EURL
European Union Reference Laboratory
for Plant Parasitic Nematodes

Funded by
the European Union

EURL Nematodes:
Collaboration to Strengthen & Harmonize Diagnostics

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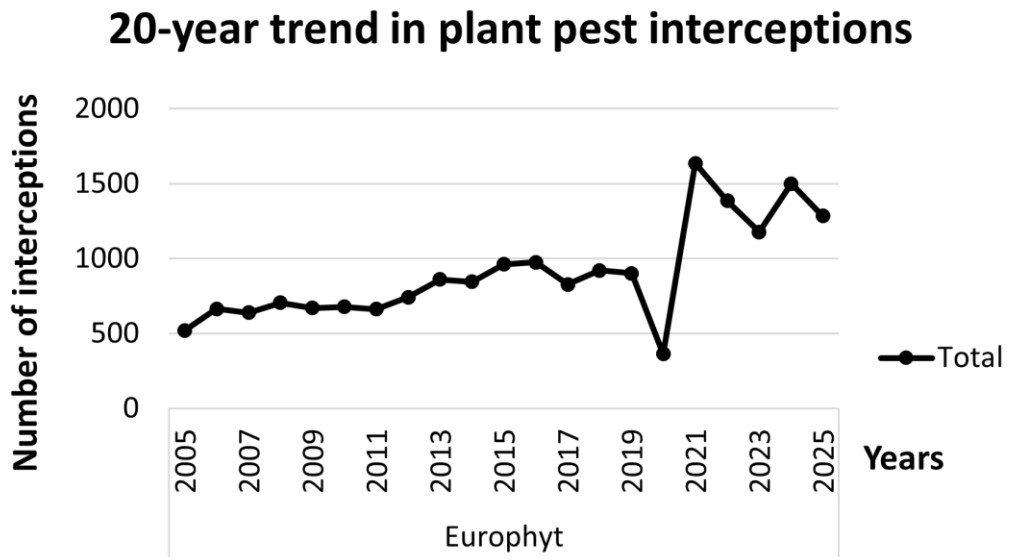
EPPO Conference on Diagnostics, 22-24 April 2026, Vienna

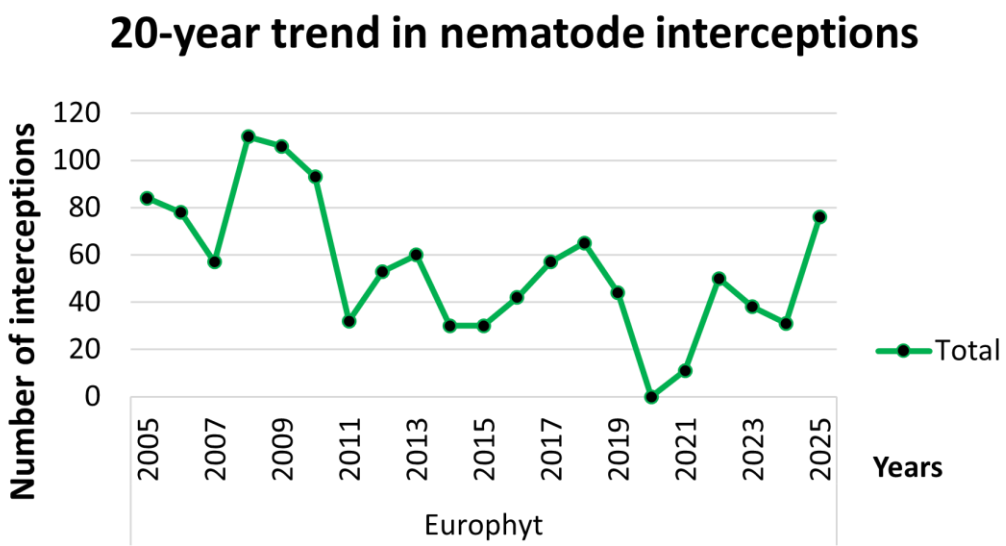
CONTEXT: The Growing Interception of Plant Pests in Europe

Challenges to food safety:

- The increasing **risk of introduction** and **spread** of new plant pests and diseases (**nematode pests**) => international movement of plants and plant products
  - **Global trade**
  - ✓ **Travel**
  - ✓ **Climate change**

Nematodes pests : 6.0% of the interceptions with harmful organisms

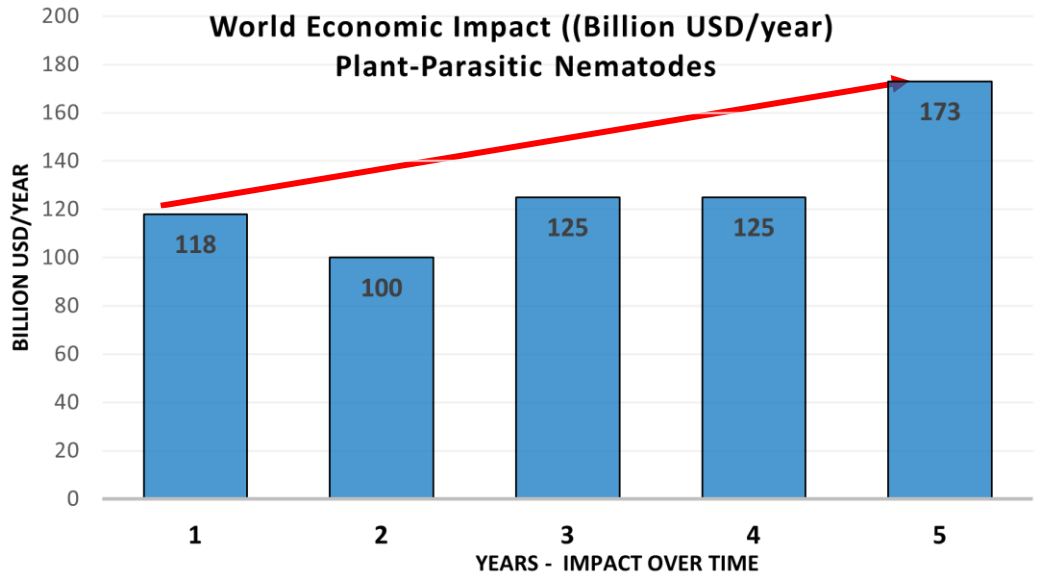




- **Plant Pest interceptions** in the EU:
  - **18.924 interceptions** between 2005 and 2025

- **Nematode Pest** interceptions in the EU:
  - **1.147 interceptions** between 2005 and 2025

Economic impact of plant parasitic nematodes (PPN) on world agriculture



(S. Mukherjee and S. Ray 2023 - Plant-Parasitic Nematodes and Their Management: A Focus on New Nematicides; B. B. Westerdah, 2021 Scenarios for sustainable management of plant parasitic nematodes; Concepción M. Mesa-Valle et al. 2020- Global Research on Plant Nematodes)

Pine trees - *Bursaphelenchus xylophilus*

(Goudet, M, 2010)

Tomato -*Meloidogyne enterolobii*.

Carrot - *Meloidogyne chitwoodi*

(ANSES, LSV Rennes and ILVO pictures)

Potato – *Globodera* spp.

(ILVO picture)

Why Diagnostics Are Critical for Plant-Parasitic Nematodes?

To avoid introduction and spread => long-term agricultural, forestry, and economic impacts.

Early detection prevents spread

Correct identification to avoid costly, unnecessary treatments.

Regulatory compliance support phytosanitary and trade decisions

Effective control decisions

Challenges of Identifying Nematodes:

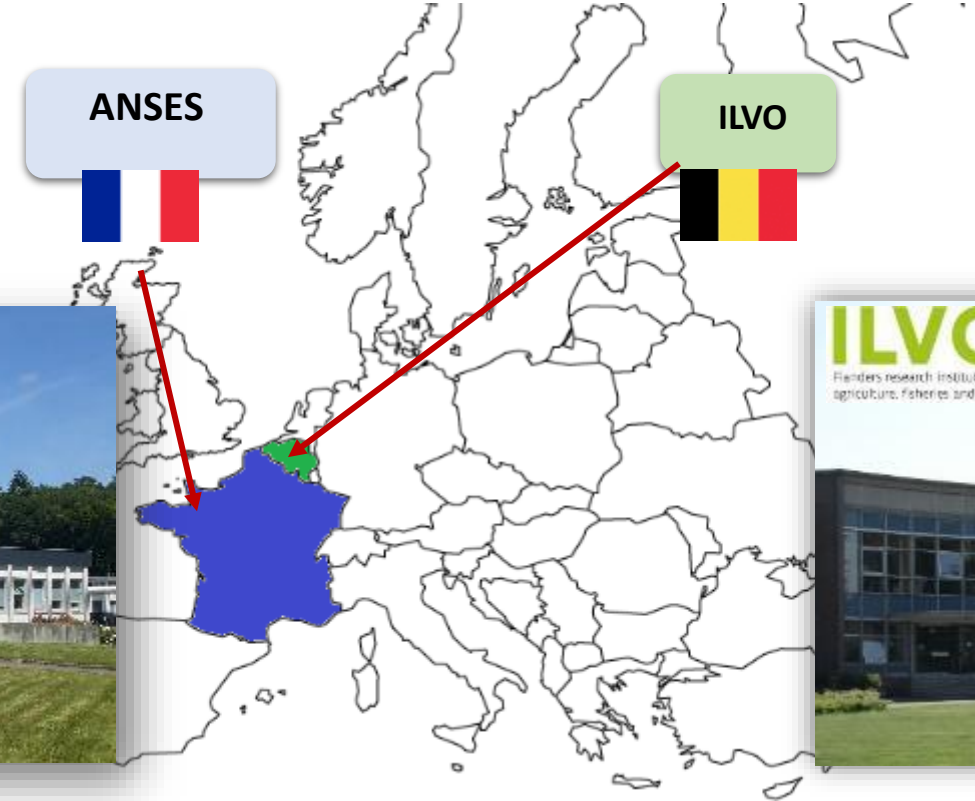
- **non-specific plant symptoms in the aerial parts** => makes an early detection of these nematodes difficult
- Very small size (often <1 mm) =>identification requires **microscopic examination**
- **High biological variability** => intraspecific variation and complex genomes.
- **Cryptic species complexes and evolving taxonomy** => complicate classification.
- **Limited** reference material, diagnostic tools, and genetic information.

WHY & WHO European Union Reference for Plant Parasitic Nematodes

To reinforce official controls at the border and within EU territory, by assisting the EU in the detection and identification of nematode pests

Consortium between ANSES and ILVO

- **EURL for Plant Parasitic Nematodes** is a partnership between
- the **Nematology Unit of ANSES** Plant Health Laboratory (Rennes, France)
- and the **Plant Sciences Unit** of Flanders Research Institute for Agriculture, Fisheries and Food - **ILVO** (Merelbeke, Belgium)



Why Harmonization of Diagnostic Methods is Important?

Ensure the quality, HARMONIZATION, and reliability of methods of analysis, test, or diagnosis used by EU-National Reference Laboratories and the results generated by them.

Standardized methods reduce variability across laboratories => reproducible results between countries

Consistent & comparable results Across the EU

Robust & Unified Data

EU-wide Monitoring Nematode distribution

Rapid & Coordinated Outbreak response Alignment across MSs

Harmonization transforms individual laboratory results into a unified EU diagnostic system

From Methods, through Practice, to Harmonisation

Harmonisation of Diagnostic Methods & Practices

Development & validation of Methods

Implementation of Diagnostic Methods across EU Reference Laboratories

EURL Diagnostic Protocols

- Full workflows:
  - Extraction
  - Detection
  - Identification
- Laboratory operational procedure
- Step-by-step guidance

Training

- ✓ Practical and Virtual sessions
- ✓ Train based on the EURL protocols
- ✓ Educational videos

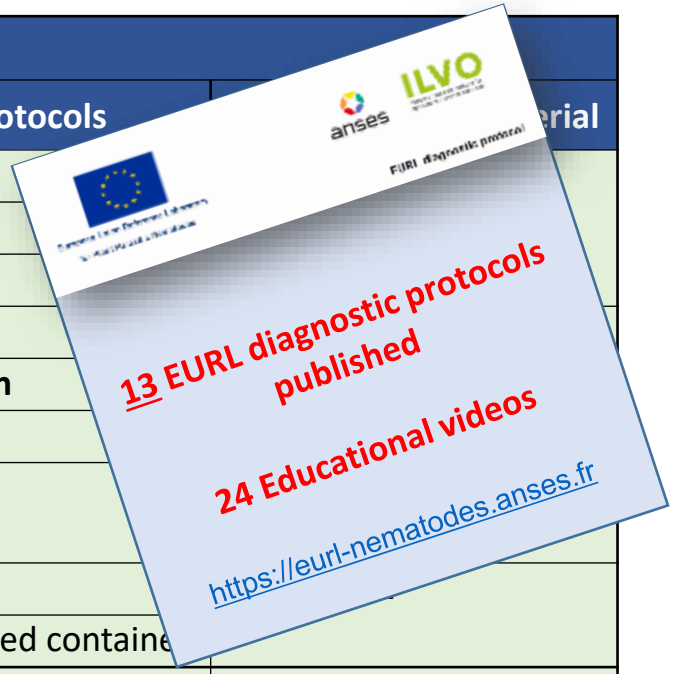
Collaboration with other Organisations

- EPPO – Diagnostic Protocols.
- EFSA – Feedback and revision on new Pest Risk Assessment protocols on nematode identity and diagnostics

Methods of analysis and DPs

Improving and developing new methods → New EURL Diagnostic protocols

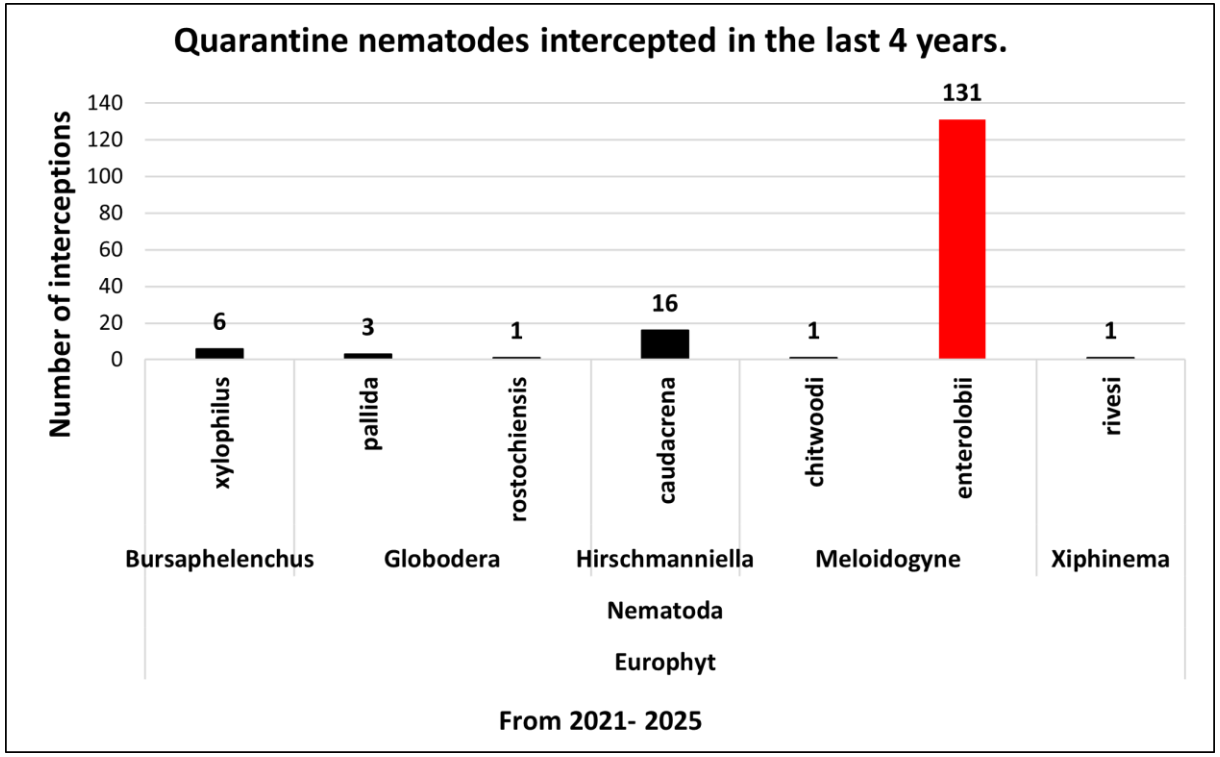
VALIDATION STUDIES			
8 Targets	**New Developed & improved methods**	**EURL Diagnostic Protocols**	**erial**
Meloidogyne fallax ***Meloidogyne chitwoodi***	Extraction	**EURL - MeloExtraction**	
	Combined morphology & molecular	**EURL - MeloIdentification**	
	Molecular identification in soil extracts by qPCR	**EURL- MeloRT-PCR-Soil**	
Globodera pallida ***Globodera rostochiensis***	Extraction and Isolation of Globodera cysts	**EURL-Globo-Extration**	
	Combined morphology & molecular	**EURL–Globo-Identification**	
	Molecular identification by qPCR	**EURL-Globo-qPCR**	
	Determining the viability of eggs and juveniles	**EURL-Globo-Viability**	
Protocol for culturing PPNs	Greenhouse cultures of *Meloidogyne* spp. on tomato plants in pots		
	Culturing of potato cyst nematodes (*Globodera*) & *Meloidogyne* spp. on potato in closed containe		
Bursaphelenchus xylophilus	Extraction from wood	**EURL–B. xylophilus-Extraction**	**Protocols: 3** **Videos: 4**
	Combined morphology & molecular	**EURL–B. xylophilus-Identification**	
	Molecular identification by qPCR from wood & insects	**EURL– B. xylophilus-qPCR**	
Meloidogyne graminicola	Combined morphology & molecular	**EURL - *M. graminicola* -Identification**	**Protocol: 1**
Meloidogye enterolobii	**Molecular detection & identification – real-time PCR**	**For 2026**	
Nacobbus aberrans s.l.	Morphology & molecular identification –real-time PCR	**For 2027**	

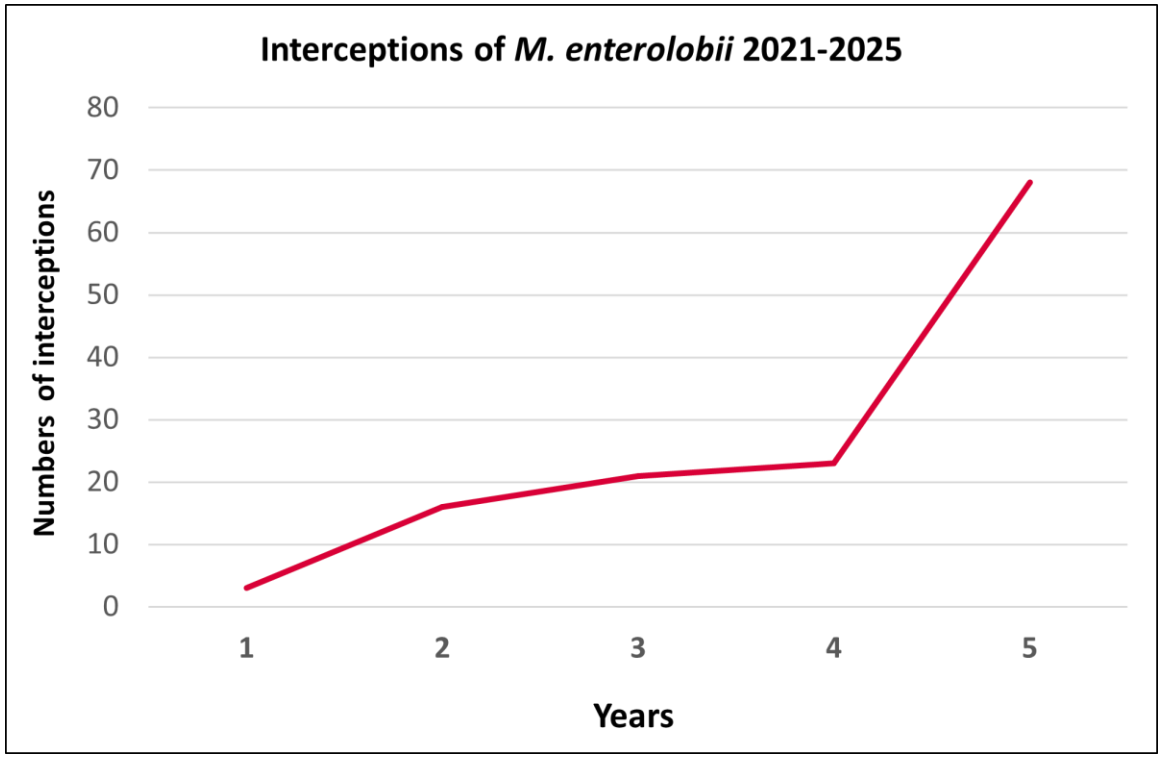


The implementation of these EURL DPs => strengthens laboratory's diagnostic preparedness => enhances harmonization of testing strategies across the EU

Methods of analysis and DPs : *M. enterolobii* Diagnostics =>EURL Diagnostic Protocols

EURL Diagnostic protocols→ in line with phytosanitary risks



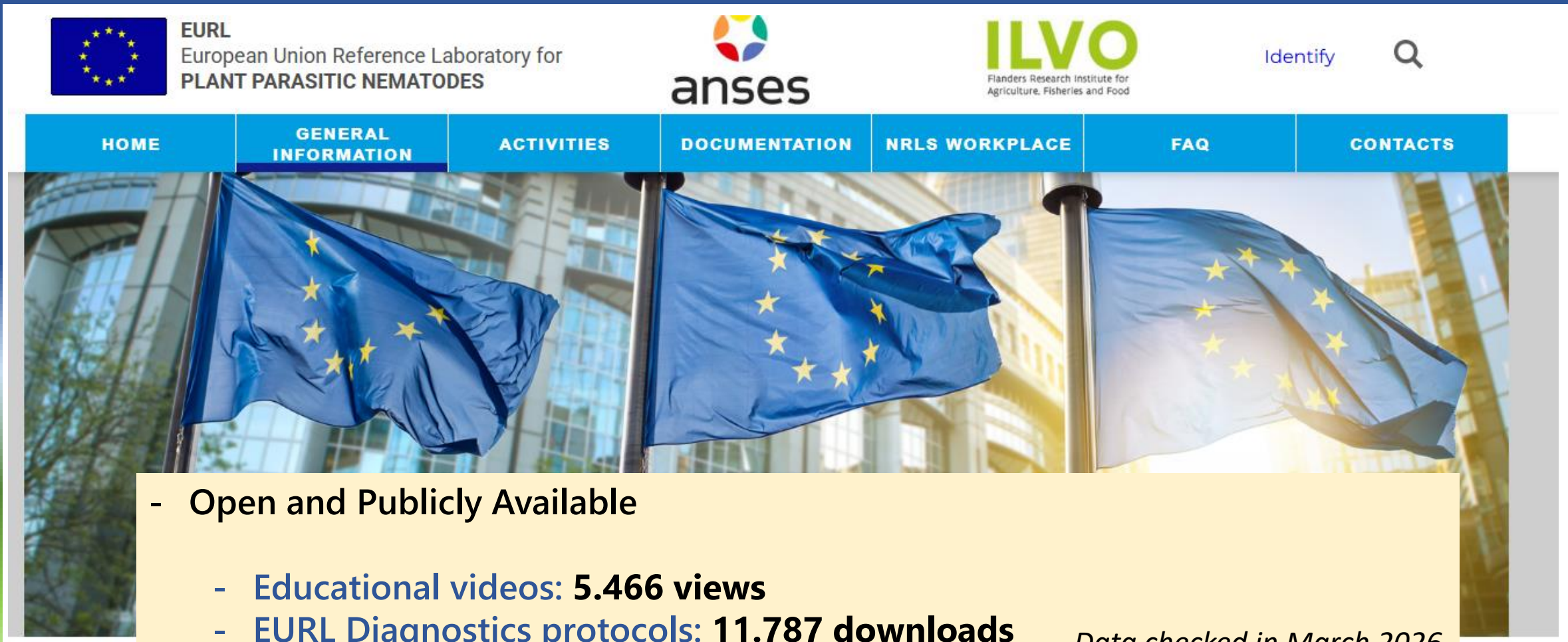


Imported plants found most frequently => infected with *M. enterolobii*

- ✓ *Ficus macrocarpa*
- ✓ *Ipomoea batatas* (sweet potato)
- ✓ *Chrysalidocarpus lutescens* (Palm tree)

EUROPHYT – EU Notification System for Plant Health Interceptions

EURL Impact Across the International Laboratory Network



- Open and Publicly Available
  - Educational videos: **5.466 views**
  - EURL Diagnostics protocols: **11.787 downloads**

Data checked in March 2026

EURL FOR PLANT PARASITIC NEMATODES

Website: https://eurl-nematodes.anses.fr

Through Practice… technical assistance to NRLs

Conducting training courses

- EURL proposes practical and virtual sessions to **train the EU-NRLs** in the identification of quarantine species
  - **2020-2024**: 5 training sessions - **Biology, extraction and identification (morphology and molecular)**
    - ✓ *B. xylophilus*; *Meloidogyne chitwoodi /M. fallax*; *M. graminicola*; *Globodera pallida/G.rostochiesis*; *Nacobbus aberrans*
  - **2026:** rearing nematode reference material
  - **2027**: identification by barcoding

Collaboration with other organisations

Collaboration → Methods of analysis & Diagnostic protocols

➢ **Collaborations with EPPO (2019-2026)**

- **EURL validated methods and Drafting teams** for EPPO DPs (PM7/XX) on EU regulated pests
  - ✓ *Globodera rostochiensis* and *Globodera pallida (*PM7/040(5), 2022)
  - ✓ *Bursaphelenchus xylophilus* (PM7/004(4), revised 2023)
  - ✓ *Meloidogyne graminicola*
  - ✓ *Nacobbus aberrans senso lato*
  - ✓ *Meloidogyne chitwoodi /M. fallax*
  - ✓ *M. enterolobii*
  - ✓ Guidelines for the management of nematode collections used for the production and maintenance of reference material

➢ « **Consistency of documentation**» between EURL and EPPO protocols & Methods => **Harmonization of testing** strategies across Europe.

➢ EURL Nematodes is a **Permanent Member of the EPPO panel** in Diagnostics in Nematodes

PPO STANDARD ON DIAGNOSTICS

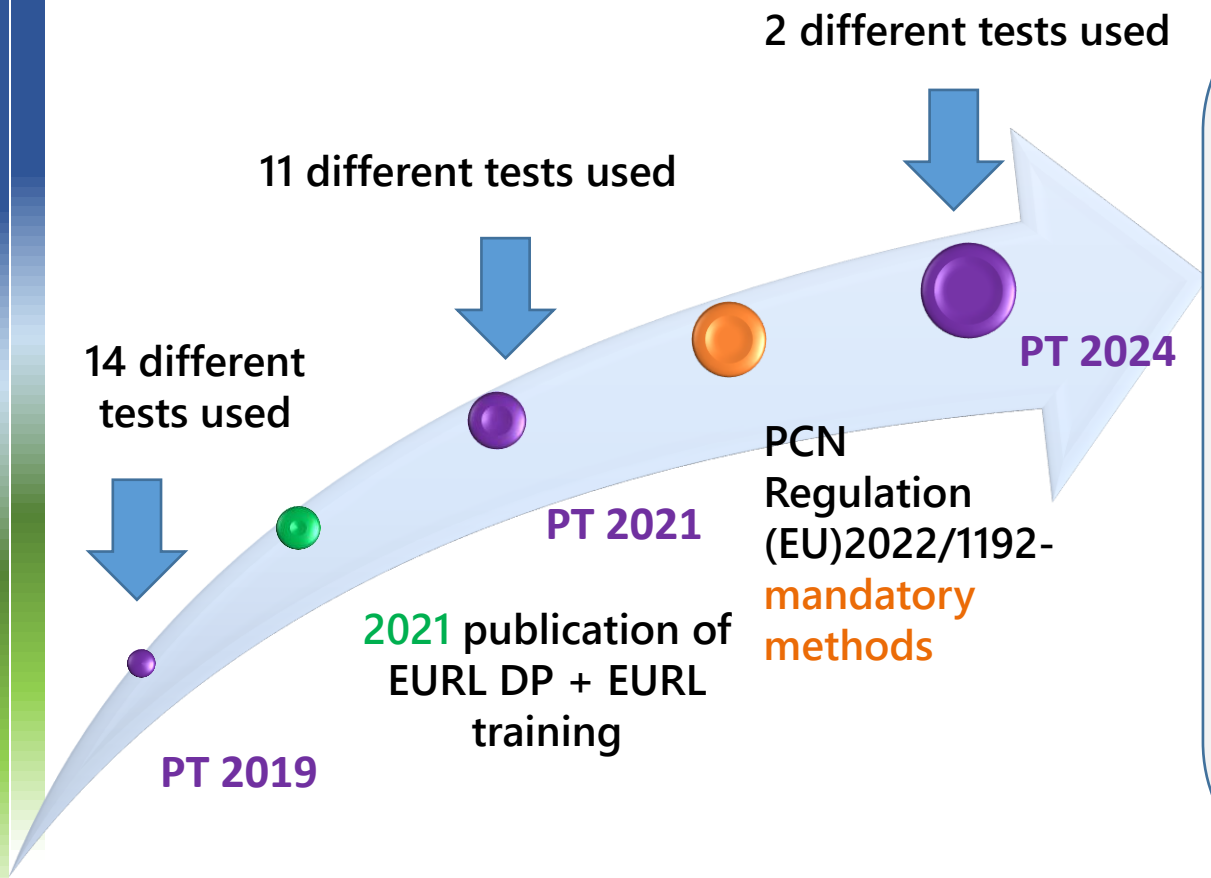
'M 7/158 (1) *Meloidogyne graminicola*

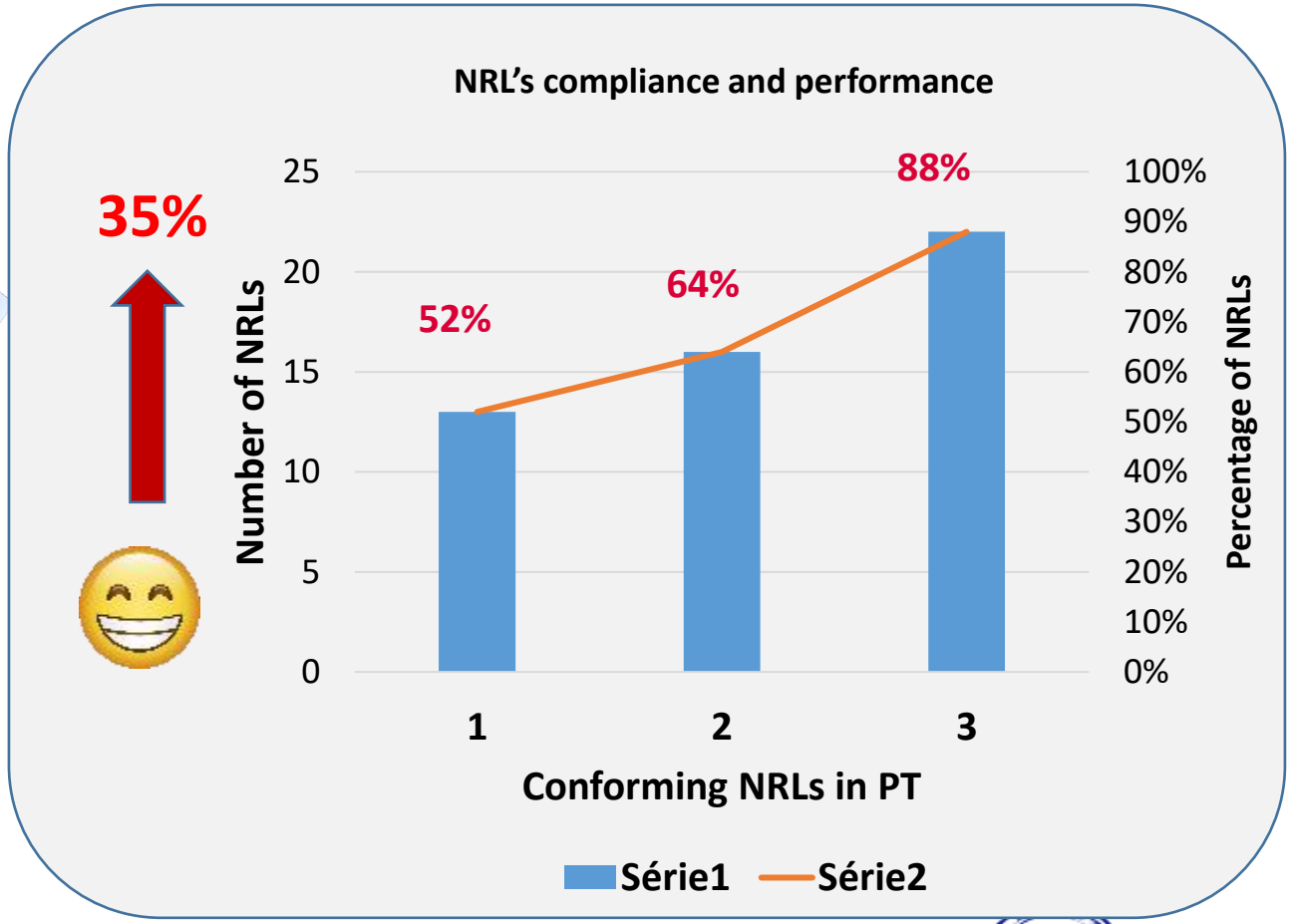
| INTRODUCTION

Panel on Diagnostics in Nematology, January 2026 in Bari (IT).

Harmonization improves the performance of EU laboratory network

Proficiency testing (PT) checks the methods and performance across laboratories => it drives harmonization by identifying variability and problems => encouraging the adoption of reference and standardized methods.

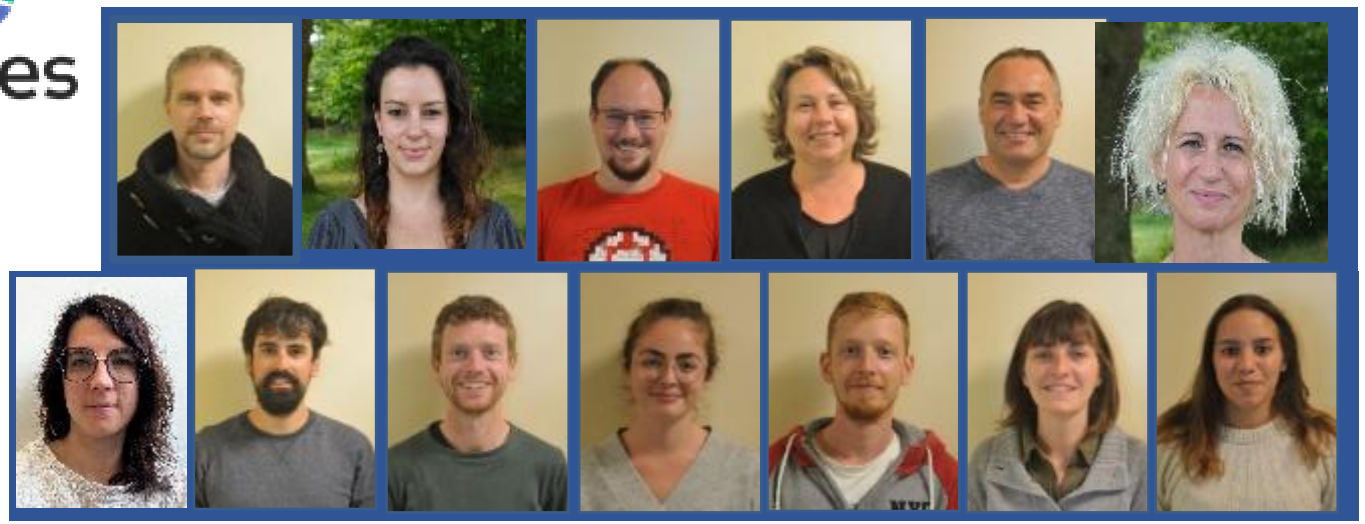




Assistance & harmonization of methods => improves diagnostic capabilities => Strengthening the EU Diagnostic Network

THANK YOU FOR YOUR ATTENTION AND ACKNOWLEDGEMENTS

ANSES – Plant Health – Nematology Unit



ILVO-Plant Sciences Unit

EU NRLs network

F. Munaut – EURL Desk Officer
(DG SANTE, Plant Health Unit)

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