

APPROVED: 13 December 2024  
doi: 10.2903/sp.efsa.2025.EN-9230

# EFSA methodology for assessing candidate priority pests under EU Regulation 2016/2031

European Food Safety Authority (EFSA), Eduardo de la Peña, Katharina Dehnen-Schmutz, Gianni Gilioli, Pablo González-Moreno, David Makowski, Alexander Mastin, Alexandre Nougadère, Maria Luisa Paracchini<sup>1</sup>, Stephen Parnell, Alessandro Portaluri, Bethan Purse, Maria Ribaya, Berta Sánchez, Marica Scala, Sara Tramontini and Sybren Vos

## Abstract

In 2022, EFSA was mandated by the European Commission's Directorate-General for Health and Food Safety (M-2022-00070) to provide technical assistance on the list of Union quarantine pests qualifying as priority pests, as specified in Article 6(2) of Regulation (EU) 2016/2031 on protective measures against plant pests. As part of Task C, EFSA conducted comprehensive expert knowledge elicitations for 46 candidate priority pests, focusing on the lag period, rate of expansion and impact on production (yield and quality losses) and the environment. This report details the methodology for assessing these candidate priority pests for which the EFSA outputs and supporting datasets were delivered to the European Commission's Joint Research Centre, to feed the Impact Indicator for Priority Pest (I2P2) model and complete the pest prioritisation ranking exercise.

© European Food Safety Authority, 2025

**Keywords:** EU quarantine pests, pest prioritisation, potential distribution area, lag period, rate of expansion, impact on agricultural and forestry production, environmental impact.

**Requestor:** European Commission

**Question number:** EFSA-Q-2024-00339

**Correspondence:** [PLANTS@efsa.europa.eu](mailto:PLANTS@efsa.europa.eu)

---

<sup>1</sup> European Commission, Joint Research Centre, Ispra (VA), Italy.



**Acknowledgements:** EFSA wishes to thank all experts and colleagues for their participation in the expert knowledge elicitations or their contributions to drafting the related EFSA reports within this priority pests mandate: Maria Aragona, Federica Baldassarre, Francesco Barbieri, Irene Barnes, Gianpaolo Barzanti, Andrea Battisti, Todd Baughman, Maria Bergsma-Vlami, Sabrina Bertin, Francesco Binazzi, Johanna Boberg, Donato Boscia, Domenico Bosco, Giuseppe Brundu, Angela Brunetti, Helena Bylund, Thierry Candresse, Concetta Cardillo, Paula Castro, Guido Ceccherini, Mariangela Ciampitti, Jaime Cubero, Vicente Dalmau Sorli, Maarten De Groot, Marc De Meyer, Thomas Deslandes, Nicolas Desneux, Rene Eschen, Luca Ferretti, Eva Fornefeld, Marc Fuchs, Giuliano Gabrieli, Andrea Gentili, Lucrezia Giovannini, Alex Gobbi, Dejana Golic, Paolo Gonthier, Marine Guerret, Anita Haegi, Alice Hughes, Alessandro Infantino, Thomas Isakeit, Josep Jaques, Bora Kaydan, Natalia Kirichenko, Roumiana Krusteva, Blanca Landa, Marianne Loiseau, Antoon Loomans, Flavio Lupia, Christian Macquarrie, Andrea Maiorano, Sylvie Malembic-Maher, Maria Manzano Martinez, Steve Marek, Robert Martin, Davide Martinetti, Cristina Marzachi, Hugo Mas, Iryna Matsiakh, Giuseppe Mazza, Deborah Mccullough, Mark Richard Mcneill, Robert Meagher, Ana Montero Castaño, Iraj Namdarian, Francesco Paoli, Nikos Papadopoulos, Silvana Paula-Moraes, Fabrizio Pennacchio, Elena Perez, Craig Phillips, Carla Pimentel, Alessandro Polito, Daniel Potter, Stephane Poussier, Nicoletta Pucci, Giuseppe Pulighe, Robert Rabaglia, Francis Reay-Jones, Daniel Rigling, Cécile Robin, Christelle Robinet, Amanda Roe, Gabriele Rondoni, Francisco Jose Ruiz Gomez, Claire Rutledge, Daria Rzepecka, Giuseppino Sabbatini Peverieri, Monique Sakalidis, Alberto Santini, Valeria Scala, Martijn Schenk, Chiara Sciandra, Sarkar Shovon, Josef Spak, Stefano Speranza, Uwe Starfinger, Gudrun Strauss, Anna Taglienti, Alice Carlotta Tani, Luciana Tavella, Antonio Tiberini, Francesco Turillazzi, Ioannis Tzanetakis, Marja Van Der Straten, Antonio Vicent Civera, Charles Vincent, Salvatore Vitale, Joan Webber, Donald Weber, Carolyn Young and Lucia Zappalà.

**Suggested citation:** EFSA (European Food Safety Authority), de la Peña E, Dehnen-Schmutz K, Gilioli G, González-Moreno P, Makowski D, Mastin A, Nougadère A, Paracchini ML, Parnell S, Portaluri A, Purse B, Ribaya M, Sánchez B, Scala M, Tramontini S and Vos S, 2025. EFSA methodology for assessing candidate priority pests under EU Regulation 2016/2031. EFSA Supporting publication 2025:EN-9230. 42 pp. doi: 10.2903/sp.efsa.2025.EN-9230

**ISSN:** 2397-8325

© European Food Safety Authority, 2025

Reproduction is authorised provided the source is acknowledged.



## Table of contents

Abstract.....	1
Table of contents .....	3
1 Introduction .....	4
1.1 Background and terms of reference as provided by the requestor .....	4
1.2 Interpretation of the terms of reference and context .....	5
1.3 Additional information .....	5
1.3.1 Project resources .....	5
1.3.2 Requested deliverables .....	6
2 Data and outputs .....	6
2.1 Pest Reports.....	6
2.2 Pest Datasheets.....	7
3 Methodology .....	8
3.1 Summary of the biology and taxonomy .....	8
3.2 Host plants .....	8
3.3 Area of potential distribution.....	9
3.3.1 Area of current distribution.....	9
3.3.2 Area of potential establishment.....	9
3.3.3 Seasonal occurrence outside the area of potential establishment .....	10
3.4 Potential pest control in the EU .....	11
3.5 Additional potential effects .....	11
3.6 Lag period and rate of expansion .....	11
3.6.1 Scenario assumptions.....	11
3.6.2 Lag period parameter .....	14
3.6.3 Rate of expansion parameter .....	14
3.7 Impact on agricultural and forestry production: yield and quality losses .....	14
3.7.1 Scenario assumptions.....	14
3.7.2 Yield and quality losses parameter.....	15
3.7.3 Impact on nurseries .....	17
3.8 Graphical representation of elicited and fitted values of the lag period, rate of expansion and yield/quality losses.....	17
3.9 Environmental impact indicators .....	18
3.9.1 Impact on ecosystem services .....	19
3.9.2 Impact on species biodiversity at community level.....	20
3.9.3 Impact on protected areas .....	21
3.9.4 Impact on host species of conservation concern .....	21
3.9.5 Increase in the use of plant protection products .....	23
References .....	24
Abbreviations .....	26
Appendix A Candidate priority pests.....	27
Appendix B Experts and EFSA staff contributing to the priority pests mandate.....	29
Appendix C List of EFSA Pest Reports and Pest Datasheets.....	36
Appendix D Number of results provided by EFSA per pest and parameter .....	38
Appendix E Flowchart of the EFSA process for assessing candidate priority pests.....	42



# 1 Introduction

## 1.1 Background and terms of reference as provided by the requestor

The European Commission Delegated Regulation (EU) 2019/1702<sup>2</sup>, sets out a list of Union quarantine pests (UQPs) which qualify as priority pests, as per Article 6(2) of Regulation (EU) 2016/2031<sup>3</sup> on protective measures against pests of plants. It lists the pests which have the potential to cause the most severe economic, social and environmental impact in European Union (EU) territory.

For the establishment of this list, in 2019, EFSA provided scientific and technical support to the Joint Research Centre (JRC) to estimate the biological and ecological indicators feeding the Impact Indicator on Priority Pests (I2P2) model (European Commission et al., 2019).

Since 2022, on the request of the European Commission (Directorate-General for Health and Food Safety), EFSA has reconducted this assessment, covering all UQPs to support the JRC by providing data required for their I2P2 analysis. This analysis is based on current scientific knowledge and considers the criteria listed in Section 2 of Annex I of Regulation (EU) 2016/2031.

More specifically, EFSA was requested to perform the following tasks.

### **Task A – deadline November 2022**

EFSA was asked 'to provide scientific and technical support to DG JRC for the analysis of all UQPs (provision of hosts for all UQPs, based on the EPPO Global Database, if the information is available, and other sources)'.

### **Task B – deadline June 2023**

EFSA was asked 'to provide scientific and technical support to DG JRC when shortlisting candidate priority pests, including the assessment of the spread and impact, in line with EFSA's quantitative risk assessment methodology'.

### **Task C – deadline October 2024**

EFSA was asked 'to conduct fully-fledged expert knowledge elicitations (EKEs) for the short list of candidate priority pests to support DG JRC in the assessment for their potential inclusion in the list of Priority Pests under Regulation (EU) 2019/1702. The information available for the 28 pests already assessed in 2019 for their potential inclusion as priority pests could be reviewed, if needed, to ensure consistency of the applied methodology'.

This report describes and explains the methodology that EFSA developed and followed in the performance of Task C.

<sup>2</sup> Commission Delegated Regulation (EU) 2019/1702 of 1 August 2019 supplementing Regulation (EU) 2016/2031 of the European Parliament and of the Council by establishing the list of priority pests. OJ L 260, 11.10.2019, p. 8–10.

<sup>3</sup> Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants, amending Regulations (EU) No 228/2013, (EU) No 652/2014 and (EU) No 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC, 98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC. OJ L 317, 23.11.2016, p. 4–104.

## 1.2 Interpretation of the terms of reference and context

EFSA's current priority pest mandate (M-2022-00070) comprises three tasks:

- Task A: conduct an analysis of all UQPs.
- Task B: create a short list of candidate priority pests.
- Task C: carry out full EKEs for the short-listed pests.

Task A was performed by comparing the host plants of all UQPs. The results are presented in the Technical Report on Task A of EFSA's priority pest mandate (Tramontini et al., 2023).

Task B was performed by applying five criteria under three different scenarios. The outcome is presented in the Technical Report on Task B of EFSA's priority pest mandate (Nougadère et al., 2023).

Following the presentation of these reports to the European Commission's Standing Committee on Plants, Animals, Food and Feed (PAFF) on 21 December 2023, and based on the JRC analysis and subsequent feedback from PAFF members, the Commission provided EFSA with a list of 46 UQPs that qualified as candidate priority pests for assessment under Task C. This short list includes additional pests not covered under the previous mandate (EFSA, 2019).

As part of Task C, EFSA conducted comprehensive EKEs for these 46 candidate priority pests (Appendix A), focusing on the lag period, rate of expansion and the impact on agricultural and forestry production (yield and quality losses) and the environment (environmental impact indicators). This report details the methodology used to assess these candidate priority pests. EFSA's resulting outputs and supporting datasets were delivered to the JRC to feed the I2P2 model and complete the pest prioritisation ranking exercise. Task C initially required an update of the methodology developed under the 2019 mandate (EFSA, 2019), which is the primary focus of this report. A detailed description of the indicators assessed in the previous mandate can be found in European Commission et al. (2019) and EFSA (2019).

Common templates for the Pest Reports and Pest Datasheets were developed and are regularly updated to ensure their fitness for purpose and usability by the JRC.

## 1.3 Additional information

### 1.3.1 Project resources

- EFSA's grant agreement with the Italian Council for Agricultural Research and Economics (CREA) (GP/EFSA/PLANTS/2022/06) 'Priority pests: data and evidence collection in support to the pest specific assessments' provides background information in preparation for the expert elicitation phase.
- The EFSA Working Group on Priority Pests<sup>4</sup> coordinated by EFSA staff (Appendix B):
  - Two EFSA scientific officers responsible for chairing various working group meetings and EKEs, coordinating the scientific expertise and the drafting of the reports. Other EFSA staff provided scientific input and contributed to project monitoring.
  - Five EKE elicitors to ensure the EKEs were conducted following the methodology described in this report.

<sup>4</sup> Minutes of the working group are available at: <https://www.efsa.europa.eu/sites/default/files/2022-11/wg-plh-priority-pests.pdf>



- 88 experts provided their knowledge on the pests and the assessed parameters, including 17 experts who contributed to the development of the methodology for assessing the environmental impact.
- Two experts were contracted under the Individual Scientific Advisers scheme to support EFSA with (1) spatial analysis, and (2) consistency and formatting review of all outputs, along with data preparation for JRC.

### 1.3.2 Requested deliverables

This report serves as the reference document for the methodology applied to all EFSA outputs produced under the mandate, specifically the Pest Reports and Pest Datasheets (Section 2) prepared for the JRC, covering the 46 short-listed pests (Appendix A). Since the prioritisation work conducted in 2019 under the previous mandate from the Commission, the methodology for parameter estimation has been revised, and new knowledge has become available for some pests. To ensure consistency, EFSA assessed all 46 short-listed pests uniformly.

## 2 Data and outputs

This section presents the data and evidence provided in the EFSA outputs (Pest Reports and Datasheets). Further details on the concepts, definitions and scenario assumptions are provided in Section 3, while the list of published EFSA outputs is given in Appendix C.

### 2.1 Pest Reports

The EFSA Pest Reports summarise the evidence needed to conduct the EKEs, based on the most complete and up-to-date scientific literature, which is also referenced in EFSA Pest Categorisations, EFSA Pest Risk Assessments, EFSA Pest Survey Cards, EPPO Pest Risk Analyses and assessments performed by other European or non-European institutions.

The data and information obtained through targeted literature searches were supplemented with expert contributions to ensure that relevant data for parameter estimation and the latest research findings were considered.

The Pest Reports are structured as follows:

- Section 1: Provides the context of the priority pests mandate.
- Section 2: Summarises the relevant information on the pest, covering its biology and taxonomy, host range (including hosts selected for the EKE on impact on production), potential distribution within the EU, available control options and potential risks related to mycotoxin contamination and pathogen transmission.
- Section 3: Describes the estimation process and results of the assessment of lag period and rate of expansion. Each assessment is supported by general and specific assumptions, the description of the parameters for estimation, question definitions, review of evidence and an analysis of uncertainties. The results for each quantile are supported by the rationale provided by the experts and presented in tables and graphs to illustrate uncertainty, along with a concise conclusion.



- Section 4: Describes the estimation process and results of the assessment of yield and quality losses in agricultural and forestry production, with the same approach applied for lag period and rate of expansion.
- Section 5: Provides the results of the assessment for the five indicators of the environmental impact framework.
- Section 6: Summarises the main conclusions from the different sections of the report.
- Appendices: Appendix A is the comprehensive host list compiled from the EPPO Global Database (EPPO, 2024), the CABI Crop Protection Compendium (CABI, 2024) and any further evidence. Appendix B summarises the sources of evidence collected from the literature and provided to experts to support the EKE.

Each Pest Report reflects the information available up to the final meeting date of EFSA's Working Group on Priority Pests dedicated to assessing the pest in question<sup>5</sup>.

## 2.2 Pest Datasheets

The Pest Datasheets are documents provided by EFSA to the JRC, summarising the input data on pest biology and ecology used to run the I2P2. They include the probability distributions estimated for all parameters through EKE, based on the available evidence (literature and datasets) and experts' beliefs. The Pest Datasheet includes:

- The list of host plants for which the impact analysis was performed.
- The area of potential distribution of the pest in the EU, at least at the NUTS2<sup>6</sup> level for each Member State.
- The impact on agricultural and forestry production (yield and quality losses) at NUTS2 level, derived from the EKE.
- The rate of expansion and lag period, derived from the EKE.
- Additional effects related to mycotoxin contamination and pathogen transmission.
- The current global distribution and countries where the organism is regulated as a UQP.
- A full list of known potential hosts.
- The impact on ecosystem services.
- The impact on species biodiversity at community level.
- The impact on protected areas.
- The impact on species conservation status.
- The risk of an increase in the use of plant protection products.

In total, within this project, EFSA generated 186 probability distributions (94 on yield/quality loss in agricultural and forestry production, 46 on lag period, 46 on rate of expansion), and 138 environmental impact values for five indicators (Section 3 and Appendix D).

<sup>5</sup> Minutes of the working group are available at: <https://www.efsa.europa.eu/sites/default/files/2022-11/wg-plh-priority-pests.pdf>

<sup>6</sup> The NUTS (Nomenclature of Territorial Units for Statistics) is a geocode standard developed and regulated by the European Union. Available online: <https://www.europarl.europa.eu/factsheets/en/sheet/99/common-classification-of-territorial-units-for-statistics-nuts->

### 3 Methodology

This section outlines the methodology for generating the data and EFSA outputs (Pest Reports and Pest Datasheets, as described in the previous section), including the concepts and general scenario assumptions used to estimate the various parameters. The process related to this methodology and the preparation of the EFSA outputs is summarised in Appendix E.

The main changes to the 2019 methodology (EFSA, 2019) for assessing candidate priority pests are as follows:

- The substitution of the parameters 'spread rate' and 'time for detection after entry' with 'rate of expansion' and 'lag period', respectively (see Section 3.6).
- The assessment of new indicators for the Environmental Domain of I2P2, replacing previous ones. For this task, the JRC was consulted on multiple occasions to avoid duplicating the use of certain indicators within each domain (see Section 3.9).

Furthermore, during the assessment phase mainly conducted via the elicitation of plant health experts in accordance with EFSA (2014), EFSA adjusted the methodology, as needed, to ensure consistency across the assessments.

#### 3.1 Summary of the biology and taxonomy

This introductory section provides general information on each pest, addressing any taxonomic or nomenclature issues and the types of impact caused. Based on a thorough review of the literature, it includes only the information directly relevant to the assessment.

#### 3.2 Host plants

This section provides details on host preference and susceptibility and their distribution in the assessment area. Along with the full list of host plants (Appendix A of the Pest Report) and considerations of the economic impact, this information provides experts with the rationale for selecting the plant species to be assessed for yield and quality losses (impact on agricultural and forestry production) through EKEs.

One or more of the following criteria are applied for host selection:

- The type of impact caused by the pest on the single host species or category of hosts.
- The economic and environmental importance of the plant species in the EU.
- The host plant preferences of the pest under assessment and its major/main hosts.
- The availability of data on the distribution of the host(s) in the EU and production statistics provided in the evidence reports (provided by CREA).

Once the host species is/are identified, experts discussed and agreed on:

- The grouping of host plants for each EKE, especially for polyphagous pests.
- The level of aggregation (genus/species/subspecies) of the hosts.

In the case of polyphagous pests, the host plants can be grouped by considering:

- The host susceptibility or the host preferences within the same taxonomic group (e.g. family, genus, species) or crop category, e.g. Eurostat categories.
- The production systems, e.g. row crops, greenhouse crops, orchards, forest plants.

- The end use of the product, e.g. forage crop, grain crop, fresh consumption.

The full host list in Appendix A of the Pest Report is compiled considering the most recent Pest Risk Assessments, the CABI Crop Protection Compendium (CABI, 2024) and the EPPO Global Database (EPPO, 2024). Hosts from the CABI list classified as 'unknown', as well as hosts from the EPPO list classified as 'alternate', 'artificial' or 'incidental' are excluded from the list. This list is reviewed and validated by the expert group involved in the EKE.

### 3.3 Area of potential distribution

The area of potential distribution in the EU includes both the area of potential establishment and the area where the pest may only occur seasonally. Combining established populations with the area of seasonal occurrence (transient populations) to define the area of potential distribution is in agreement with the International Standard for Phytosanitary Measures (ISPM) No 8 (IPPC Secretariat, 2021).

In order to identify the area of potential distribution for a given pest in the EU, information on host availability and climate suitability are used. The results of any relevant models describing the area of potential establishment are evaluated. Since it is assumed that greenhouses may offer favourable habitats for the establishment of the pest, they are considered to be part of the area of potential establishment, even if they are far from the areas where the pest can become established outdoors.

The areas of seasonal occurrence are included in the assessment if needed (Section 3.3.3).

#### 3.3.1 Area of current distribution

This is usually shown on a map of the pest's global distribution (per country) extracted from the EPPO Global Database (EPPO, 2024).

#### 3.3.2 Area of potential establishment

In order to define the area of potential establishment in the EU, the availability and distribution of hosts (Section 3.2) and the climatic suitability are taken into account. The area of potential establishment could be smaller than the area where the main hosts occur, due to climate or other ecological factors preventing the establishment of the pest.

When appropriate, published information on the potential establishment of the pest (e.g. climate suitability maps) have been included in the assessment. In the absence of suitable studies, new areas and/or maps of potential distribution were generated based on the most relevant biological and environmental data influencing pest establishment in a given area.

For meteorological and climatic data, the following datasets were used:

- JRC Gridded Agro-Meteorological data in Europe (European Commission and Joint Research Centre, 2024).
- Köppen-Geiger climate classification (Climate Change & Infectious Diseases Group, 2023).

The area of potential establishment in the EU is provided in the EFSA Pest Datasheet at the highest available spatial resolution, based on meteorological and climatic data. The minimum



level of resolution is the NUTS2 level on climate suitability (suitable/not suitable) for the establishment of the pest (in the dataset 0 = not suitable and 1 = suitable).

For harmonisation purposes, climatic suitability may be aggregated up to NUTS0 level. In such cases, the datasets include the weighted average of the NUTS2 regions based on production volumes or production areas. If host-specific data were not available, the land area of the NUTS2 regions was used to weight the average.

### 3.3.3 Seasonal occurrence outside the area of potential establishment

Outside the area of potential establishment, yield and quality losses could still occur due to the presence of transient populations. The threshold used as an inclusion/exclusion criterion for considering transient populations is the occurrence of long-distance dispersal events ( $\geq 100$  km per season from the limits of the area of potential establishment). These events may result from natural dispersal processes, including active mechanisms (e.g. the species being a strong flyer) or passive mechanisms (e.g. wind-borne transport). The constitution of seasonal populations outside the area of potential establishment due to human activity (e.g. survival in greenhouses by arrival with plants for planting) is not included in the assessment.

Yield and quality losses estimated in the area of potential establishment can be scaled by factors (i.e. coefficients) specific to the areas where there might be seasonal occurrence. These scaling factors account for: (i) the heterogeneity both in time and space in the occurrence of the transient populations, and (ii) differences in the abundance of these transient populations compared with the population abundance in the area of potential establishment.

The relevance of the impact in the area of transience is discussed case by case by the group of experts during the EKE in order to decide the need to: (i) separately assess the impact in the area of transience; or (ii) define a reduction factor for the impact in the area of transience; or (iii) exclude the impact in the area of transience from the assessment.

In cases where a reduction factor is applied, the impact of the pest in the area of seasonal occurrence is calculated as follows:

- 1 The area of potential distribution is defined by extending the border of the area of potential establishment by the maximum distance covered by the pest in one season, as estimated by experts during the EKE on the rate of expansion (see Section 3.6).
- 2 A variable is defined as a proxy for the abundance (e.g. the number of generations, thermal sums) to be used to assess the level of impact caused by the transient population.
- 3 The scaling factor for the impact is calculated as the ratio between the value of the variable defined in point 2 and the mean value of that variable in the area of potential establishment.
- 4 The yield/quality loss caused by transient populations at a location outside the area of potential establishment is calculated by multiplying the estimated median yield/quality loss in the area of potential establishment by the scaling factor computed for that location.

Protected environments (e.g. greenhouses) should also be taken into account as soon as the pest is able to reach them by natural spread.

### 3.4 Potential pest control in the EU

This section reviews the existing and potential pest control options within the pest's current distribution area, as well as potential control measures (focusing on plant protection products (PPPs)) in the area of potential distribution. This review will inform the definition of the environmental impact indicator 'increase in the use of PPPs' (see Section 3.9.5).

### 3.5 Additional potential effects

This section includes:

- The responsibility of the pest for the presence of toxins in crops for animal or human consumption based on evidence in the literature. The toxins could be produced either directly by the pest under assessment or by other pests whose presence is favoured by the pest under assessment;
- Information about the ability of the pest to transmit plant pathogens.

### 3.6 Lag period and rate of expansion

After reviewing the information on the biology and ecology of the pest and the evidence tables provided in an appendix to each Pest Report, the working group performs an EKE to assess the lag period and rate of expansion, applying the same general scenario (see Section 3.6.1) to the various pests, in order to ensure comparability of the results. For a complete description of the EKE process followed to fulfil this mandate, refer to EFSA (2019) and the related Pest Reports (see Appendix D).

#### 3.6.1 Scenario assumptions

The following set of scenario assumptions was introduced to guarantee that the assessments of the lag period and the rate of expansion were performed in standard conditions for all the pests. This procedure is considered a prerequisite for a ranking exercise, such as the one performed by the JRC in applying the I2P2 on candidate priority pests using the data provided by EFSA.

The following phases were considered when assessing the pest spread (Figure 1):

- **Phase 0:** Establishment of the pest in the assessment area.  
Founder populations are typically small and at great risk of extinction. The establishment phase is a critical period when populations grow to sufficient levels that extinction is highly unlikely (also reducing the effects of demographic and environmental stochasticity). In our scenario, we consider that a founder population has entered the EU and has adapted to the local conditions and resources. Therefore, the pest population is able to perpetuate for the foreseeable future (IPPC Secretariat, 2005).
- **Phase 1:** Lag period.  
After establishment, the founder population starts growing. The increase in population size depends on how capable individuals are to satisfy the requirements of the three basic life history strategies: survival, growth and reproduction. Usually the population growth is slow (undercrowding effects) during the lag phase and often the pest remains at a low level of abundance making its detection unlikely during this period. The need to adapt, the small population size and the low level of intraspecific competition also



limit the dispersal capacity of the individuals in the new environment. At this stage, the pest has a restricted area of distribution, and the spatial population dynamics are limited to a few dispersing propagule populations that cannot sustain a proper spread. The dispersal does not lead to a continuous spread (no invasion front) nor a homogeneous one (spread in multiple directions). The duration of the lag phase is the first parameter estimated by EKE. Its value can vary according to the species and the local conditions where establishment occurs. The value estimated by the experts is the average of all possible values of the lag period in the EU area under assessment. It could also be that a species does not need an adaptation to the new environment and that due to the rapid growth of the founder population does not display any lag phase and quickly starts spreading at a constant and homogeneous rate.

- **Phase 2:** Exponential population growth.  
There is no clear point in time defining the transition between the lag phase and the subsequent population growth phase. It is commonly reported that invasive species, after a more or less prolonged period of latency (i.e. the lag period in the current approach) start growing exponentially. This transition to an exponential growth corresponds to a condition of increased adaptation of the individuals to the new environment with positive effects on life history strategies and a population size that is far from producing significant intraspecific competition.
- **Phase 3:** High rate of population growth.  
During this phase, the pest is well adapted to local conditions, allowing its population to grow at the maximum rate until the population size reaches the maximum possible. This equilibrium reflects the balance between available resources and environmental conditions. High population abundance supports both increased dispersal rates and successful establishment of propagules after dispersal. Spatially, the spread is continuous (an invasion front is identifiable) and homogeneous (similar in all directions). Spread can be calculated in various ways; here, it is estimated as the radial expansion over time (rate of expansion). The growth rate during this phase corresponds to the second parameter estimated by EKE to characterise pest spread. This rate may vary across areas due to factors like host availability, patchiness and agricultural practices. Assuming an unlimited pest-free area, the average rate of expansion within the assessment region can be considered constant. Experts estimate this parameter as the average rate of expansion across the EU area under assessment.

For the 2019 mandate on priority pests, the estimated parameters were the 'spread rate' and 'time to detection' (EFSA, 2019). The updated parameters are:

- **lag period:** replaces the previously used 'time to detection' and represents the duration of the lag phase;
- **rate of expansion:** replaces the previously used 'spread rate'.

Replacing 'time to detection' with 'lag period' offers a more standardised, biology-based parameter for expressing eradication difficulty in the I2P2 formula used by the JRC (European Commission et al., 2019). The new parameter 'lag period' is independent of human-driven factors (such as detection efforts and methodologies for newly established populations) and is solely based on the pest's biology and the receiving environment.

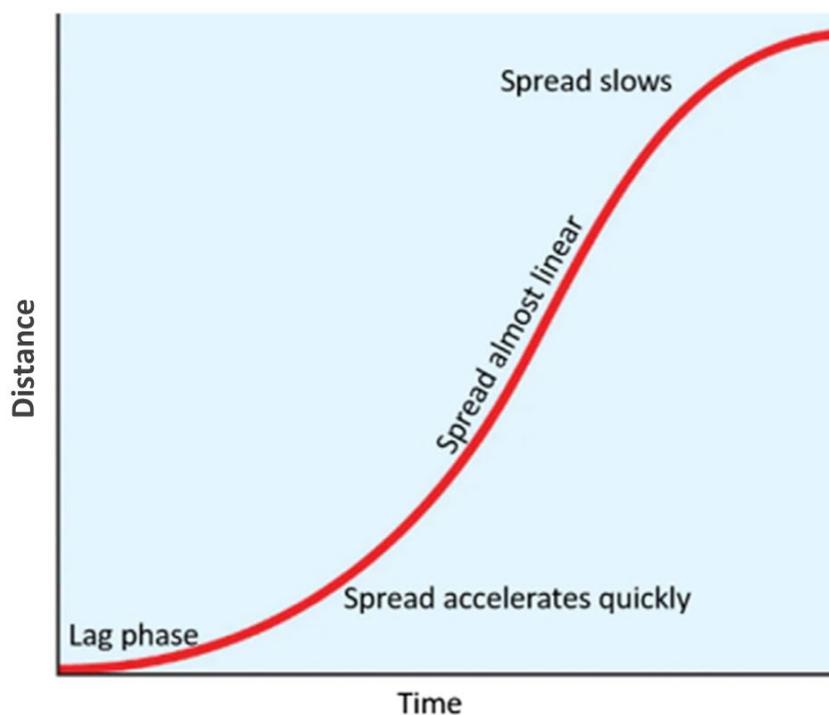


Figure 1: Conceptual logistic spread (adapted from Garre et al., 2023, and Shigesada et al., 1995): Lag period, accelerated and maximum expansion and final deceleration.

In EFSA (2019), the spread rate was defined as the maximum distance travelled within one year immediately following establishment, expressed in metres or kilometres per year. To enhance biological relevance and provide a more robust definition, this concept has been refined to represent the maximum rate of expansion over time observed after the lag period, expressed in the same units (m or km per year) (Figure 1).

The new parameters enhance compatibility across results obtained for different pests, ensuring greater comparability of the values. Additionally, they facilitate harmonisation across various EFSA outputs. Accordingly, these parameters have already been applied in several pest risk assessments conducted by the EFSA Panel on Plant Health (e.g. EFSA PLH Panel et al., 2023, 2024), which validated their use.

Additional assumptions:

- Means of spread. The spread rate results from both natural dispersal and local human-assisted activities (e.g., within a farm or between adjacent farms). The parameter values estimated for the I2P2 prioritisation tool exclude spread associated with post-harvest movement, such as commodity trade. Human-assisted spread includes actions related to production, such as common agricultural practices (e.g., using pruning equipment or farm-saved seeds within a farm). However, the trade of harvested products and plants for planting is excluded from the assessment. In forest management, practices like gathering cut logs and transporting them along forest roads are considered short-distance dispersal and are included in the spread rate. For urban infestations, pruning material is either shredded on-site or transported to a potentially distant location, which is why this factor was excluded from the spread rate assessment.



- The current climatic conditions are considered when assessing population growth/epidemics and spread of the pest.
- The potential effect of current agricultural practices and management activities applied in the EU is considered.

Specific assumptions can be added on a case-by-case basis and are included in the Pest Report.

### 3.6.2 Lag period parameter

The experts are asked to assess the probability distribution of the mean value of the lag period in the area of the EU under assessment by replying to the following question:

What is the duration [years or months] of the lag phase of a founder population of [pest] under the scenario assumptions in the area of the EU under assessment, as defined in the Pest Report?

The value estimated by the experts represents the average of all possible values of the lag period expected in the EU area under assessment. The elicited values are reported and fitted as shown in Figure 2.

### 3.6.3 Rate of expansion parameter

The experts are asked to assess the probability distribution of the mean value of the rate of expansion in the area of the EU under assessment by replying to the following question:

What is the rate of expansion [(kilo)metres/year] of [pest] under the scenario assumptions in the area of the EU under assessment, as defined in the Pest Report?

The value estimated by the experts represents the average of all possible values of the rate of expansion expected in the EU area under assessment. The elicited values are reported and fitted as shown in Figure 2.

## 3.7 Impact on agricultural and forestry production: yield and quality losses

As for the lag period and rate of expansion, after reviewing, with the experts, the evidence on yield and quality losses provided in the dossier (evidence tables in the appendix of each Pest Report), the working group performs an EKE, applying a common scenario (see Section 3.7.1) for all pests to ensure the comparability of results. For a complete description of the EKE process followed in this mandate, refer to EFSA (2019) and the related Pest Reports (see Appendix D).

### 3.7.1 Scenario assumptions

The following set of scenario assumptions was introduced to guarantee that the assessment of yield and quality losses was performed under standard conditions for all the pests. This procedure is considered a prerequisite for a ranking exercise, such as the one performed by the JRC in applying the I2P2 on candidate priority pests using the data provided by EFSA.

- Impacts are assessed by assuming that the entry, establishment and spread of the pest had already occurred. This corresponds to a scenario where the pest is already present throughout the area of potential distribution in the EU (i.e. it has spread to its maximum



extent) and that the limits of this area do not change. Furthermore, it is assumed that there are no ongoing eradication or containment programmes targeting the pest species.

- Within the area of potential distribution, pest presence depends on the distribution of the suitable patches, namely where the hosts are present and local environmental conditions are conducive for population persistence. Heterogeneity in suitable conditions, and processes of local population dynamics may lead to variation in the population abundance between and within patches. The presence of empty patches due to unsuitable conditions or local extinction is also considered. Specific patterns of spatial variation in potential abundance may occur (e.g. a latitudinal gradient due to a temperature gradient).
- The pest abundance (whatever the definition of abundance usually adopted for the pest) is considered the driving factor for the estimation of yield and quality loss. Host plants and ecosystem resistance mechanisms present in the receiving agricultural or natural ecosystems are those already available on the arrival of the new pest. Resistance mechanisms are not expected to evolve further or reduce the pest's impact due to the receiving community's adaptation.
- The pest abundance varies from one place to another according to the biotic and abiotic factors influencing the local population size. In each location where the pest occurs, its abundance is in equilibrium with the local available resources (e.g. host plants), and the local environmental conditions (including climate and ecosystem resistance). The temporal variation in pest population abundance (e.g. population fluctuations), impacts and cropping practices (e.g. the crop replacement time) are not taken into account.
- The scenario considers the potential effect of the current agricultural practices in the risk assessment area (e.g. cultivars, crop rotations, pesticide treatments).
- For plant pathogens vectored by insects or other arthropods, the distribution and population dynamics of the vectors are taken into account and their role is discussed case by case.
- For pests able to build transient populations (i.e. able to temporarily occupy an area outside the area of potential establishment; see Section 3.3.3), the assessment is conducted for the area of potential establishment. The elicited values are then scaled up or down for the area of transience.
- The temporal variation in pest population abundance (e.g. population fluctuations), impact, and cropping practices (e.g. the crop replacement time) are not taken into account.

Specific assumptions can be added on a case-by-case basis and are included in the Pest Report.

### 3.7.2 Yield and quality losses parameter

The experts are asked to estimate the probability distribution of the mean value of the yield or quality losses in the area of the EU under assessment, for each host assessed during the EKE by replying to the following question:

What is the percentage yield/quality losses in [host] production under the scenario assumptions in the area of the EU under assessment for [pest], as defined in the Pest Report?



As with the lag period and the rate of expansion, the value estimated by the experts represents the average of all possible values of yield or quality losses expected in the EU area under assessment. The elicited values are reported and fitted as shown in Figure 2.

Yield losses relate to the reduction in harvested and marketable material. The definition of yield loss changes among different types of production system and is always specified in the Pest Report. However, the most common definitions are provided below:

- For annual crops: the yield loss is defined as the reduction (as a percentage) in the amount (e.g. in weight) of harvested products due to the impact of the pest (e.g. decline of plants, reduced size/number of plants or fruits).
- For orchards without replanting: the yield loss is defined as the reduction (as a percentage) in the amount of harvested product. This definition also accounts for tree decline without replanting, a common orchard practice, which can result in reduced annual yields over multiple harvesting periods.
- For orchards with replanting: the yield loss is defined as the reduction (as a percentage) in the amount of harvested product. This definition takes into account the fact that impacted plants are substituted and that the new plants will require a certain amount of time to enter into production.
- For forest trees: the yield loss is defined as the reduction (as a percentage) in the amount (in weight) of harvested wood of sufficient quality. The type of impact will determine the definition of the parameter to be estimated:
  - For pests causing plant death, the yield loss is assimilated into the percentage of trees dying before having reached marketable size.
  - For pests affecting the plant without causing its death, the yield loss is assessed as the reduction of the marketable wood volume.
  - For pests causing both tree death and stress, the two previous components are taken into account.
- For urban trees: the yield loss is only assessed for pests causing plant death and considering the effect of replanting. Therefore, the yield loss is assimilated into the percentage of trees dying in combination with the effect of replanting activity, considering the amount of time required by the tree to reach the size of the substituted plant.

The yield loss can be estimated for each host or category of host previously defined (see Section 3.2) for the whole assessment area (the area of potential distribution) or for each partitioning of that area. For example, the area of potential distribution can be subdivided into two or more strata according to differences in climatic conditions influencing the pest population abundance and the connected impact.

The definition of quality loss varies across agricultural and forestry products and is therefore specified on a case-by-case basis in the Pest Reports. When the value of damaged marketed products is negligible compared with undamaged ones, experts may include quality reduction as part of yield loss. In most cases, quality losses were either included in the yield loss estimate or considered negligible. The yield and quality losses were assessed separately only for *Thrips palmi* (see Appendix D).

### 3.7.3 Impact on nurseries

The assessment focuses on the yield and quality losses in the final product. Intermediate products, especially propagation material, are not included in the assessment, even if there may have been additional economic impact (EFSA, 2019).

### 3.8 Graphical representation of elicited and fitted values of the lag period, rate of expansion and yield/quality losses

Each EFSA Pest Report (see Appendix C) describes the EKE process, including the generation of elicited and fitted values, along with the experts’ reasoning for each elicited value. Figure 2 provides an example of parameter assessment, illustrating expert-elicited values from the EKE meeting and the fitted distribution, as detailed in the EFSA Pest Reports.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
<b>Expert elicitation</b>	1					2.5		4		10					15
<b>Fitted distribution</b>	0.6	0.8	1.1	1.6	2.1	2.7	3.2	4.4	5.7	6.6	7.8	9.2	11.1	12.8	15.1

Fitted distribution:  $\text{ChiSq}(5)$ , @RISK8.6

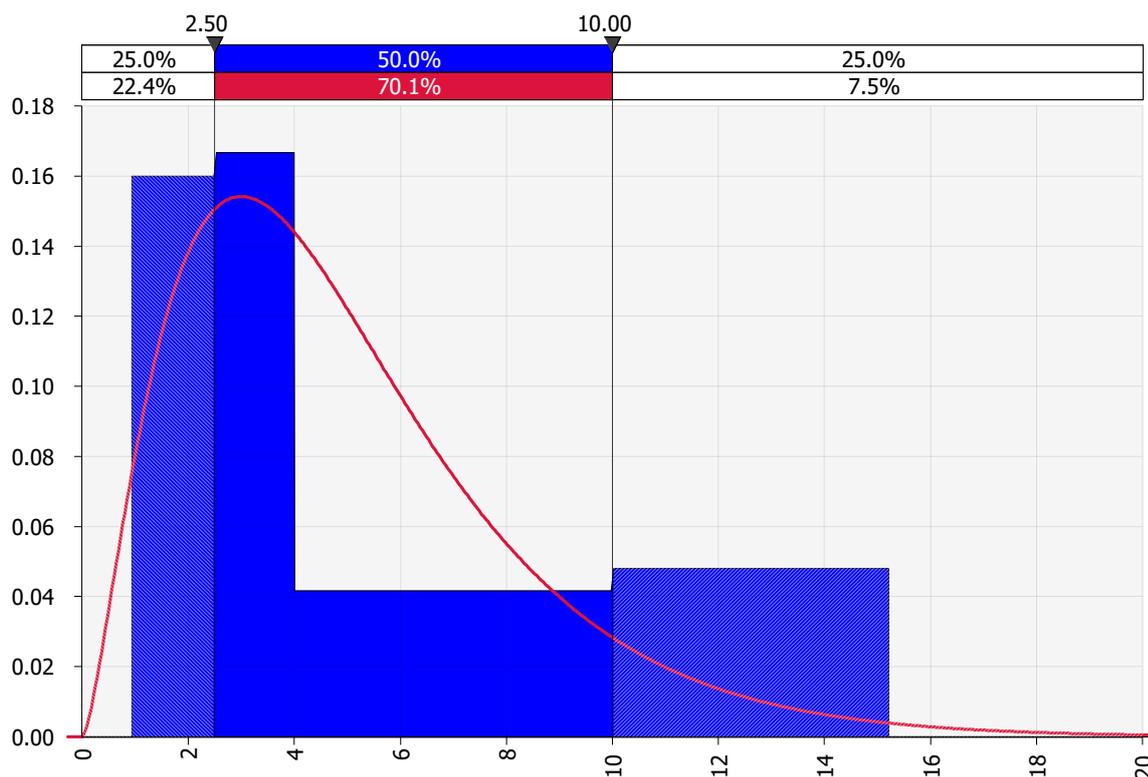


Figure 2: Example of parameter assessment (lag period, rate of expansion, or yield/quality losses) for a given candidate priority pest: (1) expert-elicited values from the EKE meeting, highlighted in green in the table and shown as blue bars in the chart, and (2) fitted values, highlighted in orange in the table and represented by a red curve in the fitted distribution. Probabilities are shown as proportions on the y-axis of the chart. In this example, related to the rate of expansion, values are expressed in kilometres per year.



### 3.9 Environmental impact indicators

The impact of the pest on the environment is assessed quantitatively, taking into account three subdomains comprising one or more indicators:

- the impact on ecosystem services;
- the impact on biodiversity:
  - impact on species diversity at community level;
  - impact on protected areas;
  - impact on species conservation status;
- an increase in the use of PPPs.

The list of indicators is summarised in Figure 3. For each indicator, the relative weight with respect to the overall environmental impact domain is given as a percentage to the right.

Domain	Sub-domain	Indicator	Weight
ENVIRONMENTAL IMPACT	Impact on ecosystem services	I.20 – Ecosystem services	45 %
	Impact on biodiversity	I.21 – Species biodiversity at community level	15 %
		I.22 – Protected areas	15 %
		I.23 – Host species of conservation concern	15 %
	Increase of the use of plant protection products	I.24 – Increase in the use of PPPs	10 %

Figure 3: List of indicators and their proposed weights for estimating the overall environmental impact of a candidate priority pest.

The approach to assessing the impact on the environment considers the activity of the pest as a perturbation to the ecosystem, which starts from its impact on the host species. This effect then proliferates to other components of the ecosystem, undermining both its structures and functions.

The magnitude assigned to the various subdomains is conceived to maximise the role of ecosystem services and biodiversity, giving them an equal weight (45%) (Figure 3).

Inside the biodiversity component, equal weight is given to three indicators (15% each) (Figure 3). The first indicator (I.21 – ‘Species biodiversity at community level’) aims to evaluate the impact of the pest on the intrinsic value of biodiversity in a given environment and is measured by the reduction of species biodiversity at community level in the affected ecosystem. The second indicator (I.22 – ‘Protected areas’) captures the potential impact of the pest on areas and communities of conservation and protection value, and the third (I.23 – ‘Host species of conservation concern’) on protected and endangered species.



The third subdomain (I.24 – ‘Increase in the use of plant protection products (PPPs)’) is targeted to account for a potential increase in the use of PPPs triggered by the presence of the new pest. A weight of 10% is assigned to the corresponding indicator (Figure 3).

### 3.9.1 Impact on ecosystem services

The impact on ecosystem services is assessed in the relevant impacted ecosystem types. The impact is estimated for each combination of relevant ecosystem services and ecosystem types. The experts are asked to assess the probability distribution of the mean value at the EU level of the reduction of the ecosystem services flow in each impacted ecosystem type by replying to the following question:

What is the percentage reduction in ecosystem service flow for [the ecosystem] under the scenario assumptions in the area of the EU under assessment for [pest], as defined in the Pest Report?

Table 1: List of ecosystem services assessed.

No	Ecosystem services assessed
1	Atmospheric composition and conditions (carbon sequestration).
2	Cultivated terrestrial plants for nutrition, materials or energy (agriculture and forestry).
3	Genetic material from plants, algae or fungi.
4	Hazard mitigation (flood and storm surge mitigation, wind protection, fire protection).
5	Hydrological cycle and water flow regulation (regulation runoff and base flows; regulation of peak flows).
6	Lifecycle maintenance, habitat and gene pool protection (excluding pollination). Seed dispersal. Maintaining or regulating nursery populations and habitats or breeding grounds (includes gene pool protection). Maintaining or regulating refuge habitats. Maintaining or regulating feeding grounds.
7	Mediation of nuisances of anthropogenic origin (noise, smell, vision, attenuation).
8	Mediation of waste or toxic substances of anthropogenic origin by living processes.
9	Pest and disease control.
10	Physical and experiential interactions with the natural environment and other biotic characteristics that have a non-use value.
11	Pollination.
12	Regulation of baseline flows and extreme events (control of erosion rates).
13	Regulation of soil quality.
14	Regulation of temperature and humidity, including ventilation and transpiration.
15	Water condition (regulation of the chemical condition of freshwaters by living processes; regulation of the chemical condition of salt waters by living processes).
16	Wild plants (terrestrial and aquatic) for nutrition, materials or energy.

A detailed description of the applied methodology is provided in a forthcoming document (EFSA report on the impact of plant pests on ecosystem services), which will include:



- 1 a section dedicated to definitions and assumptions;
- 2 a generic model;
- 3 a specific model designed for use under the Priority Pests mandate.

The scenario assumptions used to define pest population distribution and abundance for this indicator are identical to those applied in the assessment of yield and quality losses (see Section 3.7). The assessment is carried out under comparable conditions for all pests, ensuring a pest-independent general scenario. Specific assumptions will be detailed in the dedicated EFSA report on the impact of plant pests on ecosystem services.

### 3.9.2 Impact on species biodiversity at community level

Biodiversity is indicated as at the core of both provisioning services and regulating services (Isbell et al., 2017). However, structural biodiversity has a value *per se*, since it is a fundamental component of natural capital. Structural biodiversity can be considered at different levels, from genes to landscapes. For the purposes of the assessments conducted under this mandate, the impact on structural biodiversity caused by plant pests focuses on species composition at community level.

The assessment of the impact on ecosystem services introduced in the previous section starts by considering that the activity of plant pests produces a change in the plant's traits or presence (due to the mortality), which in turn affects dimensions of the ecological niches of a subset of the species in the community of the receiving ecosystem. The impact on plant traits can also influence abiotic ecosystem components associated with host plants. The assessment of the impact on biodiversity at community level focuses solely on the subset of species within the community that rely on host plants as direct structural or functional components of their ecological niche. Typically, the effects of a disturbance cascade through the network of interactions within the ecosystem. However, a simplifying assumption is made: the assessment of the impact on biodiversity is restricted to species that have a direct spatial connection or proximity, along with a continuous and prolonged relationship between non-host species, abiotic ecosystem components and the host plants in the receiving ecosystem.

Awareness of the importance of biodiversity leads people to assign value to habitats and species for their existence (non-use value) and to strive for their preservation for present and future generations. In this context, the ecosystem service 'Lifecycle maintenance, habitat and gene pool protection', as proposed in the Common International Classification of Ecosystem Services (CICES; see Haines-Young and Potschin, 2018) is conceptually the closest to biodiversity at the community level and aligns with preserving the integrity of ecological niches. Thus, it is assumed that the impact on this service can serve as a proxy for estimating the impact on species biodiversity. While differences exist – species biodiversity is a condition indicator, whereas species maintenance is a service driven by distinct factors – this conceptual closeness justifies its use as a proxy. For each pest species, the index is calculated as the reduction in the flow of ecosystem service 'Lifecycle maintenance, habitat and gene pool protection' (as estimated by the experts as part of the assessment of the impact on ecosystem services; see Section 3.9.1.) weighted for the proportion of the areas of the impacted ecosystem types over the total area of potential establishment within the assessment area.



### 3.9.3 Impact on protected areas

In order to assess the risk that a plant pest can present to protected areas, the Natura 2000 network has been considered. The impact of pests on protected areas is assessed by considering the level of exposure of the different Natura 2000 sites to the risk of the pest's presence.

The assumption is that the level of exposure is mediated by the impact on the host plants that are present in protected areas and is proportional to the importance of the host plants in the plant communities of the area at risk.

The importance of the hosts is calculated as the area covered by host plants of the pest in the Natura2000 area.

The impact on protected areas  $PA_i$  for the pest species  $i$  is defined as

$$PA_i = \frac{AR_i}{AT_i}$$

where  $AR_i$  is the importance of the host plants and  $AT_i$  is total area of the Natura2000 sites within the area of potential establishment of the pest  $i$ .

Comparison among the pests will require the consideration of a suitable value for normalisation of the index  $PA_i$  calculated for each pest species.

### 3.9.4 Impact on host species of conservation concern

To assess the potential impact of plant pests on host plants that also have the status of species of conservation concern, two pieces of information are taken into account:

- the level of risk of extinction to which the host species is exposed (estimated independently of pest arrival and impact);
- the severity of the symptoms caused by the pest on host plants, according to EFSA's report on the impact of plant pests on ecosystem services.

To account for the risk of extinction, the host plant species belonging to the following five International Union for Conservation of Nature (IUCN) Red List categories are considered (Dublin, 2024; IUCN, 2024):

- 1 'Extinct in the wild (EW)', a category containing those species whose members survive only in captivity or as artificially supported populations far outside their historical geographic range.
- 2 'Critically endangered (CR)', a category containing those species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90% over the previous 10 years (or three generations), a current population size of fewer than 50 individuals, or other factors.
- 3 'Endangered (EN)', a designation applied to species that possess a very high risk of extinction as a result of rapid population declines of 50 to more than 70% over the previous 10 years (or three generations), a current population size of fewer than 250 individuals, or other factors.
- 4 'Vulnerable (VU)', a category containing those species that possess a very high risk of extinction as a result of rapid population declines of 30 to more than 50% over the



previous 10 years (or three generations), a current population size of fewer than 1,000 individuals, or other factors.

- 5 'Near threatened (NT)', a designation applied to species that are close to becoming threatened or may meet the criteria for threatened status in the near future.

The five categories are reassigned to four groups, with each group assigned a weighting factor  $w_i$  that expresses the level of extinction risk to which the host species are exposed (Table 2).

Table 2: The four categories of species grouping the relevant IUCN categories of species and their corresponding weighting factors expressing the level of extinction risk in each group.

IUCN category	Code	$w_i$
<b>Extinct in the wild</b>	EW	4
<b>Critically endangered, endangered</b>	CE	3
<b>Vulnerable</b>	VU	2
<b>Near threatened</b>	NT	1

To account for the severity, we considered the specific estimation of the experts for each ecosystem type. The highest value of severity among those assessed was then used for the calculation.

The impact of a given pest species on the host species of conservation concern in an area of potential establishment is expressed by the index  $I_{CC}$  computed as follows. If:

- $N_{EW}$  is the number of host species that are extinct in the wild,
- $N_{CE}$  is the number of host species that are either critically endangered or endangered,
- $N_{VU}$  is the number of host species that are vulnerable,
- $N_{NT}$  is the number of host species that are near threatened,
- $S_{max}$  is the highest value of the pest symptom severity among those estimated for the different ecosystem types,

then

$$I_{CC} = (N_{EW} \times 4 + N_{CE} \times 3 + N_{VU} \times 2 + N_{NT}) \times S_{max}$$

The index  $I_{CC}$  is calculated for all the known host species of a given plant pest. For pests (mainly polyphagous) for which the host list is probably not fully described and a high level of uncertainty still remains for certain genera, the whole group of species in those genera is included in the host list.

Comparison among the pests will require the consideration of a suitable value for normalisation of the index  $I_{CC}$  calculated for each pest species.



### 3.9.5 Increase in the use of plant protection products

The working group concluded that it was not possible to identify a single parameter that accurately reflects whether pest presence would lead to the 'need for significant and long-term increases in the use of plant protection products (PPPs)', as stated in the Commission request. Since the JRC protocol addresses this aspect in terms of 'undesired effects of control measures', EFSA has proposed a three-level scoring system (Table 3) to indicate the likelihood of an increase in PPP use, without quantifying the exact number of additional treatments. This is based on four cases (A–D), as outlined in Table 3.

The cases and scores in Table 3 are selected by experts based on the review of existing and potential pest control options within the pest's current distribution area and potential control measures (focusing on PPPs) in the area under assessment (see Section 3.4).

Table 3: Expected changes in the use of plant protection products following pest establishment in the EU, categorised into four cases (A–D) with a three-level score (0–2)

Case	Expected change in the use of plant protection products (PPPs)	Score	Value in I2P2
<b>A</b>	PPPs applied against other pests in the risk assessment area are also effective against this pest, without increasing the amount/number of treatments and therefore without increasing their environmental impact	0	0
<b>B</b>	PPPs applied against other pests in the risk assessment area are also effective against the pest but only if the amount/number of treatments is increased and therefore with an expected increased environmental impact	1	0.05
<b>C</b>	PPPs applied against other pests in the risk assessment area are not sufficient to control this pest and therefore a substantial change in the control strategy is required, with use of new pesticide(s) and/or integration with other agricultural and control practices that could further increase the environmental impact	2	0.1
<b>D</b>	PPPs effective against the pest are not authorised in the EU	0	0

The control options already available in the risk assessment area and their effect on the pest under consideration are also part of the scenario assumptions when assessing yield and quality losses. For example, if the use of resistant varieties is a common practice in the EU, and this would be expected to reduce the impact of the pest if it became established, the assessment would take this into account and include a justification in the report.





- IPPC Secretariat (International Plant Protection Convention Secretariat), 2021. Determination of pest status in an area. International Standard for Phytosanitary Measures No. 8. (ISPM 8). FAO, Rome. Available online: <https://openknowledge.fao.org/server/api/core/bitstreams/2a296eef-4cf4-447a-b84a-4d8d03a3bafc/content> [Accessed: 8 December 2024].
- Isbell F, Gonzalez A, Loreau M, Cowles J, Díaz S, Hector A, Mace GM, Wardle DA, O'Connor MI, Duffy JE, Turnbull LA, Thompson PL and Larigauderie A, 2017. Linking the influence and dependence of people on biodiversity across scales. *Nature*, 546(7656), 65–72, doi:10.1038/nature22899
- IUCN (International Union for Conservation of Nature), 2024. The IUCN Red List of Threatened Species. Version 2024-2. <https://www.iucnredlist.org>. Accessed on 15/12/2024
- Nougadère A, Krusteva R, Rzepecka D and Vos S, 2023. Technical Report on Task B of EFSA's priority pest mandate (M-2022-00070). Zenodo. doi: [10.5281/zenodo.10417715](https://doi.org/10.5281/zenodo.10417715)
- Shigesada N, Kawasaki K and Takeda Y, 1995. Modeling Stratified Diffusion in Biological Invasions. *The American Naturalist*, 146(2), 229–251. Available online: <http://www.jstor.org/stable/2463059>
- Tramontini S, Vos S, Antoniou A, Krusteva R, Sarakatsani E and Rzepecka D, 2023. Technical Report on Task A of EFSA's priority pest mandate (M-2022-00070). Zenodo. doi: 10.2903/sp.efsa.2023.EN-8547



## Abbreviations

CABI	Centre for Agriculture and Bioscience International
CICES	Common International Classification of Ecosystem Services
CREA	Council for Agricultural Research and Economics
EFSA	European Food Safety Authority
EKE	Expert knowledge elicitation
EPPO	European and Mediterranean Plant Protection Organization
EU	European Union
I2P2	The Impact Indicator for Priority Pest
ISPM	International Standard for Phytosanitary Measures
IUCN	International Union for Conservation of Nature
JRC	Joint Research Centre
NUTS	Nomenclature of Territorial Units for Statistics
PAFF	European Commission's Standing Committee on Plants, Animals, Food and Feed
PPP	Plant protection product
UQP	Union quarantine pest



## Appendix A Candidate priority pests

Table A.1. List of 46 candidate priority pests for which EFSA produced Pest Reports and Pest Datasheets under Task C of the priority pests mandate (M-2022-00070). In bold, the 20 priority pests currently listed in Regulation (EC) 2019/1702. Pests evaluated under the prior priority pest mandate (EFSA, 2019) and reassessed in 2024 are marked with an asterisk (\*).

Category	Candidate priority pest
<b>Bacteria</b>	<b><i>Candidatus Liberibacter</i> spp. *</b>
	<i>Ralstonia pseudosolanacearum</i>
	<i>Xanthomonas citri</i> *
	<b><i>Xylella fastidiosa</i> *</b>
<b>Fungi</b>	<i>Bretziella (Ceratozystis) fagacearum</i> *
	<b><i>Phyllosticta citricarpa</i> *</b>
	<i>Phymatotrichopsis omnivora</i>
	<i>Pseudocercospora pini-densiflorae</i>
<b>Insects</b>	<i>Acleris minuta</i>
	<i>Acleris semipurpurana</i>
	<b><i>Agrilus anxius</i> *</b>
	<b><i>Agrilus planipennis</i> *</b>
	<b><i>Anastrepha ludens</i> *</b>
	<b><i>Anoplophora chinensis</i> *</b>
	<b><i>Anoplophora glabripennis</i> *</b>
	<b><i>Anthonomus eugeni</i> *</b>
	<b><i>Aromia bungii</i> *</b>
	<i>Arrhenodes minutus</i>
	<b><i>Bactericera cockerelli</i> *</b>
	<b><i>Bactrocera dorsalis</i> *</b>
	<b><i>Bactrocera zonata</i> *</b>
	<i>Choristoneura fumiferana</i>
	<i>Choristoneura parallela</i>
	<b><i>Conotrachelus nenuphar</i> *</b>
	<b><i>Dendrolimus sibiricus</i> *</b>



Category	Candidate priority pest
	<i>Diabrotica undecimpunctata howardi</i>
	<i>Diabrotica virgifera zeae</i>
	<i>Helicoverpa zea</i>
	<i>Keiferia lycopersicella</i>
	<i>Listronotus bonariensis</i>
	<i>Pissodes nemorensis</i>
	<i>Pissodes nitidus</i>
	<i>Pissodes strobi</i>
	<i>Pissodes terminalis</i>
	<i>Pissodes yunnanensis</i>
	<i>Polygraphus proximus</i>
	<b><i>Popillia japonica</i> *</b>
	<i>Porphyrophora tritici</i>
	<i>Prodiplosis longifila</i>
	<b><i>Rhagoletis pomonella</i> *</b>
	<b><i>Spodoptera frugiperda</i> *</b>
	<i>Spodoptera litura</i>
	<b><i>Thaumatotibia leucotreta</i> *</b>
	<i>Thrips palmi</i> *
<b>Nematodes</b>	<b><i>Bursaphelenchus xylophilus</i> *</b>
<b>Virus</b>	<i>Nepovirus myrtilli</i> (Blueberry leaf mottle virus)



## Appendix B Experts and EFSA staff contributing to the priority pests mandate

Table B.1. List of experts and EFSA staff involved in the priority pests mandate (M-2022-00070) and their specific roles.

Family name	Given name	Role	Performed tasks
Baldassarre	Federica	EFSA Trainee	Review of EFSA Pest Reports and support for project management
Barnes	Irene	Hearing Expert	EKE on <i>Bretziella (Ceratomyces) fagacearum</i> EKE on <i>Pseudocercospora pini-densiflorae</i>
Battisti	Andrea	Hearing Expert	EKE on <i>Acleris minuta</i> , <i>Acleris semipurpurana</i> , <i>Choristoneura fumiferana</i> and <i>Choristoneura parallela</i> EKE on <i>Pissodes</i> spp., <i>Polygraphus proximus</i> and <i>Arrhenodes minutus</i>
Baughman	Todd	Hearing Expert	EKE on <i>Phymatotrichopsis omnivora</i>
Bergsma-Vlami	Maria	Hearing Expert	EKE on <i>Ralstonia pseudosolanacearum</i>
Boberg	Johanna	Hearing Expert	EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratomyces) fagacearum</i> EKE on <i>Pseudocercospora pini-densiflorae</i>
Boscia	Donato	Hearing Expert	EKE on <i>Xylella fastidiosa</i>
Bosco	Domenico	Hearing Expert	EKE on <i>Xylella fastidiosa</i>
Brundu	Giuseppe	Hearing Expert	Development of the Environmental Impact Indicators
Bylund	Helena	Hearing Expert	EKE on <i>Acleris minuta</i> , <i>Acleris semipurpurana</i> , <i>Choristoneura fumiferana</i> and <i>Choristoneura parallela</i>
Candresse	Thierry	Hearing Expert	EKE on <i>Nepovirus myrtilli</i>
Castro	Paula	Hearing Expert	Development of the Environmental Impact Indicators
Ceccherini	Guido	Individual Scientific Adviser	Support in spatial analysis for environmental impact assessment
Ciampitti	Mariangela	Hearing Expert	EKE on <i>Popillia japonica</i>
Cubero	Jaime	Hearing Expert	EKE on <i>Candidatus Liberibacter</i> spp., <i>Phyllosticta citricarpa</i> and <i>Xanthomonas citri</i>



Family name	Given name	Role	Performed tasks
			EKE on <i>Ralstonia pseudosolanacearum</i>
Dalmau Sorli	Vicente	Hearing Expert	EKE on <i>Anthonomus eugenii</i> and <i>Conotrachelus nenuphar</i> . EKE on <i>Porphyrophora tritici</i> . EKE on <i>Prodiplosis longifila</i> EKE on <i>Xylella fastidiosa</i>
De Groot	Maarten	Hearing Expert	EKE on <i>Anoplophora chinensis</i> , <i>Anoplophora glabripennis</i> and <i>Aromia bungii</i> EKE on <i>Agilus anxius</i> , <i>Agilus planipennis</i>
De La Peña	Eduardo	Working Group Member and EKE Elicitor	EKE Elicitor for the EKEs on <i>Anastrepha ludens</i> , <i>Bactrocera dorsalis</i> , <i>Bactrocera zonata</i> , <i>Porphyrophora tritici</i> and <i>Prodiplosis longifila</i>  Development of the Environmental Impact Indicators
De Meyer	Marc	Hearing Expert	EKE on <i>Bactrocera dorsalis</i> , <i>Bactrocera zonata</i> , <i>Anastrepha ludens</i> and <i>Rhagoletis pomonella</i>
Dehnen-Schmutz	Katharina	Working Group Member	Development of the Environmental Impact Indicators
Deslandes	Thomas	Hearing Expert	EKE on <i>Ralstonia pseudosolanacearum</i>
Desneux	Nicolas	Hearing Expert	EKE on <i>Helicoverpa zea</i> , <i>Keiferia lycopersicella</i> and <i>Spodoptera litura</i>
Eschen	Rene	Hearing Expert	Development of the Environmental Impact Indicators
Fornefeld	Eva	Hearing Expert	EKE on <i>Ralstonia pseudosolanacearum</i>
Fuchs	Marc	Hearing Expert	EKE on <i>Nepovirus myrtilli</i>
Gilioli	Gianni	Working Group Member and EKE Elicitor	EKE Elicitor for the EKEs on <i>Agilus anxius</i> , <i>Agilus planipennis</i> , <i>Anoplophora chinensis</i> , <i>Anoplophora glabripennis</i> , <i>Aromia bungii</i> , <i>Arrhenodes minutus</i> , <i>Bretziella fagacearum</i> , <i>Bursaphelenchus xylophilus</i> , <i>Pissodes</i> spp., <i>Polygraphus proximus</i> , <i>Popillia japonica</i> , <i>Pseudocercospora pini-densiflorae</i> and <i>Xylella fastidiosa</i> .  Development of the Environmental Impact Indicators
Gobbi	Alex	EFSA Scientific Officer	Design of maps on climate suitability
Golic	Dejana	EFSA Trainee	Design of maps on climate suitability



Family name	Given name	Role	Performed tasks
Gonthier	Paolo	Hearing Expert	EKE on <i>Pseudocercospora pini-densiflorae</i> EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratocystis) fagacearum</i>
González-Moreno	Pablo	Working Group Member	Development of the Environmental Impact Indicators
Guerret	Marine	Hearing Expert	EKE on <i>Ralstonia pseudosolanacearum</i>
Hughes	Alice	Hearing Expert	Development of the Environmental Impact Indicators
Isakeit	Thomas	Hearing Expert	EKE on <i>Phymatotrichopsis omnivora</i>
Jaques	Josep	Hearing Expert	EKE on <i>Bactrocera dorsalis</i> , <i>Bactrocera zonata</i> , <i>Anastrepha ludens</i> and <i>Rhagoletis pomonella</i>
Kaydan	Bora	Hearing Expert	EKE on <i>Porphyrophora tritici</i>
Kirichenko	Natalia	Hearing Expert	EKE on <i>Dendrolimus sibiricus</i> , <i>Thaumatotibia leucotreta</i> and <i>Spodoptera frugiperda</i>
Krusteva	Roumiana	EFSA SNE	Contribution to expert selection, contractor monitoring, review of EFSA Pest Reports and support for project coordination.
Landa	Blanca	Hearing Expert	EKE on <i>Xylella fastidiosa</i>
Loiseau	Marianne	Hearing Expert	EKE on <i>Candidatus Liberibacter</i> spp., <i>Phyllosticta citricarpa</i> , <i>Xanthomonas citri</i>
Loomans	Antoon	Hearing Expert	EKE on <i>Bactericera cockerelli</i> and <i>Thrips palmi</i> EKE on <i>Anthonomus eugenii</i> , <i>Conotrachelus nenuphar</i> EKE on <i>Porphyrophora tritici</i> EKE on <i>Prodiplosis longifila</i>
Macquarrie	Christian	Hearing Expert	EKE on <i>Agrilus anxius</i> , <i>Agrilus planipennis</i>
Maiorano	Andrea	EFSA Scientific Officer	Design of maps on climate suitability
Makowski	David	Working Group Member and EKE Elicitor	EKE Elicitor for the EKEs on <i>Bactericera cockerelli</i> , <i>Diabrotica undecimpunctata howardi</i> , <i>Diabrotica virgifera zea</i> , <i>Dendrolimus sibiricus</i> , Grapevine Flavescence dorée phytoplasma, <i>Listronotus bonariensis</i> , <i>Nepovirus myrtilli</i> , <i>Phymatotrichopsis omnivora</i> , <i>Ralstonia pseudosolanacearum</i> , <i>Spodoptera frugiperda</i> , <i>Thaumatotibia leucotreta</i> and <i>Thrips palmi</i>
Malembic-Maher	Sylvie	Hearing Expert	EKE on Grapevine Flavescence dorée phytoplasma



Family name	Given name	Role	Performed tasks
Manzano Martinez	Maria	Hearing Expert	EKE on <i>Prodioplosis longifila</i>
Marek	Steve	Hearing Expert	EKE on <i>Phymatotrichopsis omnivora</i>
Martin	Robert	Hearing Expert	EKE on <i>Nepovirus myrtilli</i>
Martinetti	Davide	Hearing Expert	EKE on <i>Popillia japonica</i>
Marzachi	Cristina	Hearing Expert	EKE on Grapevine Flavescence dorée phytoplasma
Mas	Hugo	Hearing Expert	EKE on <i>Pseudocercospora pini-densiflorae</i>  EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratomyxa) fagacearum</i>  EKE on <i>Pissodes</i> spp., <i>Polygraphus proximus</i> and <i>Arrhenodes minutus</i>  Development of Environmental Impact Indicators
Mastin	Alexander	Working Group Member and EKE Elicitor	EKE Elicitor for the EKEs on <i>Anthonomus eugenii</i> , <i>Conotrachelus nenuphar</i> , <i>Helicoverpa zea</i> , <i>Keiferia lycopersicella</i> and <i>Spodoptera litura</i>
Matsiakh	Iryna	Hearing Expert	Development of the Environmental Impact Indicators
Mccullough	Deborah	Hearing Expert	EKE on <i>Agrilus anxius</i> and <i>Agrilus planipennis</i>
Mcneill	Mark Richard	Hearing Expert	EKE on <i>Listronotus bonariensis</i>
Meagher	Robert	Hearing Expert	EKE on <i>Dendrolimus sibiricus</i> , <i>Thaumatotibia leucotreta</i> and <i>Spodoptera frugiperda</i>
Montero Castaño	Ana	Hearing Expert	Development of the Environmental Impact Indicators
Nougadère	Alexandre	EFSA Scientific Officer	Chair of Working Group meetings, support to experts and JRC, rapporteur during EKEs. Priority Pests project manager
Papadopoulos	Nikos	Hearing Expert	EKE on <i>Bactrocera dorsalis</i> , <i>Bactrocera zonata</i> , <i>Anastrepha ludens</i> and <i>Rhagoletis pomonella</i>
Paracchini	Maria Luisa	Working Group Member	Development of the Environmental Impact Indicators
Parnell	Stephen	Working Group Member and EKE Elicitor	EKE Elicitor for the EKEs on <i>Acleris minuta</i> , <i>Acleris semipurpurana</i> , <i>Candidatus Liberibacter</i> spp., <i>Choristoneura fumiferana</i> , <i>Phyllosticta citricarpa</i> and <i>Xanthomonas citri</i>



Family name	Given name	Role	Performed tasks
Paula-Moraes	Silvana	Hearing Expert	EKE on <i>Helicoverpa zea</i> , <i>Keiferia lycopersicella</i> and <i>Spodoptera litura</i>
Perez	Elena	Hearing Expert	EKE on <i>Candidatus Liberibacter</i> spp., <i>Phyllosticta citricarpa</i> and <i>Xanthomonas citri</i>
Phillips	Craig	Hearing Expert	EKE on <i>Listronotus bonariensis</i>
Pimentel	Carla	Hearing Expert	EKE on <i>Pseudocercospora pini-densiflorae</i>  EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratozystis) fagacearum</i>  EKE on <i>Acleris minuta</i> , <i>Acleris semipurpurana</i> , <i>Choristoneura fumiferana</i> and <i>Choristoneura parallela</i>  EKE on <i>Pissodes</i> spp., <i>Polygraphus proximus</i> and <i>Arrhenodes minutus</i>
Portaluri	Alessandro	Working Group Member	Development of the Environmental Impact Indicators
Potter	Daniel	Hearing Expert	EKE on <i>Popillia japonica</i>
Poussier	Stephane	Hearing Expert	EKE on <i>Ralstonia pseudosolanacearum</i>
Purse	Bethan	Working Group Member	Development of the Environmental Impact Indicators
Rabaglia	Robert	Hearing Expert	EKE on <i>Pissodes</i> spp., <i>Polygraphus proximus</i> and <i>Arrhenodes minutus</i>
Reay-Jones	Francis	Hearing Expert	EKE on <i>Helicoverpa zea</i> , <i>Keiferia lycopersicella</i> and <i>Spodoptera litura</i>
Ribaya	Maria	EFSA Trainee	Review of EFSA Pest Reports and support for project management
Rigling	Daniel	Hearing Expert	EKE on <i>Pseudocercospora pini-densiflorae</i>  EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratozystis) fagacearum</i>
Robin	Cécile	Hearing Expert	EKE on <i>Bursaphelenchus xylophilus</i>
Robinet	Christelle	Hearing Expert	EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratozystis) fagacearum</i>
Roe	Amanda	Hearing Expert	EKE on <i>Acleris minuta</i> , <i>Acleris semipurpurana</i> , <i>Choristoneura fumiferana</i> and <i>Choristoneura parallela</i>



Family name	Given name	Role	Performed tasks
Rondoni	Gabriele	Hearing Expert	EKE on <i>Listronotus bonariensis</i>  EKE on <i>Diabrotica undecimpunctata howardi</i> and <i>Diabrotica virgifera zea</i>  EKE on <i>Helicoverpa zea</i> , <i>Keiferia lycopersicella</i> and <i>Spodoptera litura</i>
Ruiz Gomez	Francisco Jose	Hearing Expert	Development of the Environmental Impact Indicators
Rutledge	Claire	Hearing Expert	EKE on <i>Agrilus anxius</i> and <i>Agrilus planipennis</i>
Rzepecka	Daria	EFSA Scientific Officer	Support to EKEs and drafting of Pest Reports
Sánchez Fernández	Berta	Individual Scientific Adviser	Drafting and review of EFSA Reports
Santini	Alberto	Hearing Expert	Development of the Environmental Impact Indicators
Scala	Marica	EFSA Trainee	Review of EFSA Pest Reports and support for project management
Schenk	Martijn	Hearing Expert	EKE on <i>Listronotus bonariensis</i>  EKE on <i>Diabrotica undecimpunctata howardi</i> and <i>Diabrotica virgifera zea</i>
Shovon	Sarkar	Hearing Expert	EKE on <i>Bactericera cockerelli</i> and <i>Thrips palmi</i>
Spak	Josef	Hearing Expert	EKE on <i>Nepovirus myrtilli</i>
Starfinger	Uwe	Hearing Expert	Development of the Environmental Impact Indicators
Strauss	Gudrun	Hearing Expert	EKE on Grapevine Flavescence dorée phytoplasma
Tavella	Luciana	Hearing Expert	EKE on <i>Bactericera cockerelli</i> and <i>Thrips palmi</i>
Tramontini	Sara	EFSA Scientific Officer	Chair of Working Group meetings, support to experts and JRC, rapporteur during EKEs
Tzanetakis	Ioannis	Hearing Expert	EKE on <i>Nepovirus myrtilli</i>
Van Der Straten	Marja	Hearing Expert	EKE on <i>Dendrolimus sibiricus</i> , <i>Thaumatotibia leucotreta</i> and <i>Spodoptera frugiperda</i>
Vicent Civera	Antonio	Hearing Expert	EKE on <i>Candidatus Liberibacter</i> spp., <i>Phyllosticta citricarpa</i> and <i>Xanthomonas citri</i>  EKE on <i>Phymatotrichopsis omnivora</i>



Family name	Given name	Role	Performed tasks
Vincent	Charles	Hearing Expert	EKE on <i>Anthonomus eugenii</i> and <i>Conotrachelus nenuphar</i>  EKE on <i>Diabrotica undecimpunctata howardi</i> and <i>Diabrotica virgifera zea</i>  EKE on <i>Pissodes</i> spp., <i>Polygraphus proximus</i> and <i>Arrhenodes minutus</i>
Webber	Joan	Hearing Expert	EKE on <i>Pseudocercospora pini-densiflorae</i>  EKE on <i>Bursaphelenchus xylophilus</i> and <i>Bretziella (Ceratozystis) fagacearum</i>
Weber	Donald	Hearing Expert	EKE on <i>Diabrotica undecimpunctata howardi</i> and <i>Diabrotica virgifera zea</i>
Young	Carolyn	Hearing Expert	EKE on <i>Phymatotrichopsis omnivora</i>
Zappalà	Lucia	Hearing Expert	EKE on <i>Bactericera cockerelli</i> and <i>Thrips palmi</i>



## Appendix C List of EFSA Pest Reports and Pest Datasheets

The table below lists the 46 EFSA Pest Reports and accompanying Pest Datasheets published under this mandate as EFSA Supporting Publications (Wiley).

Table C.1. List of Pest Reports produced under EFSA mandate M-2022-00070.

EFSA Pest Reports	Question number	Output number	DOI
<i>Acleris minuta</i>	EFSA-Q-2024-00341	To be published in 2025	
<i>Acleris semipurpurana</i>	EFSA-Q-2024-00342	To be published in 2025	
<i>Agrilus anxius</i>	EFSA-Q-2024-00343	To be published in 2025	
<i>Agrilus planipennis</i>	EFSA-Q-2024-00344	To be published in 2025	
<i>Anastrepha ludens</i>	EFSA-Q-2024-00345	To be published in 2025	
<i>Anoplophora chinensis</i>	EFSA-Q-2024-00346	To be published in 2025	
<i>Anoplophora glabripennis</i>	EFSA-Q-2024-00348	To be published in 2025	
<i>Anthonomus eugenii</i>	EFSA-Q-2024-00349	To be published in 2025	
<i>Aromia bungii</i>	EFSA-Q-2024-00350	To be published in 2025	
<i>Arrhenodes minutus</i>	EFSA-Q-2024-00352	To be published in 2025	
<i>Bactericera cockerelli</i>	EFSA-Q-2024-00353	To be published in 2025	
<i>Bactrocera dorsalis</i>	EFSA-Q-2024-00356	To be published in 2025	
<i>Bactrocera zonata</i>	EFSA-Q-2024-00357	To be published in 2025	
<i>Bretziella (Ceratomyces) fagacearum</i>	EFSA-Q-2024-00361	To be published in 2025	
<i>Bursaphelenchus xylophilus</i>	EFSA-Q-2024-00362	To be published in 2025	
<i>Candidatus Liberibacter</i> spp.	EFSA-Q-2024-00363	To be published in 2025	
<i>Choristoneura fumiferana</i>	EFSA-Q-2024-00364	To be published in 2025	
<i>Choristoneura parallela</i>	EFSA-Q-2024-00365	To be published in 2025	
<i>Conotrachelus nenuphar</i>	EFSA-Q-2024-00367	To be published in 2025	
<i>Dendrolimus sibiricus</i>	EFSA-Q-2024-00374	To be published in 2025	
<i>Diabrotica undecimpunctata howardi</i>	EFSA-Q-2024-00376	To be published in 2025	
<i>Diabrotica virgifera zea</i>	EFSA-Q-2024-00387	To be published in 2025	
<i>Helicoverpa zea</i>	EFSA-Q-2024-00385	To be published in 2025	



EFSA Pest Reports	Question number	Output number	DOI
<i>Keiferia lycopersicella</i>	EFSA-Q-2024-00384	To be published in 2025	
<i>Listronotus bonariensis</i>	EFSA-Q-2024-00383	To be published in 2025	
<i>Nepovirus myrtilli</i> (Blueberry leaf mottle virus)	EFSA-Q-2024-00382	To be published in 2025	
<i>Phyllosticta citricarpa</i>	EFSA-Q-2024-00381	To be published in 2025	
<i>Phymatotrichopsis omnivora</i>	EFSA-Q-2024-00380	To be published in 2025	
<i>Pissodes nemorensis</i>	EFSA-Q-2024-00379	To be published in 2025	
<i>Pissodes nitidus</i>	EFSA-Q-2024-00378	To be published in 2025	
<i>Pissodes strobi</i>	EFSA-Q-2024-00377	To be published in 2025	
<i>Pissodes terminalis</i>	EFSA-Q-2024-00375	To be published in 2025	
<i>Pissodes yunnanensis</i>	EFSA-Q-2024-00373	To be published in 2025	
<i>Polygraphus proximus</i>	EFSA-Q-2024-00372	To be published in 2025	
<i>Popillia japonica</i>	EFSA-Q-2024-00371	To be published in 2025	
<i>Porphyrophora tritici</i>	EFSA-Q-2024-00370	To be published in 2025	
<i>Prodioplosis longifila</i>	EFSA-Q-2024-00369	To be published in 2025	
<i>Pseudocercospora pini-densiflorae</i>	EFSA-Q-2024-00368	To be published in 2025	
<i>Ralstonia pseudosolanacearum</i>	EFSA-Q-2024-00366	To be published in 2025	
<i>Rhagoletis pomonella</i>	EFSA-Q-2024-00360	To be published in 2025	
<i>Spodoptera frugiperda</i>	EFSA-Q-2024-00359	To be published in 2025	
<i>Spodoptera litura</i>	EFSA-Q-2024-00358	To be published in 2025	
<i>Thaumatotibia leucotreta</i>	EFSA-Q-2024-00355	To be published in 2025	
<i>Thrips palmi</i>	EFSA-Q-2024-00354	To be published in 2025	
<i>Xanthomonas citri</i>	EFSA-Q-2024-00351	To be published in 2025	
<i>Xylella fastidiosa</i>	EFSA-Q-2024-00347	To be published in 2025	

## Appendix D Number of results provided by EFSA per pest and parameter

Table D.1. Number of probability distributions (lag period, rate of expansion and yield/quality losses) and values of the environmental indicators estimated by the expert groups for each candidate priority pest. For yield and quality losses, multiple probability distributions can be estimated if several hosts are assessed for a given pest.

Pest species	Yield and quality losses <sup>(1)</sup>	Impact on ecosystem services	Impact on species biodiversity at community level	Impact on protected areas	Impact on species conservation status	Increase in the use of plant protection products	Lag period	Rate of expansion
<i>Acleris minuta</i>	1	0	0	0	0	1	1	1
<i>Acleris semipurpurana</i>	1	1	1	1	1	1	1	1
<i>Agrilus anxius</i>	1	1	1	1	1	1	1	1
<i>Agrilus planipennis</i>	1	1	1	1	1	1	1	1
<i>Anastrepha ludens</i>	2	0	0	0	0	1	1	1
<i>Anoplophora chinensis</i>	4	1	1	1	1	1	1	1
<i>Anoplophora glabripennis</i>	2	1	1	1	1	1	1	1
<i>Anthonomus eugenii</i>	1	0	0	0	0	1	1	1
<i>Aromia bungii</i>	3	1	1	1	1	1	1	1
<i>Arrhenodes minutus</i>	1	0	0	0	0	1	1	1
<i>Bactericera cockerelli</i>	3	0	0	0	0	1	1	1
<i>Bactrocera dorsalis</i>	3	0	0	0	0	1	1	1

<b>Pest species</b>	<b>Yield and quality losses<sup>(1)</sup></b>	<b>Impact on ecosystem services</b>	<b>Impact on species biodiversity at community level</b>	<b>Impact on protected areas</b>	<b>Impact on species conservation status</b>	<b>Increase in the use of plant protection products</b>	<b>Lag period</b>	<b>Rate of expansion</b>
<i>Bactrocera zonata</i>	2	0	0	0	0	1	1	1
<i>Bretziella (Ceratocystis) fagacearum</i>	1	1	1	1	1	1	1	1
<i>Bursaphelenchus xylophilus</i>	2	1	1	1	1	1	1	1
<i>Candidatus Liberibacter</i> spp.	1	1	1	1	1	1	1	1
<i>Choristoneura fumiferana</i>	1	1	1	1	1	1	1	1
<i>Choristoneura parallela</i>	1	0	0	0	0	1	1	1
<i>Conotrachelus nenuphar</i>	1	0	0	0	0	1	1	1
<i>Dendrolimus sibiricus</i>	1	1	1	1	1	1	1	1
<i>Diabrotica undecimpunctata howardi</i>	2	1	1	1	1	1	1	1
<i>Diabrotica virgifera zeae</i>	1	0	0	0	0	1	1	1
<i>Helicoverpa zea</i>	4	0	0	0	0	1	1	1
<i>Keiferia lycopersicella</i>	1	0	0	0	0	1	1	1
<i>Listronotus bonariensis</i>	2	1	1	1	1	1	1	1

<b>Pest species</b>	<b>Yield and quality losses<sup>(1)</sup></b>	<b>Impact on ecosystem services</b>	<b>Impact on species biodiversity at community level</b>	<b>Impact on protected areas</b>	<b>Impact on species conservation status</b>	<b>Increase in the use of plant protection products</b>	<b>Lag period</b>	<b>Rate of expansion</b>
<i>Nepovirus myrtilli</i> (Blueberry leaf mottle virus)	1	0	0	0	0	1	1	1
<i>Phyllosticta citricarpa</i>	1	0	0	0	0	1	1	1
<i>Phymatotrichopsis omnivora</i>	3	1	1	1	1	1	1	1
<i>Pissodes nemorensis</i>	1	1	1	1	1	1	1	1
<i>Pissodes nitidus</i>	1	1	1	1	1	1	1	1
<i>Pissodes strobi</i>	1	1	1	1	1	1	1	1
<i>Pissodes terminalis</i>	1	0	0	0	0	1	1	1
<i>Pissodes yunnanensis</i>	1	0	0	0	0	1	1	1
<i>Polygraphus proximus</i>	1	1	1	1	1	1	1	1
<i>Popillia japonica</i>	5	1	1	1	1	1	1	1
<i>Porphyrophora tritici</i>	1	0	0	0	0	1	1	1
<i>Prodiplosis longifila</i>	2	0	0	0	0	1	1	1
<i>Pseudocercospora pini-densiflorae</i>	1	1	1	1	1	1	1	1

<b>Pest species</b>	<b>Yield and quality losses<sup>(1)</sup></b>	<b>Impact on ecosystem services</b>	<b>Impact on species biodiversity at community level</b>	<b>Impact on protected areas</b>	<b>Impact on species conservation status</b>	<b>Increase in the use of plant protection products</b>	<b>Lag period</b>	<b>Rate of expansion</b>
<i>Ralstonia pseudosolanacearum</i>	2	0	0	0	0	1	1	1
<i>Rhagoletis pomonella</i>	1	0	0	0	0	1	1	1
<i>Spodoptera frugiperda</i>	4	1	1	1	1	1	1	1
<i>Spodoptera litura</i>	5	0	0	0	0	1	1	1
<i>Thaumatotibia leucotreta</i>	6	1	1	1	1	1	1	1
<i>Thrips palmi</i>	5 <sup>(2)</sup>	0	0	0	0	1	1	1
<i>Xanthomonas citri</i>	1	0	0	0	0	1	1	1
<i>Xylella fastidiosa</i>	7	1	1	1	1	1	1	1
<b>TOTAL</b>	<b>94</b>	<b>23</b>	<b>23</b>	<b>23</b>	<b>23</b>	<b>46</b>	<b>46</b>	<b>46</b>

(1) In general, the assessment of yield losses also includes quality losses, depending on the pest being assessed (see Pest Reports).

(2) For *Thrips palmi*, yield and quality losses were assessed separately: five assessments were conducted, including three for yield losses and two for quality losses.

## Appendix E Flowchart of the EFSA process for assessing candidate priority pests

To fulfil the tasks outlined in the mandate, the working group conducted its assessment following the steps summarised in the flowchart below.

