



PPR emergence in Europe: insights from viral genetic investigations

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EU Reference laboratory for Peste des Petits Ruminants



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the European Union



**WOAH Reference Laboratory
for peste des petits ruminants**

Reference Centre

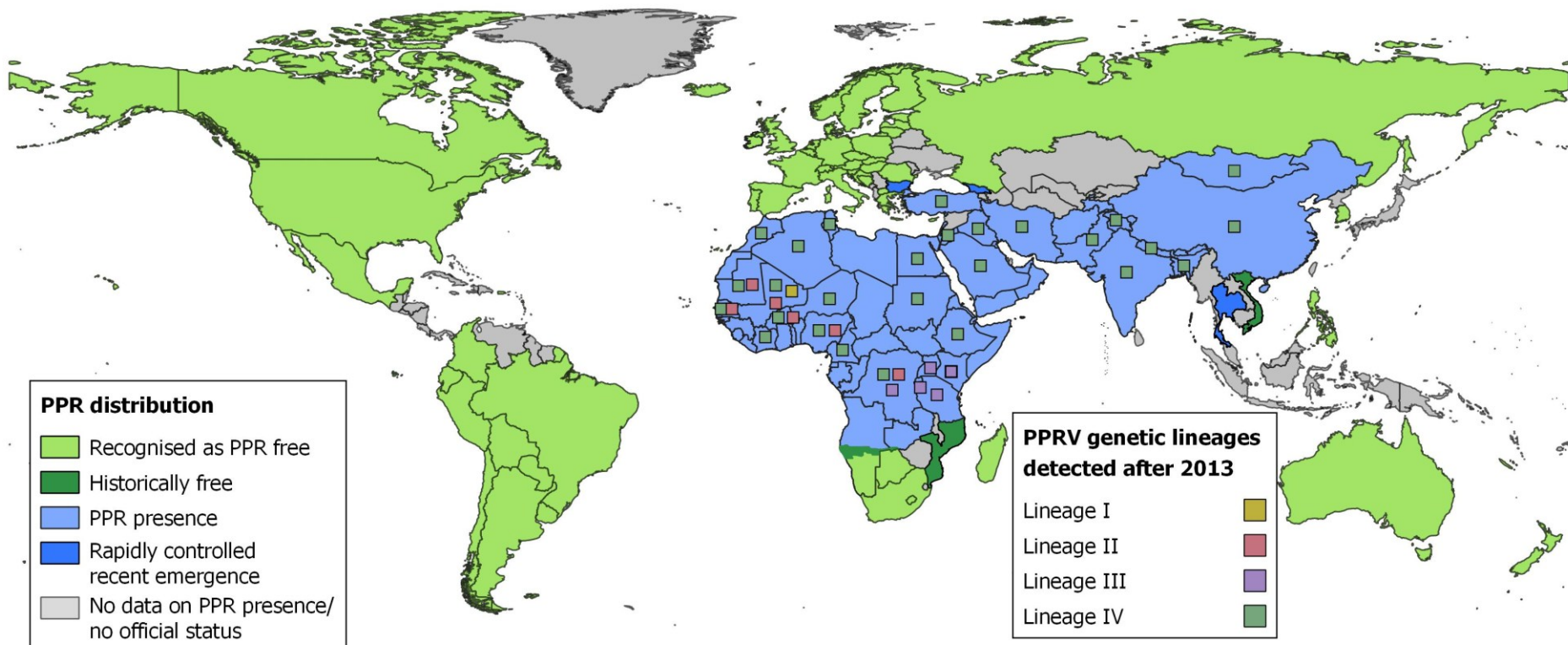


**World Organisation
for Animal Health**
Founded as OIE

PPR distribution

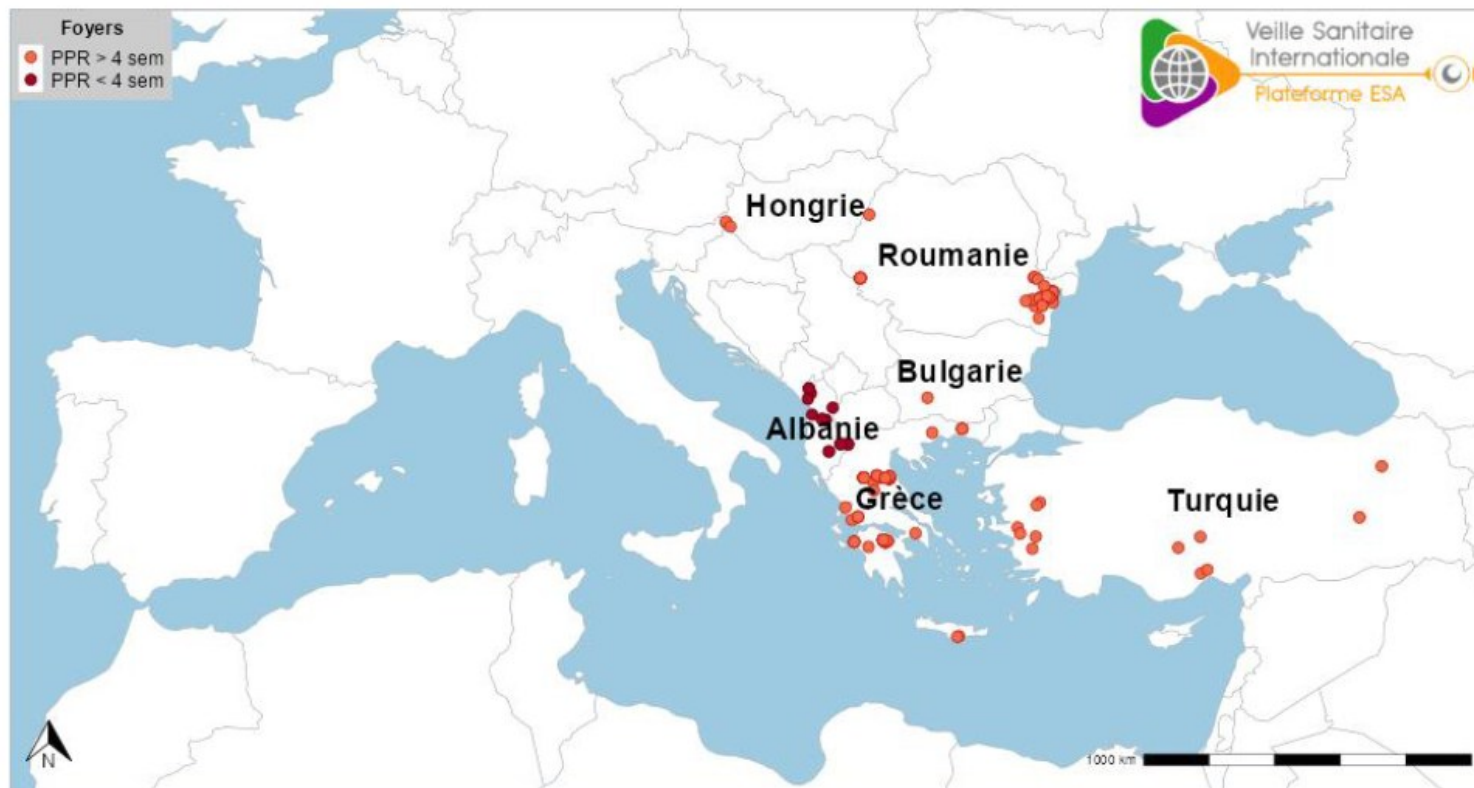
- Widespread in Africa, Middle East and Asia
- Four distinct phylogenetic lineages with lineage IV most widely distributed but one serotype (vaccines available protect against all strains)

Situation before emergence in Europe:



PPR emergence in Europe

- First notifications in July 2024 in Greece and Romania
- Emergence in Bulgaria in December 2024
- Emergence in Hungary and new outbreaks in Romania in Jan 2025
- First notification in Albania in June 2025

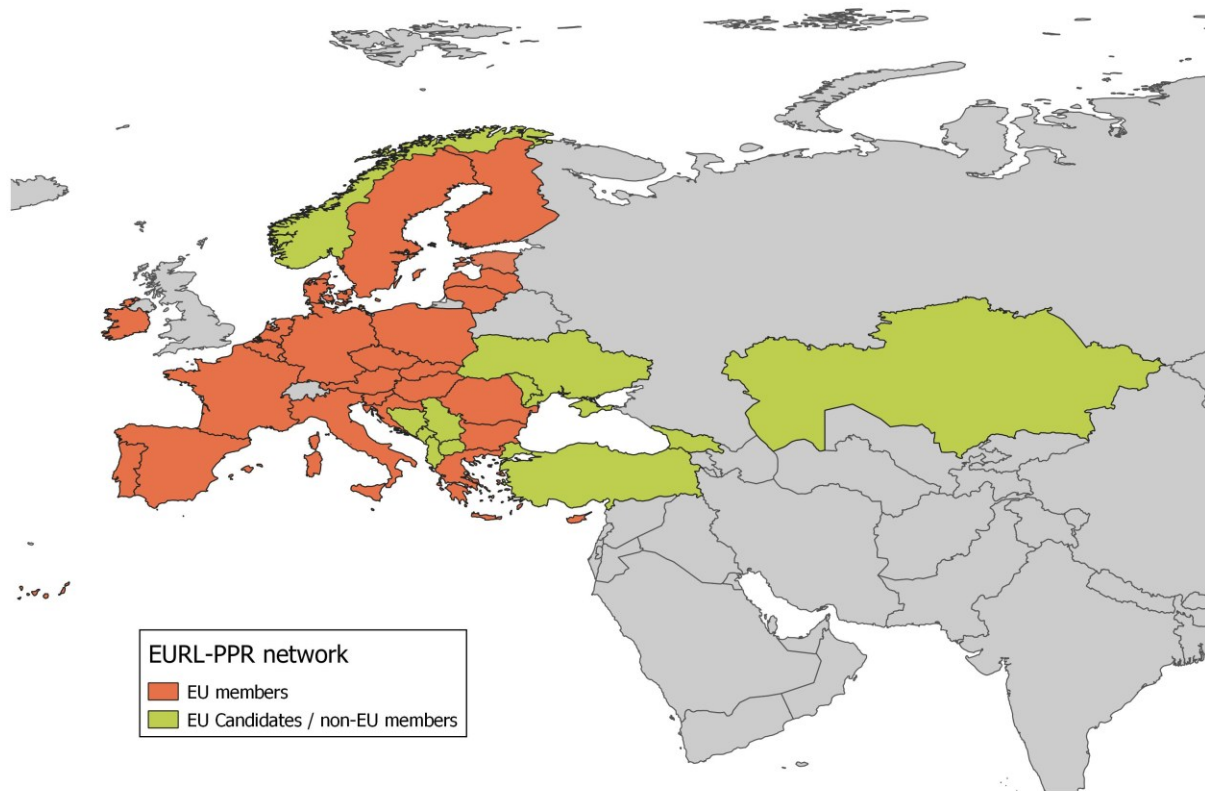




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Supporting a network of NRLs from 27 EU member states and 14 non-EU states



PPR emergence in Europe

EURL activities during PPR emergencies in countries within EURL network

- Participation to field mission
- Confirmatory diagnosis on sera and molecular biology samples received from NRLs
- Supports to NRLs with technical advice and reference material when requested
- Partial genome sequencing (portion of N gene) on all samples tested positive
- Full genome sequencing on at least one positive sample with highest viral load (based on RT-qPCR results)
- Alignment with curated PPRV sequence dataset available at <https://www.ppr-labs-oie-network.org/>
- Phylogenetic analyses and genome comparisons



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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
- Organisation of Proficiency Tests annually

To provide scientific and technical assistance to NRLs

- Training course on PPR diagnostic methods
- Organisation of annual workshop

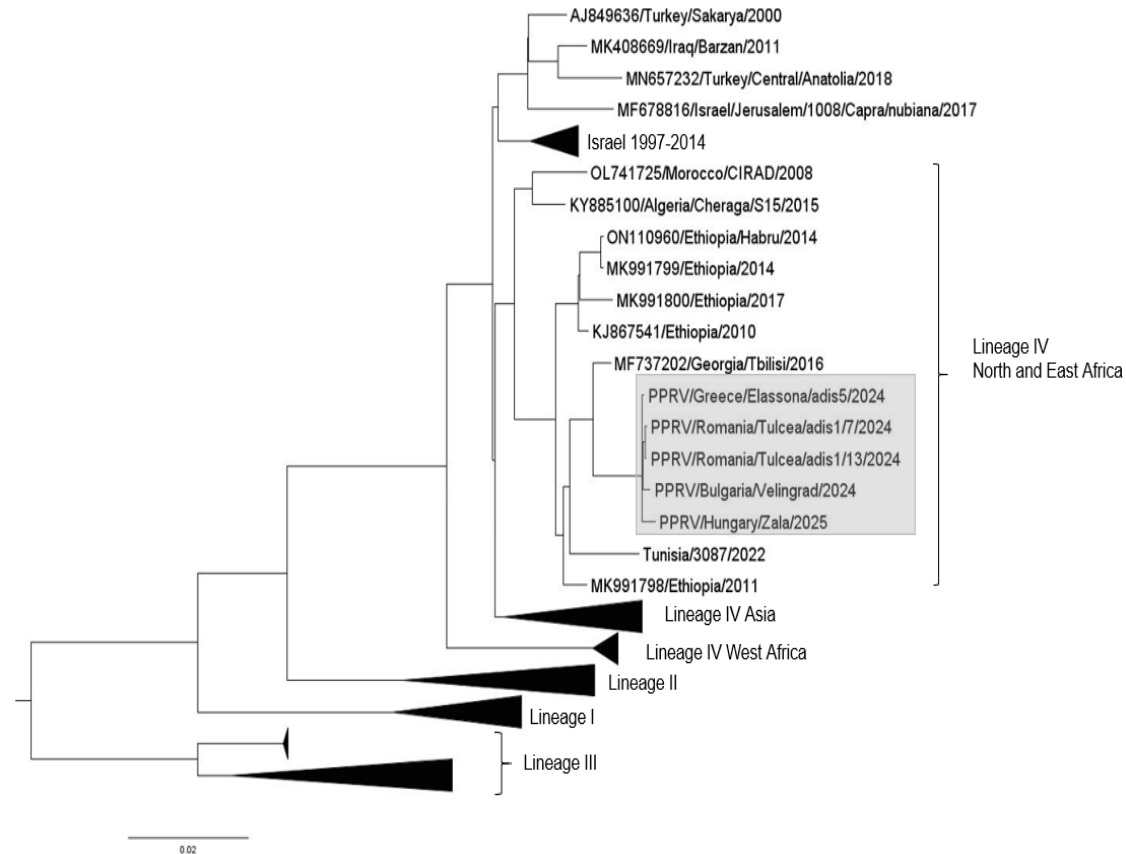
To provide scientific and technical assistance to the European Commission and other organisations

- Availability of trained staff for emergency situation (all skills)
- Active assistance in the diagnosis of PPR outbreaks
- Implementation of full quality control of the EU PPR vaccine bank every three years

First genome sequencing results

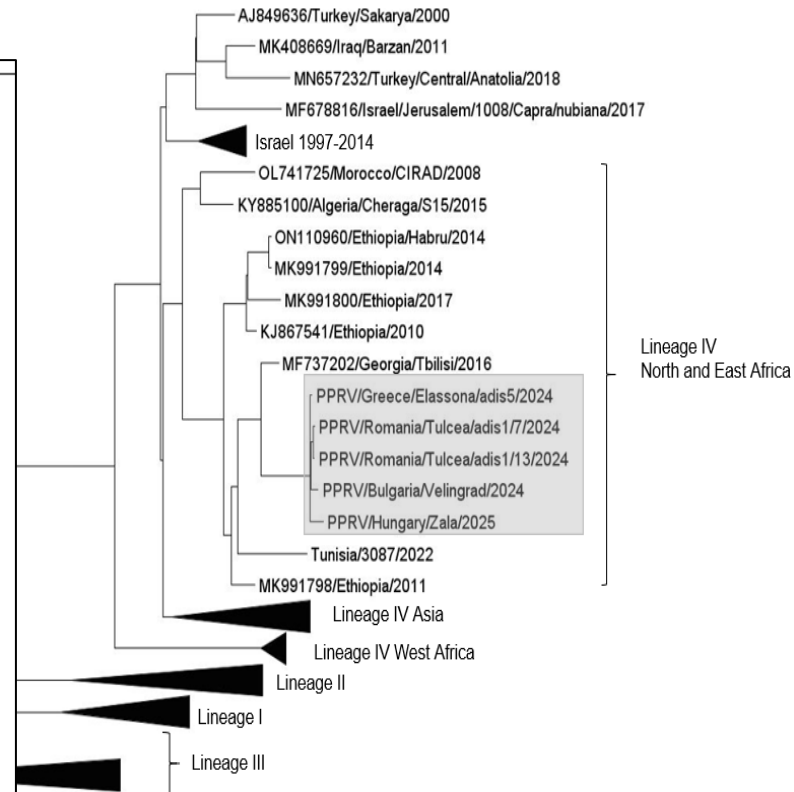
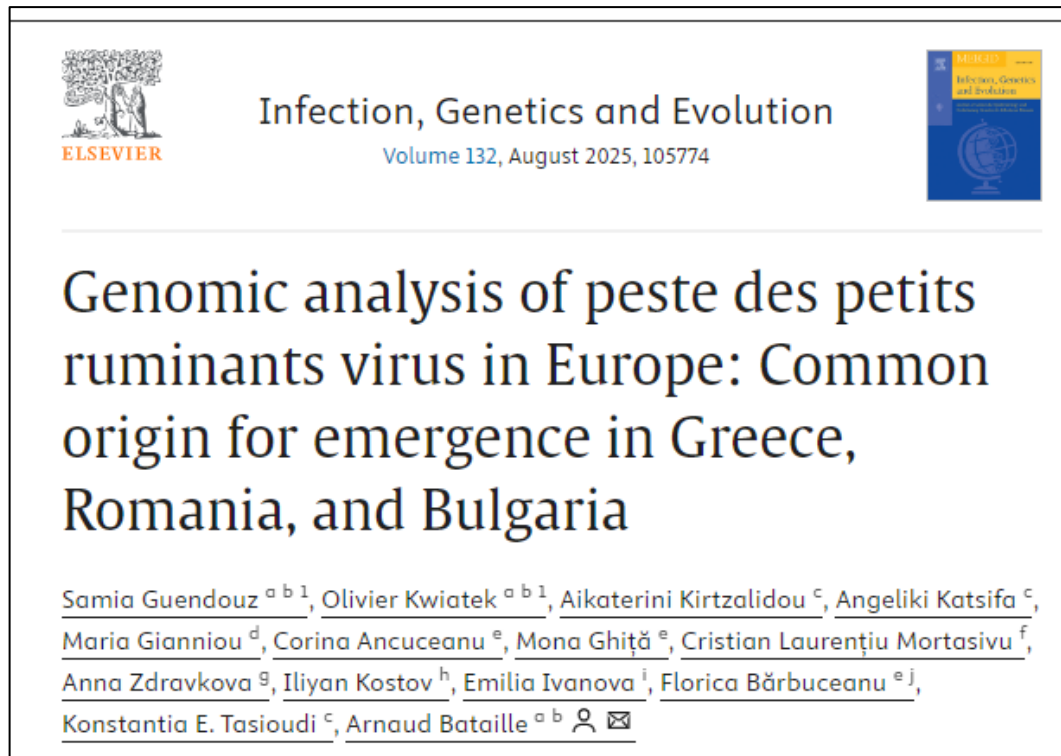
First results based on complete genome sequence for 1 sample from Greece (ADIS 5), 2 samples from Romania (ADIS 1), 1 sample from Bulgaria (ADIS 1), and partial genome (66%) from Hungary (ADIS 1)

- Genomes from EU highly similar (99.5% identity)
- Most similar sequence published: Georgia/2016 (98.3% identity)
- Confirm grouping with Lineage IV sub-clade North-East Africa
- Different from sequences available from Turkey



First genome sequencing results

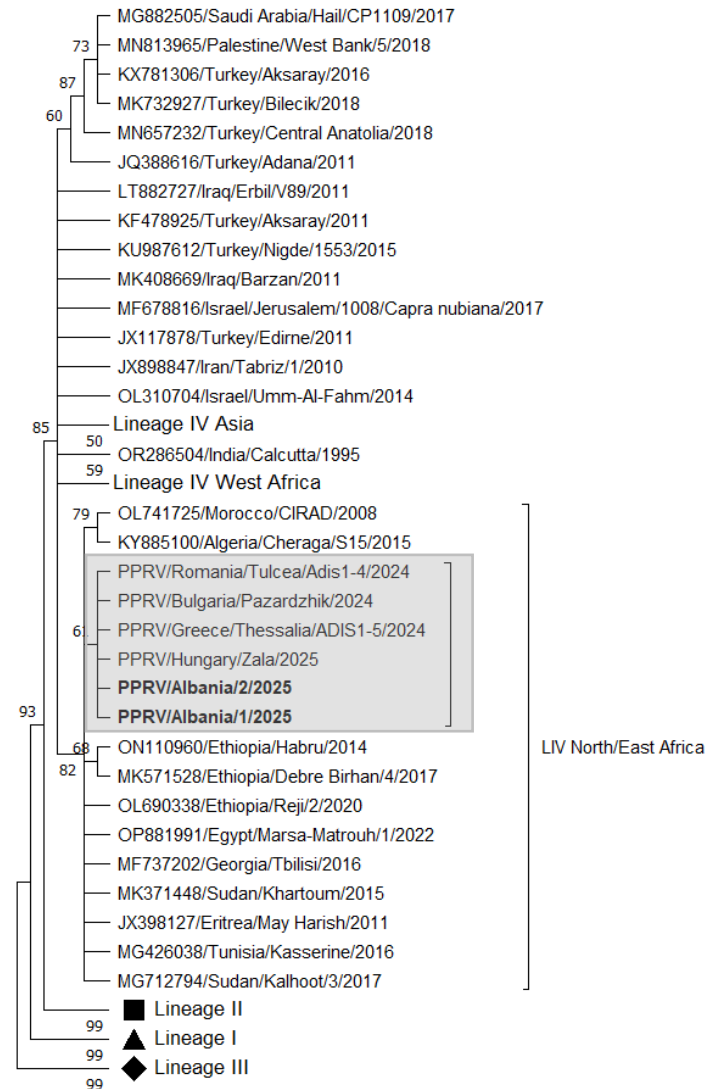
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Results of partial genome sequencing

New partial N gene sequence (250bp)
from Albania

Identical to sequences from other
European countries

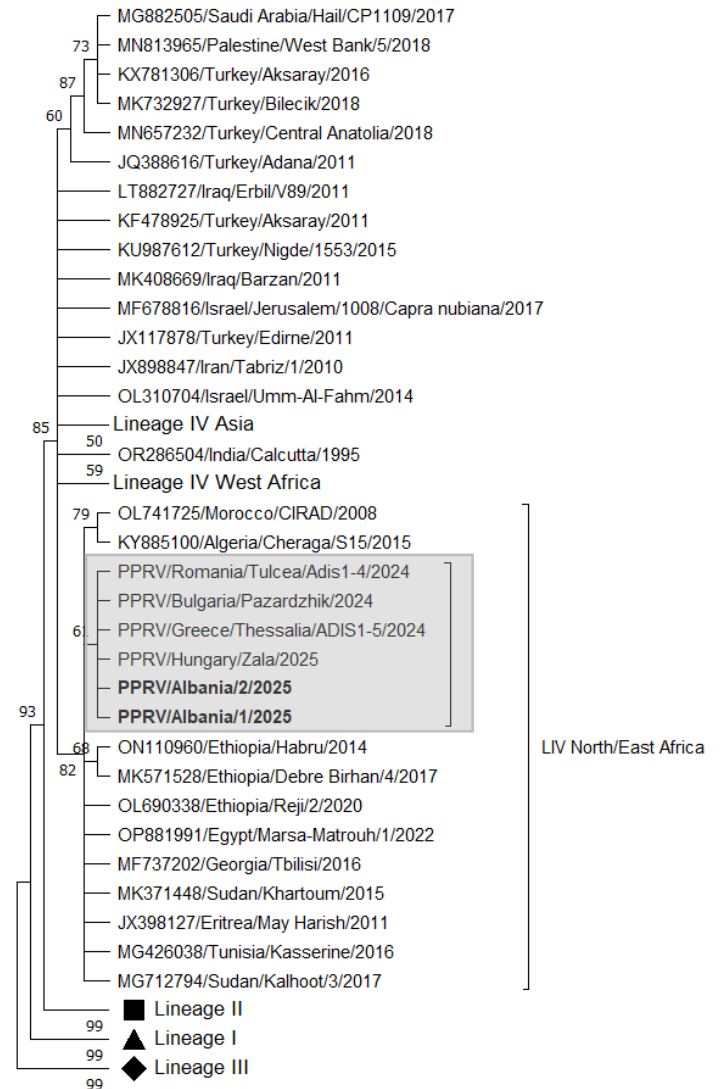


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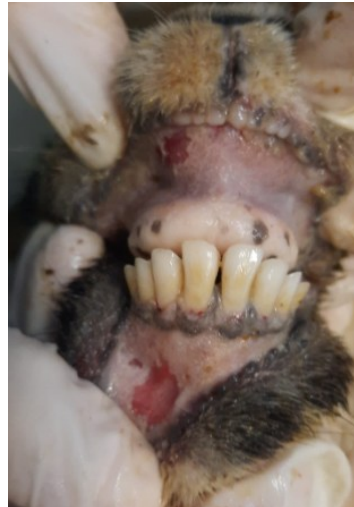
**Emergence in Albania linked to an
unidentified on-going circulation of
the European PPRV strain**



Early detection of PPR

Symptoms may be difficult to detect and 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, and depending on health condition
- For the strain in Europe, high variety of symptoms observed, subclinical transmission possible
- Samples should be sent to NRL if any one of these symptoms are observed or if strong suspicion based on epi investigation



Early detection of PPR

Risks of delays in reporting PPR suspicion by farmers/ veterinary officers

- Limited number of symptoms, low mortality with recovery of many infected animals
- Suspicion of other, better-known disease (e.g. BT) 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 leading to antibiotic treatment
- Poor communication between veterinary services and communities



Need to increase awareness in PPR-free countries

Importance of biosecurity

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 personal 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, 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, WOAHA ref lab, etc...)

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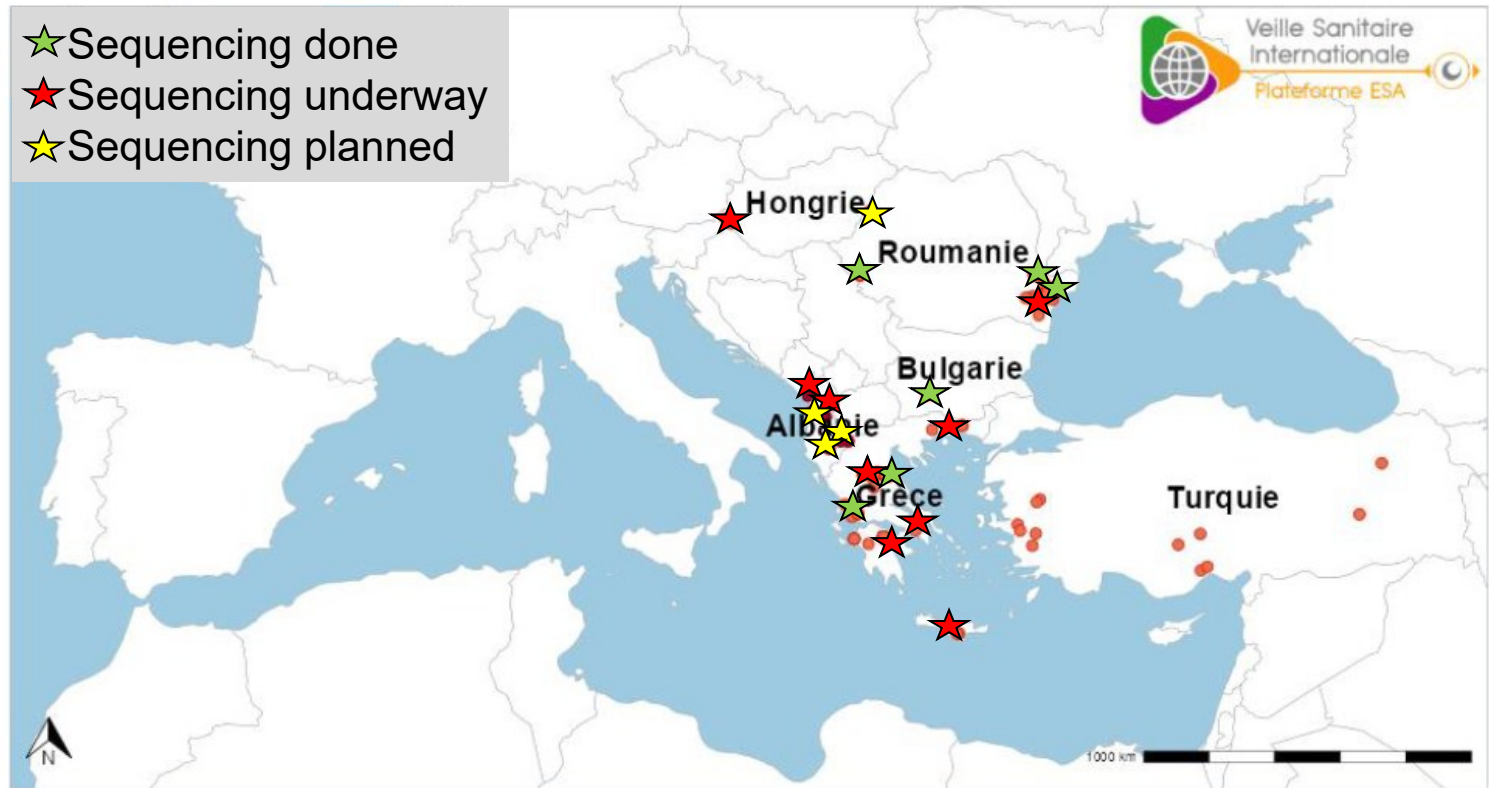
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European Union: PPR vaccination normally prohibited. May be used by EU Member States only in line with Delegated Regulation (EU) 2023/361 ([ELI: http://data.europa.eu/eli/reg_del/2023/361/oj](http://data.europa.eu/eli/reg_del/2023/361/oj)). Vaccination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

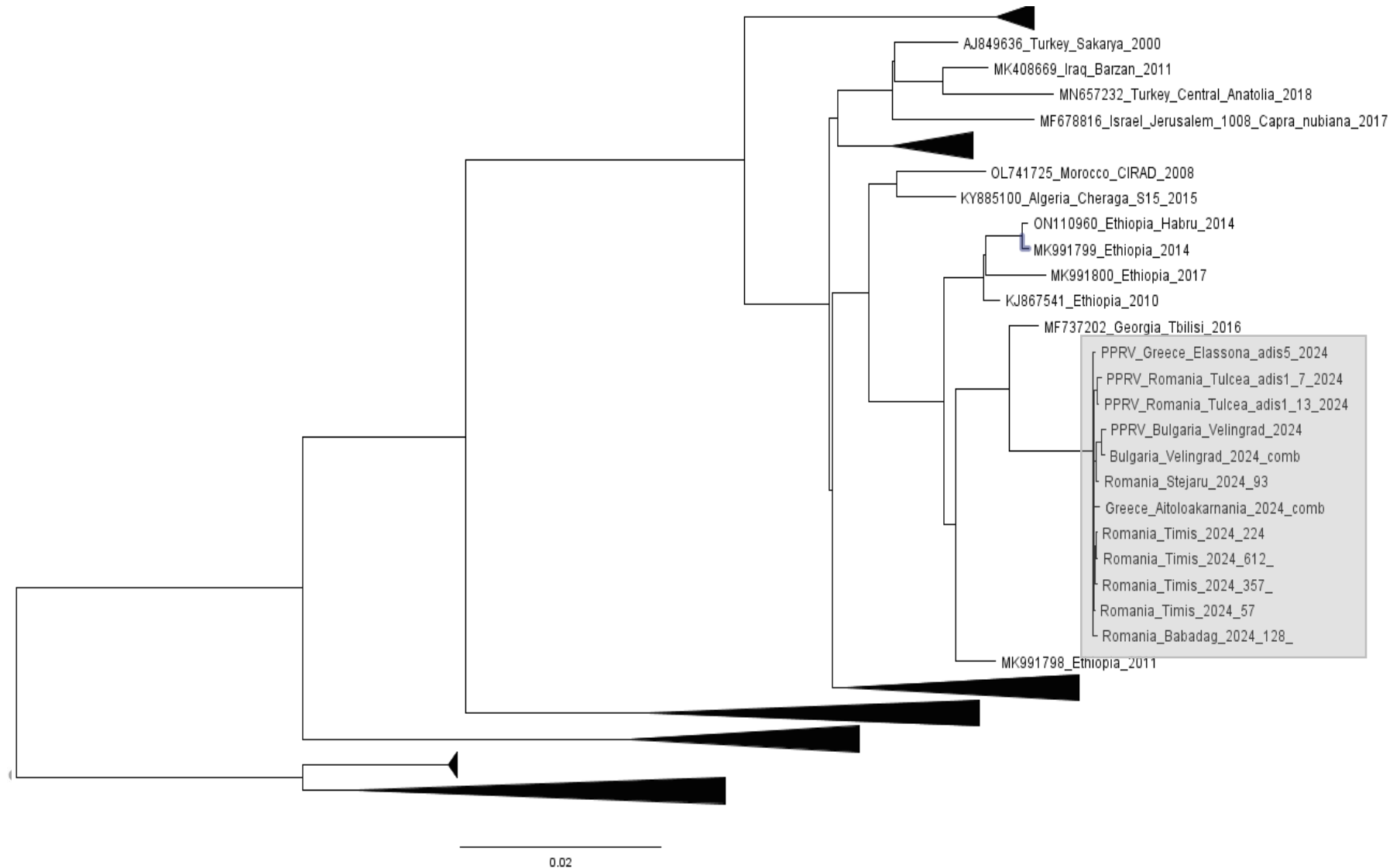
Sequencing effort underway

- Total of 12 full genome sequence obtained so far
- Method modified to improve genome sequencing capacity
- Sequencing underway for additional farms from Romania (18), Greece (8), Hungary (2), Albania (3)



Sequencing effort underway

Aim: better understanding of transmission pathway within Europe



Conclusions

- Threat of PPR to Europe has materialised, with 5 countries infected with a strain of common origin
- Control measures in place but risks of introductions are still high until the situation is clarified concerning unidentified PPRv infections
- All countries should take precautionary measures based on risks associated to legal and illegal animal movements
- Information on symptoms and sampling procedure should be disseminated largely within the veterinarian community
- Reference laboratories can support for field and lab preparedness and genetic sequencing effort
- Additional genetic sequencing on-going to investigate further the dynamic of PPR emergence in the region

THANK YOU

To receive information on the disease, on appropriate sampling, on laboratory methods, and available supports

- EU and WOA/FAO reference laboratory for PPR

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email: contact-eurl-ppr@cirad.fr

website: <https://eurl-ppr.cirad.fr/>

<https://www.ppr-labs-oie-network.org/>

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