



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention



Department
for Environment
Food & Rural Affairs

Introduction to the Scientific Symposium

Plant pests diagnostic: its importance and its relation to food security

London, 21 – 23 September 2022

International Plant Health Conference





In **1** year (2021)

811 million people in the world

were in **hunger** (food insecurity)



Approximately **118 million** more in 2020 than in 2019

Forecast



- **670 million people** will still be undernourished in **2030**:
78 million more than in a scenario in which the pandemic had not occurred.

Source: FAO, IFAD, UNICEF, WFP and WHO. 2021 and 2022 (SOFI).

Main drivers:



Conflicts and wars



Climate change



Economic downturns and crises



Unaffordable healthy food



COVID-19 pandemic in 2020 and its effects

Source: FAO, IFAD, UNICEF, WFP and WHO. 2021 and 2022 (SOFI). FAO 2017.

The impact of plant pests



Loss: 10-16% global harvest **Costs: at least 220 billion USD**

~35-40% global food supply

- **More plant pests are appearing in places where they had never seen before...**

Source: FAO and IPPC 2020. Agrios, 2005.



- The most effective way to **prevent** and **limit** the international **spread of pests** from trade and passenger movement is through **regulatory means**, establishing **phytosanitary measures**.



- It is also important to ensure that **best agricultural practices** are followed to reduce the incidence of pests at the place of origin.



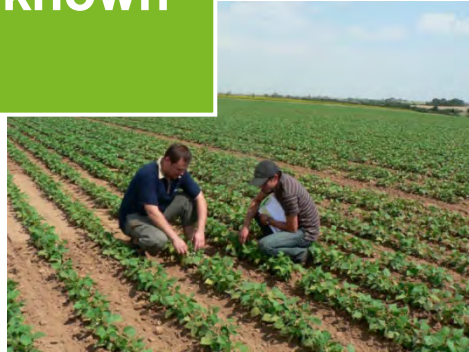
- **Phytosanitary import legislation is the first line of defense** in preventing the international spread of any pest.

Source: FAO 2021 (IPPC)



National Plant Protection Organizations activities

Surveillance
to delimit the distribution of known
pests and detect new ones



Import inspection



Pest outbreaks management



Export inspection

- Pre-export inspection of crop and consignment
- Issuance of phytosanitary certificates

National Plant Protection Organizations activities

- During inspections, samples are collected and are examined for visual symptoms or signs of presence of pests
- Insects are collected in traps and need identification
- Identification of pests is critical

We need to recognize the enemy!

Diagnostic plays a crucial role

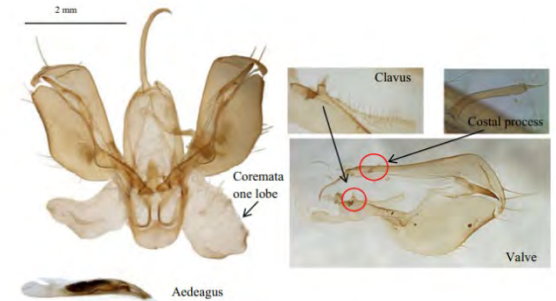
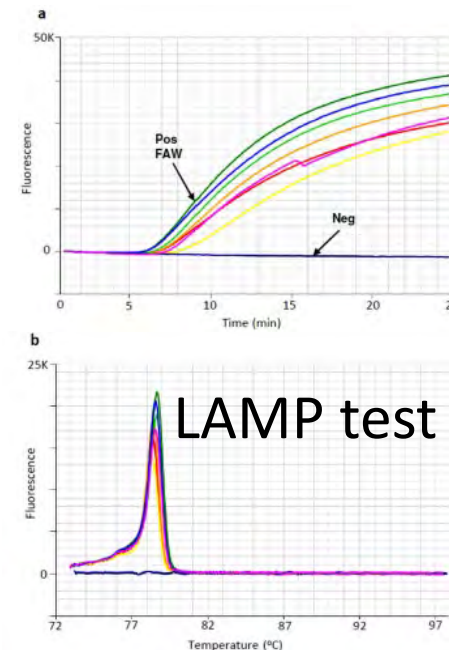
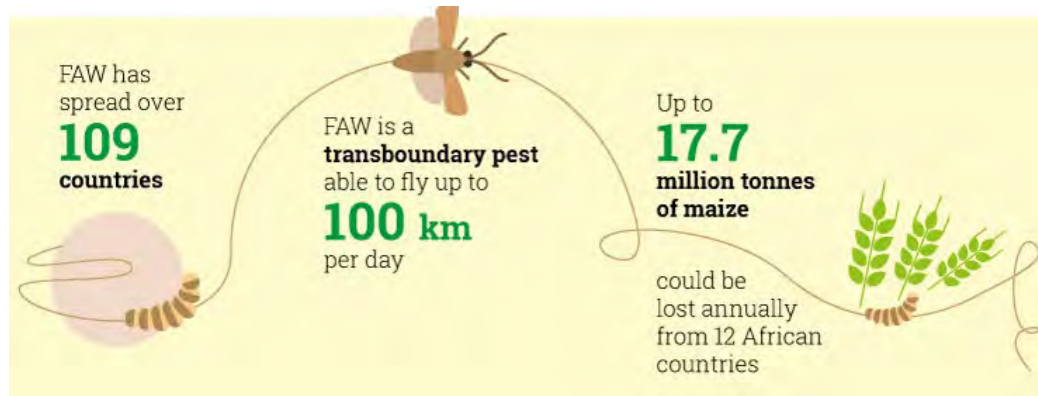



Fig. 63 Male genitalia *Spodoptera frugiperda*. Photos © J. Brambila, USDA-APHIS-PPQ.

IPPC Strategic Framework

The 2020-2030 agenda



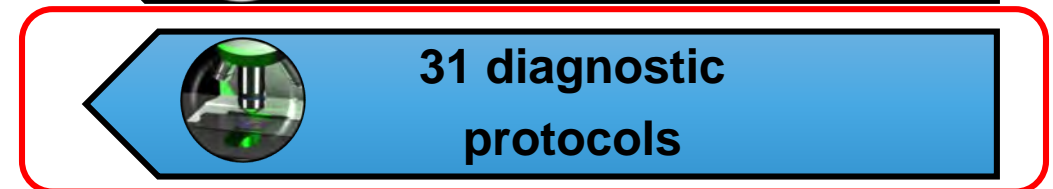
IPPC DEVELOPMENT AGENDA 2020-2030

- | | |
|---|---|
| 1. Harmonization of Electronic Data Exchange. | 5. Strengthening Pest Outbreak Alert and Response Systems. |
| 2. Commodity- and Pathway- Specific ISPMs. | 6. Assessment and Management of Climate Change Impacts on Plant Health. |
| 3. Management of E-commerce and Courier Mail Pathways. | 7. Global Phytosanitary Research Coordination. |
| 4. Developing Guidance for the Use of Third-Party Entities. | 8. Diagnostic Laboratory Network.  |

CONTRIBUTING TO UN 2030 SUSTAINABLE DEVELOPMENT GOALS



ISPMs: the framework for phytosanitary systems and operations





The IPPC diagnostic work programme

Diagnostic protocols
for regulated pests



Food and Agriculture Organization
of the United Nations

R-07
2017

ENG

Recommendation on:
The importance of
pest diagnosis

ADOPTED 2016 | PUBLISHED 2017



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention

R-08
2019

ENG

Recommendation on:
Preparing to use high-throughput
sequencing (HTS) technologies
as a diagnostic tool for
phytosanitary purposes

ADOPTED 2019 | PUBLISHED 2019

“Pest diagnosis is a cross-cutting issue that underpins most International Plant Protection Convention (IPPC) activities. **In order to take action against a pest, it must be accurately identified.** To enable safe trade, pest diagnosis must further be completed quickly and to a **high level of confidence**”.



The IPPC diagnostic work programme

Diagnostic Protocols for Regulated Pests

- **31** adopted diagnostic protocols (as of Sep 2022)
- **27** subjects in the work programme (as of Sep 2022)
- Considered international standards – not scientific publications
- Adopted as annexes to ISPM 27
- Minimum requirements for reliable diagnosis of regulated pests
- Accurate pest diagnosis (basis of an effective pest surveillance)
- Fundamental to national plant pest surveillance system



The IPPC diagnostic work programme

Technical Panel on Diagnostic Protocols (TPDP)



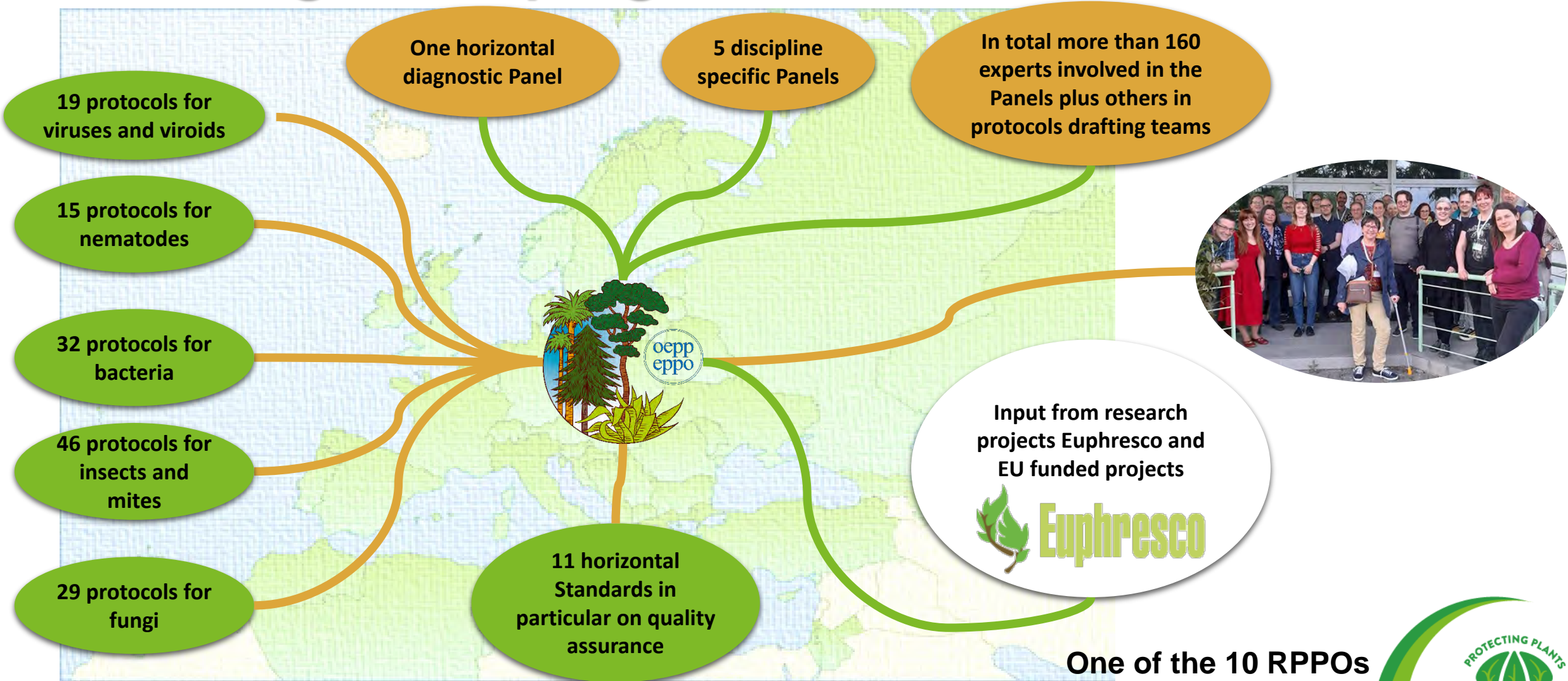
**> 60 authors
from around
the world**

London, 21 – 23 September 2022



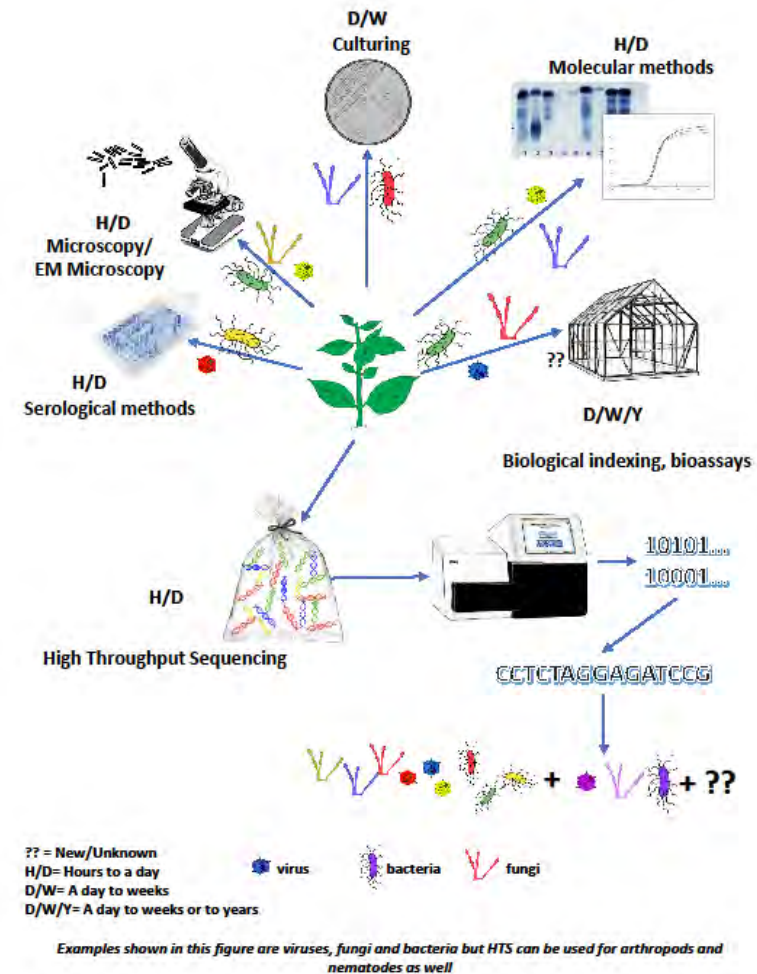
EPPO Diagnostic programme

More than 150 diagnostic standards



EPPO Diagnostic programme – main highlights

- New Standard on High Throughput Sequencing
- Revision of the Standard on Interlaboratory Comparisons
- Also Standards on Quality Assurance and Accreditation



EPPO Diagnostic programme

Regular Conferences/Workshops on plant pest diagnostics

**Workshop on the use of NGS technologies for plant pest diagnostics
2017**

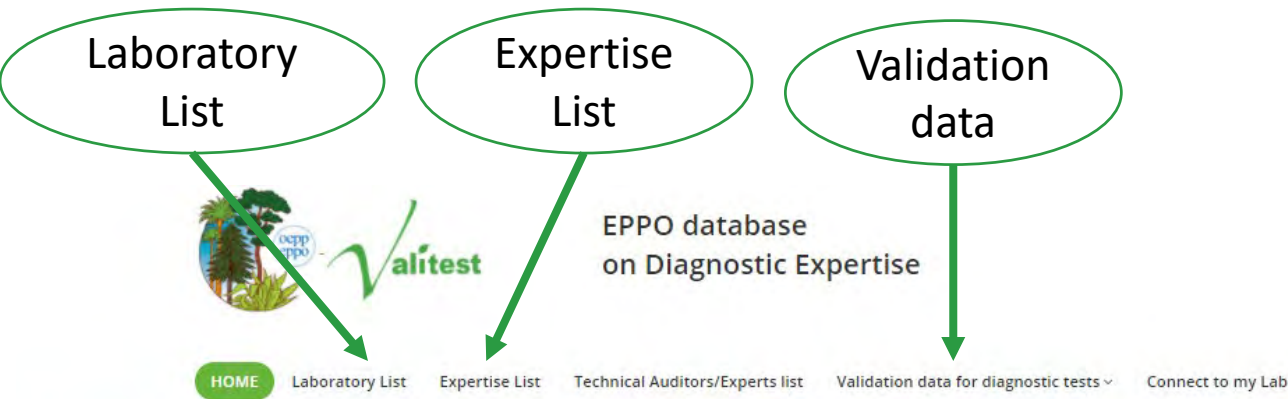


Regular workshops for heads of plant pest diagnostic laboratories

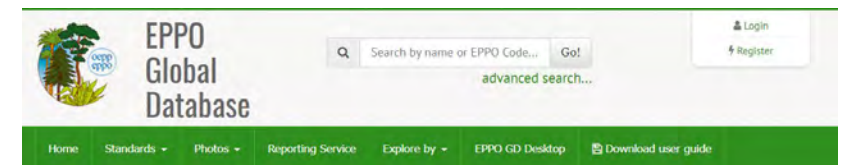


**Next workshop 2023
Organisation of Proficiency Testing
Future of HTS in plant health diagnostics**

EPPO Diagnostic programme - Databases



Linked to EPPO Global Database



This database provides an inventory of the diagnostic expertise available in the EPPO region. Its aim is to cover the expertise on regulated pests (i.e. pests of EPPO A1 and A2 Lists, pests mentioned in EPPO Standards PM4: Production of Healthy Plants for Planting), pests possibly presenting a risk to EPPO member countries (EPPO Alert List) and plants of the EPPO List of invasive alien plants. This database does not include common pests which are widely distributed in the EPPO region. The EPPO Secretariat is maintaining the database but please note that all information included in the database is based on individual expert's own declarations of their expertise. This database had been established as a follow-up action of the EPPO Council Colloquium in Madeira in 2004-09 where the declaration "Plant Health Endangered - State of Emergency" was adopted.



What is on our programme today?

High Throughput sequencing

