Webinar guide for attendees

- This webinar is being recorded!

- The webinar is in English and questions should be submitted in English through the platform
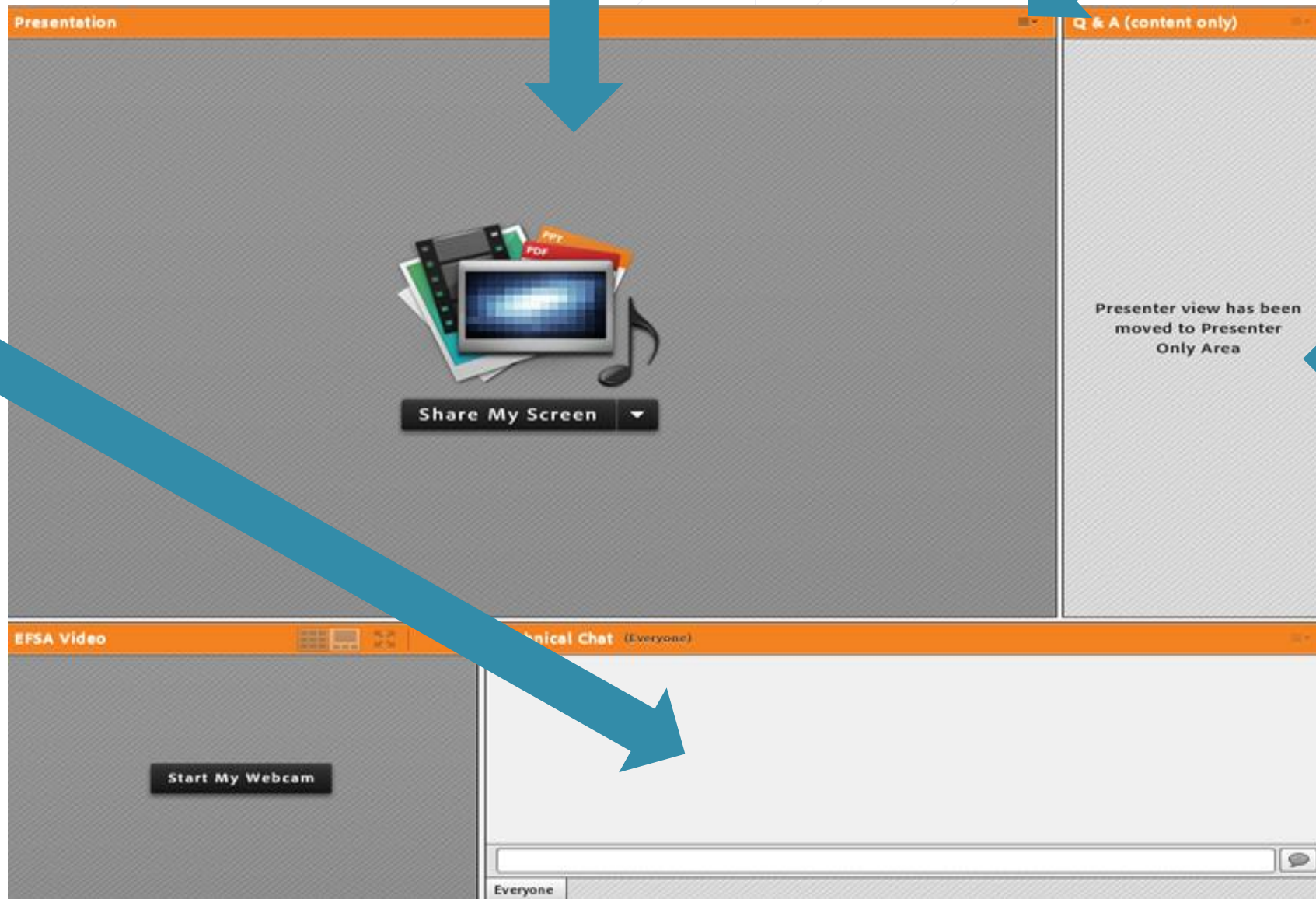
- To communicate with us use the chat boxes

Trusted science for safe food

efsa
European Food Safety Authority

➢ ***Request from the European Commission:***

- to facilitate and support the MSs in the <u>planning and execution</u> of their survey activities

- to provide <u>practical and concise outputs</u>

- to address all pests of the survey work program 2018-2020

- to provide guidelines for surveillance for

<u>3 pilot organisms</u> ⎰ *Xylella fastidiosa*
Phyllosticta citricarpa
Agrilus planipennis

Introduction: context

➢ EU regulatory context

- **EC co-financing programme:**
- **Plant health law:** (EU 2016/2031)
  General requirements
- **Priority pests** (EU 2019/1072)
  Annual surveys and contingency planning
- **Emergency measures**
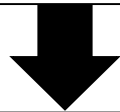
Towards more Prevention, Risk-targeting and Statistics

➢ International context

- **Instructions**
  ISPM 6 on surveillance
  ISPM 31 on Method for sampling consignments
- **Procedures and protocols**
  ISPM 1/4/8/9/10/17/22/26/27/32

Detection, delimiting and monitoring surveys

Introduction: EFSA Toolkit for pest survey

Survey preparation

Pest survey card/Story maps
Guide the surveyor through the gathering of the relevant information for the survey design

Survey design
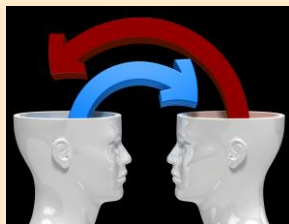
Survey guidelines:
General and specific guidelines for EAB, Xf and CBS
Statistical tool:
RiBESS+ and tutorial

Support to MSs in Workshops:
Tailored pest survey design

Quarantine pests

insects (US)

Pathogens (Europe)

Invertebrates (UK)

"high-impact" insects and path. (US)

Insect and pathogens (UK)

Boyd et al. 2013

Quarantine pests

Entry

Establishment

Spread

Impact

Quarantine pests

Pest prevalence

- Introduction
- Detection
- Land managers are aware
- Public awareness

Lag phase | Exponential Growth | Carrying capacity

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

Quarantine pests

Pest prevalence

Costs

Public awareness

Land managers are aware

Detection

Introduction

Local control ONLY

Eradication UNLIKLEY

Eradication CHALLENGING

Prevention and eradication POSSIBLE

Lag phase | Exponential Growth | Carrying capacity

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Surveillance (IPPC ISPM 5)

Surveillance

Surveillance preparation

WHAT

WHERE

WHEN

HOW

Surveillance preparation

PEST SURVEY CARD

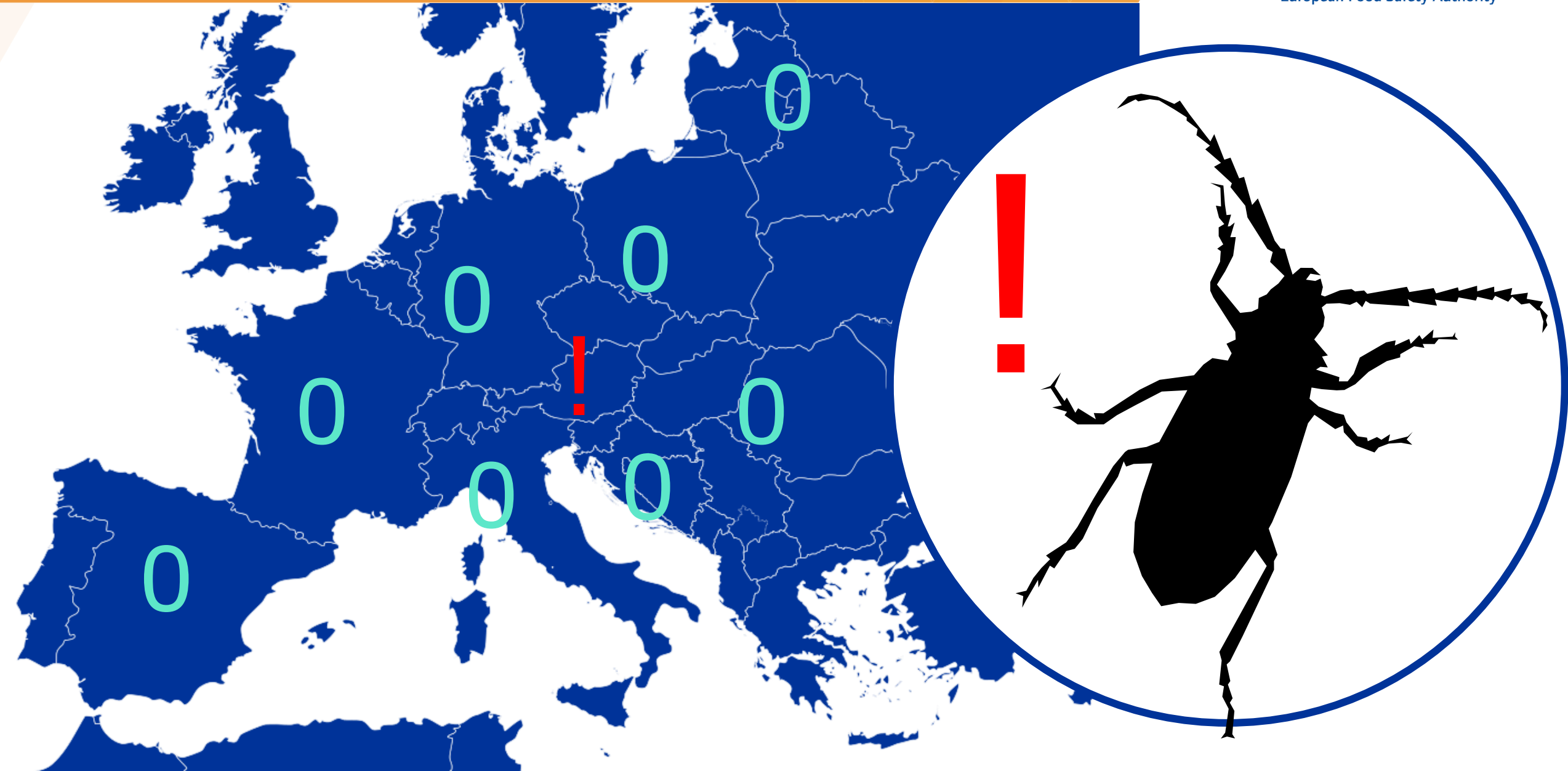APPROVED: 3 June 2019

doi:10.2903/sp.efsa.2019.EN-1667

Pest survey card on *Xylella fastidiosa*

European Food Safety Authority (EFSA),

Pest Surveillance Toolkit

**Target population
&
Detection method**

WHAT

WHERE

WHEN

HOW

Pest survey card: structure

WHAT

WHERE

WHEN

HOW

Taxonomy
Regulatory status
Distribution
Life cycle
Host range
Environmental suitability
Spread capacity
Risk factors

WHAT

WHERE

WHEN

Risk factors identification

Assessing risk activities and locations!

Table 3: Risk activities and corresponding risk locations relevant for surveillance of *Xylella fastidiosa* in all EU Member States

Risk activity	Risk locations
Production, storage and handling of host plants for planting	- Nurseries and garden centres cultivating storing ornamental plants, crop plants or treelings for planting
Transport of propagating material	- Stops along main roads and railways (e.g. truck parking lots) for routes connected to infested areas - Airports and harbours with movement from infested countries or areas
Tourism	- Host crops, gardens parks in the vicinity of touristic sites

Visual examination *(symptoms, vector, morphology)*

Sampling/trapping

Laboratory testing *(identification methods, diagnostic protocols)*
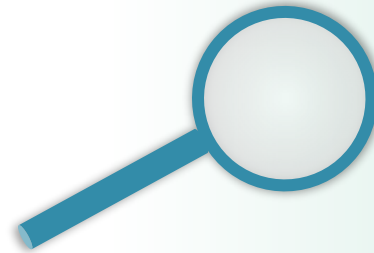
WHAT

WHEN

HOW

Target population:

Epidemiological unit

Inspection units

Risk areas

WHAT

WHERE

Having the right detection method is key!

Target population
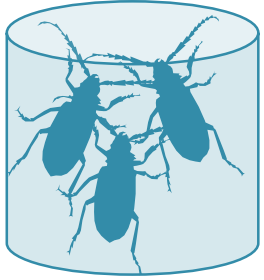
Inspection units
(a plant, or a trap)
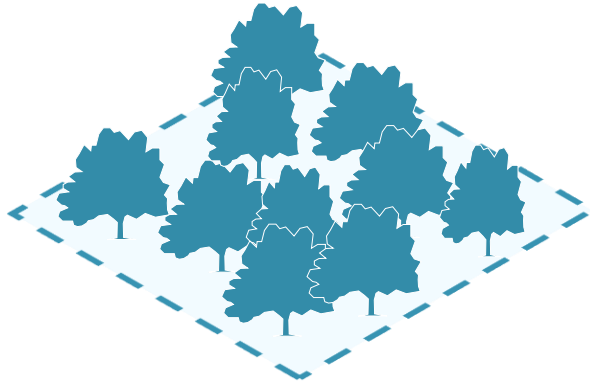
Epidemiological units
(a homogeneous area)

Risk areas: areas surrounding risk locations with same relative risk

Survey cards available

43 cards

...63 pests

EFSA journal virtual issue
https://efsa.onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1831-4732.toolkit-plant-pest-surveillance

- Pilot organisms

  Xylella fastidiosa
  Phyllosticta citricarpa
  Agrilus planipennis

- Citrus pests

- Forest pests

- Potato pests

- Miscellaneous pests

EFSA JOURNAL Open Access

HOME ABOUT BROWSE VIRTUAL ISSUES

Toolkit for plant pest surveillance in the EU

Virtual Issues | First published: 20 May 2019 | Last updated: 11 September 2020

Image ©iS

Pest surve
document
request o
Commissi
Union Me
annual su
quarantin
statistical
pest surve
internatio
requireme
distributi

..."Story maps" are available!

efsa

Plant pests story maps gallery — Type pest name...

29 maps

What is it?

Latest update of survey cards

ESRI platform

Online visual format

It's a "pocket" survey card

Story map for survey of 'Candidatus Liberibacter solanacearum' and its vectors
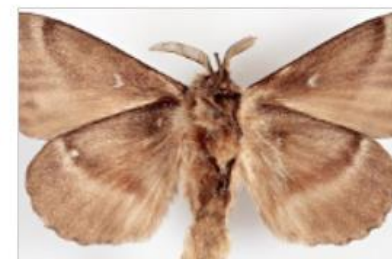
Story map for survey of Dendrolimus sibiricus

Story map for survey of Popillia japonica

Story map for survey of Scirtothrips aurantii, S. citri and S. dorsalis

Survey: from preparation to design

PEST SURVEY CARD

APPROVED: 3 June 2019

doi:10.2903/sp.efsa.2019.EN-1667

Pest survey card on *Xylella fastidiosa*

ArcGIS StoryMaps

video

video

RIBESS+ stats tool

TECHNICAL REPORT

APPROVED: 27 May 2020

doi:10.2903/sp.efsa.2020.EN-1873

Guidelines for statistically sound and risk-based surveys of *Xylella fastidiosa*

Q&A

Trusted science for safe food

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European Food Safety Authority

Survey design: Guidelines

General guidelines

➤ Context for surveillance
➤ Survey design

Specific guidelines (pilot organisms)

Application of the approach

- Setting the survey parameters
- Estimating the survey effort (RiBESS+)
- Allocating the efforts in the survey area
- Concluding of a survey

TECHNICAL REPORT

APPROVED: 31 July 2020
doi:10.2903/sp.efsa.2020.EN-1919

General guidelines for statistically sound and risk-based surveys of plant pests

European Food Safety Authority (EFSA),
Elena Lázaro, Stephen Parnell, Antonio Vicent Civera, Jan Schans, Martijn Schenk, Jose Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

TECHNICAL REPORT

APPROVED: 27 May 2020
doi:10.2903/sp.efsa.2020.EN-1873

Guidelines for statistically sound and risk-based surveys of Xylella fastidiosa

European Food Safety Authority (EFSA),
Elena Lázaro, Stephen Parnell, Antonio Vicent Civera, Jan Schans, Martijn Schenk, Gritta Schrader, Jose Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

Guidelines for statistically sound and risk-based surveys of Phyllosticta citricarpa

European Food Safety Authority (EFSA),
Elena Lázaro, Stephen Parnell, Antonio Vicent Civera, Jan Schans, Martijn Schenk, Gritta Schrader, Jose Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

Guidelines for statistically sound and risk-based surveys of Agrilus planipennis

European Food Safety Authority (EFSA),
Elena Lázaro, Stephen Parnell, Antonio Vicent Civera, Jan Schans, Martijn Schenk, José Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

https://efsa.onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1831-4732.toolkit-plant-pest-surveillance

Survey design: Type of surveys

Types of surveys

Detection survey
- Early detection of pests
- Support NPPO declarations of pest freedom
- Changes in pest status

Delimiting survey (Zoning)

- Delimit the extent of a pest following an outbreak

Monitoring survey

- Tailor pest management
- Define low prevalence area

↓

Which one to choose?

Survey design: Type of surveys

Key Questions

A) Is the pest known to occur in your survey area?

— (Pest free area) / No →

Types of surveys

Detection survey
- Early detection of pests
- Support NPPO declarations of pest freedom
- Changes in pest status

↓ Yes

B) Is the pest widespread in that area?

— (Infested foci) / No →

Delimiting survey (Zoning)
- Delimit the extent of a pest following an outbreak

↓ Yes →

Monitoring survey
- Tailor pest management
- Define low prevalence area

Once the type of survey selected, what tools are available?

Pest freedom based on evidence

Reassure trade partners

Improve timely detection and potential eradication

Survey design: Type of surveys

Key Questions

A) Is the pest known to occur in your survey area?

No → (Pest free area)

↓ Yes

B) Is the pest widespread in that area?

No → (Infested foci)
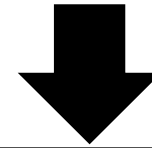
↓ Yes

Types of surveys

Detection survey
- Early detection of pests
- Support NPPO declarations of pest freedom
- Changes in pest status

Delimiting survey (Zoning)
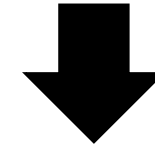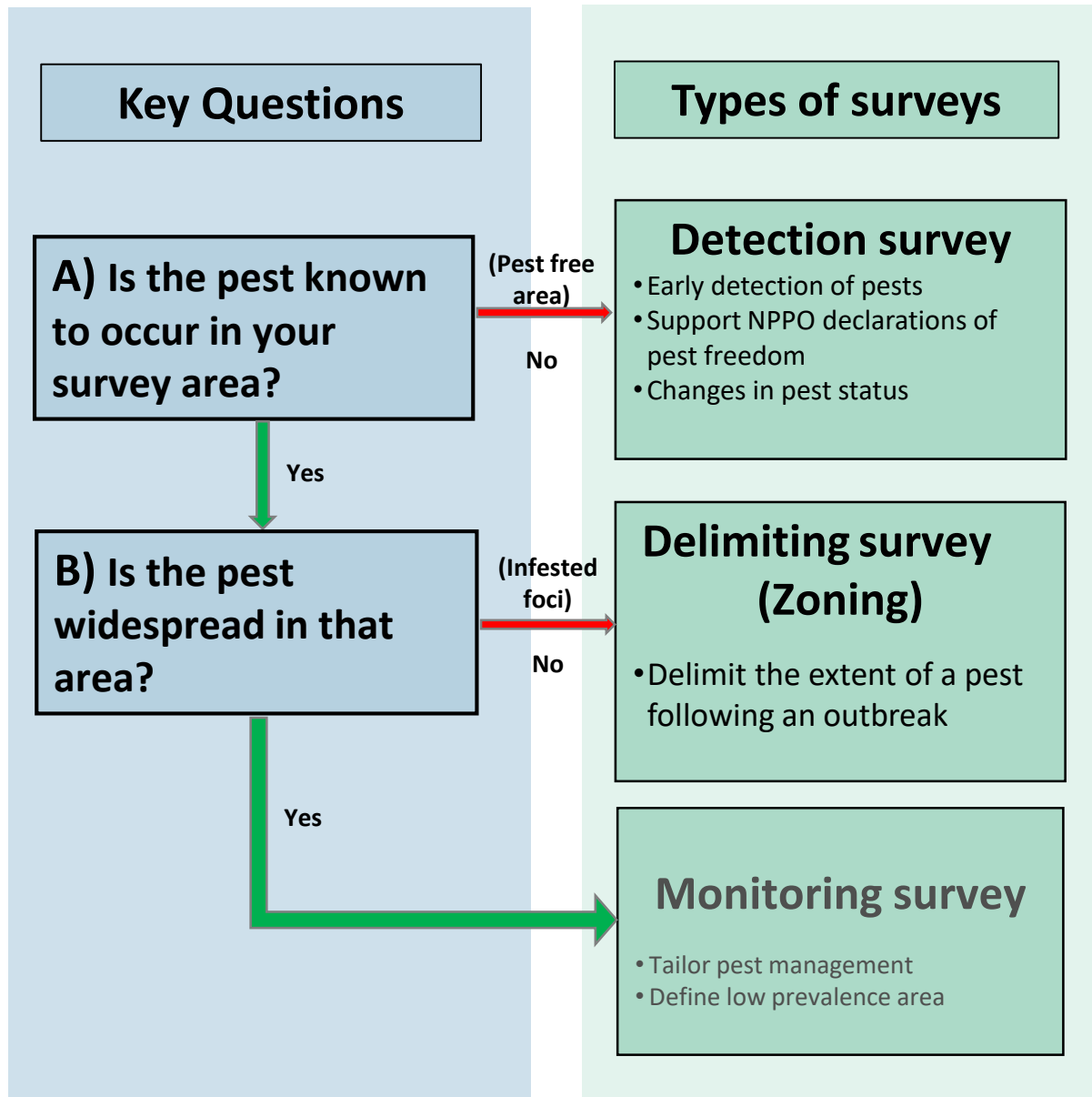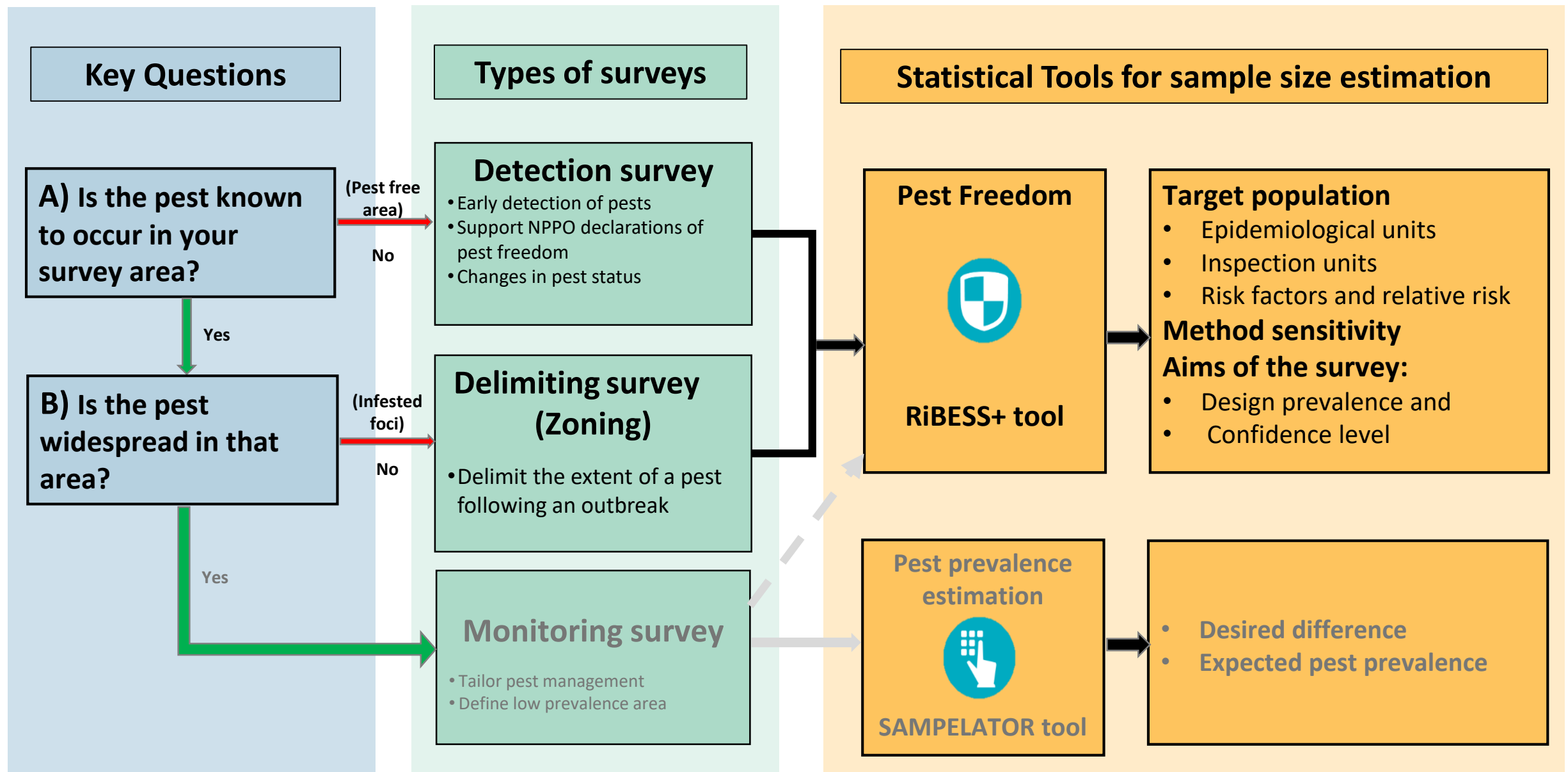- Delimit the extent of a pest following an outbreak

Monitoring survey
- Tailor pest management
- Define low prevalence area

Statistical Tools for sample size estimation

Pest Freedom

RiBESS+ tool

Target population
- Epidemiological units
- Inspection units
- Risk factors and relative risk

Method sensitivity

Aims of the survey:
- Design prevalence and
- Confidence level

Pest prevalence estimation

SAMPELATOR tool

- Desired difference
- Expected pest prevalence

Survey design: Target population

Survey preparation

Where? **What?**

Survey design

Target population (Structure and size)

Inspection units
Elementary subdivision (e.g. host plant, vectors)

Epidemiological units
A homogeneous area where interactions between pest, host plants and abiotic and biotic factors result in similar epidemiology

Risk factors
Biotic/abiotic factor increasing the probability of infestation by the pest

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Survey design: Target population

Structure
Size
Assumptions

SURVEY AREA

LAND USE CATEGORIES

Agricultural

Residential

Epidemiological unit

FROM the whole survey area TO a single hectare

Risk factors

Inspection Unit

LEVEL 1   LEVEL 2   LEVEL 3   LEVEL 4   LEVEL 5

Survey design: Detection method

Survey preparation

| Where? | What? | When? | How? |

Survey design

Target population (Structure and size)

Inspection units
Elementary subdivision (e.g. host plant, vectors)

Epidemiological units
A homogeneous area where interactions between pest, host plants and abiotic and biotic factors result in similar epidemiology

Risk factors
Biotic/abiotic factor increasing the probability of infestation by the pest

Detection method

Inspection procedure
Visual examination or trapping
Sampling and testing

Method sensitivity
=
Sampling effectiveness
X
Diagnostic sensitivity

Survey design: Detection method

> **Method sensitivity** (efficacy of detection, ISPM 31)
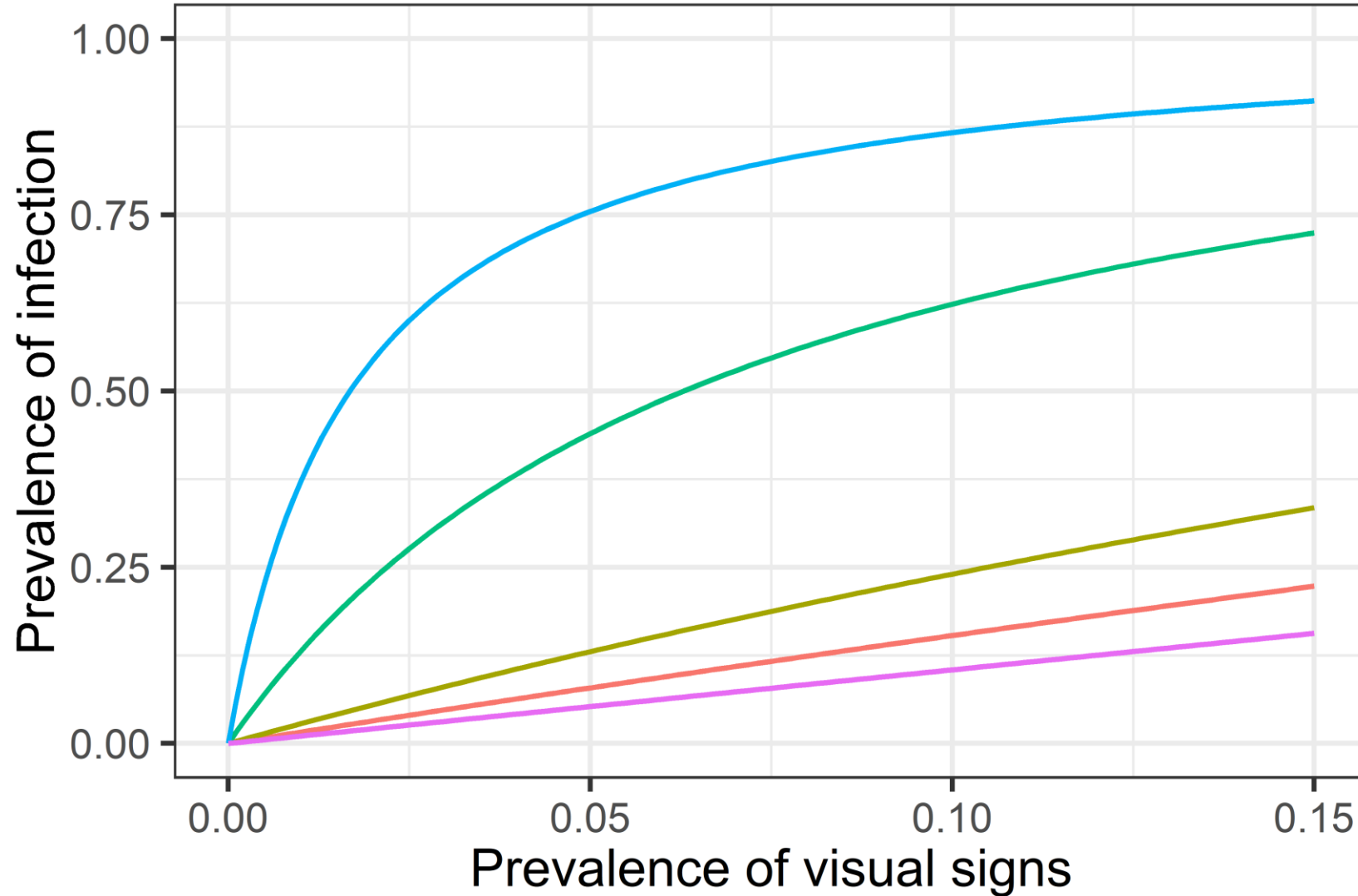> - Probability to find the pest when it is there

Effectiveness of inspection/sampling/trapping

ability to successfully choose the infected parts from a host plant

X

Diagnostic sensitivity

probability that a sample tests positive when the sample is truly positive

Olive quick decline
(*Xylella fastidiosa*)

Huanglongbing
(*Ca.* Liberibacter asiaticus)
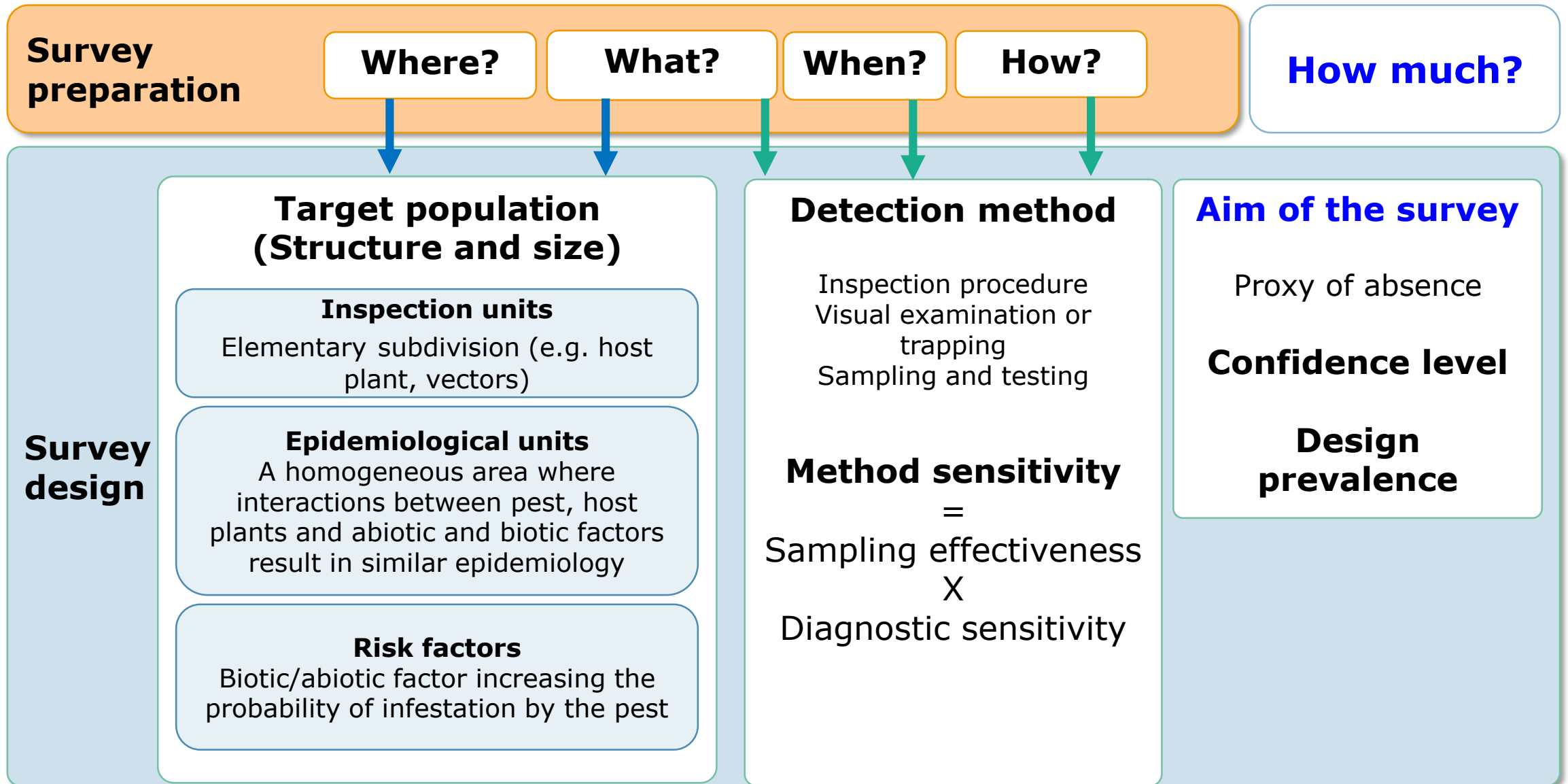
Citrus canker
(*Xanthomonas axonopodis*)

Ash dieback
(*Hymenoscyphus fraxineus*)

Sudden oak death
(*Phytophtora ramorum*)

Survey design: Aim of the survey

Survey preparation

| Where? | What? | When? | How? |

How much?

Survey design

Target population (Structure and size)

Inspection units
Elementary subdivision (e.g. host plant, vectors)

Epidemiological units
A homogeneous area where interactions between pest, host plants and abiotic and biotic factors result in similar epidemiology

Risk factors
Biotic/abiotic factor increasing the probability of infestation by the pest

Detection method

Inspection procedure
Visual examination or trapping
Sampling and testing

Method sensitivity
=
Sampling effectiveness
X
Diagnostic sensitivity

Aim of the survey

Proxy of absence

Confidence level

Design prevalence

➢ Confidence level and design prevalence

▪ Confidence level is the "amount of confidence" we want to have on the survey

▪ The Design prevalence: level of detection in ISPM 31 is the "maximum prevalence" that there could be.
  What is the prevalence I can live with?

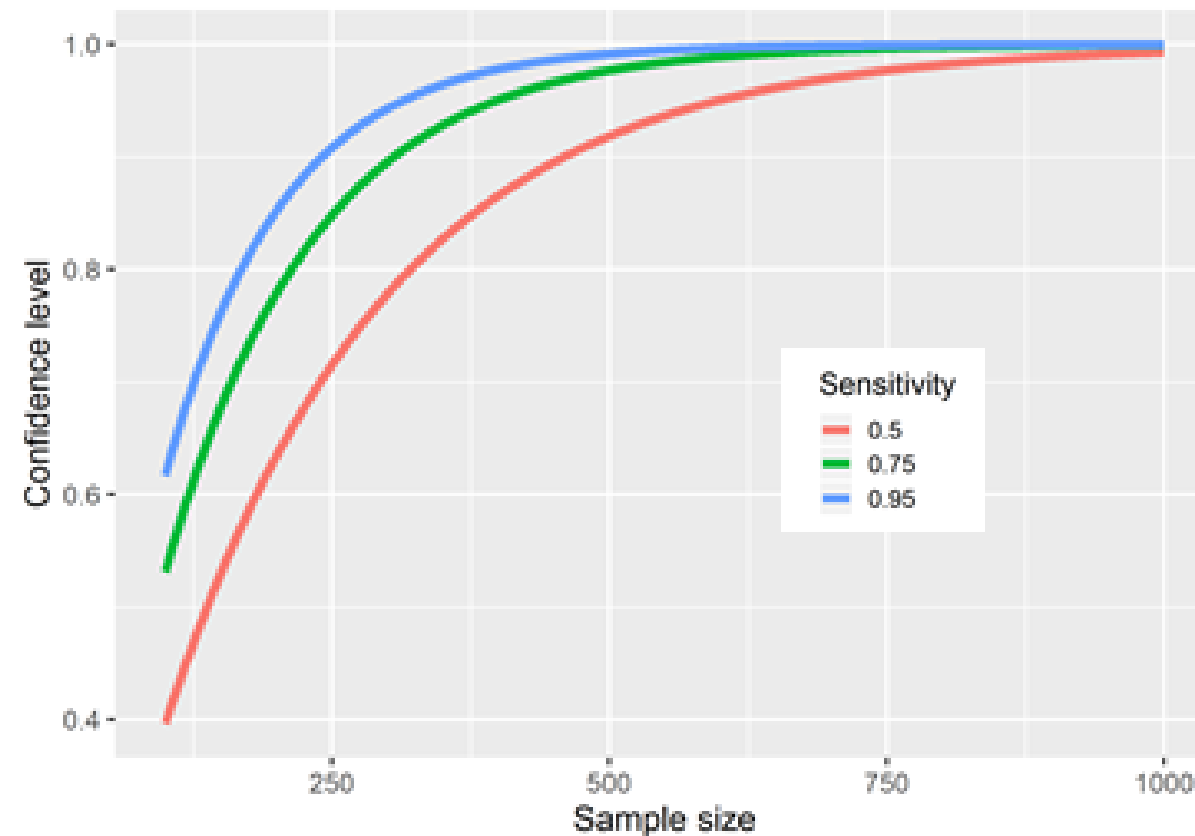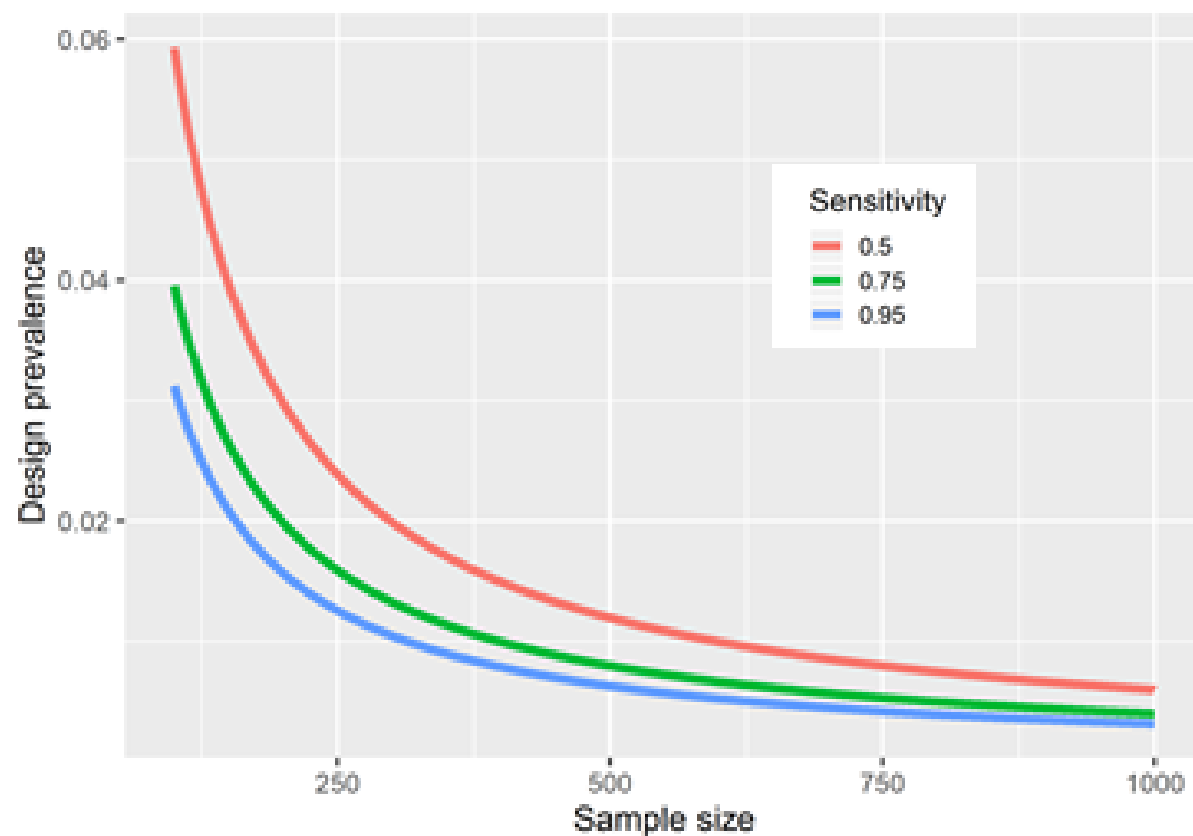▪ Gradient of design prevalence (detection/delimiting/buffer zone)
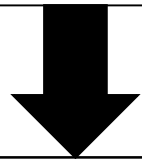
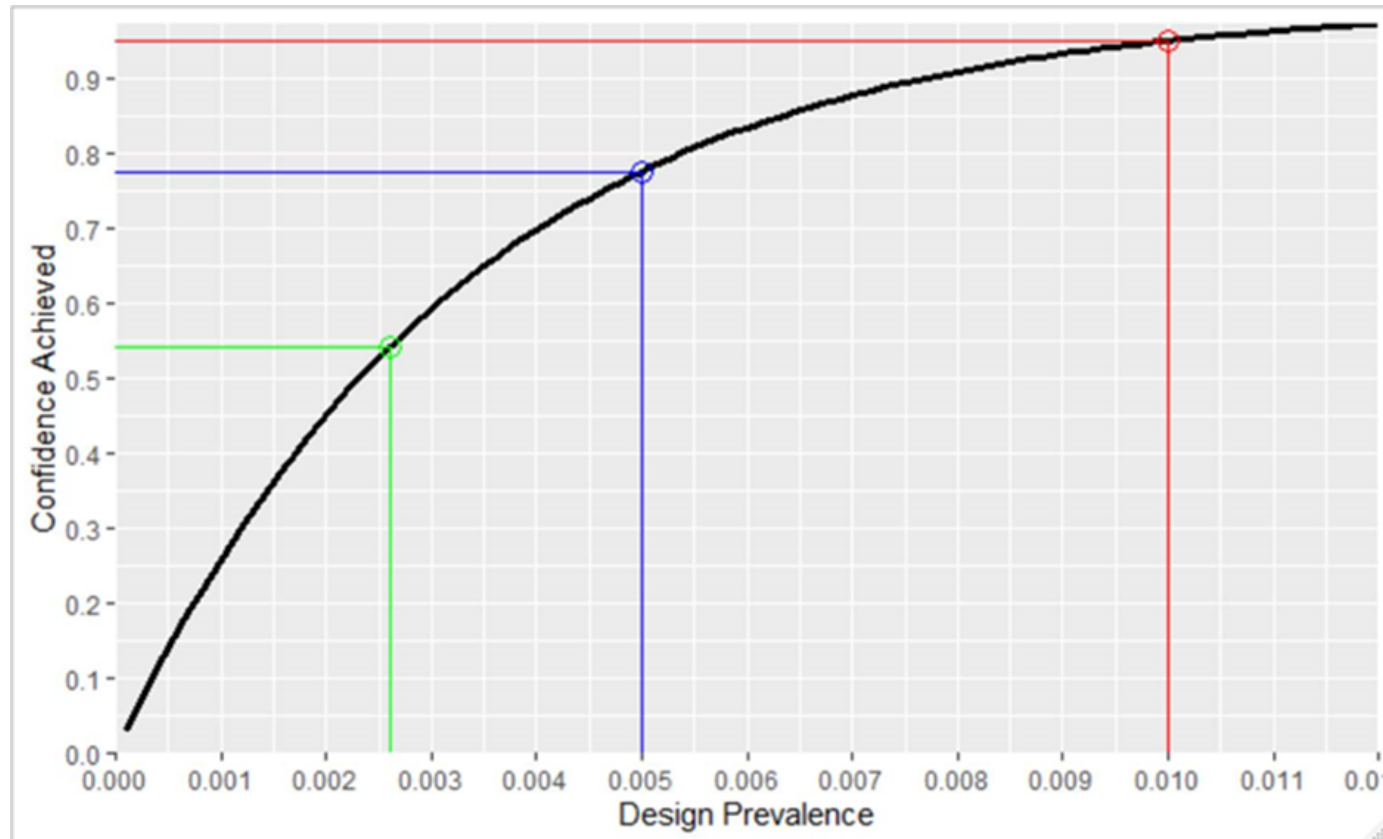**Risk managers compromise between:**
available resources
acceptable level of risk

➤ **Interrelation of survey parameters**

The lower the <u>design prevalence</u> and the higher the <u>confidence level</u>, the stronger the evidence for pest freedom.
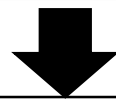
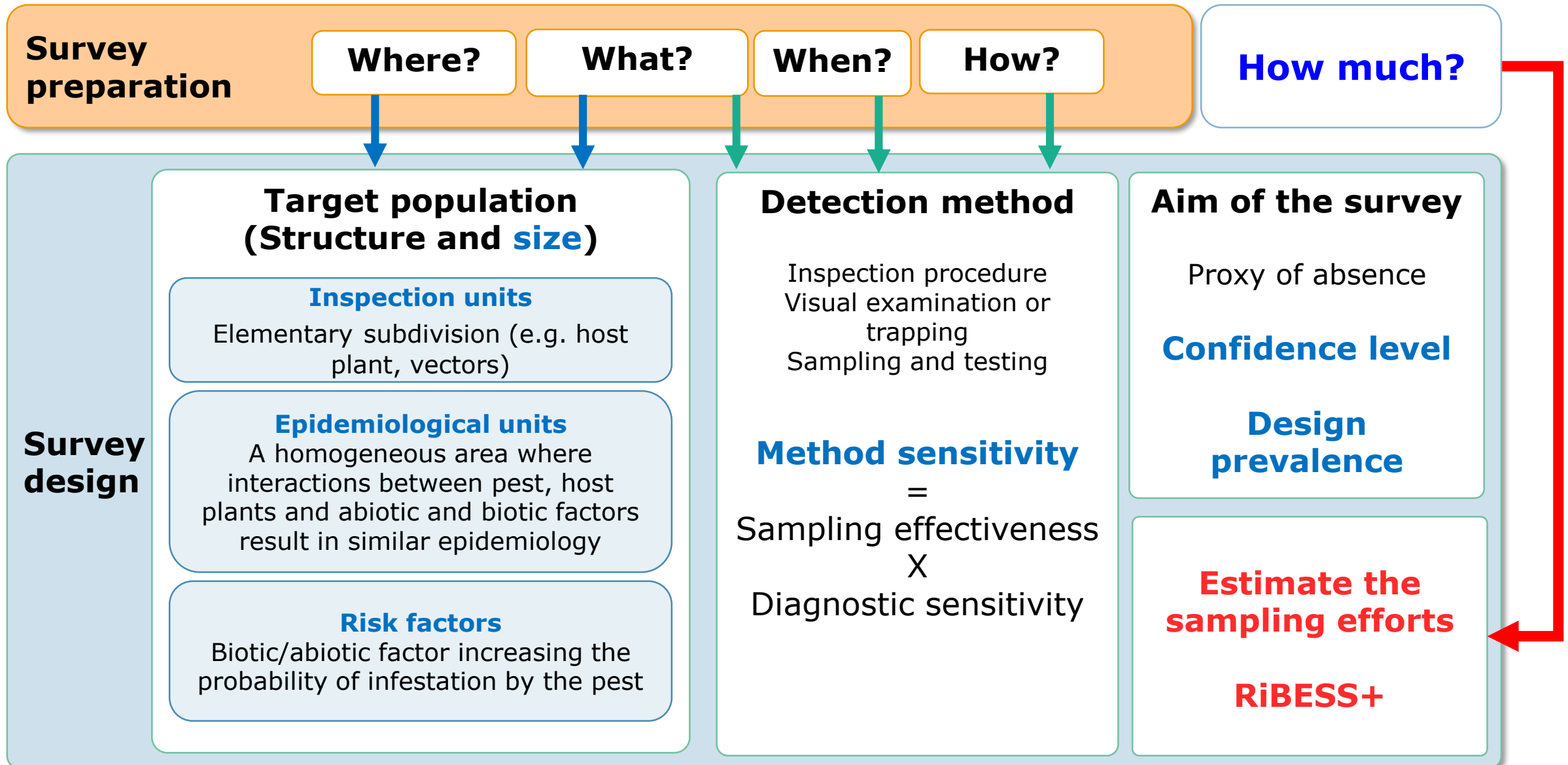> **Equivalent surveys in terms of sample size**

If no positives were found

- there is 95% confidence that if the pest is present it is below 1% design prevalence

- there is a 78% confidence that if the pest is present it is below 0.5% design prevalence
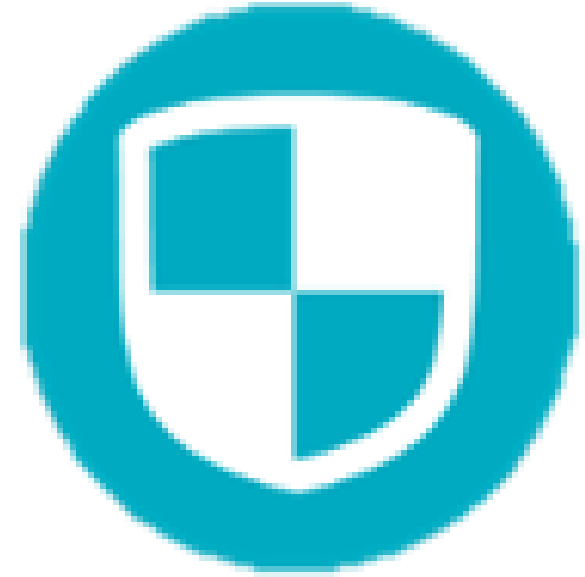
Harmonising surveys comparing them in time and space

Survey design: Conclusion

Survey preparation

| Where? | What? | When? | How? |

How much?

Survey design

Target population (Structure and size)

Inspection units
Elementary subdivision (e.g. host plant, vectors)

Epidemiological units
A homogeneous area where interactions between pest, host plants and abiotic and biotic factors result in similar epidemiology

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Detection method

Inspection procedure
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Sampling and testing

Method sensitivity
=
Sampling effectiveness
X
Diagnostic sensitivity

Aim of the survey

Proxy of absence

Confidence level

Design prevalence

Estimate the sampling efforts

RiBESS+

Tutorial for use of RiBESS+

The videos are available on the EFSA YouTube channel
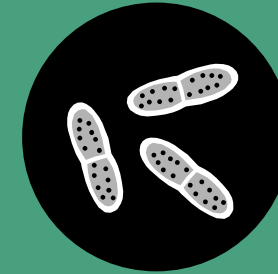
What is next...

New mandate: >200 pests in 6 yr

- Quarantine, protected zone, and emerging pests

- From pest-based to crop-based survey

- Plant health specific stats tool

Next Webinars on pest surveys

- 21 October "Detect your pests: practical statistical framework for risk-based surveillance"

- 1 December "Delimiting surveys"

Thanks for attending!

EFSA Working Group on pest surveys

- **Staff:** Sybren Vos, Ignazio Graziosi, Giulia Mattion, Jose Cortiňas Abrahantes, Gabriele Zancanaro, Alice Delbianco

- **Experts:** Stephen Parnell, Elena Lazaro, Antonio Vicent et al.

- **Tasking grants:** NWVA - Martijn Schenk, Jan Schans et al.; JKI - Gritta Schrader et al.

- **Contractor HORTA:** Maria Chiara Rosace

We also thank
Laura Carotti, Alzbeta Mikulova, Oresteia Sfyra *and* Sara Tramontini *of the ALPHA Unit and all the EFSA colleagues who provided the communication and technical support*

Thanks for attending!

In case we did not manage to answer all your questions, please feel free to reach out at:

alpha@efsa.europa.eu

Please take 5 more minutes to <u>fill out the evaluation form</u> that you will receive shortly in your inbox.
Your feedback will help us improve our service!

European Food Safety Authority

Visit the new PLH website
https://bit.ly/3dtyypm

Plants EFSA
@Plants_EFSA

The EU hub for information on assessment and emerging risks on #plants. Account managed by the @EFSA_EU #PlantHealth team.

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