected by the end of August, with some in other regions than Thessaly

EURL Activities :

- EUVET field mission
- Confirmation on sera samples and molecular biology samples (swabs, organs).
- Full genome sequencing (Lineage IV)
Georgia 2016 closest sequence known



New PPR emergences

Romania

First outbreak in farms in the region of Tulcea confirmed on 19/07/2024, but sick animals observed since June.

Fattening farms dealing with export of live animals to >20 destinations

Measures taken rapidly following EU regulations, including culling of infected farms and bans of animal movement

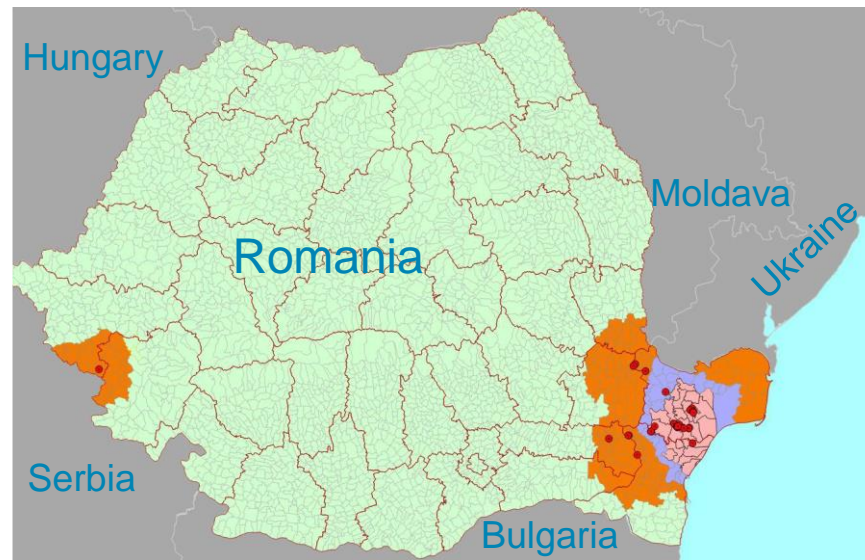
A total of 62 farms reported as infected by end of August, mostly in Tulcea

EURL Activities :

- EUVET field mission
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Georgia 2016 closest sequence known

location of some outbreaks



Key information regarding outbreak in Europe

Delays (2-4 weeks) in reporting PPR suspicion by farmers/ veterinary officers

- Suspicion of BTV leading to analysis by regional lab without capacity to test for PPR
- Symptoms observed thought to be due to heat (notably loss of appetite, apathy)
- Only symptoms associated with secondary bacterial infections (e.g. pasteurellosis) are identified, then confirmed by lab, leading to antibiotic treatment

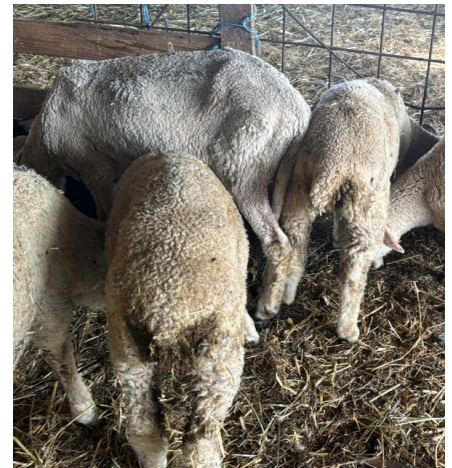


**NEED TO INCREASE AWARENESS OF
VETERINARIANS IN EUROPE**

Key information regarding outbreak in Europe

Symptoms can include

- Loss of appetite, loss of weight, apathy, nasal/ocular excretions, coughing, sudden death, diarrhea, lesions in the mouth
- Varies across species and breeds
- For the strain in Europe, stronger symptoms and higher mortality observed on sheep
- Samples should be sent to NRL if at least one of these symptoms are observed (only way to confirm PPR cases)



Samples and diagnostic tests

To ensure sensitive diagnosis of PPR virus by the NRL in case of suspicion: Sample only animals with some symptoms

Status of animal	Clinical symptoms	Type of test	Aim of test	Types of samples
Alive	with symptoms	Real-time PCR	Detection of virus	<u>Priority:</u> Nasal, ocular swab <u>AVOID whole blood</u>
Dead/ euthanized	with symptoms	Real-time PCR	Detection of virus	<u>Priority:</u> Nasal, ocular swab Lymph node, Lung <u>Optional:</u> Spleen <u>AVOID whole blood</u>

- PCR may be affected by inhibitors – dilution of RNA at 1:10 can help.
- cELISA test (detection of antibodies) on serum sample only positive 8-9 days after infection. Of interest for epidemiological investigation but not a priority.

Samples and diagnostic tests

Sample container and storage

Type of sample	Container	Preservation medium
Swab	Viscose swab in original tube (avoid cotton swab)	No
Tissues from internal organs	Plastic tube with screw-cap	No
Serum	Blood collection tube	No

Site	Type of sample	Storage condition	Length of storage	Packaging
From field to lab	All	On ice	<24hr	Double packaging
National lab	All	5 ± 3°C	<3 days	Double packaging
National lab	Swabs, tissues,	≤ -65°C	No limit	Double packaging
National lab	Serum	≤ -16°C	No limit	Simple packaging

All protocols available at <https://eurl-ppr.cirad.fr/>

Key information regarding outbreak in Europe

Direct transmission : Main route of spread (infected animals)

Indirect transmission

- Investigation in the field suggest that some farms may have been infected without direct contact with infected animals
- Possible routes of indirect transmission:
 - Trucks visiting multiple farms (milk collection, transport of feed)
 - Persons visiting multiple farms

Clear guidelines for biosecurity measures for disinfection of equipment and personel to be provided in areas at risk



PPR Vaccines

If PPR incursion cannot be controlled by stamping out, movement restrictions etc...: Vaccination could be an alternative

Vaccination may have important commercial impact, with prolonged time required to restore PPR-free status

Live, attenuated homologous vaccines available

- Most used strain: Nigeria 75/1 (Master seed held by CIRAD)
- Efficacy, innocuity, long-term storage, no residual side effects
- Cheap to produce, scalable for mass production
- Lyophilized for stability, but to be used within few hours when resuspended
- Multiple producers outside of EU
- External QC control is essential (by AU-PANVAC, WOAHP ref lab, etc...)

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European Union: PPR vaccination normally prohibited. May be used by EU Member States only in line with Delegated Regulation (EU) 2023/361 (*ELI: http://data.europa.eu/eli/reg_del/2023/361/oj*). Vaccination plan must be submitted to the EC.

Conclusions

- Threat of PPR to Europe has materialised
- Romania and Greece with outbreaks, but strong measures in place
- Risk of spread to other countries in South East Europe and beyond remains
- NRLs are ready, but lack of awareness in the field
- Information on symptoms and sampling procedure should be disseminated largely

THANK YOU

To receive information on the disease and on which method to use in which occasion

- EU reference laboratory for PPR
UMR ASTRE, CIRAD, Montpellier, France
email: contact-eurl-ppr@cirad.fr
website: <https://eurl-ppr.cirad.fr/>

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