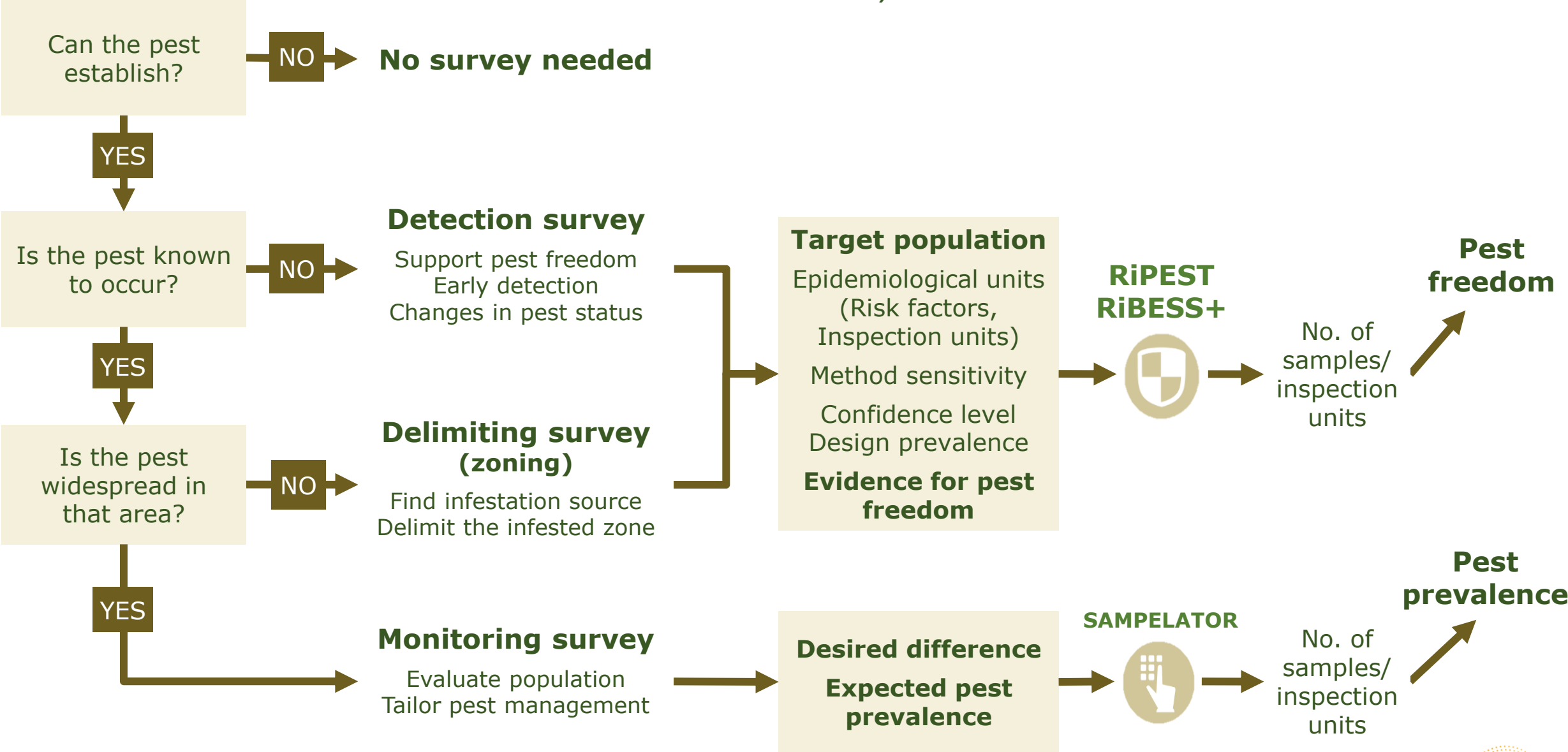




PEST SURVEY TOOLKIT AND STATISTICAL TOOL RIPEST

Tomasz Kaluski, Sybren Vos





PREPARE
THE
SURVEY

WHAT

WHERE

WHEN

HOW



Pest
Survey
Cards

DESIGN
THE
SURVEY

HOW
MUCH



Survey
guidelines
&
RiPET
RiBESS+

IMPLEMENT THE SURVEY (NPPO)



INDEX OF THE EFSA PLANT PEST SURVEY TOOLKIT

Access the Index of the EFSA Plant Pest Survey Toolkit, [here](#).

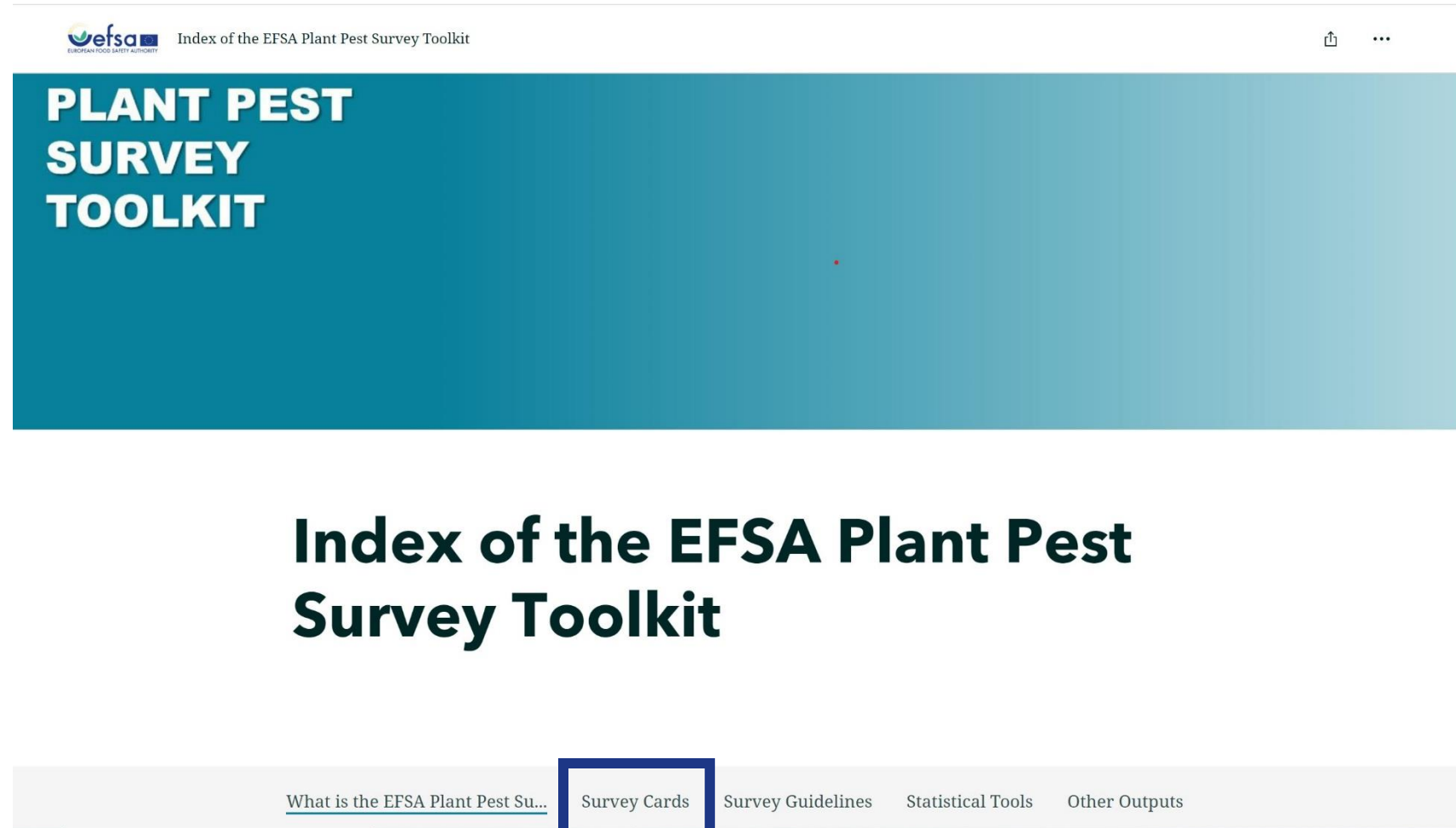


A screenshot of the EFSA Plant Pest Survey Toolkit index page. The page features a teal header with the text 'PLANT PEST SURVEY TOOLKIT' in white. Below the header, the main content area has the title 'Index of the EFSA Plant Pest Survey Toolkit' in a large, dark font. At the bottom, a navigation bar contains links: 'What is the EFSA Plant Pest Su...', 'Survey Cards', 'Survey Guidelines', 'Statistical Tools', and 'Other Outputs'. The EFSA logo is visible in the top left corner of the page.



INDEX OF THE EFSA PLANT PEST SURVEY TOOLKIT

Access the Index of the EFSA Plant Pest Survey Toolkit, [here](#).



The screenshot shows the top of a web page. At the top left is the EFSA logo (European Food Safety Authority) and the text "Index of the EFSA Plant Pest Survey Toolkit". In the top right corner, there are icons for sharing and a menu. Below this is a large teal banner with the text "PLANT PEST SURVEY TOOLKIT" in white, bold, uppercase letters. Underneath the banner, the main heading "Index of the EFSA Plant Pest Survey Toolkit" is displayed in a large, bold, black font. At the bottom of the page, there is a horizontal navigation bar with five items: "What is the EFSA Plant Pest Su...", "Survey Cards", "Survey Guidelines", "Statistical Tools", and "Other Outputs". The "Survey Cards" item is highlighted with a blue rectangular border.



SURVEY PREPARATION

**Survey
preparation**

WHERE?

WHAT?

WHEN?

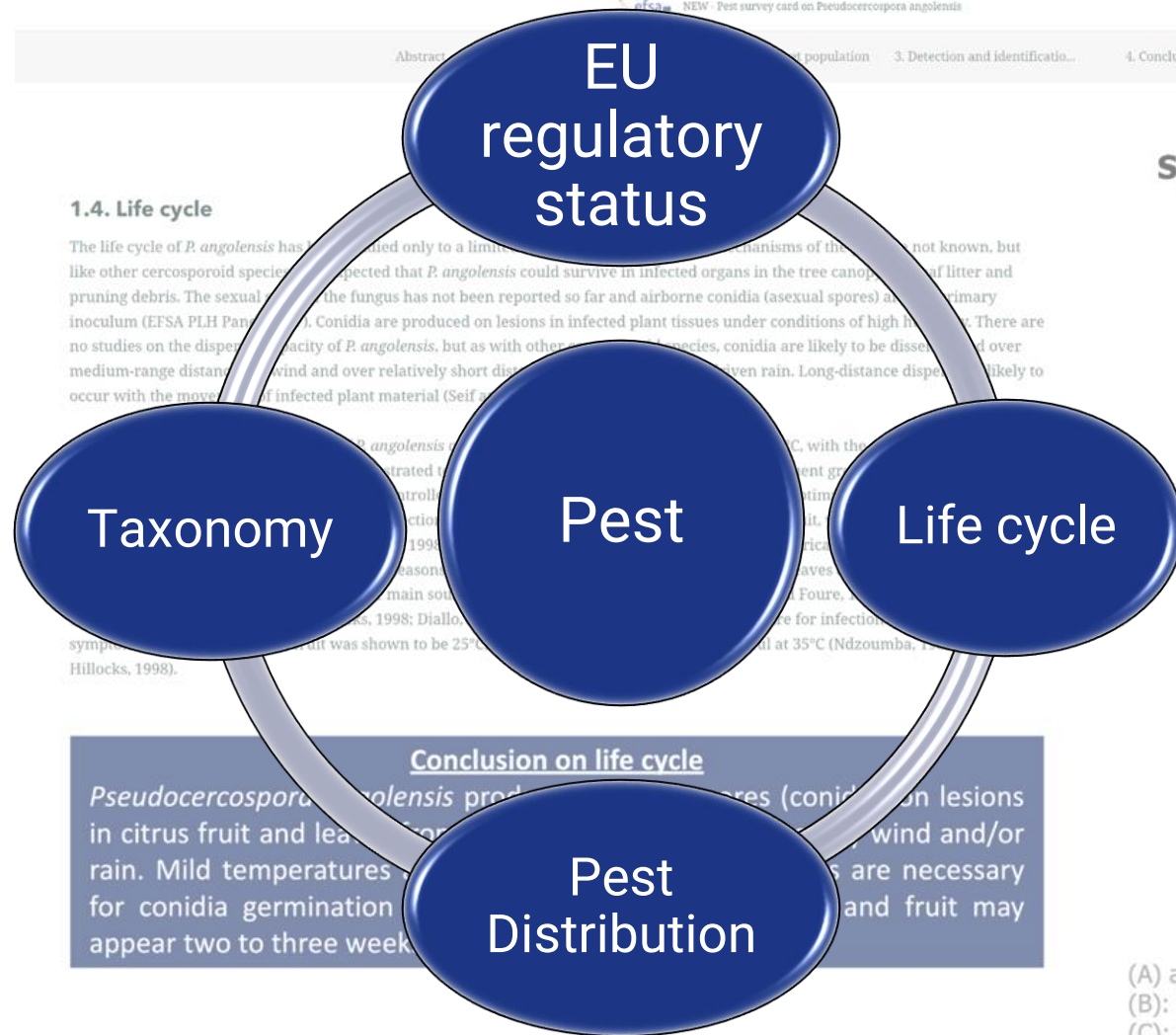
HOW?

Pest Survey Cards
(>100 pests; 40/year) :

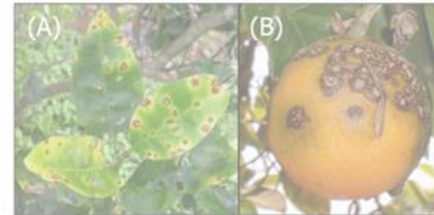
Guide the user in the
gathering of relevant data
for survey preparation



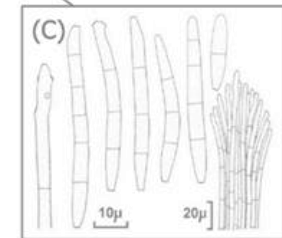
PEST SURVEY CARDS



Symptoms



Sporulation



Dissemination



Young leaves and fruits

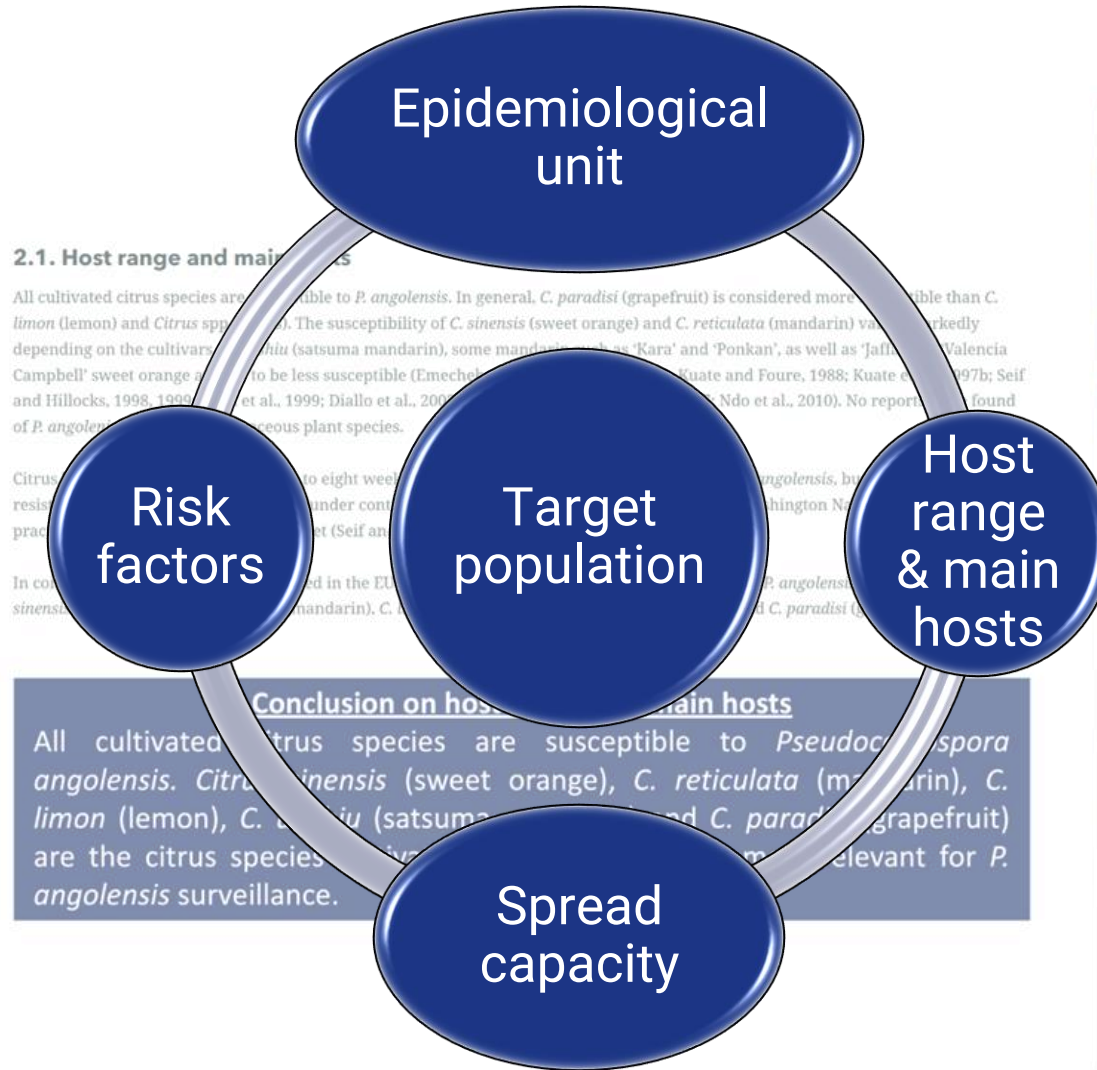
Infection

15-30°C
(optimum ~25°C)
3 – 48 h wetness

(A) and (D): © Antonio Vicent, IVIA
(B): © Lawson et al. (2017), Springer
(C): © CAB International



PEST SURVEY CARDS



PEST SURVEY CARDS

Detection and identification in the field

Detection and identification

Sampling

Detection and identification in the laboratory

Leaf spots on a young sweet orange shoot



© Antonio Vicent, IVIA

Raised tumour-like growths on sweet orange fruit



© Lawson et al. (2017), Springer

Lesions on sweet orange fruit



© Antonio Vicent, IVIA

Cracking of the fruit peel on sweet orange

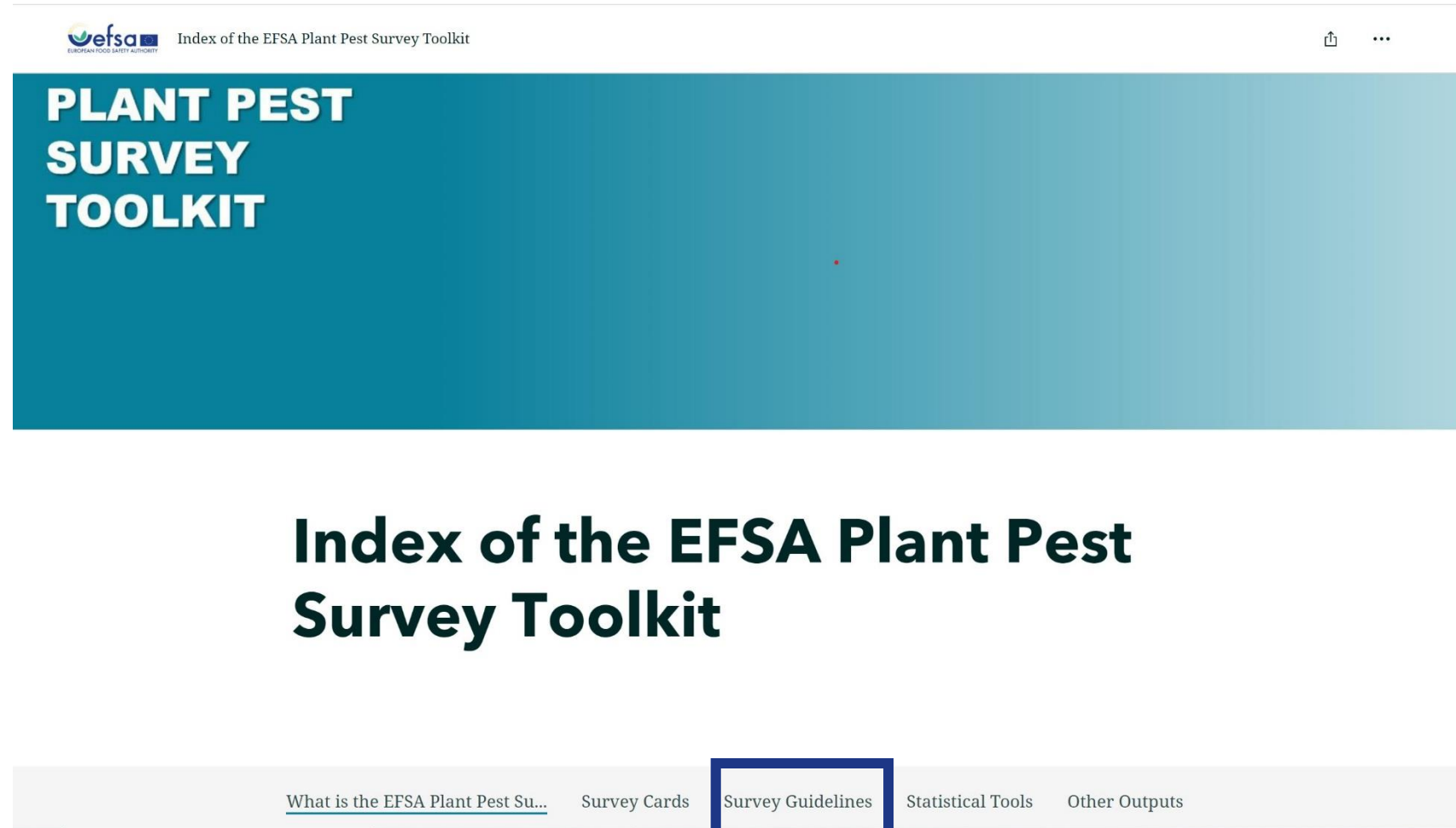


© Lawson et al. (2017), Springer



INDEX OF THE EFSA PLANT PEST SURVEY TOOLKIT

Access the Index of the EFSA Plant Pest Survey Toolkit, [here](#).



The screenshot shows the top of a web page. At the top left is the EFSA logo (European Food Safety Authority) and the text "Index of the EFSA Plant Pest Survey Toolkit". In the top right corner, there are icons for sharing and a menu. Below this is a large teal banner with the text "PLANT PEST SURVEY TOOLKIT" in white, bold, uppercase letters. Underneath the banner, the main heading "Index of the EFSA Plant Pest Survey Toolkit" is displayed in a large, bold, black font. At the bottom of the page is a navigation bar with five items: "What is the EFSA Plant Pest Su...", "Survey Cards", "Survey Guidelines", "Statistical Tools", and "Other Outputs". The "Survey Guidelines" item is highlighted with a blue rectangular border.



SURVEY GUIDELINES



EFSA Survey Guidelines



What are the Guidelines?

General Guidelines

Specific Guidelines

Check for updates

General Guidelines

Work-plan and methodology

General guidelines

Specific Guidelines

Specific guidelines on *Agrilus planipennis*

Specific guidelines on *Phyllosticta citricarpa*

Specific guidelines on *Xylella fastidiosa*



TECHNICAL REPORT

APPROVED: 11 July 2020

doi:10.2903/sp.efsa.2020.1919

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

EFSA European Food Safety Authority (EFSA)

Elena Álvarez, Stephen Parnell, Antonio Vincent Cervera, Jan S. Hans, Martijn Schenck, Jose Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

Abstract

At the request of the European Commission, EFSA prepared the general guidelines for surveys of plant pests, describing the legal, international and scientific context in which the surveys are designed, the basic principles implemented for surveillance of quarantine pests and introducing the concepts needed for the design of statistically sound and risk-based surveys. Three types of specific surveys are addressed: detection surveys for substantiation of pest freedom, delimiting surveys for determining the boundaries of an infested zone, and monitoring surveys for prevalence estimation when measuring the progress of eradication measures or for confirming a low pest prevalence area. For each survey, the survey parameters are introduced and their interactions analysed showing the importance of the assumptions that are taken for each one of them. (i) the aims of the survey are defined as the confidence of detecting a given pest prevalence (design prevalence), this reflects the trade-off between the acceptable level of the risk and availability of resources that determine the strength of the evidence to support the conclusion of the survey; (ii) the target population is addressed in terms of its structure and size, including the risk factors; and (iii) the method sensitivity is defined as the combination of the sampling effectiveness and the diagnostic sensitivity. EFSA's RiBESS+ tool is introduced for calculating the sample size using the survey parameters as input values for a statistically sound and risk-based survey design. The mathematical principles behind the tool are in line with the International Standards for Phytosanitary Measures. The survey design is flexible and can be tailored to each pest and specific situation in the Member States. Once the survey is implemented following this approach, the conclusions allow surveys to be compared across time and



SURVEY GUIDELINES



EFSA Survey Guidelines



What are the Guidelines? [General Guidelines](#) [Specific Guidelines](#)

TECHNICAL REPORT
APPROVED: 31 July 2020
efs-20-2803rap-efsa-2020-EN-1818

General guidelines for statistically sound and risk-based surveys of plant pests
Elena Lázaro, Stephen Parnell, European Commission, EFSA prepared the general guidelines for surveys of plant pests, describing the legal, international and scientific context in which the surveys are designed, the basic principles implemented for surveillance of quarantine pests and introducing the concepts needed for the design of statistically sound and risk-based surveys. Three types of specific surveys are addressed: detection surveys for substantiation of pest freedom, delimiting surveys for determining the boundaries of an infested zone, and monitoring surveys for prevalence estimation when

TECHNICAL REPORT
APPROVED: 23 June 2020
efs-20-2803rap-efsa-2020-EN-1893

Guidelines for statistically sound and risk-based surveys of *Phyllosticta citricarpa*
European Food Safety Authority (EFSA), Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

TECHNICAL REPORT
APPROVED: 27 May 2020
efs-20-2803rap-efsa-2020-EN-1873

Guidelines for statistically sound and risk-based surveys of *Xylella fastidiosa*
European Food Safety Authority (EFSA), Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

TECHNICAL REPORT
APPROVED: 30 November 2020
efs-20-2803rap-efsa-2020-EN-1993

Guidelines for statistically sound and risk-based surveys of *Agrius planipennis*
European Food Safety Authority (EFSA), Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

TECHNICAL REPORT
APPROVED: 30 November 2020
efs-20-2803rap-efsa-2020-EN-1993

Guidelines for statistically sound and risk-based surveys of *Agrius planipennis*
European Food Safety Authority (EFSA), Cortiñas Abrahantes, Gabriele Zancanaro, Sybren Vos

General

Work-r

General

Specific

Specific guidelines on *Agrius planipennis*

Specific guidelines on *Phyllosticta citricarpa*

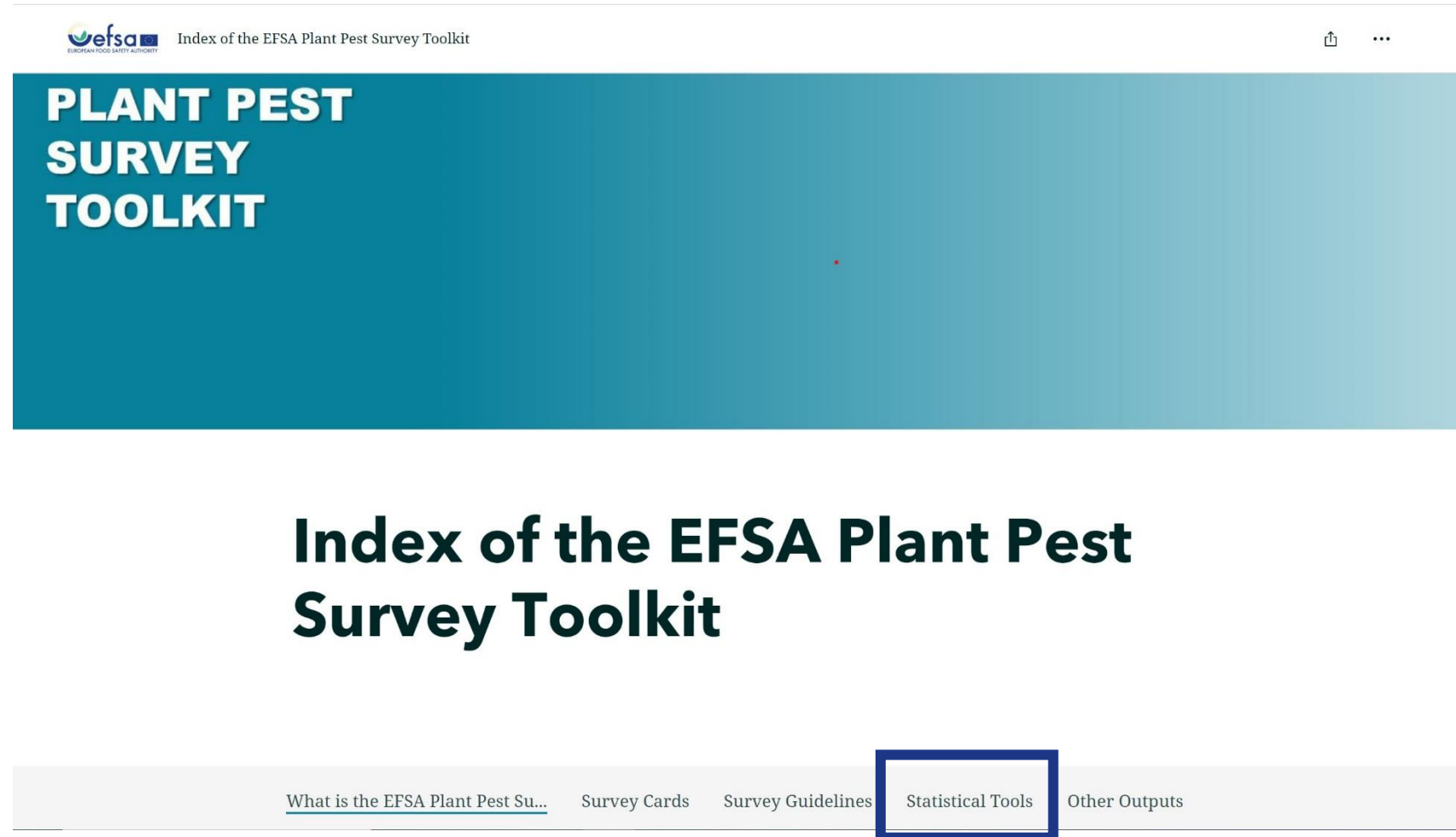
Specific guidelines on *Xylella fastidiosa*

EFSA prepared specific guidelines for the survey of *Agrius planipennis*. Based on examples, three different survey designs are presented to monitor a zone ensuring pest freedom, delimiting surveys to determine the boundaries of an infested zone, and monitoring surveys to determine the prevalence of the pest. The survey design consists of setting out the aims of the survey, the methods used to identify the pest, and the related assumptions. The guidelines to guide the design of statistically sound and risk-based surveys for the survey of *Agrius planipennis* are designed to ensure that the survey objectives are achieved, the prevalence of the pest is estimated, and the information needed for the underlying pest prevalence design is available. The survey design is based on the following principles: (i) the target population is defined in terms of its size, including the risk factors, and (ii) the method sensitivity is defined as the combination of the sampling effectiveness and the diagnostic sensitivity. EFSA's RIBESS+ tool is introduced for calculating the sample size using the survey parameters as input values for a statistically sound and risk-based survey design. The mathematical principles behind the tool are in line with the International Standards for Phytosanitary Measures. The survey design is flexible and can be tailored to each pest and specific situation in the Member States. Once the survey is implemented following this approach, the conclusions allow surveys to be compared across time and



INDEX OF THE EFSA PLANT PEST SURVEY TOOLKIT

Access the Index of the EFSA Plant Pest Survey Toolkit, [here](#).



efsa Index of the EFSA Plant Pest Survey Toolkit

PLANT PEST SURVEY TOOLKIT

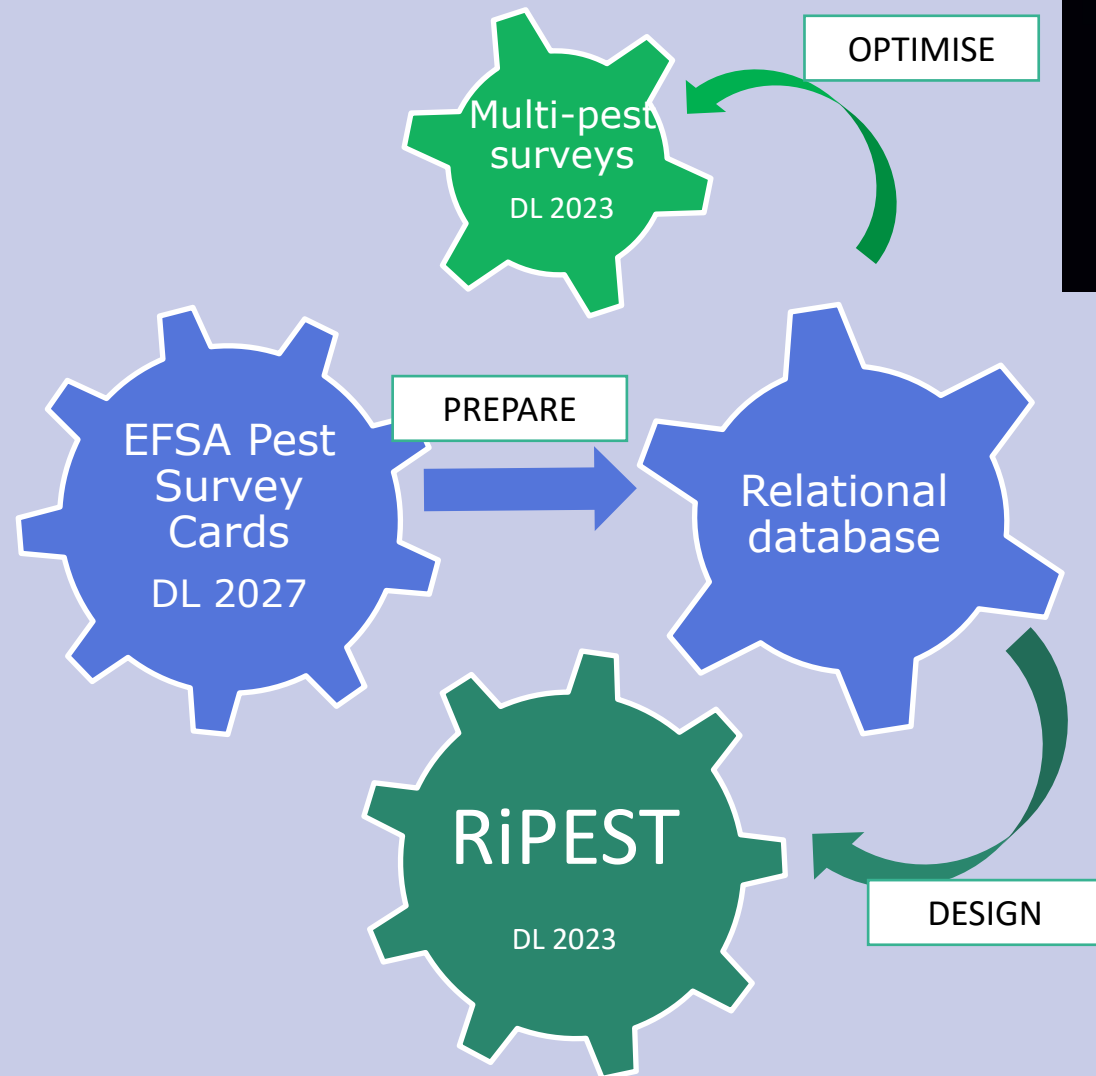
Index of the EFSA Plant Pest Survey Toolkit

[What is the EFSA Plant Pest Su...](#) [Survey Cards](#) [Survey Guidelines](#) [Statistical Tools](#) [Other Outputs](#)



PEST SURVEILLANCE ONGOING

Mandate M-2020-0114

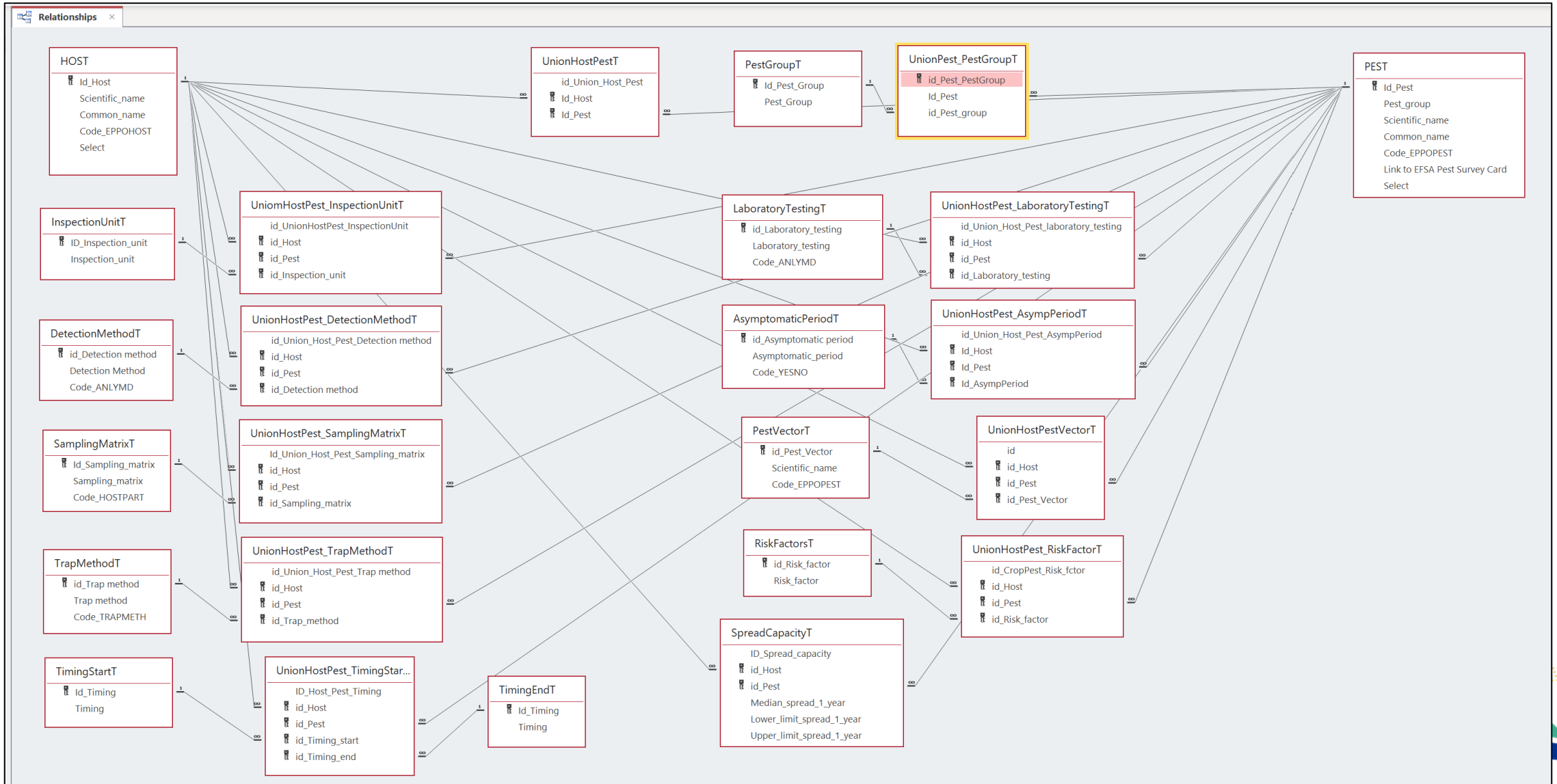


Communication
and training

MSs network
Training of 3rd
Countries

E-LEARNING COURSE
WEBINARS

RELATIONAL DATABASE FOR PEST SURVEYS



RIPEST TOOL



RiPEST – Risk-based PEst Survey Tool

Detection survey

Initiation

Preparation

1. Characterise the pest

▶ 2. Target population

3. Inspection units

Design

Implementation

Conclusion

1

Initiation

2

Preparation

Preparation phase

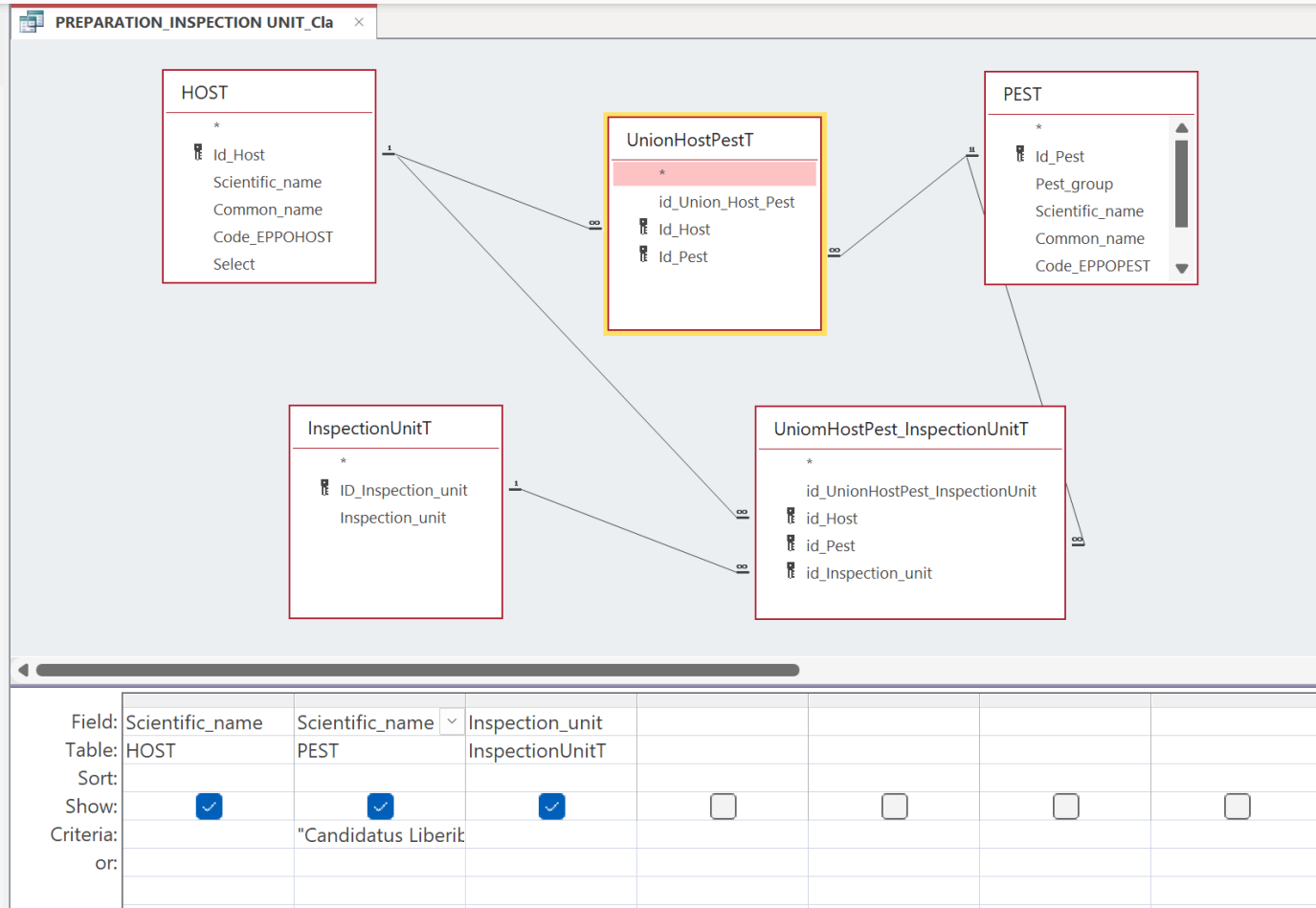
2. Target population

The target population can be defined through the inspection units, the epidemiology

Do you want to use the two-step approach?

Yes No

What is the inspection unit considered in the survey?



Field:	Scientific_name	Scientific_name	Inspection_unit				
Table:	HOST	PEST	InspectionUnitT				
Sort:							
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:		"Candidatus Liberibacter"					
or:							

PREPARATION_INSPECTION_UNIT_Cla	PEST.Scientific_name	Inspection_unit
HOST.Scientific_name	Candidatus Liberibacter asiaticus	Plant with shoots
Citrus spp.		

MULTI-PEST SURVEY TOOL



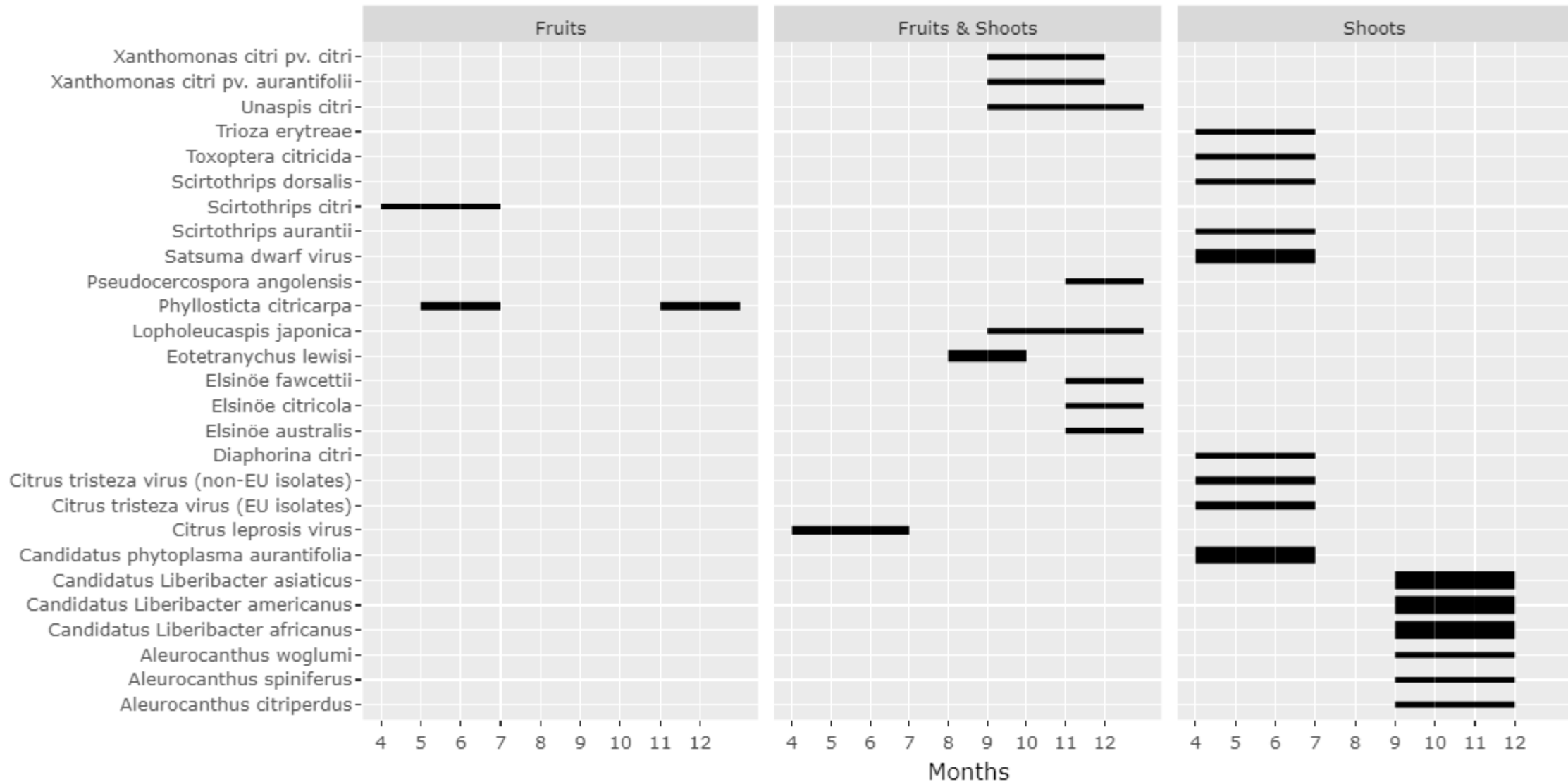
Crop approach

Optimisation of resources

Harmonisation of surveys



MULTI-PEST SURVEY TOOL)



MULTI-PEST SURVEY TOOL

Minimal effort per pest

Copy CSV Excel Show 10 entries

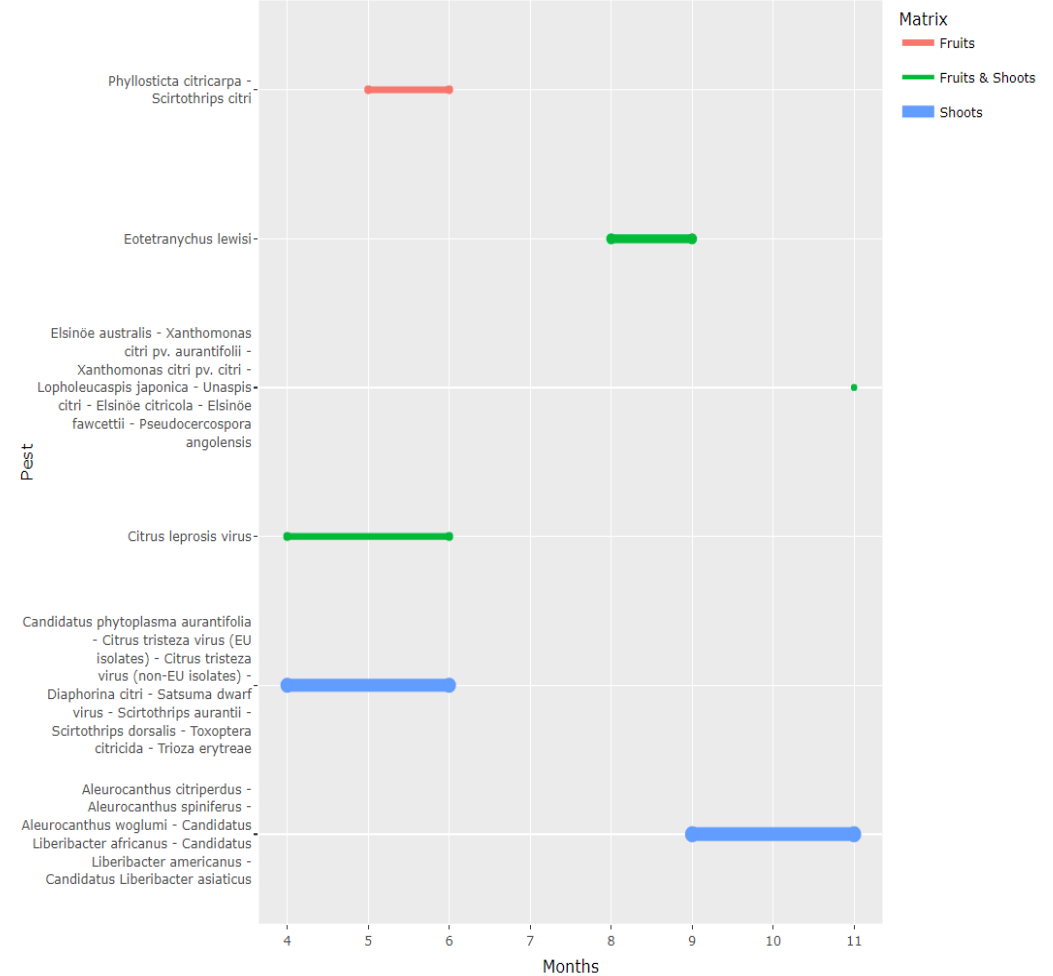
Search:

MultiPest	NPest	Matrix	SampleSize	From	Until	Reduction
1 Phyllosticta citricarpa - Scirtothrips citri	2	Fruits	349	May	June	330
2 Eotetranychus lewisi	1	Fruits & Shoots	415	August	September	0
3 Citrus leprosis virus	1	Fruits & Shoots	349	April	June	0
4 Elsinöe australis - Xanthomonas citri pv. aurantifolii - Xanthomonas citri pv. citri - Lopholeucaspis japonica - Unaspis citri - Elsinöe citricola - Elsinöe fawcettii - Pseudocercospora angolensis	8	Fruits & Shoots	330	November	November	4290
5 Aleurocanthus citriperdus - Aleurocanthus spiniferus - Aleurocanthus woglumi - Candidatus Liberibacter africanus - Candidatus Liberibacter americanus - Candidatus Liberibacter asiaticus	6	Shoots	1496	September	November	5302
6 Candidatus phytoplasma aurantifolia - Citrus tristeza virus (EU isolates) - Citrus tristeza virus (non-EU isolates) - Diaphorina citri - Satsuma dwarf virus - Scirtothrips aurantii - Scirtothrips dorsalis - Toxoptera citricida - Trioza erytreae	9	Shoots	1068	April	June	10434

Showing 1 to 6 of 6 entries

Previous 1 Next

Plot of Minimal Effort



Welcome to RiPEST

This tool is developed as an interactive guide to help the user to plan and execute a statistically sound and risk-based survey on plant pests. It has been developed based on the following EFSA guidance document:

- EFSA (European Food Safety Authority), Lázaro E, Parnell S, Vincent Civera A, Schans J, Schenk M, Cortiñas Abrahantes J, Zancanaro G and Vos S, 2020a. General guidelines for statistically sound and risk-based surveys of plant pests. EFSA supporting publication 2020:EN-1919. 65 pp. [doi:10.2903/sp.efsa.2020.EN-1919](https://doi.org/10.2903/sp.efsa.2020.EN-1919)

Based on the online application RiBESS+ (Risk based surveillance systems) that implements statistical methods for estimating the sample size, design prevalence (achieved design prevalence), global (and group) sensitivity (achieved confidence level) and probability of freedom from disease.

A session can be downloaded at any point during the survey process. This way the survey can be continued or edited at a later point in time.

[Load Survey](#)[▶ Start New Survey](#)

© EuroGeographics for the administrative boundaries (2021)



STAY CONNECTED

SUBSCRIBE TO

efsa.europa.eu/en/news/newsletters
efsa.europa.eu/en/rss
[Careers.efsa.europa.eu](https://careers.efsa.europa.eu) – job alerts



LISTEN TO OUR PODCAST

Science on the Menu – Spotify, Apple Podcast and YouTube



FOLLOW US ON TWITTER

[@efsa_eu](https://twitter.com/efsa_eu) [@methods_efsa](https://twitter.com/methods_efsa)
[@plants_efsa](https://twitter.com/plants_efsa) [@animals_efsa](https://twitter.com/animals_efsa)



FOLLOW US ON LINKEDIN

[Linkedin.com/company/efsa](https://linkedin.com/company/efsa)



FOLLOW US ON INSTAGRAM

[@one_healthenv_eu](https://instagram.com/one_healthenv_eu)



CONTACT US

efsa.europa.eu/en/contact/askefsa

