EPPO workshop for inspectors
18 November 2025

# EFSA'S SUPPORT FOR MORE EFFECTIVE PLANT HEALTH INSPECTIONS

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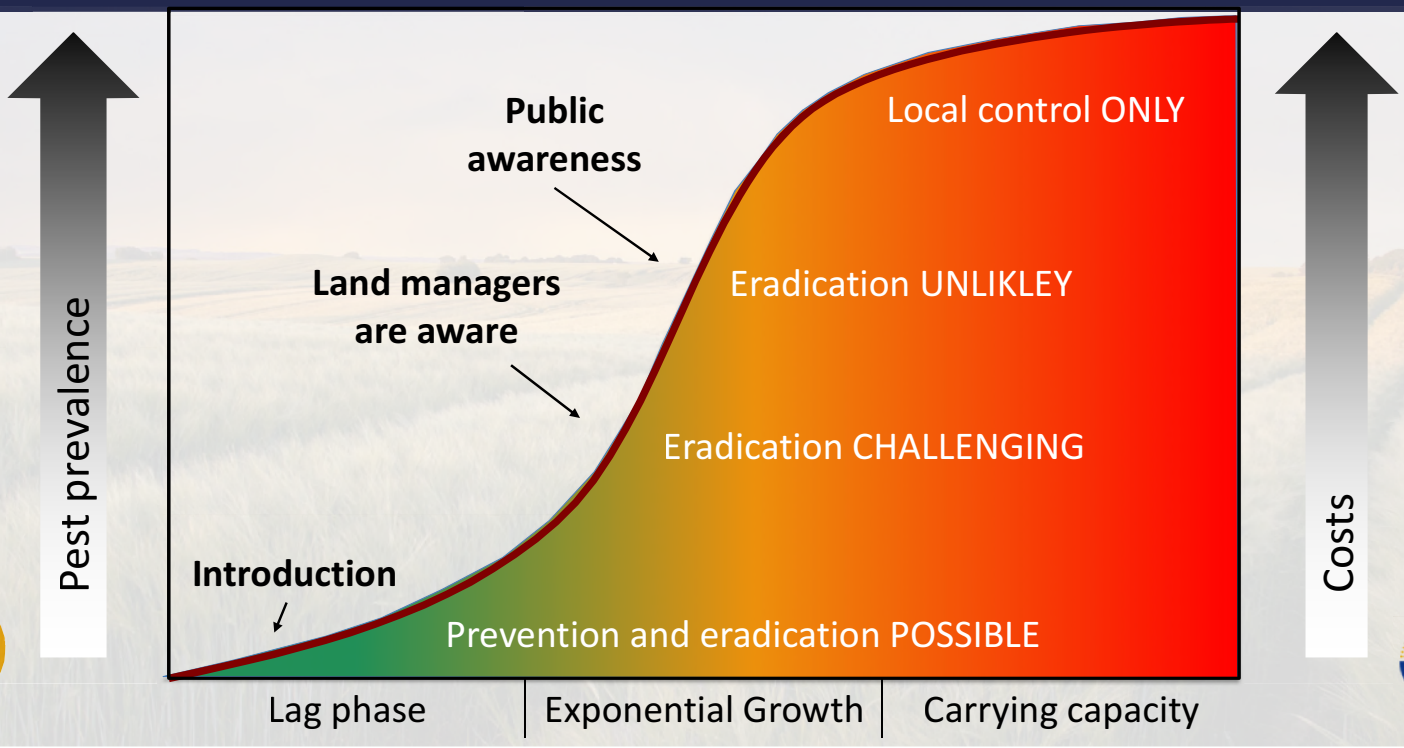
# OUTLINE

- Survey requirements
- Survey parameters
- Remote sensing → Target population and Pre-detection
- e-DNA and Pre-detection
- Insect trapping and detection
- Conclusions

# INVASION PROCESS




From: California Department of Fish and Wildlife (wildlife.ca.gov)

# Regulation (EU) 2016/2031

## Requirements for early detection

**Article 22 - Surveys on Union quarantine pests and provisional UQP**

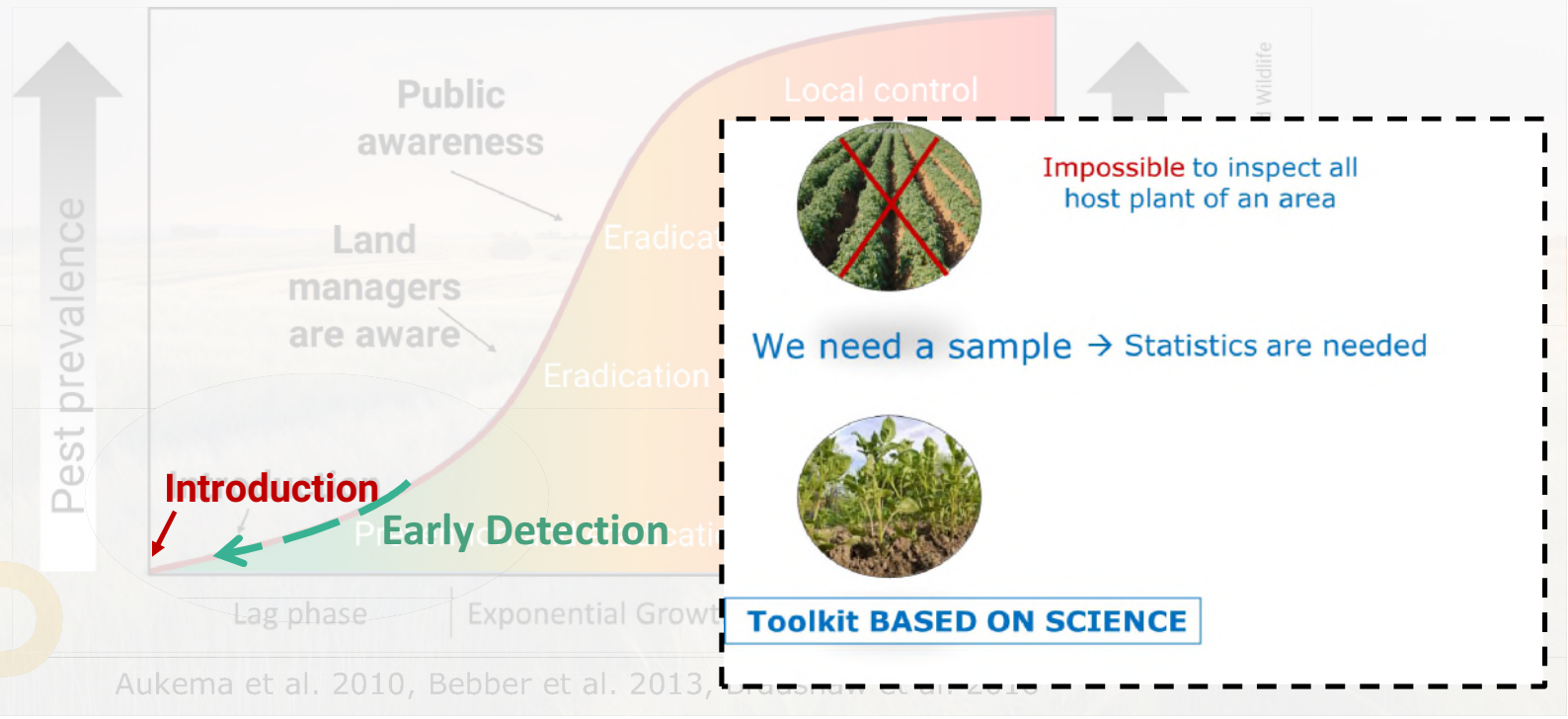
- Risk based detection surveys for all UQP that can become established or spread in a MS
- Visual examination, where appropriate sampling and testing
- Based on scientific sound and technical principles
- Reporting obligations

**Article 23 - multiannual survey programmes and data collection**

**Article 24- Survey of Priority pests**

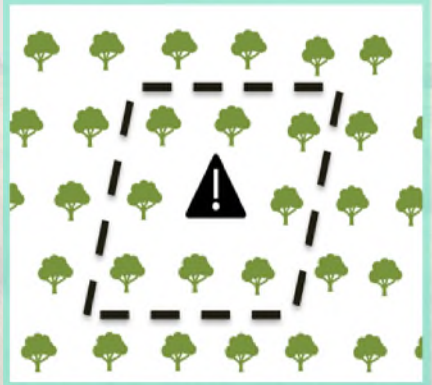
- Annual survey
- sufficiently high number of visual examinations, sampling and testing, with a high degree of confidence, the timely detection of those pests
- Reporting obligations

# EARLY DETECTION AND SURVEY



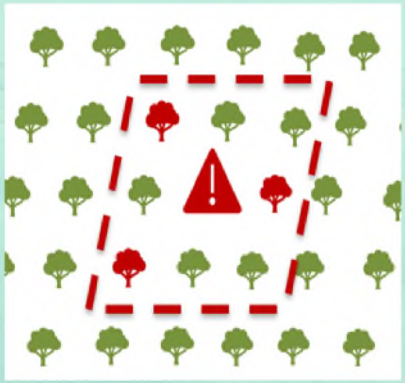
# EARLY DETECTION: PEST FREEDOM SURVEYS

**Detection Surveys**



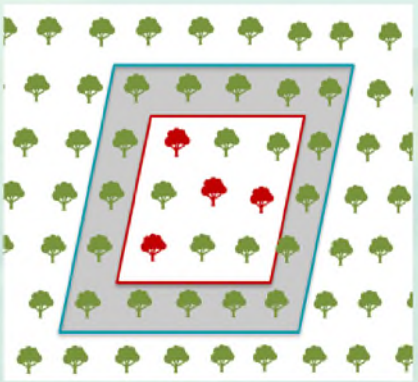
*Is the pest present? (pest freedom)*

**Delimiting Surveys**



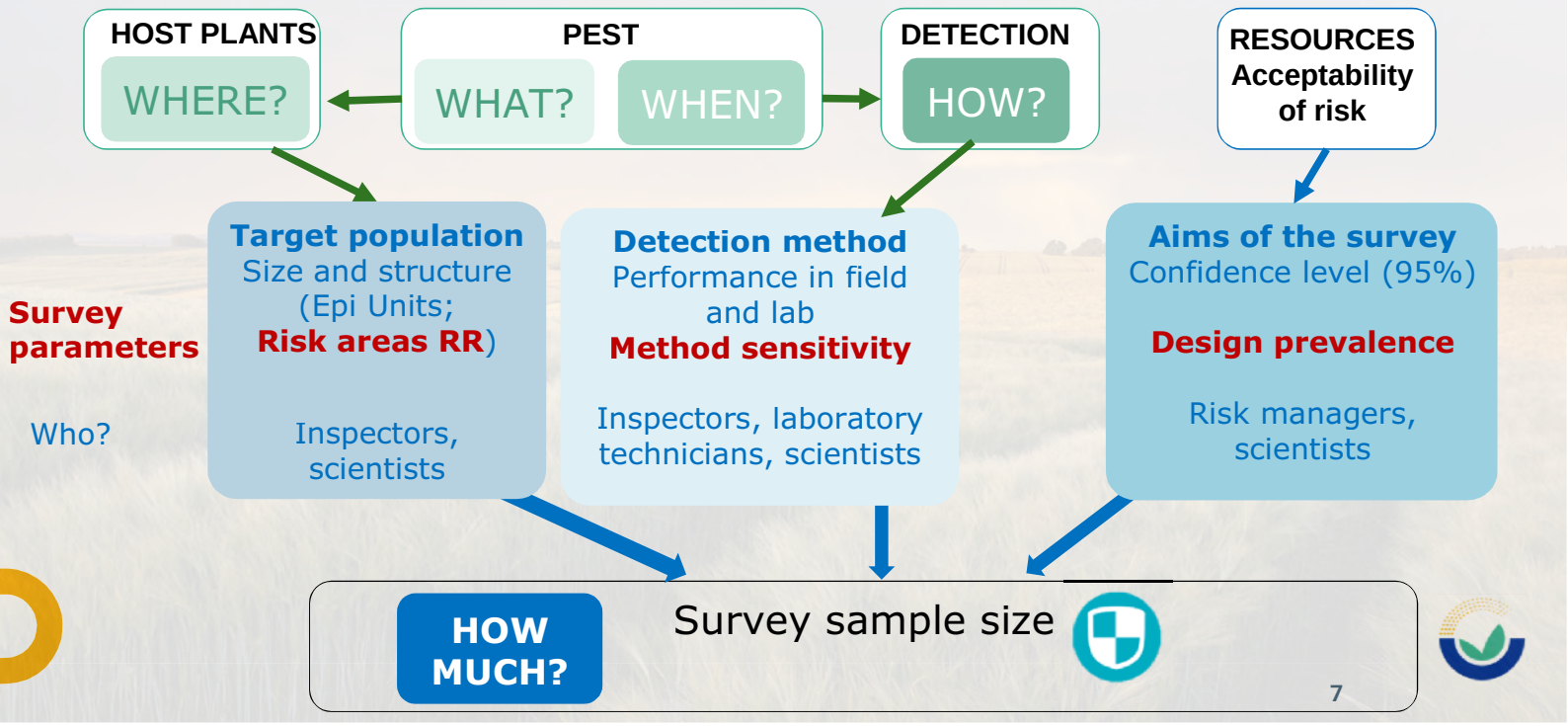
*We know it is present! How far has it spread?*

**Buffer zone surveys**



*Has it spread further?*

# SURVEY PARAMETERS



# WHERE: TARGET POPULATION STRUCTURE AND SIZE

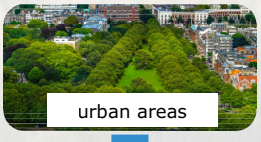
## SURVEY AREA

Country or administrative subdivision

## EPIDEMIOLOGICAL UNITS

land use categories






Level of application of the statistics

## RISK AREAS

areas around garden centres

hosts with higher probability of infection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© EPPO and Anne-Sophie Roy

Relative risk
Proportion of the population

## INSPECTION UNITS

host plants

Elementary unit for defining the size of the subdivisions

Level of application of the detection method

# WHERE: TARGET POPULATION

**MS NPPOs often have no access to precise data on the geographical distribution of the target population in a survey area.**

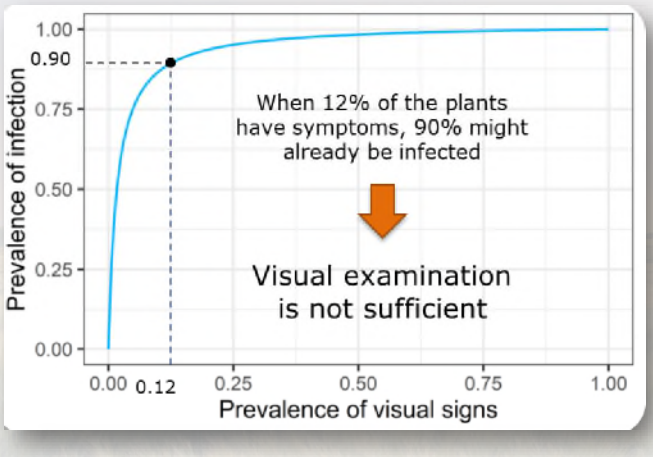
| | | |
|---|---|---|
| Remote sensing and advanced imaging | Satellite | Multispectral |
| | | RGB |
| | | Thermal |
| | | Other |
| | Airborne/Unmanned Aerial Vehicle (UAV)/Mobile platform | Hyperspectral |
| | | Multispectral |
| | | RGB |
| | | Thermal |
| | | Light Detection and Ranging (LiDAR) |
| | | Other |
| | Handheld | Spectrometer |
| | | RGB |
| | | Thermal |
| | | Other |

# WHERE: TARGET POPULATION

**Using remote sensing:**

- Can we map the target population? Are those maps available?
- Can we map epidemiological units and risk areas? Can we better target the survey by mapping areas where the probability of presence of the pest is higher?
- Can we estimate the size of each subdivision? Epi Units Risk Areas
- Can we measure the spread of the infection front in the Infested zone?
- (Can we estimate the impact caused by a pest?)

# HOW: DETECTION METHOD & SENSITIVITY




Sequence of methods for detecting and identifying the pest **from the field to the laboratory**

Visual examination + Sampling + Molecular identification

**Method sensitivity**

(efficacy of detection, ISPM31)

= Sampling effectiveness X Diagnostic sensitivity

# HOW: DETECTION METHOD & SENSITIVITY

**MS NPPOs often use Visual examination with very low sensitivity as symptoms are difficult to identify.**

## Option 1

- Using **several detection methods in parallel**, the **overall method sensitivity increases**
- Combination of field detection methods

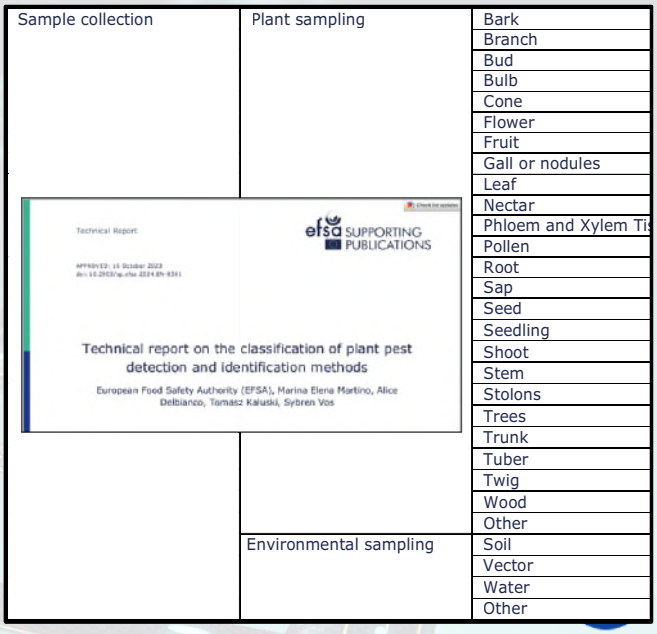
## Option 2

- Using **pre-detection methods**
- e.g. Remote sensing, eDNA

# HOW: DETECTION METHOD & SENSITIVITY

**e.g. e-DNA**

- For which pests eDNA analysis can be integrated in the survey process as a pre-detection method?
- Can we better target the survey performing eDNA analysis to support the prioritisation of the survey locations?
- Can e-DNA analysis improve the overall sensitivity of detection methods?



| | | |
|---|---|---|
| Sample collection | Plant sampling | Bark |
| | | Branch |
| | | Bud |
| | | Bulb |
| | | Cone |
| | | Flower |
| | | Fruit |
| | | Gall or nodules |
| | | Leaf |
| | | Nectar |
| | | Phloem and Xylem Ti |
| | | Pollen |
| | | Root |
| | | Sap |
| | | Seed |
| | | Seedling |
| | | Shoot |
| | | Stem |
| | | Stolons |
| | | Trees |
| | | Trunk |
| | | Tuber |
| | | Twig |
| | | Wood |
| | | Other |
| | Environmental sampling | Soil |
| | | Vector |
| | | Water |
| | | Other |

# HOW: TRAPPING INSECT PESTS

- **MS NPPOs often use traps for insect surveys.**
- **More than 60% of regulated pests in EU are insects**


| | | |
|---|---|---|
| Insect traps | Pheromone Traps | Bucket Traps |
| | | Cone Traps |
| | | Delta Traps |
| | | Funnel Traps |
| | | Water-Trap (McPhail) Traps |
| | | Other |
| | Food-Based Traps | Bait Stations |
| | | Fruit Fly Traps |
| | | Jar Traps |
| | | Sticky Traps with Food Attractants |
| | | Yellow Sticky Traps with Food Coloring |
| | | Other |
| | Sticky Traps | Blue Sticky Traps |
| | | Dual-Sided Sticky Traps |
| | | Sticky Bucket Traps |
| | | Sticky Hanging Traps |
| | | Sticky Roll Traps |
| | | Sticky Sphere Traps |
| | | Sticky Trap Cards with Pheromones |
| | | Sticky Tube Traps |
| | | Yellow Sticky Traps |
| | | Other |
| | Light Traps | Ultraviolet (UV) Light Traps |
| | | Other |
| | Colour Traps | Colour Traps |
| | | Other |
| | | Lure-and- |
| | | Other |
| | | Emergence |
| | | Fermentatio |
| | | Herbivore- |
| | | Interception |
| | | Semichemic |
| | | Other |

# HOW: DETECTION METHOD & SENSITIVITY

**Choosing traps for pest detection in the field is not easy!**

- Which trap is the most appropriate for a given pest (or for type/group of pests)?
- How well do traps perform (trap effectiveness) at low pest prevalence? At high pest prevalence?
- What is the best deployment strategy for detection, delimiting, and monitoring surveys?
- Can a multi-pest trapping approach be adopted to optimize resources?

## NEW CALL TO SUPPORT MS ON DETECTION METHODS

- New detection methods
- Knowledge transfer
- Integration in toolkit
- Practical and usable

**Improve the detection of plant pests**

# FRAMEWORK CONTRACT IN 3 LOTS

Trapping methods (Lot 1)

Environmental DNA (eDNA), (Lot 2)

Remote sensing techniques (Lot 3)

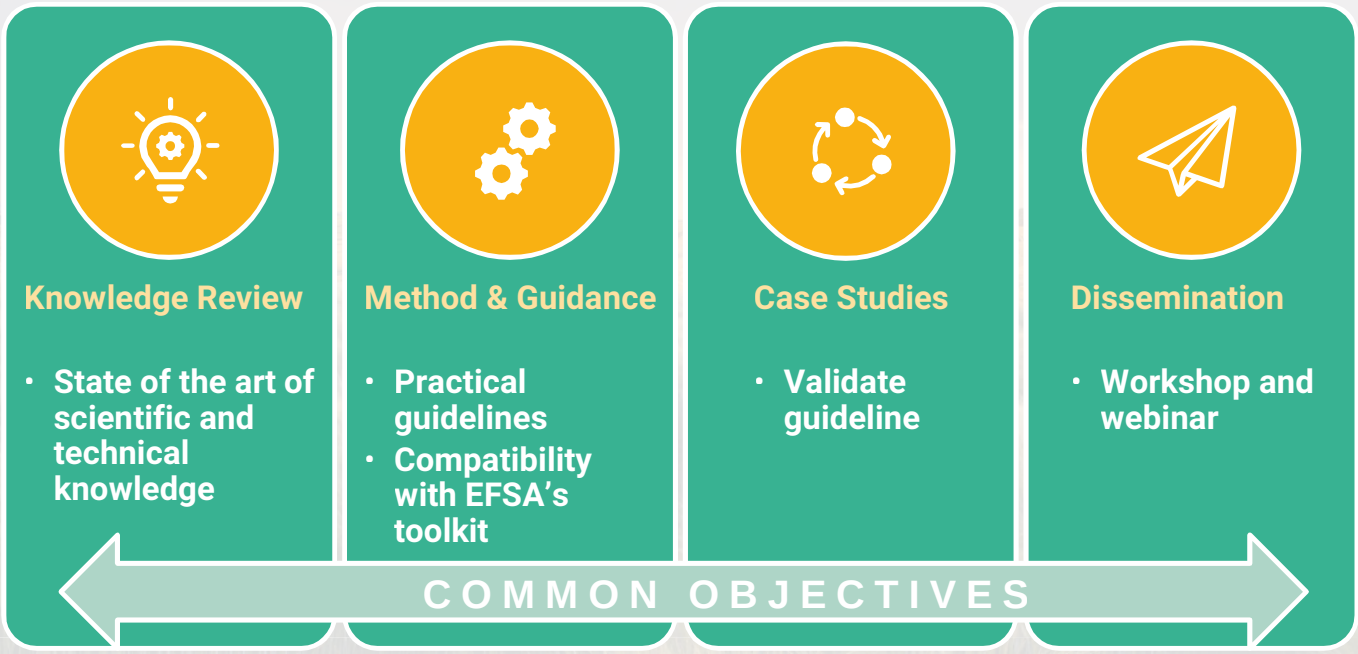
4 YEARS
3 LOTS

Tenders' specification: PART 3

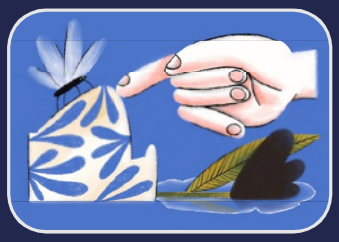
Tenders must be submitted via eSubmission.

**Strengthening EU pest detection & surveillance systems**

# COMMON OBJECTIVES FOR THE 3 LOTS



# CONCLUSION



**Exclusive focus on regulated EU quarantine pests**

**No generation of new research**

**Emphasis on knowledge transfer through state-of-the-art review**

**Produce integrated practical & user-friendly tools**

Remote sensing and e-DNA could be used as PRE-DETECTION methods increasing the pest surveys effectiveness

A lot of knowledge on insect trappings is available and needs to be integrated to use it in improving pest surveys effectiveness

# ANY QUESTIONS

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