anses
agence nationale de sécurité sanitaire
alimentation, environnement, travail
Connaître, évaluer, protéger

European Commission

ILVO
Flanders Research Institute for
Agriculture, Fisheries and Food

EUROPEAN UNION REFERENCE LABORATORY FOR PLANT PESTS ON NEMATODES: SCOPE, IMPLEMENTATION AND OBJECTIVES

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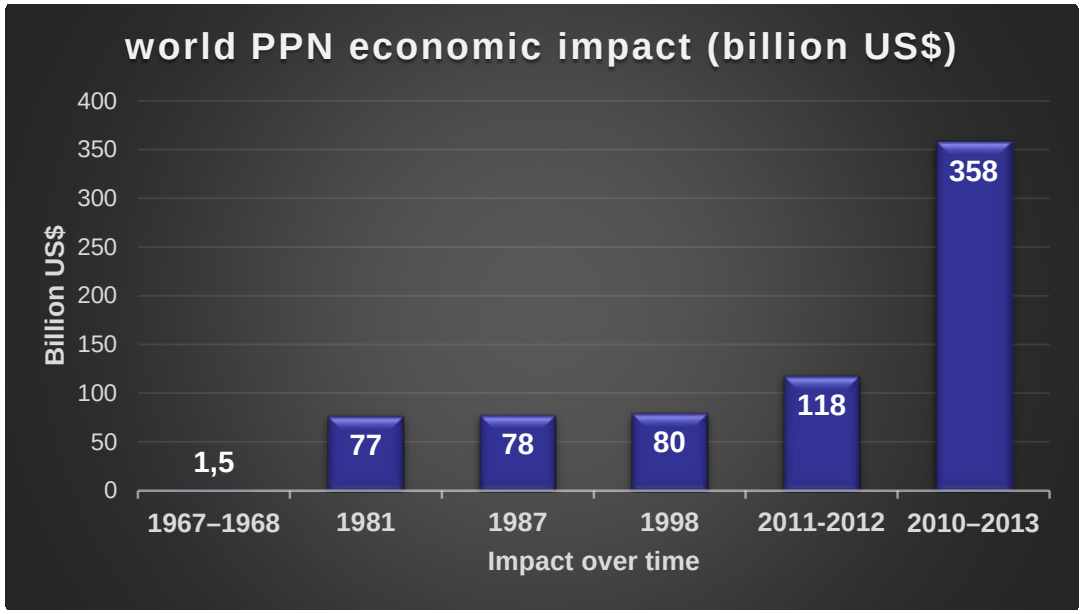
10 September 2019

EPPO Workshop for Heads of Plant Pest Diagnostic Laboratories *09 - 11 Sept 2019*

Presentation outline

- Plant parasitic nematodes economic impact
- EURL context and presentation
- EURL activities
- Work programme 2019 – 2020 and objectives

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



(Bernard G C. et al, 2017, Nematology - Concepts, Diagnosis and Control; Abd-Elgawad M M & Askary TH. 2015 Impact of Phytonematodes on Agriculture Economy)

Pines tree - *Bursaphelenchus xylophilus*
Foliar nematode

(Goudet, M, 2010)

Tomate -*Meloidogyne* spp.

Carrot - *Meloidogyne chitwoodi*

(ANSES, LSV Rennes and ILVO pictures)

Potato – *Globodera* spp.

(ILVO picture)

EURL context

mission

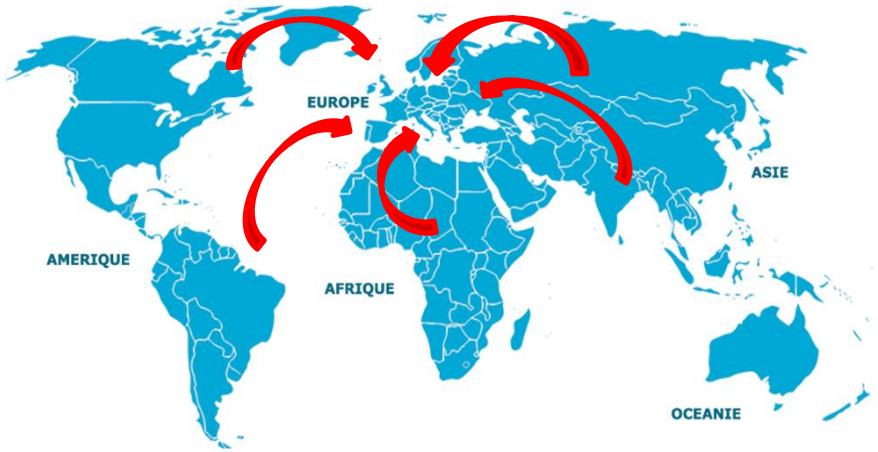
Assist both the European Commission and National Reference Laboratories (NLRs) of each Member State, in implementing the relevant European Plant Health Regulations by providing the knowledge, tools for accurate detection and identification of regulated plant-parasitic nematodes.

Risk anticipation and assessment

New potential threats | PPN dispersion

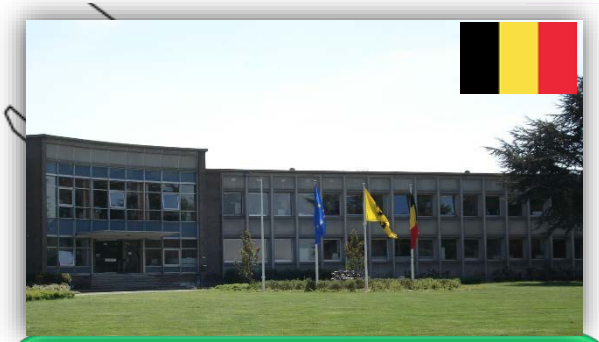
Epidemiology

vigilance | surveillance



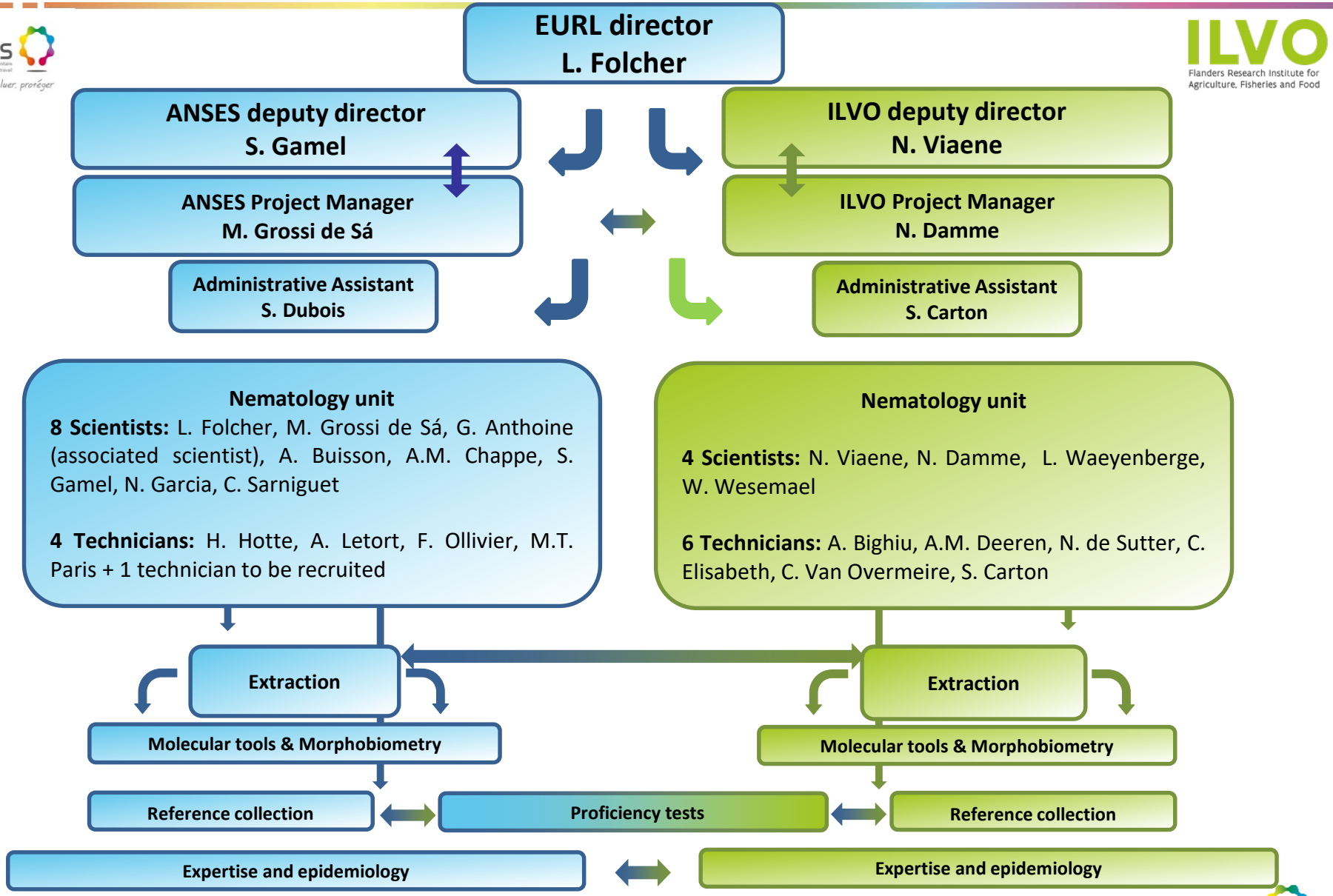
EURL presentation

Plant Health Laboratory - Nematology Unit
Domaine de la Motte au Vicomte – BP 35327
35653 Le Rheu Cédex - France



ILVO-Plant
Burg. Van Gansberghelaan 96
9820 Merelbeke
Belgium

EURL presentation



EURL presentation

Similarities, Complementarities and Plant Parasitic Nematodes expertise of each Nematology unit

B. xylophilus
G. pallida
G. rostochiensis
N. aberrans

ILVO

M. chitwoodi
M. fallax
M. graminicola
X. americanum s.l.
Hirschmanniella spp.

Nematode Collection

Nematodes

Accredited analytical methods

Morphological /Biomolecular analysis

Material

Real time PCR

Morphobiometrical criteria
Conventional PCR

ILVO

Extraction techniques

Schuling
Kort elutriator
Seinhorst elutriator
Oostenbrink

ILVO

AZC (Automated Zonal Centrifugation)

Plant parasitic nematodes expertise

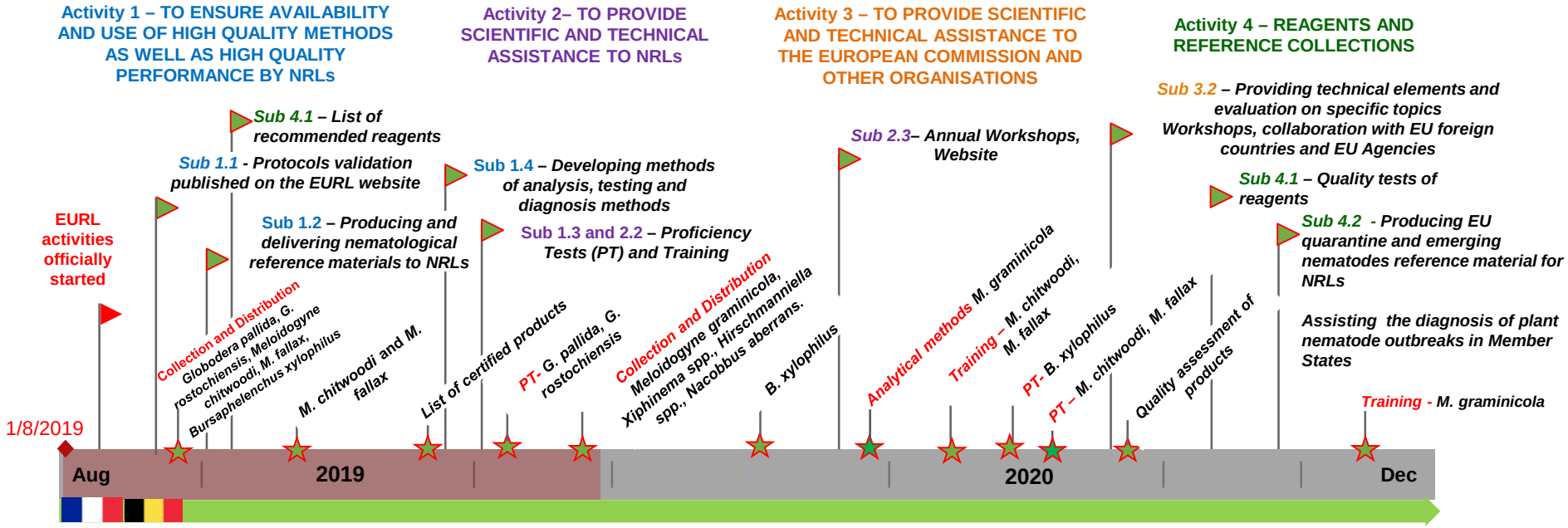
B. xylophilus
G. pallida
G. rostochiensis,

M. chitwoodi
M. fallax
Tropical *Meloidogyne spp.*

ILVO

Laboratories quality assurance
EN ISO/IEC 17025 accreditation certificate

EURL activities



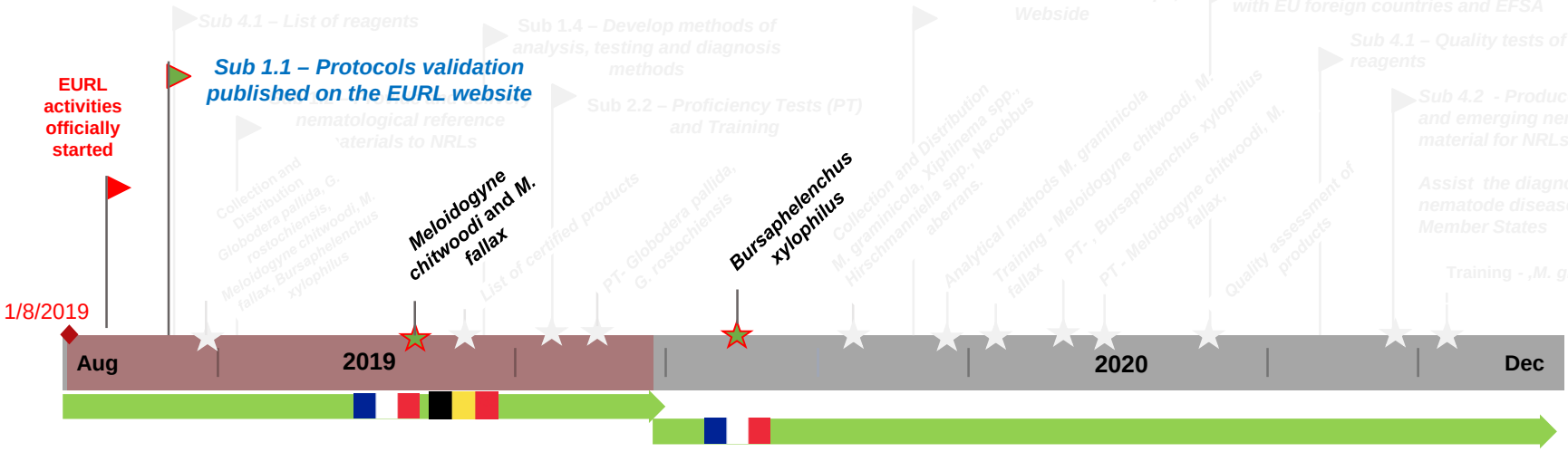
- ***To assist the National Reference Laboratories (NRLs) and the European Commission in implementing relevant European Regulations and diagnostics methods for plant parasitic nematodes***
- ***Work programme designed based on plant parasitic nematodes considered as important threats by the European Commission***








Activity 1 – TO ENSURE AVAILABILITY AND USE OF HIGH QUALITY METHODS AS WELL AS HIGH QUALITY PERFORMANCE BY NRLS



➢ ***Sub-activity 1.1 - Providing NRLs with details and guidance on the methods, including reference methods***

- **Reference detection and identification methods for major quarantine plant parasitic nematodes**
- **Review and compilation of ANSES and ILVO protocols (based on EPPO and IPPC standards)**
- **To inform and provide the NRLs:**
  - **Different available analytical methods**
  - **Reproduce these analytical methods**
- **Conducting a survey on NRL structures, facilities and their analytical capacities**

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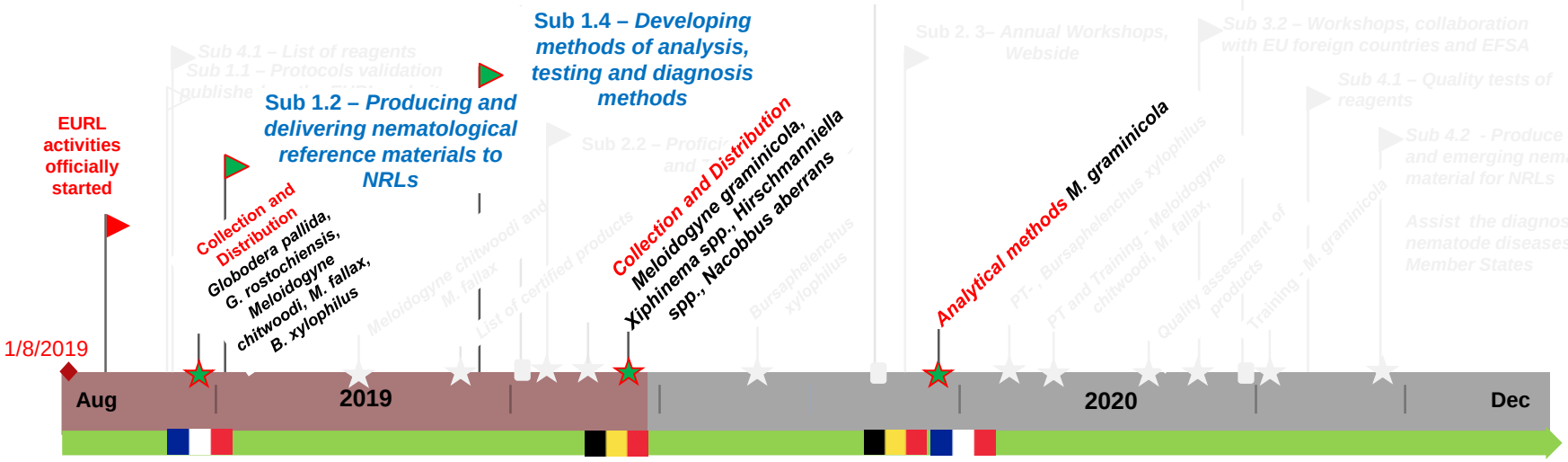


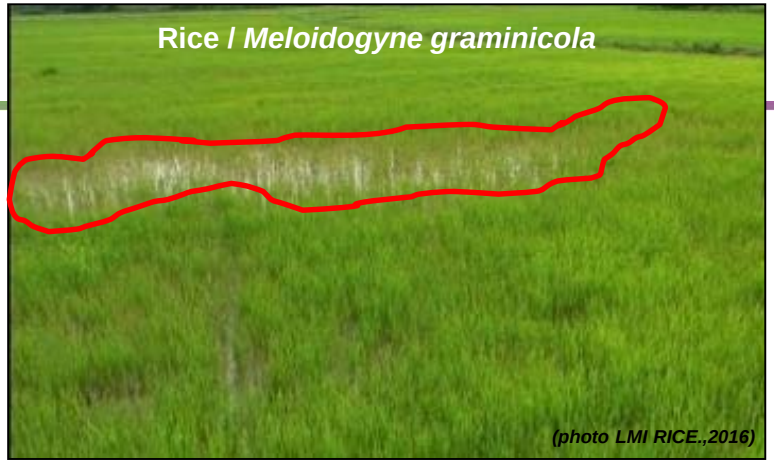
➢ **Sub-activity 1.2 /1.4 - *Providing reference materials to NRLs and develop methods of analysis, testing and diagnosis of high standards***

- **An explicit need regarding the identification of *Xiphinema americanum sensu stricto*, *Hirschmanniella* spp. and *Meloidogyne graminicola* is expressed by the European Commission**

- **Improving analytical methods (detection and identification) for *M. graminicola***

Regarding M. graminicola…

- **The main PPN damaging rice fields**
- **Large host range - more than 98 host plants** (oat, wheat, onion, mustard, lettuce, potato..)
- **Emerging PPN**
  - 2016 - Detected in the EU for the first time in 7 rice fields in Northern Italy and also in 2018 in Lombardia
- **Rice in Europe** - important sociocultural significance – Two thirds of rice consumed by Europeans is grown in the EU
  - **The EU is 70% rice self-sufficient**
  - **Italy is the leading European rice producer**
- Available morphological and molecular diagnostic tests - **require validation and NRLs training**



(http://ricepedia.org/rice-around-the-world/europe)

Detection and molecular characterization of the rice root-knot nematode *Meloidogyne graminicola* in Italy

(Fanelli et al, 2017; Eur J Plant Pathol)

Intraspecific variability of the facultative meiotic parthenogenetic root-knot nematode (*Meloidogyne graminicola*) from rice fields in Vietnam

(Bellafiore et al, 2015; C R biologies)

The development and molecular characterization of a rapid detection method for Rice root-knot nematode (*Meloidogyne graminicola*)

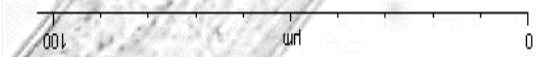
(ChoCho et al, 2016; Eur J Plant Pathol)

Regarding Xiphinema spp. and *Hirschmanniella* spp.

Xiphinema spp.

- ***X. americanum*** **group comprises 61 species** *(EPPO, 2017)*
- **Vectors of economically important regulated viruses**
- **No reliable identification protocols for *X. americanum* group**

Initial EURL proposal : Developing analytical methods to identify the species belonging to *X. americanum* group



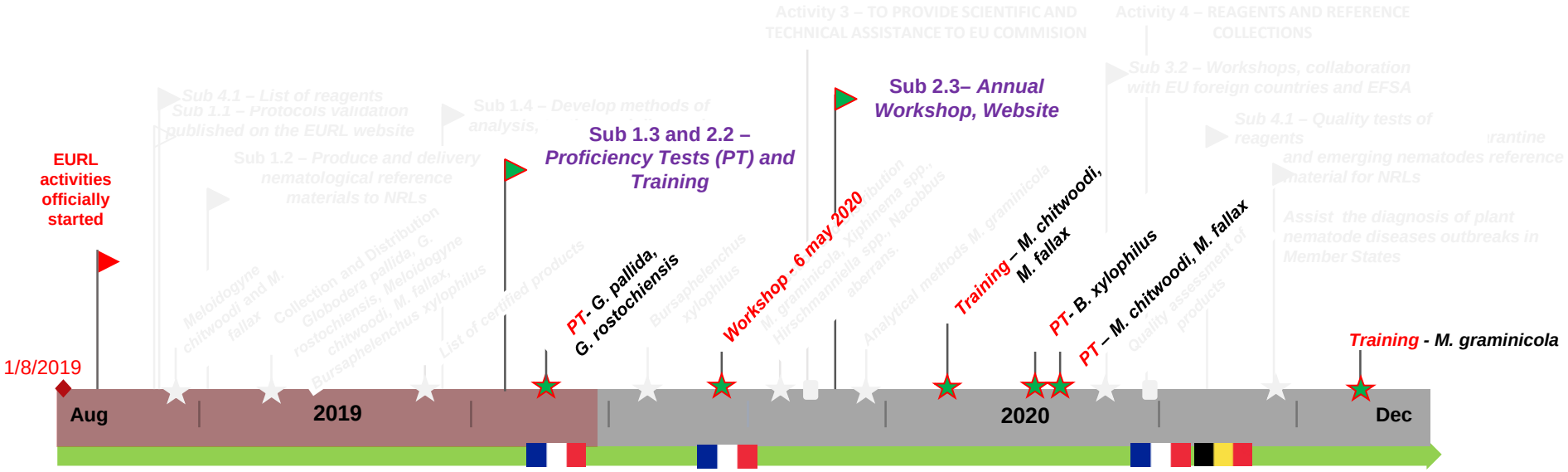
(ANSES pictures)

Hirschmanniella spp.

- ***Hirschmanniella*** **genus contains 29 species described** *(Khun et al, 2015)*
- **Suitable to enter and establish into the EU territory particularly on aquatic plants and in rice production areas**
- **Detection possible but difficult species identification**
  - **High variability of certain morphological and morphometric characters**
  - **Few specimens are available**
  - **Molecular methods lacking routine diagnostics**

All points reinforce the need for close surveillance, risk anticipation and assessment, including the improvement and development of identification methods

Activity 2 – TO PROVIDE SCIENTIFIC AND TECHNICAL ASSISTANCE TO NRLs



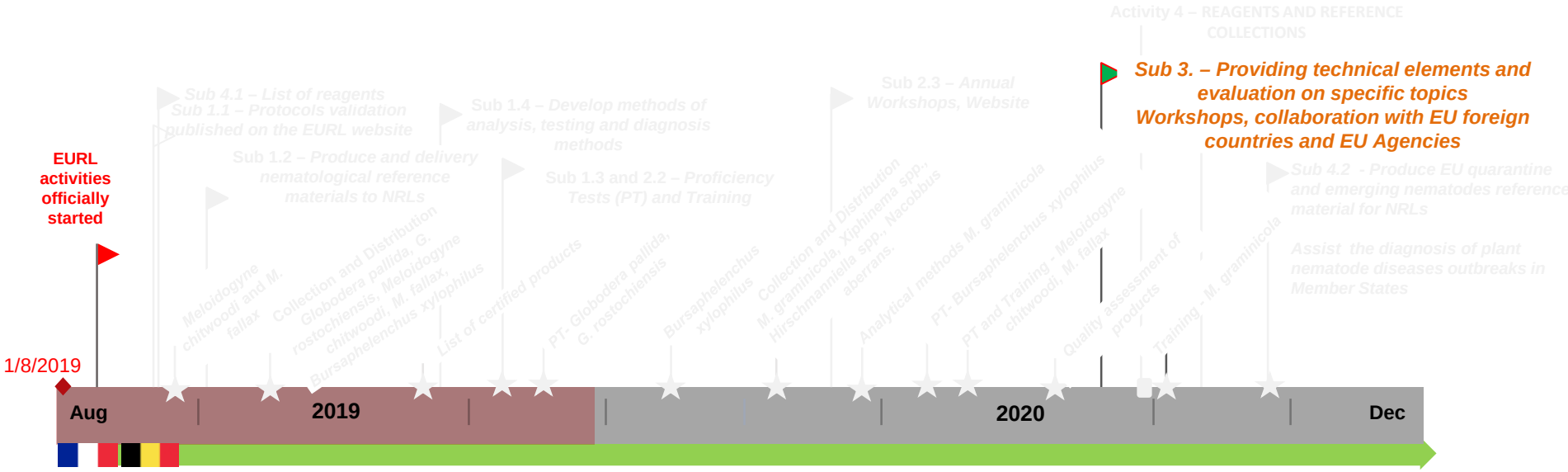
Sub-activity 1.3/ 2.2 - *Organising and leading regular proficiency tests (PTs) and training courses for national reference laboratories (NRLs) staff*

To ensure and assess reliability and accuracy of the analyses carried out by the NRLs

Sub-activity 2.3 *Providing information on relevant international research activities to NRLs and the EU Commission*

- Workshop 2020 - 6 May – Associated to the 7th International Congress of Nematology (ICN)
- Presentation of EURL missions, NRL network and their needs
- News updates on quarantine nematodes
- Ongoing research activities
- Presentation of PTs and training courses programs
- General information - phytosanitary events in nematology
- Update information on the EURL website

Activity 3 – TO PROVIDE SCIENTIFIC AND TECHNICAL ASSISTANCE TO THE EUROPEAN COMMISSION AND OTHER ORGANISATIONS



Sub-activity 3:

(I) Providing scientific and technical assistance to the EU Commission and other organisations

EURL expertise and knowledge

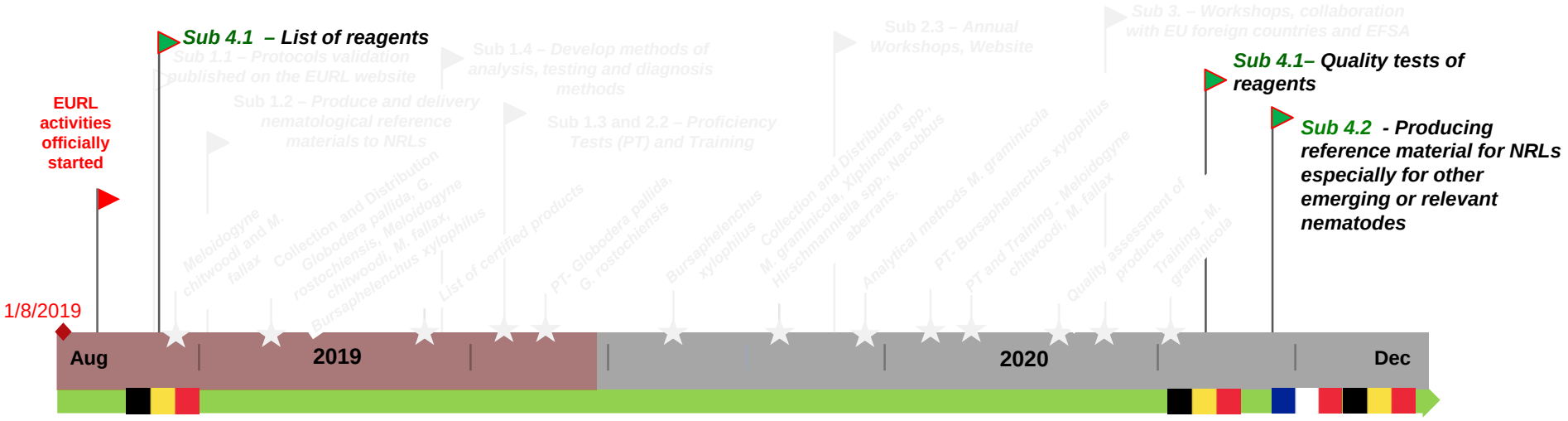
(II) Collaborating with laboratories in third countries, the European Food Safety Authority (EFSA) and other EU Agencies

To improve scientific knowledge and diagnostic capacity

(III) Assisting actively in the diagnosis of plant nematode outbreaks in Member States

To confirm and carry out diagnostic analyses when required

Activity 4 – REAGENTS AND REFERENCE COLLECTIONS



Sub-activity 4.1

Coordinating or performing quality tests of reagents used for plant nematode diagnosis

Making sure that reagents used for nematode diagnostics by NRLs are of sufficient quality (ILVO task)

Updating lists of available reference substances and reagents as well as manufacturers and suppliers **– Website publication**

Sub-activity 4.2 ***Establishing and maintaining reference collections of plant parasitic nematodes***

To provide samples to NRLs

Acknowledgments

EURL Consortium

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Thank you for your attention