European Commission

Joint Research Centre

Ranking of Union Quarantine Pests based on their potential economic, social and environmental impacts to support the identification of “priority pests”

An update of the Integrated Indication for Priority Pests (I2P2)

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2025

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JRC141239
EUR 40360

PDF ISBN 978-92-68-28761-3 ISSN 1831-9424 doi:10.2760/3350558 KJ-01-25-343-EN-N

Luxembourg: Publications Office of the European Union, 2025

How to cite this report: Schneider, K., Barreiro-Hurle, J., Vazquez-Torres, E., Di Cori, V. and Rodriguez-Cerezo, E., *Ranking of Union Quarantine Pests based on their potential economic, social and environmental impacts to support the identification of "priority pests" - An update of the Integrated Indication for Priority Pests (I2P2),* Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/3350558, JRC141239.

Contents

Abstract

This report presents a two-step approach to rank European Union Quarantine Pests (UQPs) based on their potential economic, social, and environmental impacts. In the first step, a shortlisting methodology was developed and applied to approximately 400 UQPs to select a subset of pests which were subject to a more detailed analysis in the second one. The shortlisted 46 pests were evaluated using an updated and modified version of the Impact Indicator for Priority Pests (I2P2) a composite indicator based on multi-criteria analysis. To calculate I2P2 values expert knowledge elicitations were conducted by EFSA for key parameters and these combined with a diversity of secondary data sources. The I2P2 model combines economic, social, and environmental impact into a single value which is subsequently used to rank pests. We assessed robustness of our recommendation with regards to uncertainty on the biological parameters as well as risk managers' preference on avoiding impacts in the different domains. In addition we inform on the driving factors behind the composite scores.

Acknowledgements

This work is part of the Administrative Arrangement between JRC and DG SANTE "Economic Analysis in support of the implementation of Regulation 2016/2031 and the annual surveillance programmes for animal and plant health under the Single Market Program". The authors would like to acknowledge the guidance and insights provided by colleagues at the Plant Health Unit at DG SANTE. These contributions have made that the methodology is fit for purpose and the description and analysis reflecting the provision of the Plant Health Law. The Plant Health Unit at EFSA, in particular Sybren Vos, Sara Tramontini and Alexandre Nougadere, were instrumental in clarifying our doubts on the underlying biology and pathology mechanisms of pests which allowed us to carry out a more meaningful analysis.

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Executive summary

Policy context

The increasing importance of quarantine plant pests stems from the critical need to protect Europe's agriculture, forestry, and biodiversity. As globalization accelerates trade and the movement of goods, the risk of introducing harmful pests into the EU rises significantly. Much research has been devoted to controlling such invasions, with the consensus being that prevention efforts are better than managing introduced species, e.g. through containment or eradication campaigns. However, prevention efforts can also require significant resources, both financial and human. The long list of potentially dangerous pests in turn challenges risk managers in their allocation of resources. Within the European Union (EU), a List of EU quarantine pests has been established for pests capable of entering and establishing in the EU. At present, the list contains approximately 400 pests. Arguably, a sound allocation should focus prevention efforts on those quarantine pests that are likely to have the greatest impact if introduced. To address this issue, the European Union established a list of priority pests. The list includes pests with the most significant potential economic, environmental, and social impact within the EU. This prioritization obliges member states to implement stricter monitoring, surveillance, and control measures, as well as to develop contingency plans and carry out public awareness campaigns. Five years after this list was established, we review the methodology and present the results of a new screening of all quarantine pests to rank them based on possible social economic and environmental impacts for the EU.

Key conclusions

The I2P2 composite indicator is able to propose a discriminatory ranking of both crop and forestry pests. The results are robust with regards to the uncertainty on the biological parameters of the pests but are conditional on the imposed preference weight structure. Our findings in turn inform the political dialog on potential priority pests via data-driven estimates of potential impacts across a considerable diversity of economic, social, and environmental channels.

Main findings

In the context of crop pests, Xyella fastidiosa is confirmed as the primary threat maintaining the highest position that it obtained in the 2019 assessment also in this one. Second, Listronotus bonariensis has emerged as a pest with potential significant impact. Following these two pests, there is a considerable drop-off in the I2P2 scores for the remaining pests; while these two pests get a score above 0.6, the next pest (Popillia japonica) score is 33% lower (0.4). For forestry pests, Dendrolimus sibiricus was found to rank first, with a considerable distance in the I2P2 score to the second place Agrilus anxius. A visual representation of the rankings obtained are presented in the figures below.

The composite nature of our methodology allows to separate impacts into the three main domains, allowing for insights on the pests' ranking with regards to their economic, social, and environmental impacts only. For example, for crop pests Listronotus bonariensis and Popillia japonica are expected to outrank Xylella fastidiosa in terms of environmental impact, but not with regards to economic and social impacts. For forestry pests, Dendrolimus sibiricus is expected to cause considerable environmental impact, the second highest social impact, but in terms of economic impact the pest drops to position three following Agrilus planipennis and Agrilus anxius.

Results of the ranking of Union Quarantine Pests for the aggregate Impact Indicator for Priority Pests (top) and for the economic, social and environmental domains (bottom).

Source: own elaboration

Related and future Joint Research Centre work

The Joint Research Centre has developed (Sánchez et al. 2019) and updated (this report) an indicator to rank pests based on their potential economic, social and environmental impact to support the implementation of the Plant Health Law. These findings will be used by DG SANTE in the upcoming revision of Commission Delegated Regulation 2019/1702 establishing the list of priority pests.

Quick guide

In a resource scarce world allocating plant health efforts to pests that really matter is key. This report presents a methodology based on composite indicators to summarize impacts of pests across multiple domains. A first indicator is used to screen the full set of Union Quarantine Pests. The sub-set of pests that rank highest in this indicator are then subject to a more in-depth analysis using the updated Impact Indicator for Priority Pests (I2P2). The I2P2 indicator allows identifying pests that would have the highest economic, social and environmental impact if established in the Union's territory. Using primary and secondary data on production, trade, employment and biodiversity together with phytopathology data from the pests we calculate 24 indicators which are then aggregated into a single indicator value. The ranking is checked for robustness regarding uncertainty on pathology parameters and policy priorities in terms of which kind of impacts are deemed more important by risk assessors.

1. Introduction

The increasing importance of quarantine plant pests stems from the critical need to protect Europe's agriculture, forestry, and biodiversity. As globalization accelerates trade and the movement of goods, the risk of introducing harmful pests into the EU rises significantly. Much research has been devoted to controlling such invasions (Epanchin-Niell et al., 2010; Martin et al., 2019; Paini et al., 2016), with the general consensus being that prevention efforts are better than managing introduced species, e.g. through containment or eradication campaigns. However, prevention efforts can also require significant resources, both financial and human. The long list of potentially dangerous invaders in turn challenges risk managers in their allocation of resources. Arguably, a sound allocation should focus prevention efforts on those species that are likely to have the greatest impact if introduced.

Within the European Union (EU), a List of EU quarantine pests has been established for pests capable of entering and establishing in the EU. The list is subject to regular amendment based on the information compiled on their emergence and impact in non-EU countries or their distribution in the EU. At present, the list contains approximately 400 pests. For those of them capable of causing most severe economic, environmental and/or social damage, the risk managers have decided to prioritise the prevention and crisis preparedness efforts.

The Commission adopted Commission Delegated Regulation (EU) 2019/1702, which establishes a List of Union Quarantine Pests (UQP) that qualify as priority pests, as outlined in Article 6(2) of Regulation (EU) 2016/2031 on protective measures against pests of plants. To inform that decision the DG Joint Research Centre provided an estimation of potential impact of a selection of pests using the Impact Indicator for Priority Pests (I2P2). I2P2 is a composite indicator intended to reflect the potential economic, social, and environmental impacts expected if a pest were to establish at its full potential in the Union's territory assuming farmers and foresters maintain their current practices. The scores across the pests analysed are then ranked allowing an informed discussion between with experts from EU Member States and the EC when deciding which to include on the list of priority pests.

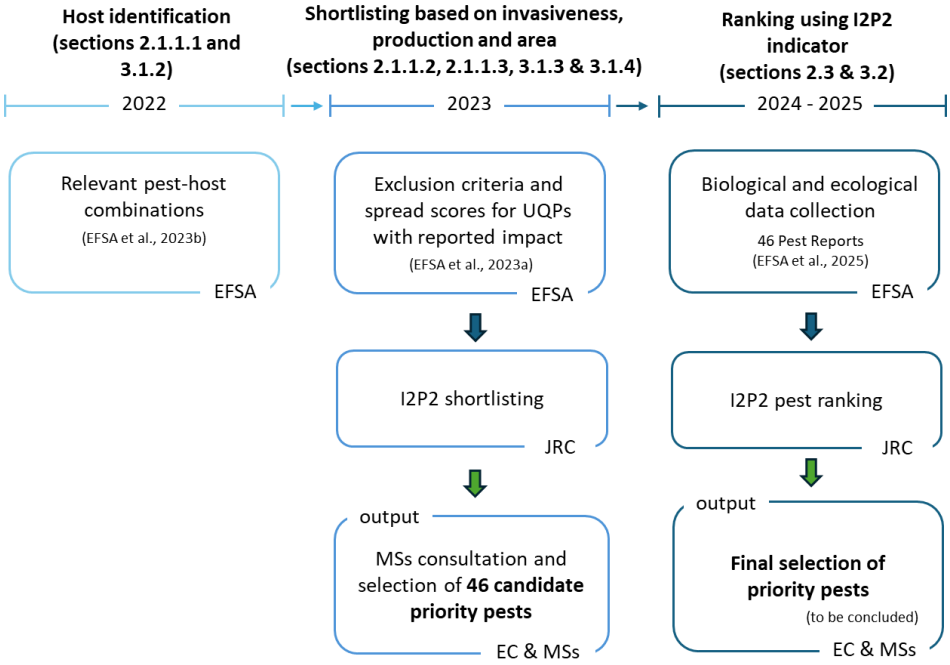
The first analysis covered 28 EU quarantine pests put forward by Member States from which 20 were included in the EU list of priority pests. In this report, we expand the assessment to the entire List of Union Quarantine Pests. To accomplish this, a subset of species was derived through a shortlisting procedure which was presented to The Standing Committee on Plants, Animals, Food and Feed (PAFF Committee) in November 2023. Following discussions in the PAFF, a list of 46 pests was selected as candidates to be fully assessed using the updated I2P2 indicator. Subsequently, data was collected for the 46 species and the I2P2 model was computed for these pests to provide a ranking of their potential impacts. As in 2019, the results of this study aim at informing risk managers on the EU quarantine pests which has the potential to cause the most severe damage if introduced and become established in the EU.

The rest of the report is structured as follows. Section 2 presents the methodology used for the first step of the assessments together with the update in terms of geographical and temporal scope and improvements in terms of social indicators for pests affecting trees made to the I2P2 indicator, compared to the original version used by Sánchez et al. (2019), used in the second step. We then present the results of both steps including robustness checks and sensitivity analysis. Section 4 briefly discusses the results to close the report with some conclusions. Detailed results are presented in annexes, including a summary fiche for each of the 46 pests evaluated. Additional details can be found in the Qlik visualization accompanying this report and accessible online.

2. Methodology

In this section, we will briefly explain the methodology used to shortlist the full set of UQP. Next, we provide a brief summary of the I2P2 model (Sánchez et al., 2019). Subsequently, we highlight methodological updates to the model. Lastly, we briefly describe all robustness checks performed. The timeline of the process and the different steps involved is depicted in **Figure 1**.

Figure 1. Summary of the process to arrive at the ranking of shortlisted Union Quarantine pests.



Source: own elaboration.

2.1. Shortlisting Step

Considering that this step has to be applied to over 400 different pests, this shortlisting step was designed under the premise of being based on readily available and easily accessible data. Therefore, all indicators based on ad-hoc consultations with member states or full-fledged expert knowledge elicitation (EKE) processes should be avoided. This shortlisting steps therefore restricts the prioritization to data on production value and area under cultivation obtained considering the full Eurostat and FAOstat databases. We therefore use a methodology that combines only two dimensions: invasiveness and area or value of major hosts for the pests. The methodology is based on the assumption that pests with higher invasiveness potential and with higher value or area of the crops that are affected by them have a higher probability of having most severe impacts, from an economic, environmental and social perspective. These impacts are the legal reasons listed in article 6 of the Plant Health Law (EU 2016/2031) for listing a pest as a priority pest. To test whether this assumption holds, the ranking obtained with this simplified approach is compared to the original ranking obtained with the I2P2 for the subset of pests originally assessed in 2019.

The shortlisting step is based on three main data sources: hosts for which the pest can have an impact, area and production of the hosts and invasiveness of the pest. We describe each of these components below.

2.1.1. Data sources

2.1.1.1. Host list

The European Food Safety Authority (EFSA) provided a list of host-species. The host-data extraction was not conducted for pests regulated only as a result of their vectoring capacity (i.e., *Bemisia tabaci Genn., Cicadomorpha, Diaphorina citri , Myndus crudus, Pityophthorus juglandis,* and *Trioza erytreae*). In case of macro groups (e.g. family level or genus level) where the individual species names are not provided in the legislation, the outputs of the horizon scanning activity (i.e. the newsletters items from March 2017 to October 2022) where used to identify emerging threats having caused concerns in the last years. For most macro groups, no host-data were extracted and, in turn, the groups were excluded from this shortlisting exercise. Three databases were used to compile this information. Namely, the EPPO Global Database, relevant EFSA output (Pest Categorizations, Survey Cards, and Priority Pest Reports), and the CABI Datasheets. In absence of any of those above-mentioned sources, other authoritative documents were considered (e.g. national PRAs, international databases) and the alternative source clearly indicated in the notes.

2.1.1.2. Production and area data

The pest-specific host list was subsequently matched to all available Eurostat and FAOstat data on production, area under cultivation, and prices. Eurostat and FAOstat data on groups of hosts were not used to avoid inflating values of individual hosts within such groups. For forestry hosts, no data is available in Eurostat or FAOstat. Consequently, the Member State surveys of the previous I2P2 exercise were used to obtain genus-level data on the national area, growing stock, and prices for different forestry hosts.

This matching process was successful for 83% of the hosts identified by EFSA. For twenty pests none of their hosts could be matched to production or area data, either due to lack of direct matching (nine cases) or to matching to crops that are not present in the EU (eleven cases). Pests for which this limitation was found can be identified in Annex 2 as they score a value of zero for the column reflecting the number of hosts matched to production data.

For crop-hosts, the annual variation in production and area under cultivation was captured by computing minimum, median, and maximum values. The year range was dynamically adapted to the data availability at country- and host-level by selecting a range that provides at least three values. The priority for the year range was as follows: 2019-2021 > 2017-2021 > 2013-2021. For forestry-hosts, only temporal point-estimates were available. However, the annual variation is expected to be significantly lower for forestry-hosts than for crop-hosts. Similarly to the year-range prioritization, the database used for production values and prices (i.e., Eurostat or FAOstat) were dynamically adapted to the data availability at country- and host-level. The priority for the databases was as follows: production and prices from Eurostat > production from Eurostat and prices from FAOstat > production from FAOstat and prices from Eurostat > production and prices from FAOstat.

2.1.1.3. Invasiveness

This indicator assesses the mechanisms by which the pest can spread via long distances. Following an in-depth review of literature, EFSA assigned a numeric ‘spread score’ to each pest based on its natural and human assisted spread capacity. This score intends to characterize the invasiveness of the organism with higher values allocated to pests with a higher invasiveness potential. Details of the approach followed by EFSA are provided in EFSA et al. (2023a and 2023b).. For the analysis

presented here, the overall spread scores provided by EFSA, ranging from 1 to 20, were normalized such that the maximum score across all pests equals to 1 and other scores [0, 1) are to be interpreted relative to the most invasive pest in the list.

2.1.1.4. Indicator construction

Once the two components were calculated, for proposing pests for further analysis, a composite indicator was computed. This composite indicator reflects both the invasiveness as well as the damage potential of each pest. The indicator was computed by aggregating the normalized "invasiveness" score, normalized "crop area or value", and normalized "forestry area or value". Each of the components was given equal weight.

The composite indicator was calculated for two different measurements of the importance of the potential damage to hosts. First, we consider the value of hosts into account, and second, we consider the host area. This allows to include in our ranking both the economic importance of the production at risk but also the presence of the hosts in the Union territory. By considering these two measurements we make sure that we are not missing pests affecting crops that have a significant economic value even if the area in which they are grown is small or hosts that have limited economic value but which are present in a large area of the Union territory.

The theoretical maximum of the composite indicators is 3, which would be assigned to a pest that has the highest value in the invasiveness score, crop-impact, and forestry-impact, simultaneously. This approach adds an additional caveat to the one mentioned above related to imperfect matching of hosts to species with production or area data. The invasiveness score is independent of the nature of the impact leading to a host to be declared in the data sources. In our approach the impact scores assume that the entire host value/area in the EU is at risk (i.e., we do not account for differences in the climatic suitability). Such an exercise was beyond the scope of the Commission's mandate to EFSA, however we try to assess whether this assumption could systematically bias our findings in section 3.1.5.

2.2. Summary of the I2P2 Model

The Impact Indicator for Priority Pests (I2P2) is a composite indicator developed by the Joint Research Centre (JRC) of the European Commission to rank plant pests based on their potential economic, social, and environmental impacts in the European Union (Sánchez et al., 2019). The I2P2 model was designed to assist risk managers in the implementation of the Plant Health Regulation, specifically in identifying and prioritizing pests that pose the most significant threats to plant health in the EU.

The I2P2 model is a hierarchical indicator with three levels, the first of which consists of three domains: economic, social, and environmental. Each domain is further divided into sub-domains. For example, the economic domain is split into production impacts, trade impacts, price and market impacts, and impacts on other agents. Each sub-domain is measured using one or more indicators. For instance, the production impacts sub-domain is measured using indicators such as maximum value of production losses, share of EU production value affected, and difficulty of eradication.

The I2P2 model employs a combination of quantitative and qualitative indicators to capture the multi-dimensional impacts of plant pests. Quantitative indicators are those that can be measured numerically, including economic losses and the number of jobs affected. Qualitative indicators are those that cannot be measured numerically, such as impacts on cultural heritage or biodiversity. The I2P2 model requires a variety of data to calculate the indicators. These data are sourced from

various entities, including Eurostat, the European Food Safety Authority (EFSA), and the JRC's BioSAMs Social Accounting Matrix (SAM), along with parameters intrinsic to the CAPRI model.

The I2P2 is determined by aggregating the indicators using a hierarchical weighting approach, with the weights being determined by the relative importance of the different domains, sub-domains, and indicators. The I2P2 can be used to generate two separate rankings for pests affecting crops and trees. The weighting and aggregation process is carried out in three steps, during which each weighting reflects the preferences of the legislators. The aggregation process commences with indicators, progressing to sub-domains, and subsequently to domains. The aggregation of the three domains (economic, social, and environmental) results in a composite indicator value, which is employed to rank the pests.

The I2P2 model is a valuable tool for risk managers, as it provides a ranking of plant pests based on their potential economic, social and environmental impacts in the EU. This ranking can then be used to inform decisions on which pests could be prioritised for action. The I2P2 indicator is a comprehensive model that takes into account a wide range of impacts and has a number of characteristics that makes it particularly useful for risk managers when discussing which pests have the potential to cause the most severe damage if introduced and become established in the EU. It is a transparent model that allows users to understand how the ranking is generated. It is a flexible model that can be adapted to different needs, and while it has a number of limitations, including significant data requirements, its static nature, and the fact that it does not take the dynamic nature of plant pest impacts into account, it remains a valuable tool for risk managers implementing the Plant Health Regulation.

In this report, we describe the results of this assessment which compared to the one carried out in 2019 updates data from a temporal and geographical perspective; incorporates new evidence on pest characteristics from EFSAs EKE process; improves the environmental domain indicators; expands the set of indicators to capture social impacts of pests affecting trees; and increases the number of pests evaluated.

2.3. Updates to the I2P2 Model

2.3.1. Data update and integration of the new EU composition post-BREXIT

For the 2024 assessment the Joint Research Centre (JRC) has checked and updated[1] all the datasets used for the original calculations (see **Table 1**). This update includes:

1. **Update of the temporal scope** for datasets. In 2019 data was used for the most recent available 4 years which were mostly 2013-2016. In 2024 we have checked the updated data availability and now mostly use data for 2020-2023 or 2019-2022.
2. **Update of the geographical scope -** For all datasets the reference for values will be EU-27 post-BREXIT.

[1] Not all datasets have been updated since for some of them there is no new data available.

Table 1. Overview of data sources used to construct the various indicators for economic, social, and environmental impacts.

Data description	Source	Link	Temporal coverage	Used in	Notes
Planted Area	Eurostat	https://ec.europa.eu/eurostat/data-browser/view/apro_cpnh1/default/table?lang=en	2020-2023 (Average)	i1, i2, i6, i8, i9, i10, i12, i17	For crops
	National inventories	Not applicable	2019	i1, i2, i6, i8, i9, i10, i12, i13f, i14f, i15f, i17	For trees Ad-hoc request
Yield	Eurostat	https://ec.europa.eu/eurostat/data-browser/view/apro_cpnh1/default/table?lang=en	2020-2023 (Average)	i1, i2, i6, i8, i9, i10, i12	For crops
	National inventories	Not applicable	2019	i1, i2, i6, i8, i9, i10, i12	For trees Ad-hoc request
Prices	Eurostat	https://ec.europa.eu/eurostat/data-browser/view/APRI_AP_CRPOUTA/default/table?lang=en	2020-2023 (Average)	i1, i2, i10	For crops
	FAO	https://www.fao.org/faostat/en/#data/PP	2020-2023 (Average)	i1, i2, i10	For crops - If not available in Eurostat
	UNECE/National inventories	Not applicable	2019	i1, i2, i10	For trees Ad-hoc request
	Multiple		Multiple	i1, i2	Ad-hoc for products with quality loss
Exchange rates	European Central Bank	https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/index.en.html	Jan/1999-March/2024	i1, i2, i10	Used to convert FAO production prices from USD to Euros
Potential yield loss	EFSA	Not yet available	2024	i1, i2, i4, i5, i6, i8, i9, i10, i11, i12, i13c, i13f, i14c, i14f, i15c, i15f, i16f, i17	From EKE process
Potential quality loss	EFSA	Not yet available	2024	i1, i2	From EKE process
Duration of lag phase	EFSA	Not yet available	2024	i3	From EKE process
Rate of expansion	EFSA	Not yet available	2024	i3	From EKE process
Quantity of imports	Comext	https://ec.europa.eu/eurostat/comext/newxtweb/	2020-2023 (Average)	i8, i9	EEC SPECIAL TRADE DOMAIN > EU SINCE 1999 CN (SIMULATED)
Quantity of exports	Comext	https://ec.europa.eu/eurostat/comext/newxtweb/	2020-2023 (Average)	i4, i5, i6, i7, i8, i9	EEC SPECIAL TRADE DOMAIN > EU SINCE 1999 CN (SIMULATED)
Number countries restricting trade	EFSA	Not applicable	2024	i4, i5, i6, i7, i8, i9	From EKE process

Table 1. Overview of data sources used to construct the various indicators for economic, social, and environmental impacts (cont.).

Data description	Source	Link	Temporal coverage	Used in	Notes
Importing countries	Comext	https://ec.europa.eu/eurostat/comext/newxtweb/	2020-2023 (Average)	i4, i5, i6, i7, i8, i9	EEC SPECIAL TRADE DOMAIN > EU SINCE 1999 CN (SIMULATED)
Own price elasticities	CAPRI Model	https://www.capri-model.org/	2023	i8	For crops
	GFPM	Not applicable	2014	i8	For trees
Output multipliers	EU BioSAM	https://data.jrc.ec.europa.eu/dataset/41b05f72-0c65-4a4c-bffc-27c71d01d159	2015	i10	
Intermediate demand	EU BioSAM	https://data.jrc.ec.europa.eu/dataset/41b05f72-0c65-4a4c-bffc-27c71d01d159	2015	i11	
Labour needs for the production	Eurostat	https://ec.europa.eu/eurostat/databrowser/view/EF_M_FARMLEG/default/table?lang=en	2020	i12	For crops -AWU, ha
	Eurostat	https://ec.europa.eu/eurostat/databrowser/view/for_area/default/table	2020	i12	For trees - Ha
	Eurostat	https://ec.europa.eu/eurostat/databrowser/view/for_awu/default/table	2020	i12	For trees - AWU
Host-specific caloric supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i13c	
Total caloric supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i13c	
Host-specific protein supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i14c	
Total protein supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i14c	
Host-specific fat supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i15c	
Total fat supply	FAO	https://www.fao.org/faostat/en/#data/FBS	2022	i15c	
Capacity to produce fungal toxins	EFSA	Pest specific reports published in EFSA Journal – https://efsa.onlinelibrary.wiley.com/toc/23978325/2025/22/2	2024	i16c	From EKE process
Holdings with other gainful activities	Eurostat	https://ec.europa.eu/eurostat/databrowser/view/ef_oga_type/default/table	2020	i17	

Table 1. Overview of data sources used to construct the various indicators for economic, social, and environmental impacts (cont.).

Data description	Source	Link	Temporal coverage	Used in	Notes
Total number of holdings	Eurostat	https://ec.europa.eu/eurostat/data-browser/view/ef_oga_type/default/table	2020	i17	
Number of Protected Designation of Origin, Protected Geographical Indication of Traditional Speciality Guaranteed	GIview	https://www.tmdn.org/giview/gi/search	2024	i18	Data available up to 08/07/2024 (1996-2023)
Number of UNESCO World Heritage Sites	UNESCO	https://whc.unesco.org/en/list/	2019	i19	
	National inventories	Not applicable	2019	i19	Ad-hoc request
Number of coats of arms, anthems, works of art	UNESCO	https://whc.unesco.org/en/list/	2019	i19	
	National inventories	No applicable	2019	i19	Ad-hoc request
Precipitation per year and country	World Development Indicators	https://databank.worldbank.org/average-precipitation-in-depth/id/3827a503	2020	i15f	
Mean wind speed at 10m	New European Wind Atlas	https://map.neweuropeanwindatlas.eu/	1989-2018 (Average)	i15f	
PM2.5 accumulated in trees	Corada et al., 2021	https://www.sciencedirect.com/science/article/pii/S0269749120367932?via%3Dihub	Multiple	i15f, i16f	
Abundance of use hosts as street and park trees	National inventories	Not applicable		i16f	Ad-hoc request
Total weight collected by household and type of WFP	StarTree Project	https://star-tree.eu/	2016	i13f, i14f	
% of collected WFP amounts that is sold	StarTree Project	https://star-tree.eu/	2016	i14f	
% of household income obtained from the sale of WFPs	StarTree Project	https://star-tree.eu/	2016	i14f	
% of product collected in forests	StarTree Project	https://star-tree.eu/	2016	i13f, i14f	
Environmental indicators	EFSA	Not applicable	2024	i20, i21, i22, i23, i24	From EKE process

Source: Own elaboration.

2.3.2. Update of Expert Knowledge Elicitation process by EFSA for previously assessed pests

EFSA has updated the parameters provided to JRC for the calculation of indicators 23 out of the 28 originally assessed pests that the PAFF agreed to reassess in November 2023. These parameters include:

1. List of hosts included in the Expert Knowledge Elicitation (EKE)
2. Yield loss and quality loss for the hosts included in the EKE
3. Expansion and lag phase
4. Additional treatments
5. Additional effects
6. Distribution
7. Quarantine countries
8. Full list of hosts affected by the pest

EFSA provided the JRC with results from the EKEs for the following 23 pests which were decided to be reassessed (**Table 2**).

Table 2. Overview of pests that were reassessed.

Pest name	EPPO code
Agrilus anxius	AGRLAX
Xanthomonas citri	XANTCI; XANTAU
Phyllosticta citricarpa	GUIGCI
Candidatus liberibacter	LIBEAF; LIBEAM; LIBEAS
Spodoptera frugiperda	LAPHFR
Agrilus planipennis	AGRLPL
Bretziella fagacearum	CERAFA
Anoplophora chinensis	ANOLCN
Anoplophora glabripennis	ANOLGL
Bursaphelenchus xylophilus	BURSXY
Anastrepha ludens	ANSTLU
Rhagoletis pomonella	RHAGPO
Popillia japonica	POPIJA
Bactrocera dorsalis	DACUDO
Bactrocera zonata	DACUZO
Aromia bungii	AROMBU
Bactericera cockerelli	PARZCO
Dendrolimus sibiricus	DENDSI
Anthonomus eugenii	ANTHEU
Thaumatotibia leucotreta	ARGPLE
Xylella fastidiosa	XYLEFA
Thrips palmi	THRIPL
Conotrachelus nenuphar	CONHNE

Source: Own elaboration.

2.3.3. Expert Knowledge Elicitation process for the new pests

In addition EFSA also provided the JRC with the results of the EKEs for the following 23 new pests which were pre-selected from the full list of Union Quarantine Pests following the screening process undertaken by JRC and EFSA and the comments provided by the PAFF members after its meeting in November 2023. EFSA provided inputs for the same indicators as above for the following pests (**Table 3**). Details on the selection of these pests can be found in section 3.1.

Table 3. Overview of pests that were newly assessed.

Pest name	EPPO code
Pissodes nemorensis	PISONE
Pissodes strobi	PISOST
Spodoptera litura	PRODLI
Helicoverpa zea	HELIZE
Polygraphus proximus	POLGPR
Phymatotrichopsis omnivora	PHMPOM
Nepovirus myrtilli	BLMOV0
Keiferia lycopersicella	GNORLY
Ralstonia pseudosolanacearum	RALSPS
Listronotus bonariensis	HYROBO
Pseudocercospora pini-densiflorae	CERSPD
Diabrotica undecimpunctata howardi	DIABUH
Choristoneura parallela	CHONPA
Pissodes terminalis	PISOTE
Pissodes yunnanensis	PISOYU
Pissodes nitidus	PISONI
Acleris semipurpurana	CROISE
Arrhenodes minutus	ARRHMI
Prodiplosis longifila	PRDILO
Porphyrophora tritici	PORPTR
Acleris minuta	ACLRMI
Diabrotica virgifera zeae	DIABVZ
Choristoneura fumiferana	CHONFU

Source: Own elaboration.

2.3.4. New Social Impact Indicators for pests affecting trees

2.3.4.1. Motivation

When implementing the original I2P2 indicator (Sánchez et al. 2019) it was observed that the subdomain 2.2, "*Impact on food security or food safety*" under the Social impacts domain, was not well suited to capture the effect of pests affecting tree hosts. De facto, the whole sub-domain was excluded from the calculations giving higher weights to the other two (see **Table 4**). In order to avoid this issue, the JRC has developed new indicators under the Social Impacts domain, which will allow for better capturing, measuring and comparing impacts of pests affecting trees.

2.3.4.2. Overview of the I2P2 structure after adding the new indicators

The structure of the social domain in the 2019 version of I2P2 included 3 sub-domains and eight indicators. However, due to data availability and variability, de facto in the analysis only two indicators could be used when assessing pests affecting tress, as reflected in table 25 of Sánchez et al. (2019) and reported in Table 4 below.

Table 4. Structure of the social domain for I2P2. In bold indicators that could be calculated for pests affecting trees. From Sánchez et al. (2019).

Domain	Sub-domain	Indicator	Sub-domain weight
Social Impacts	2.1 Impact on employment	**I.12 Job losses**	0.17
	2.2 Impact on food security or food safety	I.13 Share of caloric supply	0
		I.14 Share of protein supply	
		I.15 Share of fat supply	
		I.16 Ability to produce fungal toxins	
	2.3 Impact on recreation, landscape or cultural heritage	I.17 Share of holdings with other gainful activities	0.17
		I.18 Products covered by EU quality labels	
		I.19 Presence of affected hosts on cultural heritage landmarks	

Source: Own elaboration.

As it can be seen, for pests affecting trees the subdomain 2.2. "*Impact on food security of food safety*" was not evaluated. To overcome this limitation and to avoid that the 33% of the total value of the I2P2 was driven by only two indicators for pests affecting trees, in the 2024 version we have developed two indicators to capture food security and two indicators that capture a new dimension of social aspects related to health (as reported in Table 5). The latter would be similar to the food safety issues related to fungal toxins for crops. In this manner, this sub-domain will have the same number of indicators in both groups of pests. Each of the new indicators will have the same weight (0.25) within the subdomain 2.2 "*Impact on food security and food safety*", better aligning with the structure of the sub-domain for pests affecting crops. The social domain used in 2019 updated in temporal and geographical scope as described in section 2.3.1 is still used for pests affecting crops.

Table 5. Summary of new indicators and components for the social impacts of forestry and forest ecosystems in I2P2 2024.

Domain	Sub-domain	Indicator
Social Impacts	2.2f Impact food security and health	I.13f Quantity losses of wild forest products collected by households
		I.14f Reduction in quantity sold by households with wild forest products income exceeding 10%
		I.15f Losses in $PM_{2.5}$ accumulation capacity affecting forests
		I.16f Losses in $PM_{2.5}$ accumulation capacity affecting street trees and parks.

Source: Own elaboration.

Taking these new indicators into account, the sub-domain 2.2 will be calculated as follows depending on the type of hosts the pest affects:

- Pests affecting only crops hosts: 2.2c Impact on food security or food safety.
- Pests affecting only forestry hosts: 2.2f Impact on social forestry aspects

— Pests affecting agroforestry hosts:

— 2.2c Impact on food security or food safety + 2.2f Impact on social forestry aspects

Table 6 reports the final indicators for the subdomain impacts on food security and health in I2P2 2024 depending on the type of host affected by the pest. When the pest affects both crops and trees (the so-called agro-forestry pests) both set of indicators will be used.

Table 6. Indicators used for sub-domain 2.2 in I2P2 2024 depending on the type of host the pest affects. "c" stands for "crops" while "f" stands for "forestry".

Sub-domain	indicator	
	Crops	**Forestry**
2.2 Impact on food security or food safety / health	I.13c Share of caloric supply	I.13f Quantity losses of wild forest products collected by households
	I.14c Share of protein supply	I.14f Reduction in quantity sold by Households with income from wild forest products exceeding 10%
	I.15c Share of fat supply	I.15f Losses in $PM_{2.5}$ accumulation capacity affecting forests
	I.16c Ability to produce fungal toxins	I.16f Losses in $PM_{2.5}$ accumulation capacity affecting street trees and parks

Source: Own elaboration.

Below we provide the specific details for each of the new four indicators developed for the sub-domain for pests affecting trees taking into account both data sources used and construction of the indicator.

2.3.4.3. Food security from a forest perspective - Wild Forest Products

Wild forest products (WFPs), also known as non-wood forest products (NWFPs), are "goods of biological origin other than wood derived from forests, other wooded land and trees outside forests" (FAO, 2018). Besides their market (or private) component, WFPs are also strongly connected to social and cultural services such as food security, recreation, local culture, wellbeing, and ecological knowledge, making them by all means a social service provided by forest ecosystems. Despite their importance and increasing acknowledgment by different European initiatives, such as the European Green Deal (European Commission, 2019) and the EU bioeconomy strategy (European Commission, 2018), WFPs contribution to wealth and societies is only partially known.

In recent years, studies have tried to unravel the social value of WFPs both in forests and non-forest activities (Di Cori et al., 2021; Lovrić et al., 2020, 2021) as a first step towards a more comprehensive value chain analysis. Providing information on the relation between pests affecting trees and WFPs collection by European households will contribute to this effort, highlighting the relationship between WFPs and trees, and supporting risk managers in their decisions to invest and act to maintain this important forest ecosystem service.

2.3.4.3.1. Description and data sources

The indicators presented measure the losses in the wild forest products collected and sold by households due to the effects of a pest on the trees that are associated with the WFP. Due to the nature of I2P2, only WFPs categories that could be explicitly linked to trees have been taken into account. Their link with one or more tree genus from the ecological perspective is recognized in the literature, and the categories selected are mushrooms (Guerin-Laguette et al., 2000; Hussain &

Sher, 2021; Pachlewski et al., 1996; Wang et al., 1995), truffles[2] (Benucci et al., 2011; Čejka et al., 2023; Wilgan, 2023), forest nuts (Akcan et al., 2017; Mutke & Picardo, 2014; Pollegioni et al., 2017), and saps and resins (Dietemann et al., 2019; Svanberg et al., 2012). For each category, the most collected species in Europe according to Lovrić et al. (2020) have been considered for the analysis.

For each species of WFPs we then performed the matching with the related tree genus. For the categories of forest nuts, and saps and resins, the WFP is a direct product of the tree. For the categories of mushrooms and truffles, the link between the WFPs and the tree genus is due to the mutually symbiotic relationship happening between the two (Mycorrhizas). For example, for penny bun (*Boletus edulis*) we consider that impacts on the following tree genus would have an impact on them as reflected in **Table 7**.

Table 7. Summary of new indicators and components for the social impacts of forestry and forest ecosystems in I2P2 2024.

NWFP product	Tree genus
Penny bun *(Boletus edulis)*	*Betula*
Penny bun *(Boletus edulis)*	*Fagus*
Penny bun *(Boletus edulis)*	*Picea*
Penny bun *(Boletus edulis)*	*Quercus*

Source: Own elaboration.

Data on collection, consumption and uses of WFPs on different European countries was obtained from the StarTree Project (https://star-tree.eu/). In particular, the JRC used the following data:

- By household and type of WFP: total weight collected, % of collected amounts that is sold.
- By household: % of household income obtained from the sale of WFPs.
- By type of WFP: percentage of product that has been collected in forests.

Together with data on WFPs, we utilized forestry area in hectares for each host at country level from the ad-hoc consultation carried out in 2019 for the initial application of the I2P2, as well as data on potential proportion of loss in yield per country and tree genus/species provided by EFSA as part of the EKEs.

2.3.4.3.2. Technical implementation

I.13f Losses in Quantity of wild forest products collected by households

This indicator calculates the losses in the quantity of WFPs collected by households that could occur in case of a pest would enter, establish and spread throughout the area of potential distribution in the EU (i.e. it has spread to its maximum extent) and there are no ongoing eradication or containment programmes (Baker et al. 2019). This loss, approximates the food availability that is lost for households which collect WFP. While the importance of WFP in total calorie, protein or fats is much smaller than that of crops we don't run the risk of overestimating this indicator as it will only be compared across pests affecting trees and, due to the normalization process, won't distort

[2] Please note that the association of truffles with these tree genus does not necessarily mean that these are the only trees they can associate with. Truffles are known for their adaptability to different environments.

the overall indicator as it will always range between 0 (for the pest with the lowest absolute value) to 1 (for the pest with the highest absolute value).

This indicator is calculated following three steps.

1. **Allocation of total amount collected to the different tree genus that support their growth (at country level)**: Data on WFP is provided as a total value for each country, therefore we need to assign this total across the different genuses and we do that based on area at country level. For the allocation tree genuses taken into account for include all the tree genus from which the product can be obtained and that are present in the country and not only the ones that can be affected by the pest.

$$WFP_{i,j,wfp} = \frac{WFP_{total_{i,wfp}} * area_{j,i}}{\sum_{j=1}^{h} area_{j,i}}$$

$$for\ each\ country\ (i), genus\ from\ which\ the\ WFP\ can\ be\ collected\ (j)\ and\ wfp(wfp)$$

2. **Removal of the amounts not collected in forests (at country level):** The WFP database from StarTree reports products collected in forests but also in other land uses. Some of these products can be present also in pasture land, peatlands, moors, or even urban areas, so to avoid overestimating the potential impact of pests affecting trees we need to subtract production associated to non-forest areas. For that, the amount collected from each type of tree genus needs to be multiplied only by the percentage that was collected in forests (%_collected_in_forests). This percentage differs across WFPs.

From steps 1 and 2 we obtain the total amount collected of WFPs in forests by tree genus: the stock of WFPs that could be affected by a specific pest with tree genus (j) as a host.

$$WFP_{i,j,wfp}\ collected\ in\ forests = WFP_{i,j,wfp} * \%\_collected\_in\_forests_{wfp}$$

$$for\ each\ country\ (i), genus\ from\ which\ the\ WFP\ can\ be\ collected\ (j)\ and\ wfp(wfp)$$

3. **Loss in the amount collected due to the effect of the pest:** The stock calculated as described above does not take into account how much the pest affects the specific tree hosts. To incorporate this, we multiply the amount collected from each type of tree genus in forests by the yield loss reported by EFSA in the EKEs in order take the effect of the pest into account. For the hosts that are not affected by the pest, the yield loss is zero.

After processing the data, the indicator is calculated as follows, adding across the different Member States (MS) (*i*), the different forestry hosts affected by the pest (*j*), and for the WFPs that can be collected from each host (wfp):

$$(I.13f)\ Q\_WFP\_L = \sum_{i=1}^{i=27} \sum_{j=1}^{j=h} \sum_{wfp=1}^{i=WFP} WFP_{i,j,wfp}\ collected\ in\ forests\ *\ yield\_loss_{j,i}$$

$$for\ each\ country\ (i), genus\ from\ which\ the\ WFP\ can\ be\ collected\ (j)\ and\ wfp(wfp)$$

The indicator will be measured in kilos of loss products and it will be normalised from to calculate the final score.

I.14f Income losses in households with WFPs income exceeding 10%

Besides impact in food availability captured in I.13f, we also want to consider how this losses can affect the incomes of households that are dependent on WFPs for their livelihoods. I.14f measures the potential quantity losses in European households for which the sale of the WFPs represents more than 10% of their income.

This indicator follows a similar approach as for the previous indicator, but two some additional steps:

1. **Select households with expected highest impact:** when considering supply, only households for which the sale of WFPs represents more than 10% of their income are taken into account.
2. **Focus only on amount of WFPs sold**: when considering affected amounts, only the part that is sold is used in the calculations.

In order to calculate the income loss, two different approaches are taken into account:

— **No adaptation of households to quantity decrease:** this assumes that all households follow a behaviour where their objective is to continue selling the same **<u>percentage</u>** of collected WFPs out of the total after the decrease in the quantity they are collecting. Therefore all households will experience a loss of income. The possible increase in the products price is not taken into account, nor is the quality loss.

$$(I.14f,\ approach\ 1)\ Q\_WFP\_SL\_1 = \sum_{i=1}^{i=27}\sum_{j=1}^{j=h}\sum_{wfp=1}^{i=WFP}\sum_{h=1}^{h=H} amount\_collected_{wfp,h,i} * \%\_sold_{wfp,h,i} * \%\_\%\_collected\_in\_forests_{wfp} * \%\_presence_{j,i} * yield\_loss_{j,i}$$

— **Prioritization of income over own consumption:** this assumes that households follow a behaviour where their objective is to continue selling the same **<u>amount</u>** of WFPs (in order to get the same income). In this scenario, the income obtained from the sale of WFPs decreases only for some households (those for which losses are above the share not previously sold). The indicator captures this decrease. Again, the possible increase in the products price and the quality loss are not taken into account.

$$\begin{aligned}(I.14f, approach\ 2)\ Q\_WFP\_SL\_1 \\ = MIN(\sum_{i=1}^{i=27}\sum_{j=1}^{j=h}\sum_{wfp=1}^{i=WFP}\sum_{h=1}^{h=H} amount\_collected_{wfp,h,i} * \%\_sold_{wfp,h,i} \\ * \%\_collected\_in\_forests_{wfp} * \%\_presence_{j,i} * (1 \\ - yield\_loss_{j,i}), \sum_{i=1}^{i=27}\sum_{j=1}^{j=h}\sum_{wfp=1}^{i=WFP}\sum_{h=1}^{h=H} amount\_collected_{wfp,h,i} * \%\_sold_{wfp,h,i} \\ * \%\_collected\_in\_forests_{wfp} * \%\_presence_{j,i})\end{aligned}$$

The final indicator to capture income loss is calculated as the average of the two scenarios described above.

$$(I.14f) = AVG((I.14f, approach\ 1), (I14.f, approach\ 2))$$

The indicator will be measured in kilos of loss products and it will be normalised from 0 to 1 calculate the final score.

2.3.4.3.3. Assumptions and limitations

When constructing these two indicators several assumptions had to be made which lead them to have some limitations. One primary assumption is that the entire quantity of WFPs produced is collected, implying that any reduction in collection is directly proportional to a decrease in production. This assumption may not fully capture realities on the ground, where discrepancies between production and collection rates can exist. Furthermore, the use of area as a proxy for wild food product production simplifies the complex ecological interactions that influence productivity. Additionally, these indicators do not account for quality loss, which could impact the market value and utility of the products. Finally, the potential for product price increases due to scarcity or market dynamics is not considered. However, this is still the best approach to incorporate the food security dimension into pest affecting trees.

2.3.4.4. Health impacts from a forestry perspective - impact on $PM_{2.5}$ reduction capacity

For pests affecting crops indicator I.16 tried to capture the risks to food safety posed by pests that could produce fungal toxins. This approach is not fit for purpose for pests affecting trees, and therefore we have developed alternative indicators to capture the increased health risks that can be caused by pests affecting trees as part of the social domain of the I2P2 indicator. For that, we focus on how trees reduce presence of particulate matter smaller than 2.5 micrometers in diameters (also known as fine dust) in the air.

According to the European Environmental Agency, particulate matter: "consists of a mixture of solids and liquid droplets which can either be emitted directly or form when pollutants from various sources react in the atmosphere" (EEA, 2024). They come in different sizes and those smaller than 10 micrometers are able to enter our lungs and cause serious health problems. The World Health Organization has collected enough scientific evidence[3] to state that the most harmful exposure to particulate matter is long-term exposure to fine particles ($PM_{2.5}$, smaller than 2.5 micrometers in diameter).

Trees can help reducing the amount of $PM_{2.5}$ present in the air we breathe, which has a beneficial effect on human health. The amount of $PM_{2.5}$ particles adsorbed by trees has been analysed in the literature (Corada et al., 2021). Depending on many characteristics, e.g. the shape or surface of the leaves, different genus of trees can adsorb different quantities of $PM_{2.5}$ (Gaglio et al., 2022; Sæbø et al., 2012; Sgrigna et al., 2020).

Based on this, we proposes two new indicators for the social domain to measure how pests affecting trees reduce the $PM_{2.5}$ accumulation capacity by trees. The indicators analyse the effect that pests can have in this reduction capacity in forests (I15f) and in urban areas (I16f). The indicators also take into account the fact that climatic conditions affect the concentration of $PM_{2.5}$ both in the air and in the tree accumulation capacity (Megaritis et al., 2014).

[3] https://www.who.int/health-topics/air-pollution#tab=tab_1

2.3.4.4.1. Description and data sources

As stated above we include to indicators to capture this dynamic in forests (I15f) and on urban and peri-urban areas (I16f). The latter is included due to the fact that urban areas show higher concentration of $PM_{2.5}$ particles due to e.g. vehicles and factory emissions among others and most of the EU population lives in urban areas (70%). To calculate the indicators we used data on four concepts: (i) $PM_{2.5}$ accumulation, (ii) climatic conditions, (iii) forest area (both total and in urban areas) and (iv) yield losses due to the pest.

1. Data on **$PM_{2.5}$ accumulated** in trees has been retrieved from the literature (Corada et al., 2021) and used at genus level when possible. When no data was available at genus level we use family level data as a fall back.

2. The values found in the literature relate to specific experimental plots or limited areas which might not be representative for the whole EU. We therefore try to take into account variability in accumulation rates incorporating data on **climatic conditions**. Variability in accumulation in the atmosphere and trees is mainly driven by two climatic parameters: precipitation and wind. The effect of both parameters is similar (same order of magnitude) during all seasons, according to Megaritis et al. (2014). Moreover, both precipitation and wind affect $PM_{2.5}$ in the same way: an increase in the parameter decreases $PM_{2.5}$ concentration. To account for the climatic effects, JRC has collected data for all EU MS for both precipitation levels and wind[4].

3. **Areas** for each species both in total and urban areas are taken from the ad-hoc consultation undertaken for the 2019 implementation of the I2P2.

4. Regarding the potential **yield loss** per country and tree genus/species, values are obtained from EFSA input via the EKE process.

2.3.4.4.2. Technical implementation

I.15f Losses in $PM_{2.5}$ accumulation capacity affecting forests

In order to calculate this indicator, JRC first processed the data collected as follows:

[4] For precipitation: average precipitation in depth (mm per year and country) from the World Development Indicators (year 2020, last updated on 24/10/2024) https://data.worldbank.org/indicator/AG.LND.PRCP.MM?year=2020.

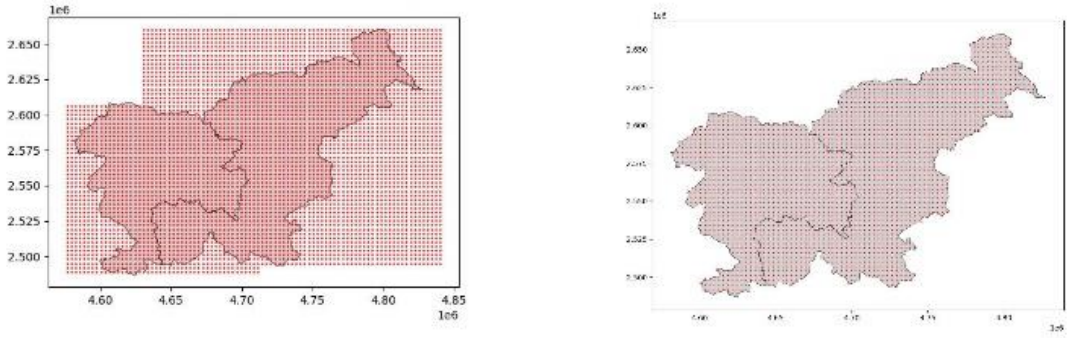
For wind: meso-scale layers, mean wind speed at 10m from the New European Wind Atlas: https://map.neweuropeanwindatlas.eu/.

— **$PM_{2.5}$ accumulated in trees** ($PM_{2.5}$): data for tree genus on the accumulation capacity was gathered from the literature (Corada et al., 2021). When the genus was not present in the literature, we assigned the same value as the most similar genus of the same family, taking into account the similarity of the tree leaf's size, shape, and surface composition, all important traits for the adsorption capacity. When different values for different genus where found across the literature, we prioritized values obtained for plots in Europe compared to other world regions. When we found different values for different European studies, we computed the average. Finally, when data was available for different seasons we also computed the average. The result is a matrix of $PM_{2.5}$ accumulated in trees that provides a value for each of the trees that are hosts for the assessed pests.

— **Precipitation data** (grouped) (P): countries are categorized into 3 distinct groups based on their precipitation levels. To account for the inverse relationship between precipitation and $PM_{2.5}$ concentration, the grouping system categorized countries with higher precipitation levels into lower groups (starting from 1), indicating that in these regions climate can influence more $PM_{2.5}$ presence in the air and, subsequently, the $PM_{2.5}$ amount captured by trees. This value will be then divided by the average P_{AVG} for all countries.

— **Wind data** (W): countries are categorized into 3 distinct groups, following the same approach as the one explained for the precipitation data. However, the New European Wind Atlas does not allow for downloading the data for each EU MS but for a certain area indicated with its bounds, which would often include also the sea, as shown in **Figure 2**. Thus, using the EUROSTAT GISCO statistical unit dataset[5], JRC has calculated these bounds for each MS at NUTS level 2, downloading the data from the New European Wind Atlas and filtering the points to keep only those that belong to the inland of the selected country. As a final step, since data in I2P2 are used at country level, we calculated the median for each country. This value will be then divided by the average W_{AVG} for all countries.

Figure 2. Steps of JRC data processing for wind data.



Source: own elaboration.

[5] https://ec.europa.eu/eurostat/web/gisco/geodata/statistical-units/territorial-units-statistics

— Potential **loss in yield** (r_{loss}) obtained from EFSA's EKEs

— **Host planted area** (A) in each country from the JRC ad-hoc data collection in 2016.

After processing the data, the indicator is calculated as follows, adding across the different MS (*i*) and the different tree hosts affected by the pest (*j*):

$$(I.15f)\ PM_{2.5}\_AC\_F = \sum_{j=1}^{j=n}\sum_{i=1}^{i=27}(A_{j,i} * r_{loss\ i,j} *\ PM_{2.5\ j} * \frac{P_i}{P_{AVG}} * \frac{W_i}{W_{AVG}})$$

$PM_{2.5}$ accumulation in tree leaves measured in $\frac{micrograms}{cm^2}$ has been directly multiplied by the forest area in hectares, which is usually calculated as tree canopy cover[6].

I.16f Losses in $PM_{2.5}$ accumulation capacity affecting street trees and parks

In order to calculate this indicator, JRC first processed the data collected as follows:

— **PM2.5 accumulated in trees** ($PM_{2.5}$): same calculation as in previous section.

— Potential **loss in yield** (r_{loss}): same calculation as above.

— **Use of hosts as street trees and in parks** (QPS). We take the values obtained from the ad-hoc consultation carried out in 2019 for the original I2P2 application. For each tree species or genus MS were requested to respond whether it is used in streets and parks and to rate the relative importance using a five-level scale starting at zero when the tree is not present and reaching a maximum of four when that specific tree is used in more than 50% of streets and urban parks.

The indicator is then calculated adding across the different MS (*i*) and the different forestry hosts affected by the pest (*j*):

$$(I.15f)\ PM_{2.5}\_AC\_TP = \sum_{j=1}^{j=n}\sum_{i=1}^{i=27}[(QPS_{i,j} *\ r_{loss\ i,j} *\ PM_{2.5j})$$

2.3.4.4.3. Assumptions and limitations

When constructing these two indicators several assumptions had to be made which lead them to have some limitations. One primary limitation is that the $PM_{2.5}$ accumulation capacity can significantly vary depending on local environmental conditions and tree species variability. Our indicators might thus oversimplify the diverse ecological and biological interactions that affect pollutant capture. Additionally, while wind and precipitation are acknowledged as influential factors in the interaction of $PM_{2.5}$ with trees, they do not encompass the entire complexity of these dynamics. Furthermore, the health impact of $PM_{2.5}$ exposure is contingent upon a range of additional factors, including pre-existing health conditions and the duration of exposure, which are not

[6] Forest canopy cover, also known as canopy coverage or crown cover, is defined as the proportion of the forest covered by the vertical projection of the tree crowns (Jennings et al. 1999).

accounted for in our indicators. However, this is still the best approach to incorporate the health dimension into pest affecting trees.

2.3.5. New environmental impact indicators developed by EFSA

EFSA has provided the JRC with new environmental impact indicators (Table 8) that will replace the previously existing ones. The explanation of the environmental indicators can be found in de la Peña et al (2025).

Table 8. Indicators for the environmental domain of the new I2P2 2024.

Domain	Sub-domain	Indicator
Environmental Impact	**3.1 Impact on ecosystem services**	I.20 Loss in EU ecosystem service flow
	3.2 Impact on biodiversity	I.21 Loss in EU community biodiversity
		I.22 EU protected areas with host plants
		I.23 Weighted count of IUCN host species
	3.3 Increase of the use of plant protection products	I.24 Increase in pesticide use

Source: Own elaboration.

2.3.5.1. Final I2P2 Model

Table 9 presents the final list of indicators that will be used to calculate the I2P2 model for 2024. It includes the new indicators regarding the social forestry aspects, as well as the new environmental indicators developed by EFSA.

Table 9. Summary of indicators for assessing the economic, social and environmental impacts.

Domain	Sub-domain	Indicator		
Economic Impacts	**1.1 Production impacts**	I.1 Maximum value of production losses		
		I.2 Share of EU production value affected		
		I.3 Difficulty of eradication		
	1.2 Trade impacts	I.4 Number of importing countries expected to impose restrictions on trade		
		I.5 Value of export losses		
		I.6 Share of export losses over total production		
		I.7 Trade dispersion		
	1.3 Price and market impacts	I.8 Change in domestic price		
		I.9 Change in domestic production over imports		
	1.4 Impacts on other agents	I.10 Upstream effects		
		I.11 Downstream effects		
Social Impacts	**2.1 Impact on employment**	I.12 Job losses		
	Crops		**Trees**	
	2.2c Impact on food security or food safety	I.13c Share of caloric supply	**2.2f Impact on social forestry aspects**	I.13f Quantity losses of wild forest products collected by households
		I.14c Share of protein supply		I.14f Reduction in quantity sold by Households with wild forest products income exceeding 10%
		I.15c Share of fat supply		I.15f Losses in PM2.5 accumulation capacity affecting forests
		I.16c Ability to produce fungal toxins		I.16f Losses in PM2.5 accumulation capacity affecting street trees and parks
	2.3 Impact on recreation, landscape or cultural heritage	I.17 Share of holdings with other gainful activities		
		I.18 Products covered by EU quality labels		
		I.19 Presence of affected hosts on cultural heritage landmarks		
Environmental Impact	**3.1 Impact on ecosystem services**	I.20 Loss in EU ecosystem service flow		
	3.2 Impact on biodiversity	I.21 Loss in EU community biodiversity		
		I.22 EU protected areas with host plants		
		I.23 Weighted count of IUCN host species		
	3.3 Increase of the use of plant protection products	I.24 Increase in pesticide use		

Source: Own elaboration.

The final indicator is constructed assuming equal weights across domains, sub-domains and specific indicators.

2.4. Sensitivity and Uncertainty Analyses

The model depicted above has two sources of parameter specific uncertainty. First, the by EFSA elicited biological parameters on yield penalties, lag times, and spread rates are uncertainty distributions. Second, the aggregation from indicators to sub-domains and to the final I2P2 score follows a subjective weighting scheme that might influence the final results. We address both these sources of uncertainty through simulation-based analyses.

With regards to the by EFSA elicited biological parameters, we compute all results using the 25th, 50th, and 75th percentile of the elicited distribution. The main results correspond to the scores obtained using the 50th percentile. Subsequently, we report on changes in the pest ranking if other quantiles were to be applied. Notably, quantiles were in generally varied for all pests simultaneously.

With regards to the subjective weighting scheme, we perform a Latin hypercube sampling approach to simulate combinations of different weights used in the aggregation step. Subsequently, we assess the stochastic dominance of pests' ranking with regards to the distribution of weights assessed and we perform a filtering approach to derive whether the lowest rank a pest could achieve under any weighting scheme. In doing so, we derive weighting-free recommendations on the ranking order of pests and shed light on the weighting preferences that may lead to an alternative ranking. Consequently, these analyses allow us to assess the robustness in our final recommendation with regards to the uncertainty in the EFSA parameters as well as the subjectivity of the weighting scheme.

3. Results

3.1. Shortlisting Step

3.1.1. Pests excluded

Out of the total list of Union Quarantine pests, 114 pests were not included in this shortlisting analysis due them being groups of species, vectors, or because of an absence of data on hosts' production value and area under cultivation (see Annex 1). Hence, this list of excluded pests comprise species that were purposefully excluded by EFSA in agreement with risk mangers (i.e., spp. groups and vectors) as well as pests that were intended to be assessed, however, for which no data on crop or forestry production was available.

3.1.2. Descriptive statistics of the host list

Annex 2 depicts the number of hosts listed and matched to production data for each pest. The number of hosts listed for each pest ranges from 1 to 615 with the average being 29. The number of hosts per pest matched to production data ranges from 0 to 98 with the average being 7. However, as some of the underlying host species fall into the same Eurostat and FAOstat production data, the number of unique production datasets used is generally lower than the number of hosts matched; ranging from 0 to 64 with the average being 5 datasets.

As mentioned in section 2.1.1, for 20 pests we could not find any statistical data on production or area for the hosts identified by EFSA. A critical limitation of our analysis is the absence of systematic economic data on the host value for specific ornamental plants. In turn, hosts identified that may be ornamental plants were generally excluded from the economic analysis. However, of the 219 analyzed pests only 10 pests identified hosts with observed impact that may be ornamentals (10 unique hosts), which are shown in Annex 3. As a robustness check, we assessed the relative and absolute crop-host value that these ornamental hosts would need to add to the overall pest impact score such that the particular pest would reach the top-50 subset in the scenario on invasiveness plus host value.

The results confirm that our rankings are robust to the exclusion of ornamental hosts. *Thrips palmi* Karny and the Tomato leaf curl New Delhi virus are ranked 35 and 31, respectively and therefore signaled as potential candidates for further analysis. Hence, the exclusion of *Orchidaceae* and *Chrysanthemum* spp. as hosts, respectively, had no effect on them reaching the top-50. The other pests with ornamental hosts with observed impact identified were either excluded from the assessment, due to absence of economic host data, or they ranked positions from 138 to 168 in the analysis. For those pests to reach the composite index score that would push them in the top-50, the economic value of the ornamental hosts would need to range between 7.7 and 34.1 billion Euro. Such a valuation for individual ornamental hosts is extremely unlikely given that the entire ornamental sector in the EU is estimated to have an output value of 10 billion Euro annually (International Association of Horticultural Producers, 2016, p.16).

3.1.3. Composite shortlisting scores

As a starting point for the shortlisting we focus on the pests that appear on the 50 pests with highest value for the composite score taking into account production or area (**Figure 3**). This subset of UQP comprises a total of 66 organisms, of which 22 were already assessed in the 2019 exercise Table 10 to Table 12 depict the 44 pests that were not assessed in 2019 signaling the kind of hosts it affects following the same classification used in 2019 and whether it makes the subset due to the ranking based on area, value, or both.

Table 10. Subset of, not previously assessed, shortlisted UQP in both scenarios.

		Value of the composite indicator taking into account…	
Pest name	**Type**	**Hosts' value of production**	**Hosts' area**
Pissodes nemorensis Germar	FORESTRY	1.73	1.77
Pissodes strobi (Peck)	FORESTRY	1.73	1.77
Fusarium circinatum Nirenberg & O'Donnell	FORESTRY	1.34	1.52
Oemona hirta (Fabricius)	AGROFORESTRY	1.30	0.68
Pissodes terminalis Hopping	FORESTRY	1.26	1.45
Pissodes yunnanensis Langor & Zhang	FORESTRY	1.26	1.45
Pissodes nitidus Roelofs	FORESTRY	1.26	1.45
Scirtothrips dorsalis Hood	CROP	1.24	0.66
Tobacco ringspot virus	CROP	1.15	0.67
Grapevine vein-clearing virus	CROP	1.11	0.63
Grapevine berry inner necrosis virus	CROP	1.11	0.63
Spodoptera litura (Fabricus)	CROP	1.10	1.01
Helicoverpa zea (Boddie)	CROP	1.00	0.99
Andean potato latent virus	CROP	0.95	0.81
Acleris semipurpurana (Kaerfott)	FORESTRY	0.92	0.78
Polygraphus proximus Blandford	FORESTRY	0.87	0.84
Arrhenodes minutus Drury	FORESTRY	0.85	0.61
Potato virus H	CROP	0.83	0.69
Potato black ringspot virus	CROP	0.83	0.69
Phytophthora ramorum (non-EU isolates) Werres, De Cock & Man in 't Veld,	FORESTRY	0.77	0.76

Source: own elaboration

Table 11. Subset of, not previously assessed, shortlisted UQP in the host value scenario.

Pest name	Type	Value of the composite indicator
Tomato ringspot virus	CROP	1.16
Phymatotrichopsis omnivora (Duggar) Hennebert	CROP	0.87
Candidatus Phytoplasma fraxini (reference strain) Griffiths *et al.*	CROP	0.78
Candidatus Phytoplasma australiense Davis *et al.* (reference strain)	CROP	0.78
Blueberry leaf mottle virus	CROP	0.81
Candidatus Phytoplasma pruni-related strain (North American grapevine yellows, NAGYIII) Davis *et al.*	CROP	0.99
Grapevine red blotch virus	CROP	0.86
Tomato leaf curl New Delhi virus	CROP	0.92
Prodiplosis longifila Gagné	CROP	0.92
Keiferia lycopersicella (Walsingham)	CROP	0.92
Globodera rostochiensis (Wollenweber) Behrens	CROP	0.80
Globodera pallida (Stone) Behrens	CROP	0.80
Ralstonia pseudosolanacearum Safni *et al.*	CROP	0.85
Candidatus Phytoplasma pruni-related strains (Clover yellow edge, Potato purple top Akpot7, MT117, Akpot6; PPT-COAHP, -GTOP)	CROP	0.79
Tomato yellow vein streak virus	CROP	0.79

Source: own elaboration

Table 12. Subset of, not previously assessed, shortlisted UQP in the host area scenario.

Pest name	Type	Value of the composite indicator
Listronotus bonariensis (Kuschel)	CROP	1.13
Porphyrophora tritici Sarkisov *et al.*	CROP	1.13
Pseudocercospora pini-densiflorae (Hori & Nambu) Deighton	FORESTRY	0.95
Diabrotica undecimpunctata howardi Barber	CROP	0.73
Acleris minuta (Robinson)	CROP	0.70
Choristoneura parallela Robinson	CROP	0.69
Diabrotica virgifera zeae Krysan & Smith	CROP	0.68
Thecaphora solani (Thirumulachar & O'Brien) Mordue	CROP	0.63
Choristoneura fumiferana Clemens	FORESTRY	0.59

Source: own elaboration

Figure 3. Pest ranking following the composite indicators and their components for invasiveness and host value (above) and host area (below). Red dots signal pests assessed in in 2019 (Sánchez et al. 2019).

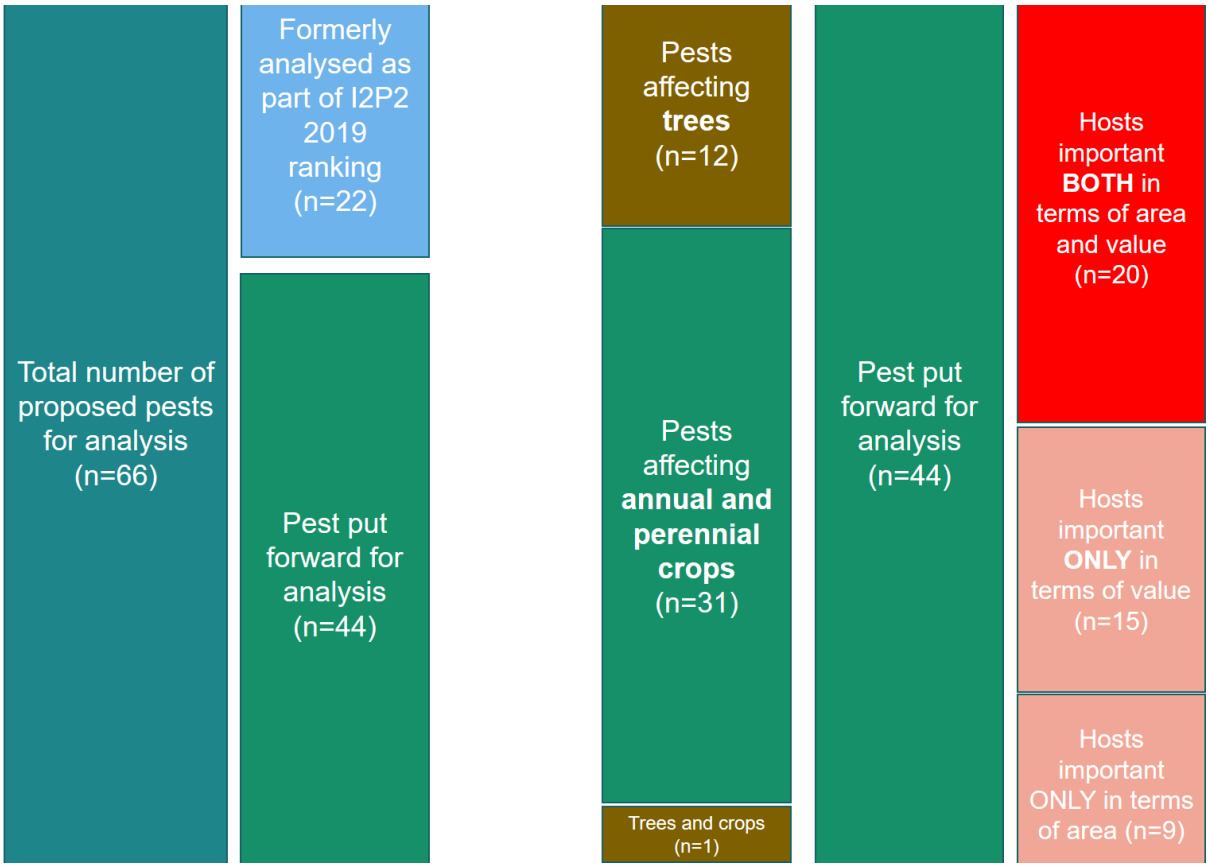
Source: own elaboration

3.1.4. Selection of pests for analysis based on the shortlisting step

Based on the analysis of the invasiveness, production value and cultivated area at risk for hosts with major impact, the JRC delivered a complete ranking of pests based on the potential impact in the EU. To make this ranking more useful, a sub-set containing the top-50 highest ranked pests (by the composite indicators) in the scenario of invasiveness and host value as well as invasiveness and host area, respectively was identified. This ranking and subset was then used by risk managers as information to select pests that would be subject to in-depth analysis.

The pest-type of the sub-set of 66 pests was determined by the hosts identified that could be matched to crop- and/or forestry-data. Using the classification put forward in the 2019 assessment, the subset comprises 3 agroforestry-, 43 crop-, and 18 forestry-pests. Notably, the subset includes 20 out of the 28 organisms originally put forward by MS for the assessment in 2019. This underscores the fact that very relevant pests have previously been selected. Of the 44 pests in the sub-set that were not analysed in 2019 we identify 1 agroforestry, 31 crop-, and 12 forestry-pests. The distribution of pests between these categories is represented in **Figure 4**. Out of these 44 organisms, 20 are in the top-50 in both scenarios, 15 are in the top-50 of the value-scenario but not in the area-scenario, and 9 are in the top-50 of the area-scenario but not the value-scenario.

Figure 4. Distribution of selected pests between different classifications of pests.



Note: Candidatus Liberibacter was previously analyzed as spp. but now split into spp. asiaticus, africanus, and americanus. Hence, the 20 previously analyzed pests correspond to 22 observations.

Source: own elaboration.

These results were presented and discussed at the Standing Committee for Plants, Animals, Food and Feed (PAFF) during its meeting of 20th November 2023. In this presentation the JRC suggested that independently of whether they belong to this sub-set or not, the 28 previously analysed pests were kept throughout the analysis and ranking alongside the other UQP to assess the consistency of the approach with the previous selection of UQP. In addition, it was argued that pests that were ranked in the top-50 in both scenarios should be given more attention as the results are more robust.

Based on the discussions following the meeting it was agreed that 46 pests would be fully assessed or re-assessed. Arguments put forward to justify the shortlisting of 46 pests related to low risk of introduction, difficulty on diagnostic differentiation, current control system for the pest fit for purpose, pest in process of re-classification as Regulated Non-Quarantine Pests or pest being already widely present in the EU, as well as time and resource constraints.

The 46 pests that are subject to assessment in this report include 23 out of the 28 pests evaluated in 2019 (all but *Tiletia indica, Grapevine flavescence dorée phythoplsma, Synchytrium endobioticum, Clavibacter sepedonicus* and *Ralstonia solanacearum*); and 23 pests from the 44 which ranked highest in the shortlisting process. These latter group included 13 pests affecting crops and 10 affecting trees. The list of pests assessed only in the 2024 exercise is presented in **Table 13** .

Table 13. Union Quarantine Pests not previously assessed selected for full assessment not by type of hosts they affect.

Pest name	Affecting crop hosts	Affecting trees
Listronotus bonariensis	X	
Spodoptera litura	X	
Ralstonia pseudosolanacearum	X	
Porphyrophora tritici	X	
Helicoverpa zea	X	
Diabrotica undecimpunctata howardi	X	
Prodiplosis longifila	X	
Phymatotrichopsis omnivora	X	
Acleris minuta	X	
Choristoneura parallela	X	
Keiferia lycopersicella	X	
Diabrotica virgifera zeae	X	
Nepovirus myrtilli	X	
Choristoneura fumiferana		X
Polygraphus proximus		X
Pissodes strobi		X
Pissodes nemorensis		X
Pseudocercospora pini-densiflorae		X
Pissodes nitidus		X
Arrhenodes minutus		X
Acleris semipurpurana		X
Pissodes terminalis		X
Pissodes yunnanensis		X

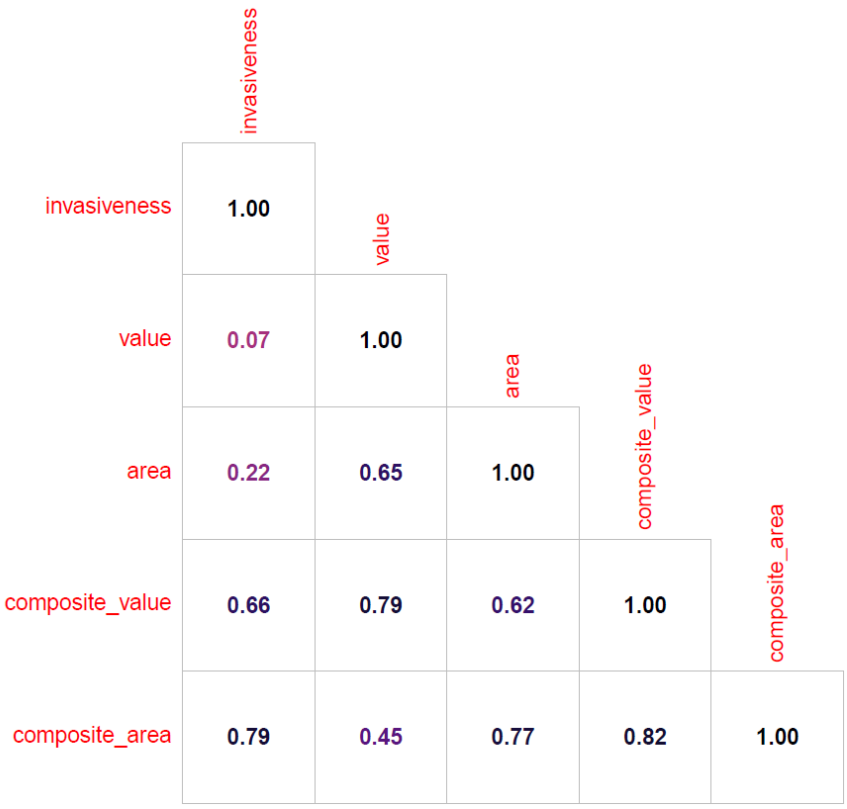
Source: own elaboration

3.1.5. Correlation analysis of the shortlisting indicators

In order to assess the relevance of the ranking based on the simplified impact indicator we take advantage of the fact that for the 28 pests analyzed in 2019 we have both the scores of the full-fledged I2P2 and of this simplified methodology. For these 28 pests, the correlation of the host production value and the full I2P2 is 0.68 indicating a considerable consistency of this simplified analysis with the full assessment and the low risk of neglecting the nature of the impact leading to a host to be declared in the data sources when calculating the shortlisting indicator.

As indicated in Figure 5, the invasiveness score was weakly correlated with host information on value and area (0.07 and 0.22, respectively), which indicates that different aspects are captured in the composite indices. The invasiveness is moderately to highly correlated with the overall composite indices (0.66 and 0.79 for the scenario on value and area, respectively); stressing the importance of the scores derived by EFSA for the final pest ranking. The host value and area are moderately correlated (0.65), which speaks for the importance of some high-value crops that are cultivated on a relatively small share of the agricultural land. In turn, a dual assessment on value and area is called for to capture this diversity in potential impacts.

Figure 5. Correlation of invasiveness, host value, host area, and the composite indicators.

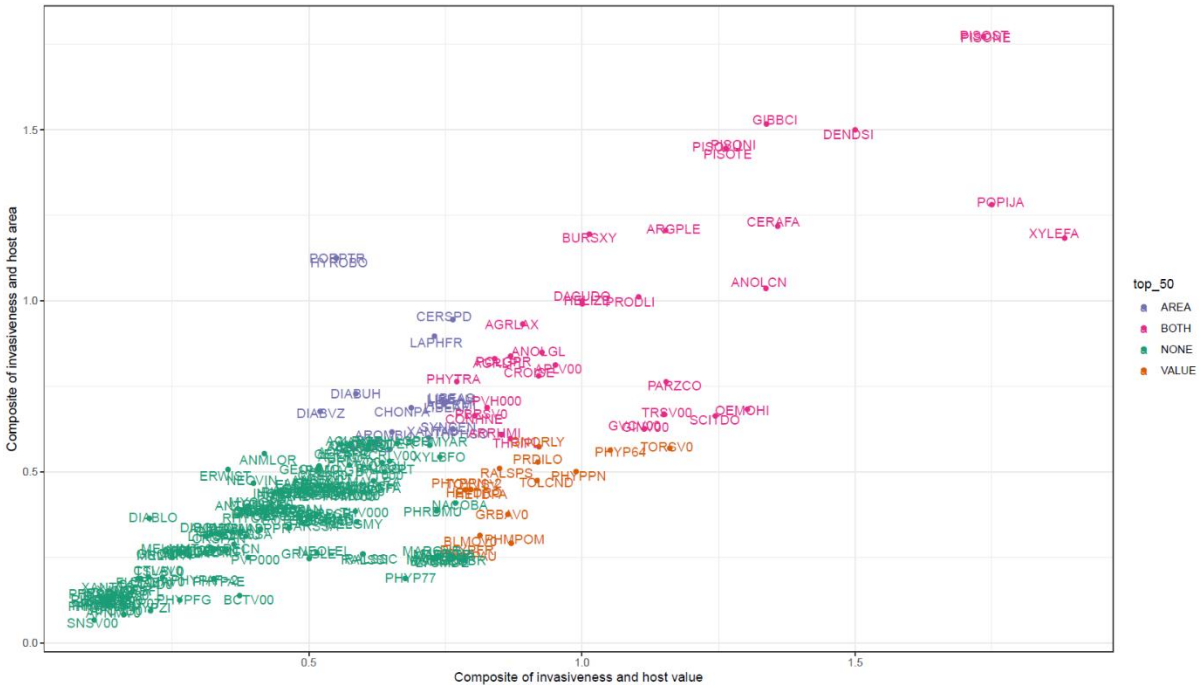


Source: own elaboration

The two composite indices are highly correlated (0.82), which points to consistency and overlap in the pest ranking that can be utilized in prioritizing by emphasizing pests that affect hosts that are important in both area and valueFigure 6. Figure 6 provides a visual representation of the information presented in the Table 10 to Table 12. The graph illustrates the strong correlation between the two composite indicators, while depicting the different groups of pests that may be considered. The pests coloured in pink fall into the top-50 in both scenarios and are therefore

robust candidates for the full assessment. The subset under consideration may be expanded by the pests colored in purple and orange, which are pests that are particularly relevant when taking host area and host value into account, respectively.

Figure 6. Correlation of the two composite indices.



Source Own elaboration

3.2. I2P2 results

In the following sections, the updated I2P2 results and pest ranking are presented, and insights on the robustness with regards to the biological parameters are provided by comparing the I2P2 scores for different quantiles of the by EFSA elicited parameters (see Annex 4). The subsequent section discusses the stochastic simulations of different weighting schemes to assess the highest rank a given pest may achieve, if all possible weighting schemes are considered. The final section provides insights on which domains contributed to the pests' overall I2P2 score to shed light on the expected impacts.

3.2.1. Robustness check: Comparison of the ranking for the pests that were evaluated using I2P2 in 2019 and 2024.

The first robustness check we make for our rankings is to see how the pests that have been evaluated using both version of the I2P2 differ across them. The 2019 scores and rankings, along with the 2024 scores and rankings for the pests included in both assessments, are provided in **Table 14**. It is important to note that continuous scores are generally computed as a relative measure (they are built normalising score which is affected by what pests are evaluated); consequently, the scores themselves lack inherent meaning. However, the derived rankings are directly comparable across the two assessments.

Table 14. Comparison of the previous and new I2P2 scores for the subset of pests previously assessed.

Pest affecting...	Pest	Previous Score	Previous Rank	New Score	New Rank
Agroforestry	*Anoplophora chinensis*	0.75	1	0.51	1
	Aromia bungii	0.25	2	0.38	2
Crops	*Xylella fastidiosa*	0.79	1	0.66	1
	Popillia japonica	0.49	2	0.42	2
	Thaumatotibia leucotreta	0.45	3	0.31	3
	Candidatus Liberibacter spp., associated with HLB	0.37	4	0.29	4
	Conotrachelus nenuphar	0.31	5	0.24	5
	Spodoptera frugiperda	0.21	9	0.22	6
	Phyllosticta citricarpa	0.11	17	0.20	7
	Anthonomus eugenii	0.28	6	0.20	8
	Bactrocera zonata	0.18	12	0.19	9
	Bactericera cockerelli	0.25	7	0.18	10
	Bactrocera dorsalis	0.20	10	0.18	11
	Rhagoletis pomonella	0.25	8	0.17	12
	Thrips palmi	0.18	14	0.15	13
	Xanthomonas citri	0.12	16	0.15	14
	Anastrepha ludens	0.18	11	0.14	15
Forestry	*Dendrolimus sibiricus*	0.29	3	0.55	1
	Agrilus anxius	0.40	2	0.40	2
	Anoplophora glabripennis	0.55	1	0.25	3
	Agrilus planipennis	0.27	5	0.22	4
	Bursaphelenchus xylophilus	0.27	4	0.12	5
	Bretziella fagacearum	0.10	6	0.10	6

Source: own elaboration

For pests affecting trees and crops, the two pests under evaluation maintained their original rankings. However, this is not the case for pests affecting crops and pests affecting trees. Changes in ranking can be attributed to the updates in terms of the data used (the host list, the biological parameters provided by EFSA, and changes in production and trade patterns for agricultural and forestry products), the modification of the I2P2 model.

For the pests affecting crops, the first five remained unaltered, while the subsequent pests underwent changes to their rankings. Exploring what drives this change for the pests that have raised in the ranking, we can see that, *Spodoptera frugiperda*, which ascends from position 9 to position 6, in the new EKE conducted by EFSA has additional species as potential hosts, the pest is now considered to be able to produce mycotoxins and the number of countries with which the EU trades has expanded. However, overall the new results largely reproduce the previous prioritisation of pests. This leads to an increased value for the production impacts, trade impacts and food

security subdomains of I2P2 where these parameters are used. For *Phyllosticta citricarpa*, which ascends from position 17 to position 7, we see that this move upwards is driven by an increase in the yield loss parameter reported by EFSA that is used in multiple indicators, a case that is repeated for *Bactrocera zonata*, which moves up from position 12 to position 9.

As regards pests that have fallen in the ranking, besides the fact that the 3 pests discussed above have now higher values we can see that there is either a reduction in the hosts for which impacts are calculated (*Anastrepha ludens, Bactericera cockerellii*), decrease in the yield losses reported (*Authonomus eugenii, Bactericera cockerelli)* or reductions in the lag phase and expansion rate (*Anthonomus eugenii).*

The changes in the ranking of pests affecting trees are driven by the fact that we include new indicators and the weights for the social domain change rather than by the fact that new evidence is provided in the EKEs carried out by EFSA.

3.2.2. Pest Ranking

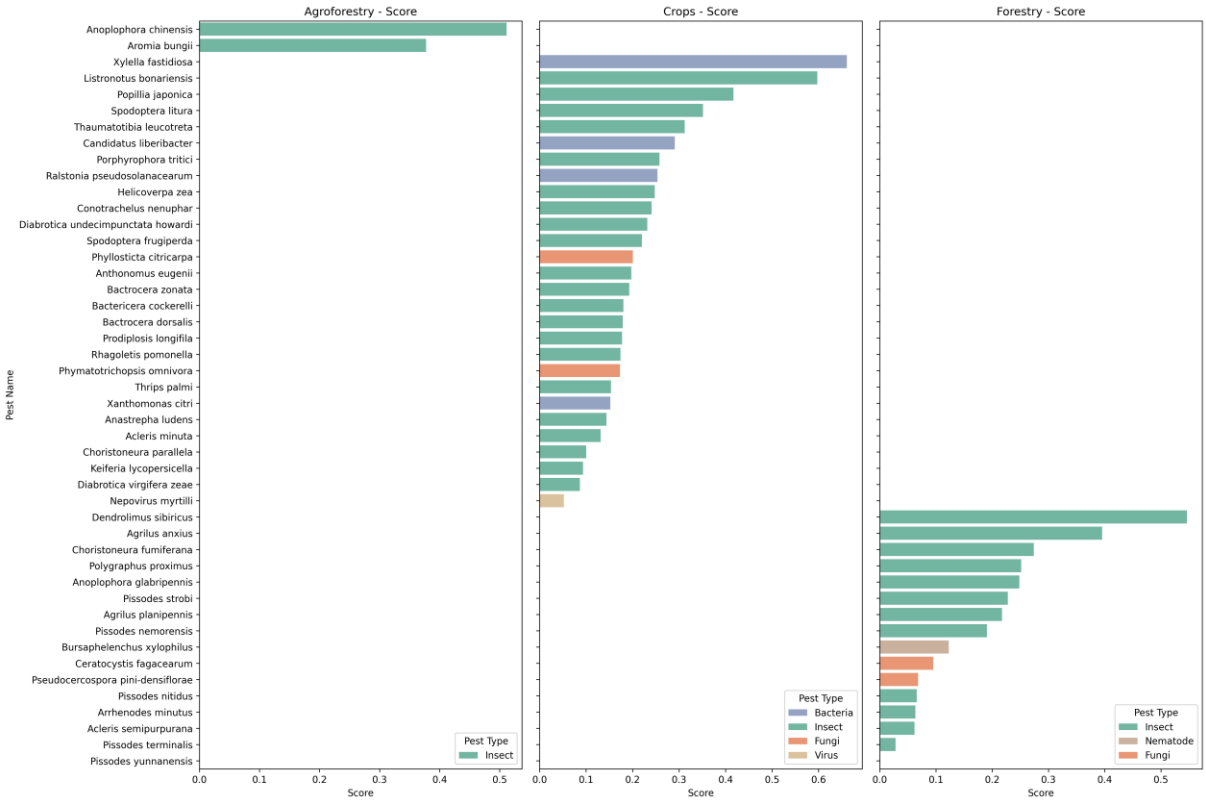
In this section, the I2P2 scores and the results for each domain are presented. The reference computation utilised the 50th percentile (Q50) of the biological parameters that were elicited by EFSA. Furthermore, scenarios were computed using the 25th and 75th percentiles (Q25 and Q75), and changes in the scores relative to the Q50 results are visualised in Annex 4.

Figure 7, as well as **Table 15** and **Table 16**, show the I2P2 score by host type. It is imperative to note that these scores are inherently relative measures, which precludes the possibility of direct comparison across diverse host types. To illustrate, a score of 0.6 in the context of agroforestry does not inherently signify a greater impact in comparison to a score of 0.5 in the domain of crops. Consequently, comparative analyses of pests are undertaken exclusively within the confines of a specific host type.

In the context of crop pests, *Xyella fastidiosa* is confirmed as the primary threat maintaining the highest position that it obtained in the 2019 assessment also in this one. Second, *Listronotus bonariensis* has emerged as a pest with potential significant impact. It is noteworthy that permanent grassland serves as a host for *Listronotus bonariensis*. However, due to the lack of systematic economic data concerning the production of grassland, this host was not considered in the assessment. Robustness checks suggest that if grassland were to be included, *Listronotus bonariensis* would likely rank first (data available upon request). Following these two pests, there is a considerable drop-off in the I2P2 scores for the remaining pests; while these two pests get a score above 0.6, the next pest (*Popillia japonica*) score is 33% lower (0.4). For forestry pests, *Dendrolimus sibiricus* was found to rank first, with a considerable distance in the I2P2 score to the second place *Agrilus anxius*. For both groups of pests, the ranking also clearly identifies one pest which obtains a significantly lower score (*Nepovirus myrtilli* and *Pissodes yunnanensis* respectively).

However, for both pests affecting crops and trees, those ranked in central positions are generally close in their I2P2 scores. In other words, the I2P2 provides actionable information at the high and low end of the distribution but less so for its central part. This reduces the capacity of the I2P2 to discriminate between this group of pests and call for risk managers to take into consideration other aspects of the pest when deciding which pests are selected for inclusion on the list of priority pests.

Figure 7. I2P2 ranking under median values for the biological parameters.



Source Own elaboration

Table 15. I2P2 ranking of crop pests under median values for the biological parameters.

Pest	I2P2 score	Rank
Xylella fastidiosa	0.66	1
Listronotus bonariensis	0.60	2
Popillia japonica	0.42	3
Spodoptera litura	0.35	4
Thaumatotibia leucotreta	0.31	5
Candidatus Liberibacter spp., associated with HLB	0.29	6
Porphyrophora tritici	0.26	7
Ralstonia pseudosolanacearum	0.25	8
Helicoverpa zea	0.25	9
Conotrachelus nenuphar	0.24	10
Diabrotica undecimpunctata howardi	0.23	11
Spodoptera frugiperda	0.22	12
Phyllosticta citricarpa	0.20	13
Anthonomus eugenii	0.20	14
Bactrocera zonata	0.19	15
Bactericera cockerelli	0.18	16
Bactrocera dorsalis	0.18	17
Prodiplosis longifila	0.18	18
Rhagoletis pomonella	0.17	19
Phymatotrichopsis omnivora	0.17	20
Thrips palmi	0.15	21
Xanthomonas citri	0.15	22
Anastrepha ludens	0.14	23
Acleris minuta	0.13	24
Choristoneura parallela	0.10	25
Keiferia lycopersicella	0.09	26
Diabrotica virgifera zeae	0.09	27
Nepovirus myrtilli	0.05	28

Source: own elaboration

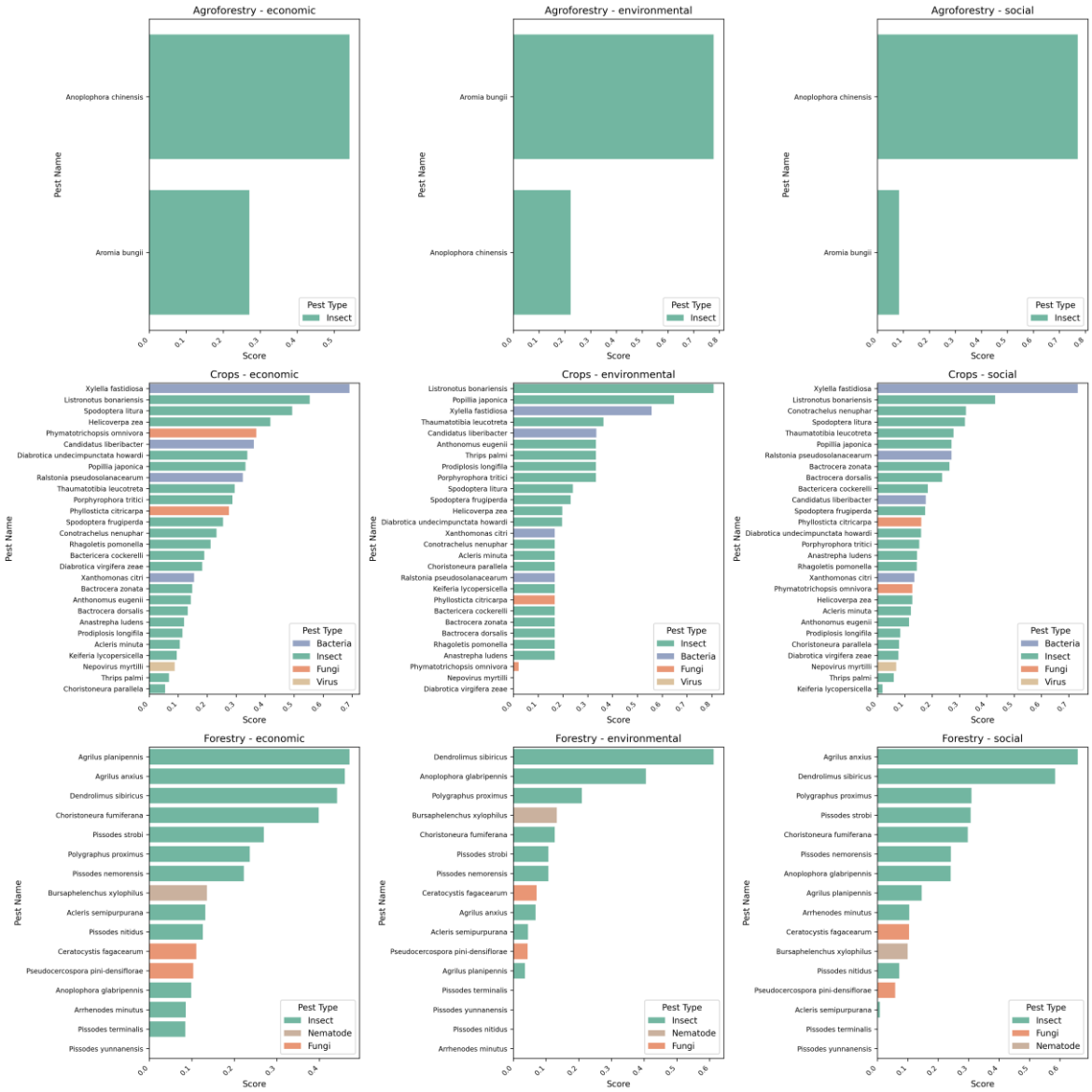
Table 16. I2P2 ranking of forestry pests under median values for the biological parameters.

Pest	I2P2 score	rank
Dendrolimus sibiricus	0.55	1
Agrilus anxius	0.40	2
Choristoneura fumiferana	0.27	3
Polygraphus proximus	0.25	4
Anoplophora glabripennis	0.25	5
Pissodes strobi	0.23	6
Agrilus planipennis	0.22	7
Pissodes nemorensis	0.19	8
Bursaphelenchus xylophilus	0.12	9
Bretziella fagacearum	0.10	10
Pseudocercospora pini-densiflorae	0.07	11
Pissodes nitidus	0.07	12
Arrhenodes minutus	0.06	13
Acleris semipurpurana	0.06	14
Pissodes terminalis	0.03	15
Pissodes yunnanensis	0.00	16

Source: own elaboration

Figure 8 decomposes the scores presented above into the three main domains. This allows insights on pest rankings with regards to their economic, social, and environmental impacts only. For example, in the case of agroforestry *Aromia bungii* is suggested to cause considerable environmental impact relative to *Anoplophora chinesis.* However, economic and social impacts are expected to be considerably higher for the latter.

Figure 8. I2P2 domain scores under median values for the biological parameters.



Source Own elaboration

Similar changes in ranking are observable for crop and forestry pests as well. For example, for crop pests *Listronotus bonariensis* and *Popillia japonica* are expected to outrank *Xylella fastidiosa* in terms of environmental impact, but not with regards to economic and social impacts. For forestry pests, *Dendrolimus sibiricus* is expected to cause considerable environmental impact, the second highest social impact, but in terms of economic impact the pest drops to position three following *Agrilus planipennis* and *Agrilus anxius*. In the centre positions, alternations in the pest rankings was even more pronounced for both crop and forestry pests.

These main results were produced under an equal weighting scheme, which was judged to best reflect the legislative text and risk managers' unbiased preferences. Given the differences in domain-specific rankings, we can expect considerable influence of the employed weighting scheme on the final pest ranking. This underscores the importance of the stochastic results presented below, which investigate the robustness of pests' rank over a diversity of weighting schemes.

The inherent uncertainty on the biological parameter was taken into account by computing the I2P2 scores for the Q25 and Q75 values. In Annex 4, shows the I2P2 scores for the Q25 scenario (a) as well as the differences in scores relative to the Q50 scenario (b). For agroforestry, no changes in ranking was observed and hence the changes were omitted from the figure to improve readability. For crop pests, the reduction in the percentiles of the biological parameter caused the highest increase in the I2P2 score for *Spodoptera litura* and the highest decrease for *Xylella fastidiosa.* However, the magnitude of these changes [-0.01, 0.04] was generally minor and in turn resulted in little to no change in the pest ranking. For forestry pests, the reduction in the percentiles of the biological parameter caused the highest increase in the I2P2 score for *Dendrolimus sibiricus* and the highest decrease for *Agrilus anxius.* In terms of magnitude, the change from Q50 to Q25 was sizable in terms of the I2P2 score but negliable in terms of the final ranking of pests.

Annex 4 also shows the I2P2 scores for the Q75 scenario (a) as well as the differences in scores relative to the Q50 scenario (b). For agroforestry, again no changes in ranking was observed and hence the changes were omitted from the figure to improve readability. For crop pests, the reduction in the percentiles of the biological parameter caused the highest increase in the I2P2 score for Xylella fastidiosa and the highest decrease for Rhagoletis pomonella. However, the magnitude of these changes [-0.015, 0.015] was again minor and in turn resulted in little to no change in the pest ranking (see **Table 17** and **Table 18**). For forestry pests, the reduction in the percentiles of the biological parameter caused the highest increase in the I2P2 score for *Agrilus anxius* and the highest decrease for *Dendrolimus sibiricus.* In terms of magnitude, the change from Q50 to Q25 was considerable in terms of the I2P2 score. While the pest ranking was robust, the Q75 values increased the distance of *Dendrolimus sibiricus* to the second place and resulted in very comparable scores for *Agrilus anxius, Choristoneura fumiferana, Polygraphus Proximus*, and *Anoplophora glabripennis.*

Table 17. Ranking under different quantiles for EFSA elicited biological parameters for crop pests.

Pest	Rank Q25	Rank Q50	Rank Q75	Rank change Q50-Q25	Rank change Q50-Q75
Xylella fastidiosa	1	1	1	0	0
Listronotus bonariensis	2	2	2	0	0
Popillia japonica	3	3	3	0	0
Spodoptera litura	4	4	4	0	0
Thaumatotibia leucotreta	5	5	5	0	0
Candidatus Liberibacter spp., associated with HLB	6	6	6	0	0
Porphyrophora tritici	7	7	7	0	0
Ralstonia pseudosolanacearum	8	8	10	0	-2
Helicoverpa zea	9	9	8	0	1
Conotrachelus nenuphar	10	10	9	0	1
Spodoptera frugiperda	11	12	12	1	0
Diabrotica undecimpunctata howardi	12	11	11	-1	0
Phyllosticta citricarpa	13	13	14	0	-1
Bactrocera zonata	14	15	15	1	0
Anthonomus eugenii	15	14	13	-1	1
Prodiplosis longifila	16	18	19	2	-1
Bactrocera dorsalis	17	17	17	0	0
Bactericera cockerelli	18	16	18	-2	-2
Phymatotrichopsis omnivora	19	20	20	1	0
Thrips palmi	20	21	22	1	-1
Rhagoletis pomonella	21	19	16	-2	3
Xanthomonas citri	22	22	21	0	1
Anastrepha ludens	23	23	23	0	0
Acleris minuta	24	24	24	0	0
Choristoneura parallela	25	25	25	0	0
Diabrotica virgifera zeae	26	27	27	1	0
Keiferia lycopersicella	27	26	26	-1	0
Nepovirus myrtilli	28	28	28	0	0

Source: own elaboration

Table 18. Ranking under different quantiles for EFSA elicited biological parameters for forestry pests.

Pest	Rank Q25	Rank Q50	Rank Q75	Rank change Q50-Q25	Rank change Q50-Q75
Dendrolimus sibiricus	1	1	1	0	0
Agrilus anxius	2	2	2	0	0
Choristoneura fumiferana	3	3	3	0	0
Anoplophora glabripennis	4	5	5	1	0
Agrilus planipennis	5	7	7	2	0
Polygraphus proximus	6	4	4	-2	0
Pissodes strobi	7	6	6	-1	0
Pissodes nemorensis	8	8	8	0	0
Bursaphelenchus xylophilus	9	9	9	0	0
Bretziella fagacearum	10	10	10	0	0
Pseudocercospora pini-densiflorae	11	11	12	0	-1
Arrhenodes minutus	12	13	14	1	-1
Pissodes nitidus	13	12	13	-1	-1
Acleris semipurpurana	14	14	11	0	3
Pissodes terminalis	15	15	15	0	0
Pissodes yunnanensis	16	16	16	0	0

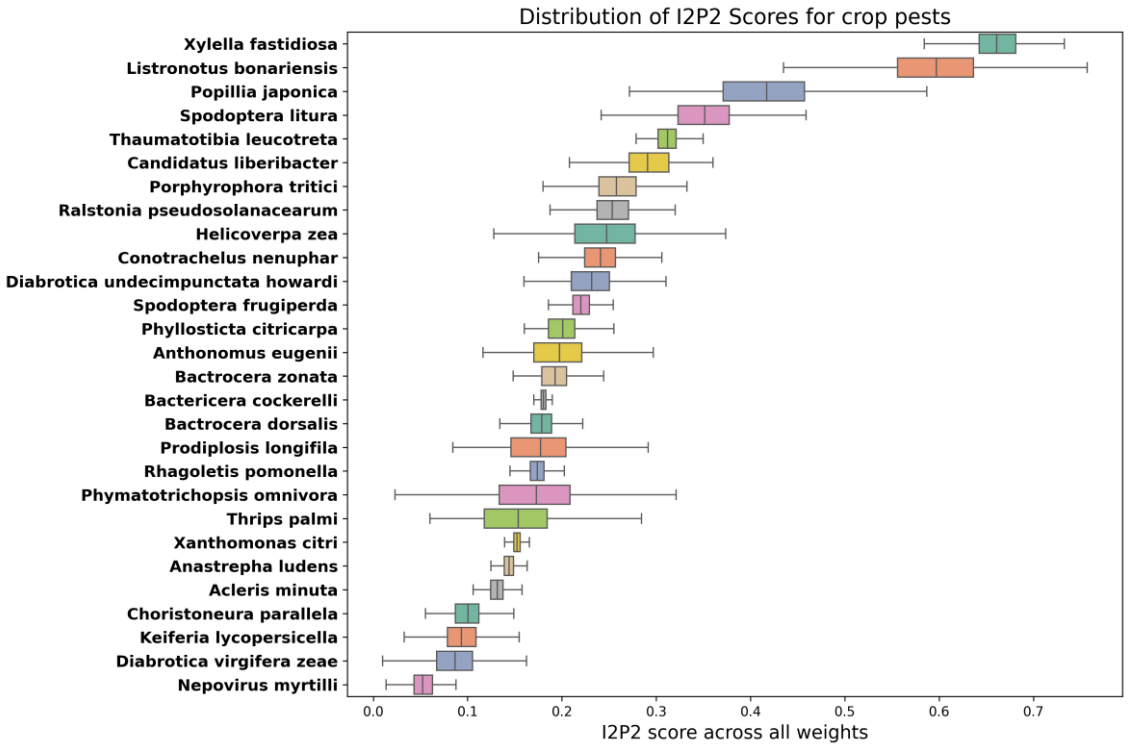
Source: own elaboration

3.2.3. Weight-Dependent Uncertainty of Pest Rankings

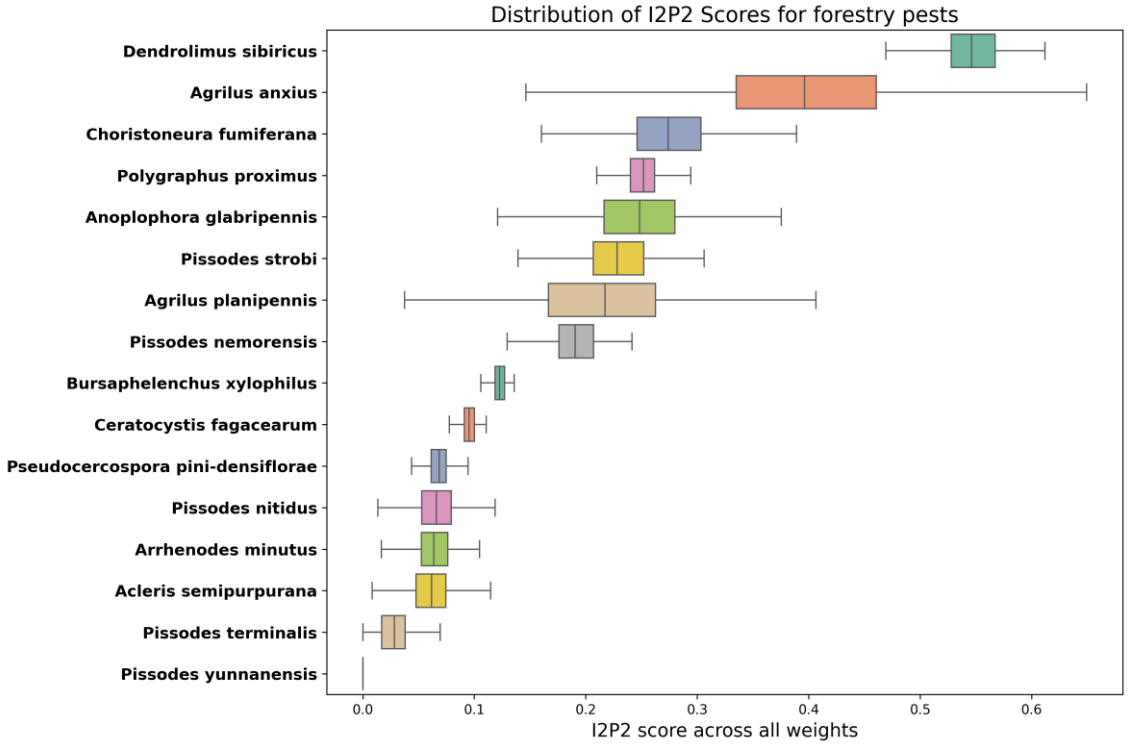
An inherent property of multi-criteria assessment models is an aggregation step to derive a composite indicator, such as the I2P2 score. This aggregation is most commonly done in a weighted fashion, whereby the weights are intended to capture the preferences of the risk managers. To look further into the differentiated effect across the three domains we conducted a stochastic analysis with regards to weights at the domain level. The main results presented so far were obtained through the implementation of a deterministic version of the I2P2 which follows the agreed equal weighting scheme as this was deemed to most accurately reflect the legislative text and the impartial preferences of the risk managers, thereby valuing the exclusion of any potential impacts across all dimensions. However, given the observed discrepancies in domain-specific rankings, it can be anticipated that the employed weighting scheme will exert an influence on the final ranking of pests. This underscores the significance of the stochastic results that are presented below, which investigate the robustness of pests' rank when subjected to a variety of weighting schemes.

As the weighting of importance in different impacts is inherently subjective, and stakeholders may feel that the equal weighting approach fails to underscore aspects that are critically important to them. To address this shortcoming, a simulation approach was employed to compute I2P2 scores for all pests under different weighting schemes. Latin Hypercube sampling was performed to sample out of the possible range [0, 1] for each weight. Subsequently, combinations of weights were assessed, and the distribution of I2P2 scores across tens of thousands of evaluations was visualised in Figure 9. In this figure, different domain weights (i.e. economic, social, and environmental) were simulated and the distribution of I2P2 scores plotted. Additional data in which all sub-domain weights were simulated is available upon request to the authors.

Figure 9. Distribution of I2P2 scores for the stochastic simulation of domain weights.



(a)



(b)

Source Own elaboration

The overall ranking of pests was found to be consistent; however, as evidenced by the whiskers of the boxplots, there was a considerable overlap of scores, particularly in the centre positions. In other words, there were likely to be weighting schemes in which, for example, *Popillia japonica* fell below *Spodoptera litura*. **Figure 8** provides further insights in this regard. It is evident from **Figure 8** that *Spodoptera litura* is ranked higher in terms of economic and social impacts in comparison to *Popillia japonica*, while the latter is considerably more impactful in the environmental domain. Consequently, under the preferences of risk managers who prioritise economic and/or social aspects over environmental ones, *Spodoptera litura* would likely be ranked above *Popillia japonica*.

An additional piece of information that can be deduced from these distributions is the degree of multi-dimensionality in the anticipated impacts of the pests. For instance, the distribution of I2P2 scores across all possible weighting schemes for *Xylella fastidiosa* is comparatively narrow in comparison to that of other pests. This is attributable to the fact that *X. fastidiosa* scored highly in all domains (cf. **Figure 8**), and variation in the weighting did not have a significant effect on the overall I2P2 score. By contrast, the distribution of I2P2 scores for *Popillia japonica* is relatively wide. This is because *Popillia japonica* scored highly only in the environmental domain and was placed in a centre position for economic and social impacts (cf. **Figure 8**). Consequently, the final I2P2 score for *Popillia japonica* is contingent on the weighting scheme, with higher scores if the environmental domain is prioritised and lower scores if the economic and/or social domain are considered more important.

To better understand the impact of alternative weights on the ranking provided we calculated the highest rank each pest was able to achieve across all possible weighting schemes simulated. Rankings are computed using the same weight structure for all pests and assuring that the sum of the three domains is kept at 100.

This highest rank achieved by each pest is presented in **Table 19** and **Table 20**. Evidently, the highest ranked pests remain at the top with *Xylella fastidiosa* and *Listronotus bonariensis* both having weighting schemes that led to them ranking in first position. However, in other cases the choice of weights (i.e. the importance risk managers want to give to each domain) does have an impact in the ranking.

For example *Conotrachelus nenufar*is ranked in tenth position under equal weighting across impact domains, but when looking at the ranking by domain (Figure 8) one can see that for the social domain this pest comes 3rd. In turn, if risk managers would consider that social impacts should be taken more into account than economic or environmental (i.e. weight for social domain should be considerably higher than for the other two), the pest could rank higher (the highest ranking it could achieve would be 3rd)[7]. In other words, Table 19 and 9 take a worst-case scenario for each individual pest and suggest the maximum ranking it could achieve if more importance would be given to its main impact domain(s). In doing so, we provide a weight-free prioritization of impacts.

[7] This ranking is achieved when **all** pests are evaluated using the same weighting scheme. However, the weighting scheme that leads to the highest ranking is not the same for all pests.

Table 19. Maximum I2P2 rank across all weighting schemes for crop pests.

Pest	Maximum rank across all weighting schemes
Listronotus bonariensis	1
Xylella fastidiosa	1
Popillia japonica	2
Conotrachelus nenuphar	3
Spodoptera litura	3
Candidatus Liberibacter spp., associated with HLB	4
Helicoverpa zea	4
Thaumatotibia leucotreta	4
Phymatotrichopsis omnivora	5
Ralstonia pseudosolanacearum	5
Porphyrophora tritici	6
Anthonomus eugenii	7
Diabrotica undecimpunctata howardi	7
Bactrocera zonata	8
Prodiplosis longifila	8
Bactrocera dorsalis	9
Thrips palmi	9
Bactericera cockerelli	10
Spodoptera frugiperda	10
Phyllosticta citricarpa	12
Rhagoletis pomonella	15
Anastrepha ludens	16
Diabrotica virgifera zeae	17
Xanthomonas citri	18
Acleris minuta	21
Choristoneura parallela	24
Keiferia lycopersicella	24
Nepovirus myrtilli	25

Source: own elaboration

Table 20. Maximum I2P2 rank across all weighting schemes for forestry pests.

Pest	Maximum rank across all weighting schemes
Agrilus anxius	1
Agrilus planipennis	1
Dendrolimus sibiricus	1
Anoplophora glabripennis	2
Choristoneura fumiferana	2
Polygraphus proximus	3
Bursaphelenchus xylophilus	4
Pissodes strobi	4
Pissodes nemorensis	6
Bretziella fagacearum	9
Pissodes nitidus	9
Acleris semipurpurana	9
Arrhenodes minutus	9
Pseudocercospora pini-densiflorae	10
Pissodes terminalis	15
Pissodes yunnanensis	16

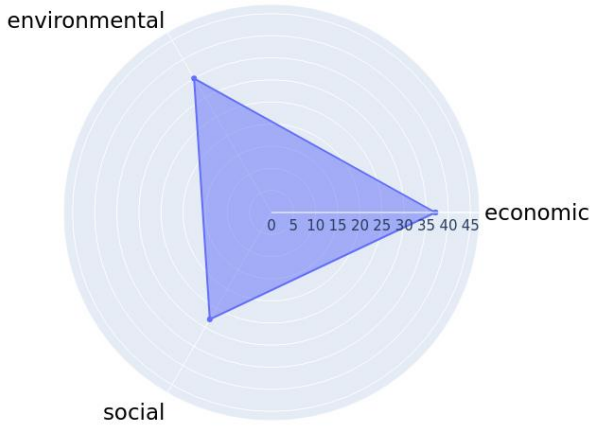
Source: own elaboration

3.2.4. Domain contribution to the Pests' Scores

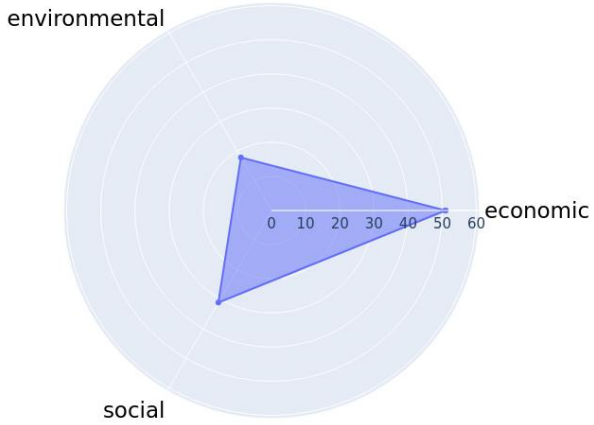
A multi-criteria analysis offers the advantage of transparency in how complex problems (i.e. different impact domains) contribute to an overall index. It is argued that risk managers should be informed about the factors that influence a pest's overall score and rank, in order to facilitate informed discussion about which aspects are at risk if a given pest were to invade the territory. As outlined in section 2.2, the I2P2 model is a hierarchical aggregation from indicators to sub-domains, from sub-domains to domains, and from domains to the I2P2 score. In the following subsection, the contribution of domain scores to the overall I2P2 score is briefly considered. The focus on domain contributions to the overall score strikes a balance between the level of available details and the ease with which the presented data can be understood. In principle, a similar assessment of contributions to the overall score is available for each of the indicators and for the sub-domains. The decomposition of driving sub-domains is available for each pest in Annex 5.

Figure 10 presents the mean domain contributions across pests as a percentage of the total I2P2 score for crop and forestry pests. The spider graph demonstrates the various domains located on the periphery of the circle, along with their respective percentage contributions as data points. On average, across crop pests, the economic and environmental domains contribute around 35% of the total I2P2 score, respectively. Following this, impacts in the social domain account for around 30%. For forestry pests, the economic and social domains contribute around 50% and 30%, respectively. The environmental domain accounts for around 20%. While this might be counter-intuitive, one should note that the contribution depends both on the importance of the impact and the dispersion of that impact across pests. The latter being key due to the normalization process undertaken. This is brought to light when we explore the contribution of domains to the total I2P2 score for individual pests.

Figure 10. Average domain contribution (%) to the overall I2P2 score for crop (a) and forestry (b) pests.



(a)



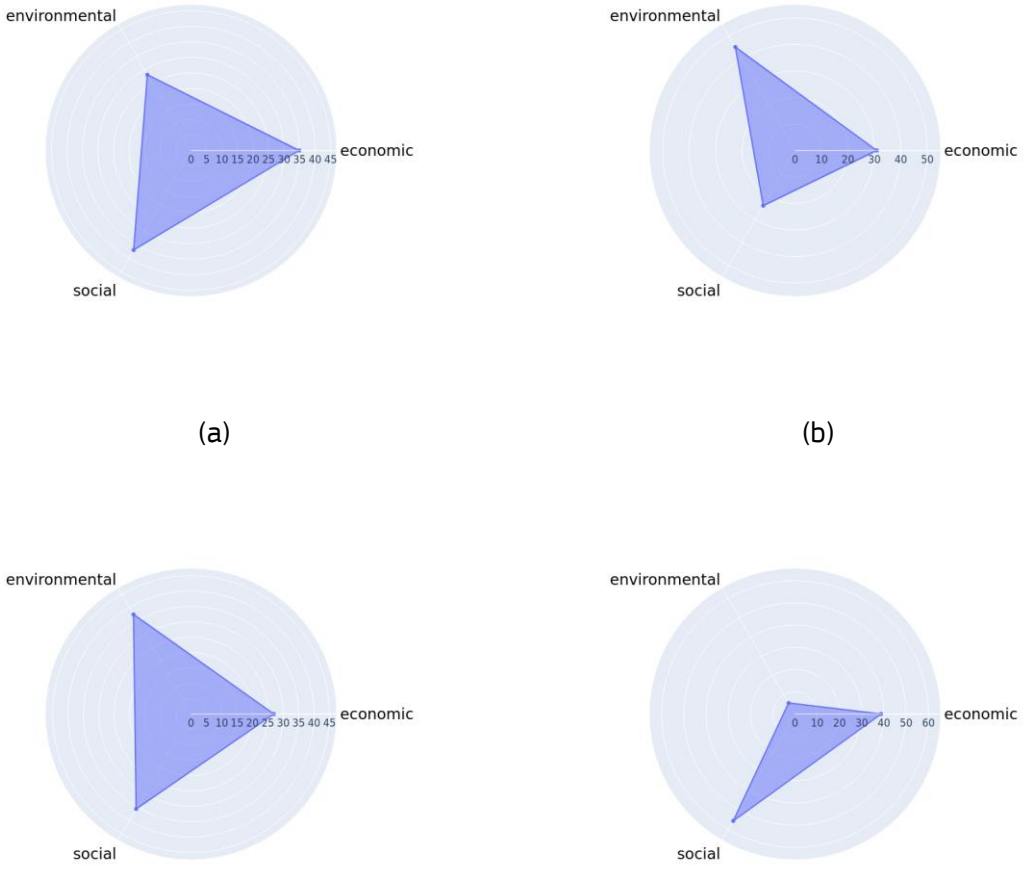
(b)

Source Own elaboration

Figure 11 exemplifies these results for the top crop and forestry pests which have the highest I2P2 score. For crop pests, we can see that for *Xylella fastidiosa*, the domain contributions were fairly spread with a slightly larger contribution of social and economic aspects. Conversely, for *Listronotus bonariensis*, the impact was largely driven by environmental concerns determining over 40% of the I2P2 score, followed by economic impacts with around 30% contribution to the overall I2P2 score. If we move to pests affecting trees, for *Dendrolimus sibiricus*, the main contribution came from the social and environmental impacts with over 35%. On the other hand, for *Agrilus anxius*, main contributions came from the social domain with over 50%, followed by economic impacts with around 40%. These results highlight the diversity in impacts captured across the different pests evaluated, and consequently the methodological advantages of I2P2.

Analogous evaluations could be conducted at the indicator- or sub-domain level. However, the domain level offers the most value in terms of the information gained relative to the complexity. Nonetheless, Annex 5 holds pest fact sheets for each pest. Among other information, we show all indicator values in a non-normalized fashion, as well as the by EFSA elicited parameter values, evaluated hosts, and the contributions of domain- and sub-domain scores to the overall scores.

Figure 11. Domain contribution (%) to the overall I2P2 score for the top two crop (*Xylella fastidiosa* a & *Listronotus bonariensis* b) and forestry (*Dendrolimus sibiricus* c & *Agrilus anxius* d) pests.



Source Own elaboration

Details of the pest specific indicators can found in individual pest-fiches presented in Annex 5 or accessed on-line the Qlik visualization accompanying this report and accessible online.

4. Discussion

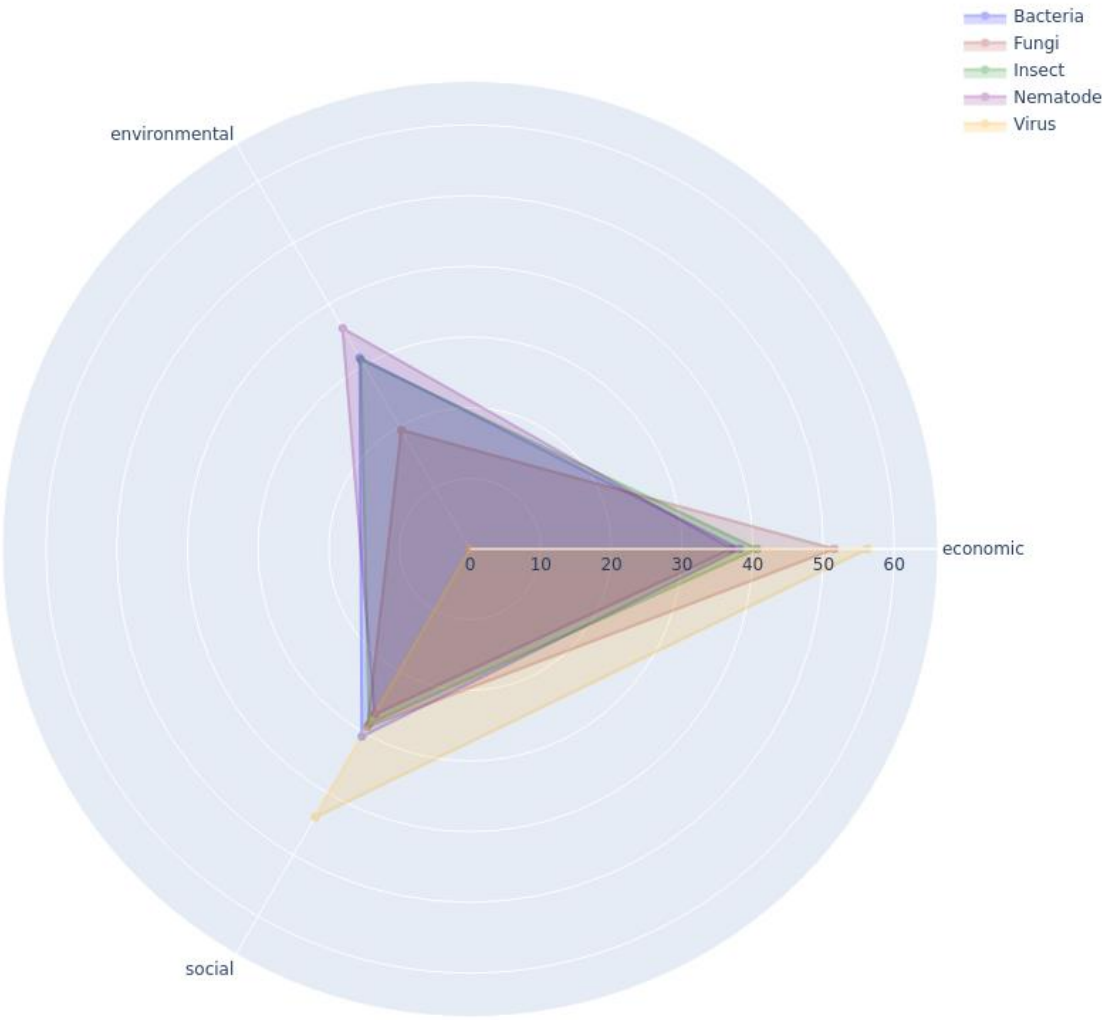
The regulation of emerging plant pests is challenging for risk managers due to the general absence of data on possible consequences and the increasing number of species of concern. In sum, data-driven decision support tools such as I2P2 aim to inform expert discussions by providing guidance on which organisms to focus on and by shedding light on potential impacts that may be expected upon invasion.

The results presented here are an outcome of an interdisciplinary assessment that followed a sequential approach in prioritising pests for scientific evaluation. The composite indicator used here combines a diversity of data sources to acknowledge the multifaceted nature of impacts from invasive species. While critical assumptions and limitations apply, the I2P2 score transparently aggregates expected impacts across dimensions to derive a ranking of pests that is aimed to inform the discussion of risk managers on the priority pests.

In the analysis presented here, the entire list of UQPs was approached through a shortlisting methodology and then 46 pests were analysed in depth. The methodology used is, in principle, applicable to all types of plant pests and diseases. Of the 46 pests shortlisted, 36 are insects, 4 are bacteria, 4 are fungi, 1 is a nematode and 1 is a virus, highlighting the potential impact of new insect pests. The potential rapid spread and high damage associated to insects are reasons behind their frequent appearance in the short list. Vascular restricted bacteria, although being a few numbers in the shortlist and final ranking, score very high in impacts due to the long time to detection and the need to use new plant protection products to achieve effective treatments. In fact, a member of this group, *Xylella fastidiosa*, is consistently ranked first as the most potentially damaging pest for the EU. In turn, while **Figure 12.** Average domain contribution (%) by pest type.. is intended to provide an overview of the expected domain impacts by pest type, it should be noted that the underlying data for insects was very heterogeneous and we only have one pest in the category of nematodes and viruses. For bacteria, the average contributions were well spread across all domains. For fungi, the average contribution was heavily weighted towards economic impacts at around 52%, followed by social impacts (28%) and environmental impacts (20%). For insects, the average contribution was 40% for economic impacts, followed by environmental and social impacts at around 30% each. For nematodes, impacts were fairly evenly distributed across all domains. Finally, for the virus, the impacts were mainly driven by the economic domain around 57%, followed by social impacts with around 43%.

Our additional computations at Q25 and Q75 suggest that the ranking is largely robust to the uncertainty in the biological parameters as elicited by EFSA. However, a stochastic assessment of different weighting schemes was found to result in considerable overlap of pests' I2P2 scores. This implies that risk managers priorities with regards to safeguarding economic, social, or environmental impact may affect the final ranking. To facilitate a more nuanced evaluation of the results, disaggregated results for all domains are provided. Finally, sub-domain-specific contributions to the overall score for all pests are presented, with the aim of informing about the drivers behind the composite score and thereby fostering understanding of the underlying data and methodology.

Figure 12. Average domain contribution (%) by pest type.



Source Own elaboration

5. Conclusions

The exercise described here analysed the full list of UQPs. After excluding UQPs not suitable for analysis (see section 3.1.1.), first, a shortlisting methodology was developed and used to propose a subset of pests for a full I2P2 analysis. Following the shortlisting methodology and subsequent discussion with risk-managers, a subset of 46 were shortlisted for a full analysis derived a subset of 46 pests that were analysed in detail. Next, expert knowledge elicitations were conducted for these 46 pests to estimate biological parameters. Subsequently, various datasets were combined to estimate potential economic, social, and environmental impacts if a pest were to establish and reach their maximum distribution in the Union's territory. To estimate these impacts we used the I2P2 model, which combines economic, social, and environmental impact into a composite indicator that is used to rank the pests. We assessed the robustness of the ranking with regards to the uncertainty on the biological parameters as well as alternative ways to evaluate the relative importance of each impact domain (economic, social and environment). Finally, we inform on the driving factors behind the composite scores. The results are expected to inform risk managers' discussions on the potential update of the Commission Implementing Decision 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.

References

Akcan, T., Gökçe, R., Asensio, M., Estévez, M., & Morcuende, D. (2017). Acorn (Quercus spp.) as a novel source of oleic acid and tocopherols for livestock and humans: discrimination of selected species from Mediterranean forest. *Journal of Food Science and Technology*, *54*(10), 3050–3057. https://doi.org/10.1007/s13197-017-2740-3

Benucci, G. M. N., Raggi, L., Albertini, E., Grebenc, T., Bencivenga, M., Falcinelli, M., & Di Massimo, G. (2011). Ectomycorrhizal communities in a productive Tuber aestivum Vittad. orchard: composition, host influence and species replacement. *FEMS Microbiology Ecology*, *76*(1), 170–184. https://doi.org/10.1111/j.1574-6941.2010.01039.x

Čejka, T., Trnka, M., & Büntgen, U. (2023). Sustainable cultivation of the white truffle (Tuber magnatum) requires ecological understanding. *Mycorrhiza*, *33*(5–6), 291–302. https://doi.org/10.1007/s00572-023-01120-w

Corada, K., Woodward, H., Alaraj, H., Collins, C. M., & de Nazelle, A. (2021). A systematic review of the leaf traits considered to contribute to removal of airborne particulate matter pollution in urban areas. *Environmental Pollution*, *269*, 116104. https://doi.org/10.1016/j.envpol.2020.116104

de la Peña, E., Dehnen-Schmutz, K., Gilioli, G., González-Moreno, P., Makowski, D., Mastin, A., Nougadère, A., Paracchini, M. L., Parnell, S., Portaluri, A., Purse, B., Ribaya, M., Sánchez, B., Scala, M., Tramontini, S., & Vos, S. (2025). EFSA methodology for assessing candidate priority pests under EU Regulation 2016/2031. EFSA Supporting Publications, 22(1). https://doi.org/10.2903/sp.efsa.2025.EN-9230

Di Cori, V., Franceschinis, C., Robert, N., Pettenella, D. M., & Thiene, M. (2021). Moral Foundations and Willingness to Pay for Non-Wood Forest Products: A Study in Three European Countries. *Sustainability*, *13*(23), 13445. https://doi.org/10.3390/su132313445

Dietemann, P., Miller, K. von, Höpker, C., & Baumer, U. (2019). On the Use and Differentiation of Resins from Pinaceae Species in European Artworks Based on Written Sources, Reconstructions and Analysis. *Studies in Conservation*, *64*(sup1), S62–S73. https://doi.org/10.1080/00393630.2019.1568678

EEA. (2024). What is particulate matter and what are its effects on human health? *[November 18, 2024] from Https://Www.Eea.Europa.Eu/En/about/Contact-Us/Faqs/What-Is-Particulate-Matter-and-What-Are-Its-Effects-on-Human-Health*.

EFSA (European Food Safety Authority), Nougadère, A., Krusteva, R,, Rzepecka, D. and Vos, S. (2023a). Technical Report on Task B of EFSA's priority pest mandate (M-2022-00070): Data for supporting shortlisting of Union Quarantine Pests. EFSA Technical report. Zenodo: EFSA Knowledge Junction. 67 pp. doi: 10.5281/zenodo.10417715

FSA (European Food Safety Authority), Antoniou, A., Krusteva, R., Rzepecka, D., Sarakatsani, E., Tramontini. S., Vos, S. (2023b). Technical Report on Task A of EFSA's priority pest mandate (M-2022-00070). EFSA supporting publication 2023:EN- 8547. 12 pp. doi:10.2903/sp.efsa.2023.EN-8547

Epanchin-Niell, R. S., Hufford, M. B., Aslan, C. E., Sexton, J. P., Port, J. D., & Waring, T. M. (2010). Controlling invasive species in complex social landscapes. *Frontiers in Ecology and the Environment*, *8*(4), 210–216. https://doi.org/10.1890/090029

European Commission. (2018). *A new Bioceconomy strategy for a sustainable Europe: Restoring healthy ecosystems and enhancing biodiversity*. https://doi.org/10.3390/su10061745

European Commission. (2019). *The European Green Deal. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social*

Committee and the Committee of the Regions. (pp. 1–24). https://doi.org/10.2307/j.ctvd1c6zh.7

FAO. (2018). *The State of the World's Forests 2018 - Forest pathways to sustainable development*. https://doi.org/10.1016/b0-12-145160-7/00156-3

Gaglio, M., Pace, R., Muresan, A. N., Grote, R., Castaldelli, G., Calfapietra, C., & Fano, E. A. (2022). Species-specific efficiency in PM2.5 removal by urban trees: From leaf measurements to improved modeling estimates. *Science of The Total Environment*, *844*, 157131. https://doi.org/10.1016/j.scitotenv.2022.157131

Guerin-Laguette, A., Plassard, C., & Mousain, D. (2000). Effects of experimental conditions on mycorrhizal relationships between Pinus sylvestris and Lactarius deliciosus and unprecedented fruit-body formation of the Saffron milk cap under controlled soilless conditions. *Canadian Journal of Microbiology*, *46*(9), 790–799. https://doi.org/10.1139/w00-059

Hulme, P. E. (2009). Trade, transport and trouble: managing invasive species pathways in an era of globalization. *Journal of Applied Ecology*, *46*(1), 10–18. https://doi.org/10.1111/j.1365-2664.2008.01600.x

Hussain, S., & Sher, H. (2021). Ecological characterization of Morel (Morchella spp.) habitats: A multivariate comparison from three forest types of district Swat, Pakistan. *Acta Ecologica Sinica*, *41*(1), 1–9. https://doi.org/10.1016/j.chnaes.2020.10.007

Lovrić, M., Da Re, R., Vidale, E., Prokofieva, I., Wong, J., Pettenella, D., Verkerk, P. J., & Mavsar, R. (2020). Non-wood forest products in Europe – A quantitative overview. *Forest Policy and Economics*, *116*, 102175. https://doi.org/10.1016/j.forpol.2020.102175

Lovrić, M., Da Re, R., Vidale, E., Prokofieva, I., Wong, J., Pettenella, D., Verkerk, P. J., & Mavsar, R. (2021). Collection and consumption of non-wood forest products in Europe. *ForestryAnI NternationaI Journal of Forest Research Forestry*, *94*, 757–770. https://doi.org/10.1093/forestry/cpab018

Martin, E. A., Dainese, M., Clough, Y., Báldi, A., Bommarco, R., Gagic, V., Garratt, M. P. D., Holzschuh, A., Kleijn, D., Kovács-Hostyánszki, A., Marini, L., Potts, S. G., Smith, H. G., Al Hassan, D., Albrecht, M., Andersson, G. K. S., Asís, J. D., Aviron, S., Balzan, M. V., … Steffan-Dewenter, I. (2019). The interplay of landscape composition and configuration: new pathways to manage functional biodiversity and agroecosystem services across Europe. *Ecology Letters*, *22*(7), 1083–1094. https://doi.org/10.1111/ele.13265

Megaritis, A. G., Fountoukis, C., Charalampidis, P. E., Denier Van Der Gon, H. A. C., Pilinis, C., & Pandis, S. N. (2014). Linking climate and air quality over Europe: Effects of meteorology on PM2.5concentrations. *Atmospheric Chemistry and Physics*, *14*(18), 10283–10298. https://doi.org/10.5194/acp-14-10283-2014

Mutke, S., & Picardo, A. (2014). *Toward a traceability of European pine nuts from forest to fork*.

Pachlewski, R., Strzelczyk, E., & Kermen, J. (1996). Studies of Cantharellus cibarius - a mycorrhizal fungus of pine and spruce. *Acta Mycol*, *2*(31), 143–150.

Paini, D. R., Sheppard, A. W., Cook, D. C., De Barro, P. J., Worner, S. P., & Thomas, M. B. (2016). Global threat to agriculture from invasive species. *Proceedings of the National Academy of Sciences*, *113*(27), 7575–7579. https://doi.org/10.1073/pnas.1602205113

Pollegioni, P., Woeste, K., Chiocchini, F., Del Lungo, S., Ciolfi, M., Olimpieri, I., Tortolano, V., Clark, J., Hemery, G. E., Mapelli, S., & Malvolti, M. E. (2017). Rethinking the history of common walnut (Juglans regia L.) in Europe: Its origins and human interactions. *PLoS ONE*, *12*(3). https://doi.org/10.1371/journal.pone.0172541

Sæbø, A., Popek, R., Nawrot, B., Hanslin, H. M., Gawronska, H., & Gawronski, S. W. (2012). Plant species differences in particulate matter accumulation on leaf surfaces. *Science of The Total*

Environment, *427–428*, 347–354. https://doi.org/10.1016/j.scitotenv.2012.03.084

Sánchez, B., Barreiro-Hurle, J., Soto Embodas, I., & Rodriguez-Cerezo, E. (2019). *The Impact Indicator for Priority Pests (I2P2): a tool for ranking pests according to Regulation*. https://doi.org/10.2760/585182

Sgrigna, G., Baldacchini, C., Dreveck, S., Cheng, Z., & Calfapietra, C. (2020). Relationships between air particulate matter capture efficiency and leaf traits in twelve tree species from an Italian urban-industrial environment. *Science of The Total Environment*, *718*, 137310. https://doi.org/10.1016/j.scitotenv.2020.137310

Svanberg, I., Sõukand, R., Łuczaj, Ł., Kalle, R., Zyryanova, O., Dénes, A., Papp, N., Nedelcheva, A., Šeškauskaitė, D., Kołodziejska-Degórska, I., & Kolosova, V. (2012). Uses of tree saps in northern and eastern parts of Europe. *Acta Societatis Botanicorum Poloniae*, *81*(4), 343–357. https://doi.org/10.5586/asbp.2012.036

Wang, Y., Sinclair, L., Hall, I. R., & Cole, A. L. J. (1995). Boletus edulis sensu lato: A new record for New Zealand. *New Zealand Journal of Crop and Horticultural Science*, *23*(2), 227–231. https://doi.org/10.1080/01140671.1995.9513892

Wilgan, R. (2023). High Species Diversity but Low Specificity to Ectomycorrhizal Tree Partners Exhibited by Native Truffle Species (Tuber spp., Pezizales) in Poland, Central Europe. *Forests*, *14*(12), 2407. https://doi.org/10.3390/f14122407

List of abbreviations and definitions

Abbreviations	Definitions
EFSA	European Food Safety Authority
EKE	Expert Knowledge Elicitation
EU	European Union
I2P2	Impact Indicator for Priority Pests
PAFF	Standing Committee on Plants, Animals, Food and Feed
Q25	25th Percentile of a distribution
Q50	50th Percentile of a distribution
Q75	75th Percentile of a distribution
UQP	Union Quarantine Pest

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Annexes

Annex 1. Overview of pests excluded from the analysis.

Pest name
Acidiella kagoshimensis
Acidoxantha bombacis
Acleris nishidai
Acroceratitis distincta
Adrama spp.
Allamanda leaf mottle distortion virus
Anastrepha bahiensis
Anastrepha spp.
Arceuthobium spp.
Aschistonyx eppoi
Asimoneura pantomelas
Atropellis spp.
Austrotephritis protrusa
Bactrocera spp.
Begomoviruses
Bemisia tabaci
Callistomyia flavilabris
Campiglossa albiceps
Campiglossa californica
Campiglossa duplex
Campiglossa reticulata
Campiglossa snowi
Candidatus Phytoplasma cocostanzania
Candidatus Phytoplasma palmae
Candidatus Phytoplasma palmicola
Candidatus Phytoplasma pruni-related strain (North American grapevine yellows, NAGYIII) Davis et al.
Carpomya incompleta
Ceratitis spp.
Choristoneura spp.
Cicadomorpha
Citrus leprosis viruses
Clerodendron yellow mosaic virus
Coconut cadang-cadang viroid
Craspedoxantha marginalis
Cronartium spp.
Crotalaria witches' broom phytoplasma
Dacus spp.
Diaphorina citri
Dioxyna chilensis
Dirioxa pornia

Elsinoë citricola
Euleia separata
Eumargarodes laingi
Euphranta camelliae
Euphranta cassia
Euphranta oshimensis
Eurosta solidaginis
Eutreta spp.
Fusarium oxysporum f. sp. albedinis
Gastrozona nigrifemur
Goedenia stenoparia
Gymnocarena spp.
Gymnosporangium spp.
Hirschmanniella spp.
Insizwa oblita
Ips calligraphus
Ips grandicollis
Marriottella exquisita
Monochamus spp. (non-European populations)
Myndus crudus
Neaspilota alba
Neaspilota reticulata
New Candidatus Phytoplasma
Non-EU isolates of potato viruses S, X and Potato leafroll virus
Oligonychus perditus
Palm lethal yellowing phytoplasmas
Paracantha trinotata
Parastenopa limata
Paratephritis fukaii
Paratephritis takeuchii
Paraterellia varipennis
Philophylla fossata
Pissodes cibriani
Pissodes nitidus
Pissodes punctatus
Pissodes terminalis
Pissodes yunnanensis
Pissodes zitacuarense
Pityophthorus juglandis
Pomacea
Pomacea maculata
Procecidochares spp.
Pseudocercospora pini-densiflorae
Ptilona confinis
Ptilona persimilis

Ralstonia syzygii subsp. celebesensis
Rhagoletis spp.
Rhynchophorus palmarum
Rioxoptilona dunlopi
Scolytinae spp. (non-European)
Sida leaf curl virus
Sphaeniscus binoculatus
Sphenella nigricornis
Strauzia spp.
Strawberry leaf curl virus
Taomyia marshalli
Tephritidae
Tephritis leavittensis
Tephritis luteipes
Tephritis ovatipennis
Tephritis pura
Trioza erytreae
Trupanea femoralis
Trupanea wheeleri
Trypanocentra nigrithorax
Trypeta flaveola
Urophora christophi
Venturia nashicola
Viruses, viroids and phytoplasmas of Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L. and Vitis L.
Viruses, viroids and phytoplasmas of Solanum tuberosum L. and other tuber-forming Solanum spp.:
Xanthaciura insecta
Xiphinema americanum sensu stricto
Xiphinema bricolense
Zeugodacus spp.

Annex 2. Overview of the number of hosts matched for the shortlisting step.

Pest name	Total number of hosts listed	Number of hosts matched to production data	Number of unique production data used
Acidiella kagoshimensis	1	0	0
Acidoxantha bombacis	2	0	0
Acleris gloverana	12	11	5
Acleris issikii	3	3	2
Acleris minuta	11	3	3
Acleris nishidai	4	0	0
Acleris nivisellana	7	3	2
Acleris robinsoniana	2	1	1
Acleris semipurpurana	7	6	1
Acleris senescens	8	7	5
Acleris variana	24	22	6
Acrobasis pyrivorella	2	1	1
Acroceratitis distincta	4	0	0
Adrama spp.	1	0	0
Ageratum yellow vein virus	1	1	1
Agrilus anxius	21	21	1
Agrilus planipennis	15	14	1
Aleurocanthus citriperdus	9	3	2
Aleurocanthus spiniferus	102	17	17
Aleurocanthus woglumi	184	20	16
Allamanda leaf mottle distortion virus	1	0	0
American plum line pattern virus	9	7	5
Anastrepha bahiensis	4	0	0
Anastrepha fraterculus	205	30	22
Anastrepha grandis	9	6	4
Anastrepha ludens	50	14	11
Anastrepha spp.	1	0	0
Andean potato latent virus	3	1	1
Andean potato mild mosaic virus	4	1	1
Andean potato mottle virus	10	5	3
Anisogramma anomala	3	1	1
Anoplophora chinensis	197	71	24
Anoplophora glabripennis	92	54	16
Anthonomus bisignifer	4	1	1
Anthonomus eugenii	35	9	4
Anthonomus grandis	16	1	1
Anthonomus quadrigibbus	25	11	7
Anthonomus signatus	11	2	2
Apiosporina morbosa	17	15	5
Apple fruit crinkle viroid	4	3	3

Apple necrotic mosaic virus	3	1	1
Apriona cinerea	22	14	7
Apriona germari	65	18	8
Apriona rugicollis	16	6	4
Arceuthobium spp.	1	0	0
Aromia bungii	36	24	11
Arrhenodes minutus	14	13	5
Aschistonyx eppoi	2	0	0
Asimoneura pantomelas	1	0	0
Atropellis spp.	1	0	0
Austrotephritis protrusa	2	0	0
Bactericera cockerelli	36	6	5
Bactrocera carambolae	266	33	23
Bactrocera dorsalis	454	39	26
Bactrocera facialis	20	11	9
Bactrocera latifrons	65	13	9
Bactrocera occipitalis	2	2	1
Bactrocera passiflorae	47	13	8
Bactrocera spp.	1	0	0
Bactrocera tryoni	276	34	25
Bactrocera zonata	45	16	14
Beet curly top virus	20	9	7
Begomoviruses	1	0	0
Bemisia tabaci	1	0	0
Bistrispinaria fortis	2	1	1
Bistrispinaria magniceps	2	2	2
Black raspberry latent virus	3	1	1
Blueberry leaf mottle virus	5	1	1
Botryosphaeria kuwatsukai	7	2	2
Bretziella fagacearum	37	34	1
Buckland valley grapevine yellows phytoplasma	1	1	1
Bursaphelenchus xylophilus	49	18	6
Callistomyia flavilabris	4	0	0
Campiglossa albiceps	5	0	0
Campiglossa californica	3	0	0
Campiglossa duplex	1	0	0
Campiglossa reticulata	1	0	0
Campiglossa snowi	2	0	0
Candidatus Liberibacter africanus	27	6	4
Candidatus Liberibacter americanus	21	6	4
Candidatus Liberibacter asiaticus	42	6	4
Candidatus Phytoplasma americanum	3	2	2
Candidatus Phytoplasma aurantifolia-reference strain	15	1	1

Candidatus Phytoplasma aurantifoliaâ€"related strains (GD32; St_JO_10, 14, 17; PPT-SA; Rus-343F; PPT-GT029, -GT030, -SINTV; Potato Huayao Survey 2; Potato hair sprouts)	184	23	20
Candidatus Phytoplasma australiense	43	9	8
Candidatus Phytoplasma cocostanzania	27	0	0
Candidatus Phytoplasma fragariae	9	7	4
Candidatus Phytoplasma fraxini	12	5	3
Candidatus Phytoplasma hispanicum	3	1	1
Candidatus Phytoplasma palmae	71	0	0
Candidatus Phytoplasma palmicola	27	0	0
Candidatus Phytoplasma phoenicium	17	11	8
Candidatus Phytoplasma pruni-related strain (North American grapevine yellows, NAGYIII) Davis et al.	1	0	0
Candidatus Phytoplasma pyri	9	4	4
Candidatus Phytoplasma ziziphi	8	3	3
Candidatus.Phytoplasma.aurantifolia.strains2	153	19	19
Candidatus.Phytoplasma.pruni.related.strains	41	8	8
Carpomya incompleta	6	0	0
Carpomya pardalina	6	4	3
Carposina sasakii	29	8	8
Ceratitis rosa	148	22	17
Ceratitis spp.	1	0	0
Bretziella platani	5	5	1
Ceratothripoides claratris	16	9	9
Cherry rasp leaf virus	29	9	9
Cherry rosette virus	2	1	1
Cherry rusty mottle associated virus	2	1	1
Cherry twisted leaf associated virus	3	2	2
Chilli leaf curl virus	5	4	4
Choristoneura carnana	3	3	2
Choristoneura conflictana	27	19	8
Choristoneura fumiferana	33	23	5
Choristoneura lambertiana	11	4	3
Choristoneura occidentalis biennis	3	3	2
Choristoneura occidentalis occidentalis	11	9	4
Choristoneura orae	2	2	2
Choristoneura parallela	14	1	1
Choristoneura pinus	11	5	3
Choristoneura retiniana	4	4	2
Choristoneura rosaceana	93	44	24
Choristoneura spp.	1	0	0
Chrysanthemum stem necrosis virus	5	1	1
Chrysomyxa arctostaphyli	11	8	1
Cicadomorpha	1	0	0
CiLV-C	22	8	4
CiLV-C2	4	1	1

CiLV-N sensu novo	1	1	1
Citrus chlorotic spot virus	2	1	1
Citrus leprosis viruses	1	0	0
Citrus strain of OFV (citrus strain)	15	4	3
Citrus tristeza virus	34	7	4
Clavibacter sepedonicus	3	3	3
Clerodendron yellow mosaic virus	1	0	0
Cnestus mutilatus	35	12	7
Coconut cadang-cadang viroid	26	0	0
Coniferiporia sulphurascens	25	16	5
Coniferiporia weirii	6	1	1
Conotrachelus nenuphar	38	27	13
Cotton leaf curl Gezira virus	17	5	5
Cotton leaf curl Multan virus	4	1	1
Cowpea mild mottle virus	48	7	7
Craspedoxantha marginalis	16	0	0
Cronartium fusiforme	12	3	1
Cronartium spp.	1	0	0
Crotalaria witchesâ€™ broom phytoplasma	1	0	0
Curtobacterium flaccumfaciens pv. flaccumfaciens	45	13	13
Dacus ciliatus	62	16	11
Dacus spp.	1	0	0
Davidsoniella virescens	4	3	1
Dendroctonus frontalis	32	3	2
Dendroctonus ponderosae	14	1	1
Dendroctonus rufipennis	9	9	1
Dendroctonus valens	49	7	4
Dendrolimus sibiricus	26	20	6
Diabrotica barberi	29	11	10
Diabrotica undecimpunctata howardi	158	30	27
Diabrotica undecimpunctata undecimpunctata	108	27	27
Diabrotica virgifera zeae	77	11	11
Diaphorina citri	1	0	0
Dimargarodes meridionalis	2	1	1
Dioxyna chilensis	6	0	0
Dirioxa pornia	1	0	0
Elsinoë australis	22	7	5
Elsinoë citricola	1	0	0
Elsinoë fawcettii	22	5	4
Eotetranychus lewisi	92	18	17
Euleia separata	4	0	0
Eumargarodes laingi	6	0	0
Euphorbia leaf curl virus	3	2	2
Euphorbia yellow mosaic virus	2	2	2
Euphranta camelliae	2	0	0

Euphranta canadensis	5	4	1
Euphranta cassia	1	0	0
Euphranta japonica	3	2	2
Euphranta oshimensis	1	0	0
Eurhizococcus brasiliensis	52	16	14
Eurhizococcus colombianus	5	2	2
Eurosta solidaginis	3	0	0
Eutreta spp.	1	0	0
Euwallacea fornicatus sensu lato	330	75	22
Exomala orientalis	25	6	6
Fusarium circinatum	71	4	4
Fusarium oxysporum f. sp. albedinis	1	0	0
Gastrozona nigrifemur	4	0	0
Geosmithia morbida	16	1	1
Globodera pallida	3	3	3
Globodera rostochiensis	3	3	3
Goedenia stenoparia	6	0	0
Grapevine berry inner necrosis virus	1	1	1
Grapevine flavescence doree phytoplasma	22	5	4
Grapevine red blotch virus	4	1	1
Grapevine vein-clearing virus	1	1	1
Grapholita inopinata	22	3	3
Grapholita packardi	20	10	9
Grapholita prunivora	18	8	8
Guignardia laricina	10	10	1
Gymnocarena spp.	1	0	0
Gymnosporangium clavipes	12	2	2
Gymnosporangium spp.	1	0	0
Gymnosporangium yamadae	18	1	1
Helicoverpa zea	156	42	40
HGSV-2	5	2	2
Hirschmanniella mucronata	1	1	1
Hirschmanniella oryzae	1	1	1
Hirschmanniella spp.	1	0	0
Hishimonus phycitis	33	8	7
Insizwa oblita	1	0	0
Ips calligraphus	7	0	0
Ips grandicollis	18	0	0
Keiferia lycopersicella	13	4	3
Lettuce infectious yellows virus	20	8	6
Liriomyza sativae	109	29	23
Listronotus bonariensis	34	9	8
Longidorus diadecturus	8	5	5
Lopholeucaspis japonica	121	34	22
Lycorma delicatula	188	63	23

Margarodes capensis	2	1	1
Margarodes greeni	4	2	2
Margarodes prieskaensis	2	1	1
Margarodes trimeni	1	1	1
Margarodes vitis	13	4	4
Margarodes vredendalensis	1	1	1
Marriottella exquisita	1	0	0
Massicus raddei	27	13	4
Melampsora farlowii	3	3	1
Melampsora medusae f. sp. tremuloidis	1	1	1
Meloidogyne chitwoodi	114	34	28
Meloidogyne enterolobii	96	17	16
Meloidogyne fallax	24	10	10
Melon yellowing-associated virus	1	1	1
Monacrostichus citricola	3	2	2
Monochamus alternatus	40	11	4
Monochamus spp. (non-European populations)	1	0	0
Mycodiella laricis-leptolepidis	4	4	1
Myndus crudus	1	0	0
Nacobbus aberrans	102	24	16
Naupactus leucoloma	67	23	23
Neaspilota alba	5	0	0
Neaspilota reticulata	2	0	0
Nemorimyza maculosa	65	3	3
Neocosmospora ambrosia	6	2	1
Neocosmospora euwallaceae	36	22	9
Neoleucinodes elegantalis	19	3	3
New Candidatus Phytoplasma	2	0	0
Non-EU isolates of potato viruses S, X and Potato leafroll virus	1	0	0
Oemona hirta	227	53	27
Oligonychus perditus	20	0	0
Palm lethal yellowing phytoplasmas	85	0	0
Pantoea stewartii subsp. stewartii	8	3	3
Papaya leaf curl Guandong virus	5	2	2
Papaya leaf curl virus	8	3	3
Paracantha trinotata	2	0	0
Parastenopa limata	7	0	0
Paratephritis fukaii	1	0	0
Paratephritis takeuchii	1	0	0
Paraterellia varipennis	1	0	0
Peach mosaic virus	8	7	5
Peach rosette mosaic virus	12	4	4
Pear decline Taiwan II	2	1	1
Philophylla fossata	8	0	0
Phyllosticta citricarpa	22	7	5

Phyllosticta solitaria	6	1	1
Phymatotrichopsis omnivora	615	98	64
Phyrdenus muriceus	3	3	3
Phytophthora ramorum	216	41	15
Pissodes cibriani	1	0	0
Pissodes fasciatus	2	2	1
Pissodes nemorensis	28	9	2
Pissodes nitidus	10	0	0
Pissodes punctatus	2	0	0
Pissodes strobi	29	9	2
Pissodes terminalis	4	0	0
Pissodes yunnanensis	1	0	0
Pissodes zitacuarense	12	0	0
Pityophthorus juglandis	1	0	0
Polygraphus proximus	31	47	4
Pomacea	1	0	0
Pomacea canaliculata	54	3	3
Pomacea maculata	39	0	0
Popillia japonica	121	51	31
Porphyrophora tritici	3	3	3
Potato black ringspot virus	4	1	1
Potato leafroll virus	13	3	3
Potato virus B	1	1	1
Potato virus H	2	1	1
Potato virus P	1	1	1
Potato virus S	10	2	2
Potato virus T	7	3	1
Potato virus X	22	6	5
Potato yellow dwarf virus	14	3	3
Potato yellow mosaic virus	3	1	1
Potato yellow vein virus	15	2	2
Potato yellowing virus	8	2	2
Premnotrypes spp.	1	1	1
Procecidochares spp.	1	0	0
Prodiplosis longifila	64	26	23
Pseudocercospora angolensis	14	6	4
Pseudocercospora pini-densiflorae	27	0	0
Pseudopityophthorus minutissimus	23	18	5
Pseudopityophthorus pruinosus	26	23	4
Ptilona confinis	3	0	0
Ptilona persimilis	4	0	0
Puccinia pittieriana	21	3	2
Ralstonia pseudosolanacearum	117	20	17
Ralstonia solanacearum	86	15	13
Ralstonia syzygii subsp. celebesensis	4	0	0

Ralstonia syzygii subsp. indonesiensis	9	3	3
Raspberry latent virus	1	1	1
Raspberry leaf curl virus	9	2	1
Rhagoletis pomonella	61	17	8
Rhagoletis spp.	1	0	0
Rhigopsidius tucumanus	1	1	1
Rhynchophorus palmarum	38	0	0
Rioxoptilona dunlopi	4	0	0
Ripersiella hibisci	53	2	1
Saperda candida	16	7	7
Satsuma dwarf virus	27	2	2
Scirtothrips aurantii	48	10	10
Scirtothrips citri	66	19	16
Scirtothrips dorsalis	177	33	28
Scolytinae spp. (non-European)	1	0	0
Septoria malagutii	6	1	1
Sida leaf curl virus	1	0	0
Sphaeniscus binoculatus	1	0	0
Sphaerulina musiva	12	12	2
Sphenella nigricornis	8	0	0
Spodoptera eridania	25	12	12
Spodoptera frugiperda	363	66	59
Spodoptera litura	68	19	18
Squash leaf curl China virus	4	2	2
Squash vein yellowing virus	4	3	3
Stagonosporopsis andigena	4	1	1
Stegophora ulmea	19	18	1
Strauzia spp.	1	0	0
Strawberry chlorotic fleck-associated virus	2	1	1
Strawberry leaf curl virus	1	0	0
Strawberry necrotic shock virus	8	2	2
Sweet potato chlorotic stunt virus	14	1	1
Sweet potato little leaf phytoplasma	4	1	1
Sweet potato mild mottle virus	1	1	1
Synchytrium endobioticum	4	1	1
Taomyia marshalli	2	0	0
Tecia solanivora	1	1	1
Temperate fruit decay-associated virus	6	3	3
Tephritidae	1	0	0
Tephritis leavittensis	5	0	0
Tephritis luteipes	1	0	0
Tephritis ovatipennis	10	0	0
Tephritis pura	1	0	0
Thaumatotibia leucotreta	117	27	20
Thecaphora solani	6	3	2

Thrips palmi	139	35	31
Tilletia indica	8	4	4
Tobacco ringspot virus	161	25	23
Tomato chocolate virus	1	1	1
Tomato leaf curl Joydebpur virus	2	2	2
Tomato leaf curl New Delhi virus	68	20	15
Tomato leaf curl Palampur virus	10	7	6
Tomato marchitez virus	2	2	2
Tomato mild mottle virus	5	2	2
Tomato mosaic Havana virus	1	1	1
Tomato mottle Taino virus	2	1	1
Tomato mottle virus	1	1	1
Tomato ringspot virus	62	27	22
Tomato severe rugose virus	9	7	6
Tomato yellow leaf curl Thailand virus	2	2	2
Tomato yellow vein streak virus	3	3	3
Toxoptera citricida	114	14	11
Toxotrypana curvicauda	2	1	1
Toxotrypana recurcauda	2	1	1
Trioza erytreae	1	0	0
Trirachys sartus	52	38	16
Trupanea bisetosa	9	1	1
Trupanea femoralis	15	0	0
Trupanea wheeleri	20	0	0
Trypanocentra nigrithorax	1	0	0
Trypeta flaveola	16	0	0
Unaspis citri	35	9	7
Urophora christophi	1	0	0
Venturia nashicola	3	0	0
Viruses, viroids and phytoplasmas of Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L. and Vitis L.	1	0	0
Viruses, viroids and phytoplasmas of Solanum tuberosum L. and other tuber-forming Solanum spp.:	1	0	0
Xanthaciura insecta	5	0	0
Xanthomonas citri pv. aurantifolii	7	2	2
Xanthomonas citri pv. citri	30	6	4
Xanthomonas oryzae pv. oryzae	26	1	1
Xanthomonas oryzae pv. oryzicola	14	1	1
Xiphinema americanum sensu stricto	4	0	0
Xiphinema bricolense	1	0	0
Xiphinema californicum	36	14	14
Xylella fastidiosa	338	57	25
Xylosandrus compactus	67	6	5
Zacerata asparagi	2	1	1
Zeugodacus cucurbitae	91	23	17
Zeugodacus spp.	1	0	0

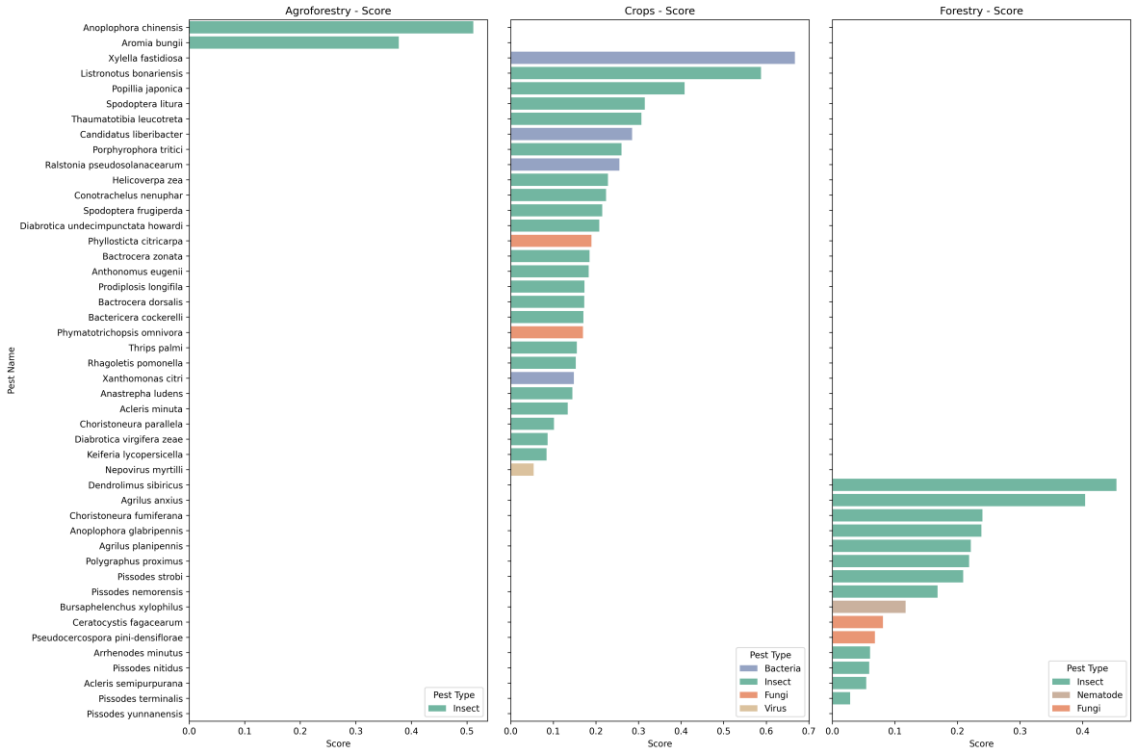
Zonosemata electa	7	3	2

Annex 3. Ornamental host value needed for reaching the top-50 in the invasiveness and host value scenario for pests which have ornamental hosts identified as observed impact by EFSA.

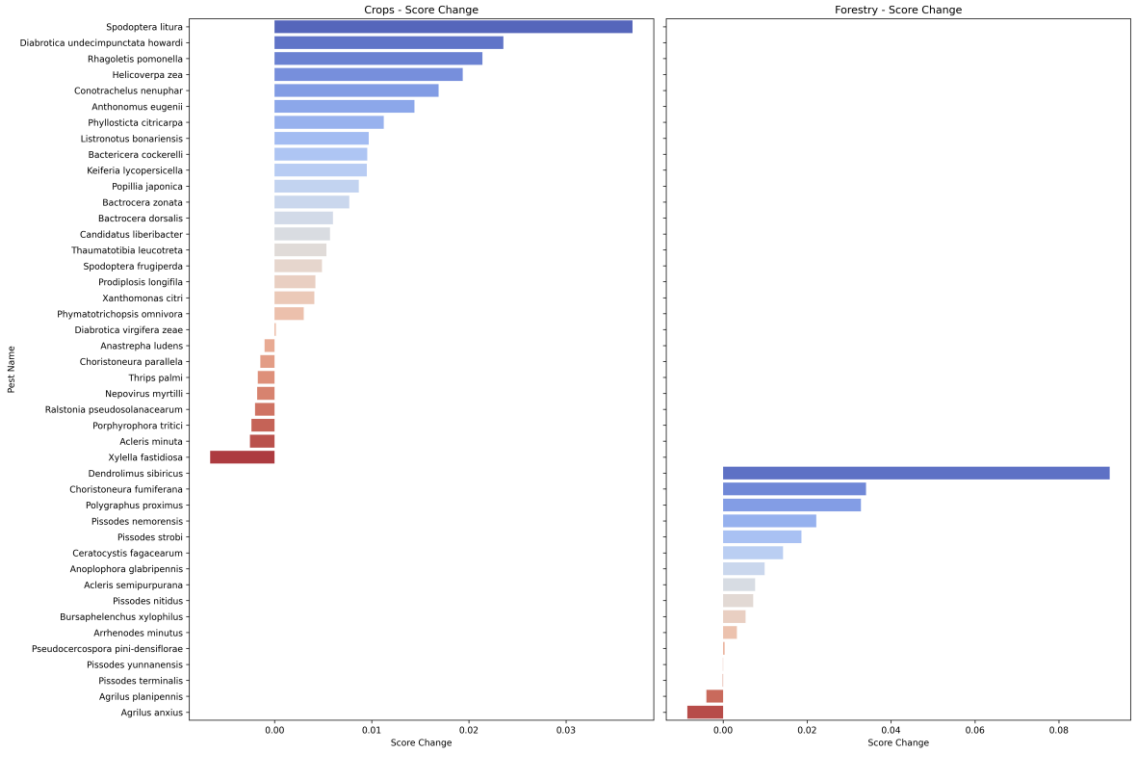
Pest name	Pest rank by the composite indicator of invasiveness and host value	Value of the composite indicator	Potential ornamental host listed by EFSA	Relative host value needed for the pest to reach the top-50 (cut-off is 0.771)	Host value needed for the pest to reach the top-50 (Euro)
Anthonomus grandis (Boh.)	159	0.3776	*Hibiscus spp*	0.3933	20,740,478,137
Aschistonyx eppoi Inouye	Not included	0.1250	*Juniperus chinensis*	0.6458	34,062,066,570
Eotetranychus lewisi (McGregor)	138	0.4642	*Euphorbia pulcherrima*	0.3066	16,170,965,787
Grapholita inopinata (Heinrich)	167	0.3491	*Malus prunifolia*	0.4218	22,244,077,491
Grapholita inopinata (Heinrich)	167	0.3491	*Malus baccata*	0.4218	22,244,077,491
Nemorimyza maculosa (Malloch)	168	0.3400	*Chrysanthemum spp*	0.4309	22,724,160,305
Oligonychus perditus Pritchard and Baker	Not included	0.6250	*Juniperus chinensis*	0.1458	7,691,706,597
Oligonychus perditus Pritchard and Baker	Not included	0.6250	*Juniperus bonsai*	0.1458	7,691,706,597
Ripersiella hibisci Kawai and Takagi	Not included	0.1875	*Hibiscus spp*	0.5833	30,765,771,573
Ripersiella hibisci Kawai and Takagi	Not included	0.1875	*Pelargonium spp*	0.5833	30,765,771,573
Thrips palmi Karny	35	0.8693	*Orchidaceae*	-0.0984	Not applicable (already in the top 50)
Chrysanthemum stem necrosis virus	Not included	0.3750	*Chrysanthemum spp*	0.3958	20,876,886,583
Tomato leaf curl New Delhi virus	31	0.9176	*Chrysanthemum spp*	-0.1467	Not applicable (already in the top 50)

Annex 4. Changes in I2P2 scores under different quantiles for the biological parameters.

I2P2 ranking under Q25 parameters (a) and the score changes relative to Q50 results (b)

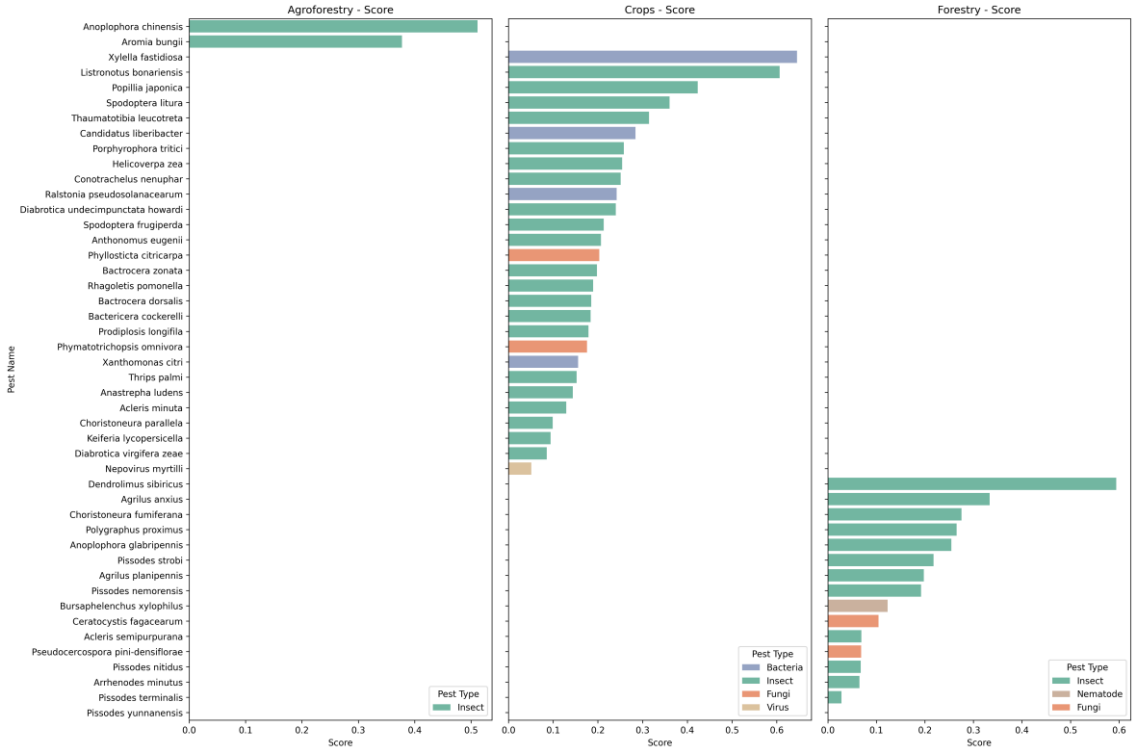


(a)

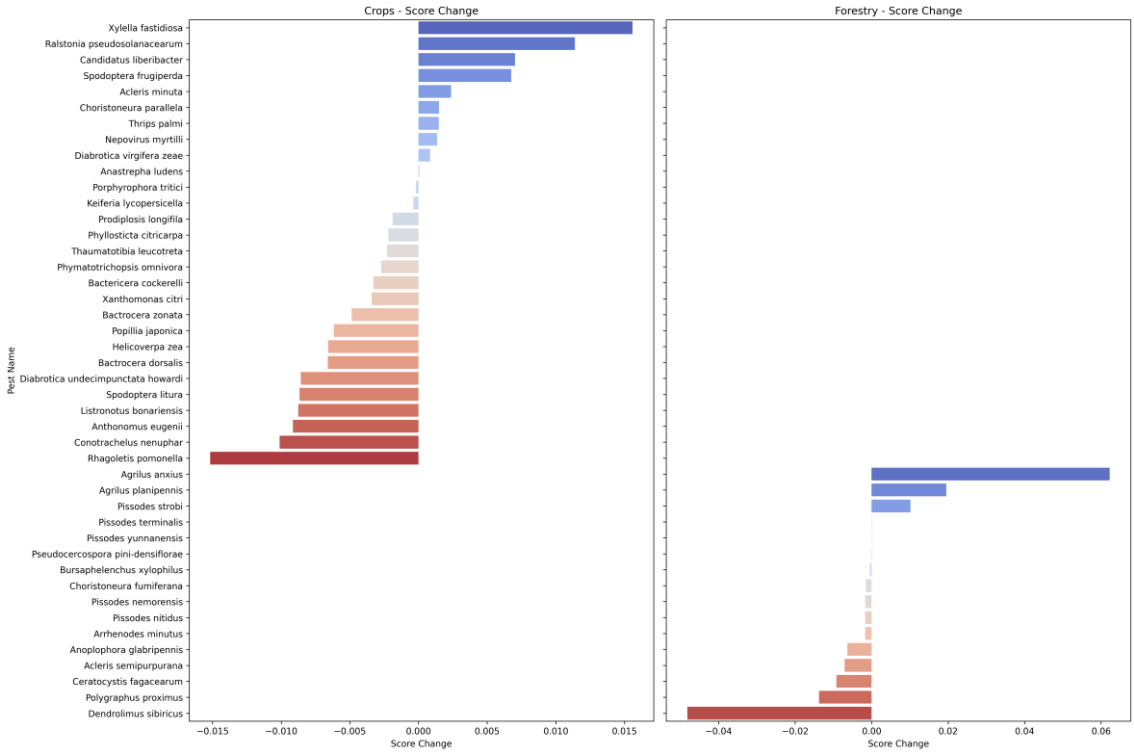


(b)

I2P2 ranking under Q75 parameters (a) and the score changes relative to Q50 results (b)



(a)



(b)

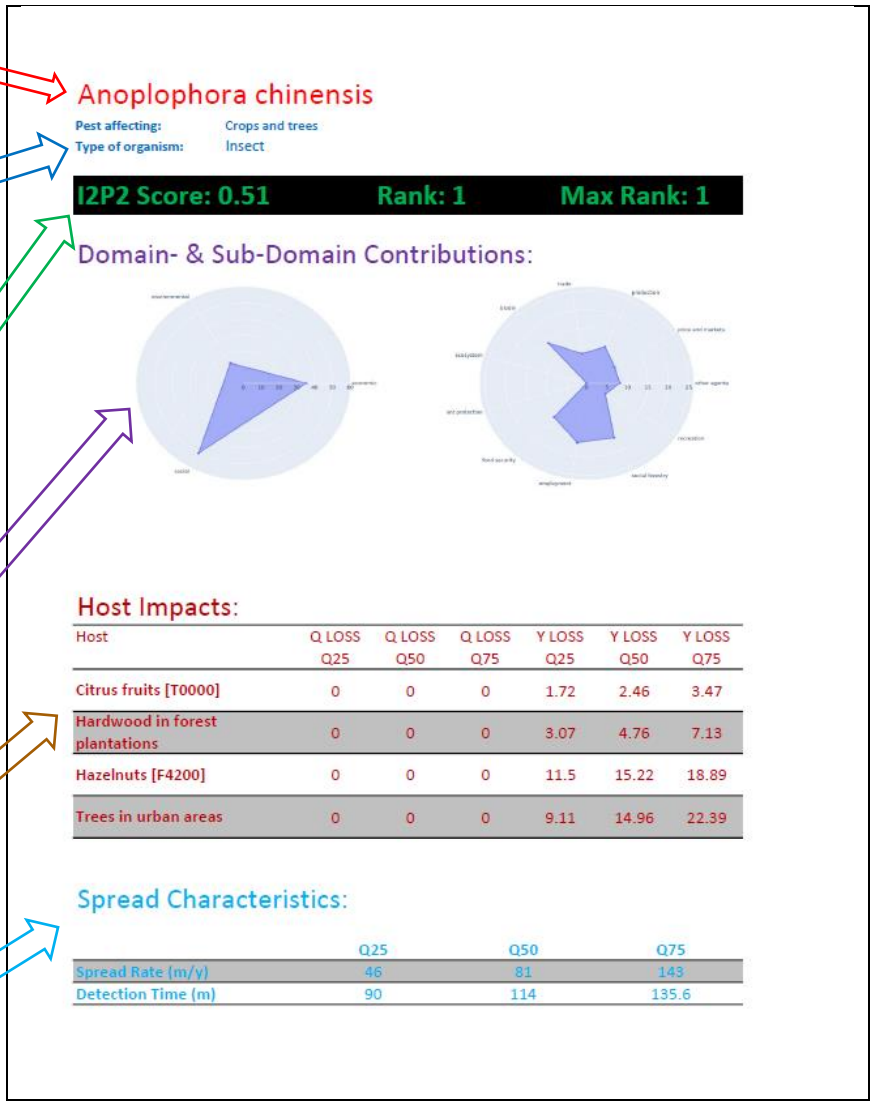
Annex 5 Collection of Pest-Specific Fact Sheets.

In this annex we provide 46 pest-specific 2-page fiches that hold an overview of relevant information and data. Fiches are presented starting with those affecting crops and trees (1-2), following with those affecting crops (3 – 30) and finalizing with those affecting trees (31 – 46). Inside each of the three categories pests are order by their ranking based on the I2P2 score.

The following information is provided in the pest specific 2-page fiche [*please note that colours are shown only in this example for ease of identification – all fiches are black and white only*].

First Page:

Pest name
Type of pest in terms of hosts it affects (crops, trees or crops and trees) and type of organism (bacteria, funghi, nematode or virus).
I2P2 score for the pest, ranking compared to other pests (see section 3.3.2) and maximum ranking it can achieve under a particular weighting scheme (see section 3.2.3)
Profile of the pest in terms of impacts (see section 3.2.4)
Yield and quality losses estimates from EFSA for all relevant hosts, including median and 1st and 3rd quartile values
Spread characteristics of the pest from EFSA



Anoplophora chinensis

Pest affecting: Crops and trees
Type of organism: Insect

I2P2 Score: 0.51 Rank: 1 Max Rank: 1

Domain- & Sub-Domain Contributions:

Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	1.72	2.46	3.47
Hardwood in forest plantations	0	0	0	3.07	4.76	7.13
Hazelnuts [F4200]	0	0	0	11.5	15.22	18.89
Trees in urban areas	0	0	0	9.11	14.96	22.39

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	46	81	143
Detection Time (m)	90	114	135.6

Second Page:

Indicator name and measurement unit	Indicator value in original unit	Indicator as % of the maximum value the indicator takes among all pests in the same category (pests affecting trees, crops, or crops and trees)

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	18742.57	100.0%
I.2 Share of EU production value affected (%)	27.4	100.0%
I.3 Difficulty of eradication (meters)	769.5	20.8%
I.4. Number of importing countries banning trade (#)	148	100.0%
I.5 Value of export losses (Million Euros)	1285.88	100.0%
I.6 Share of export losses over total production (%)	0.06	3.8%
I.7 Trade dispersion (dimensionless)	0.88	100.0%
I.8 Change in domestic price (%)	26.88	100.0%
I.9 Change in domestic production over imports (%)	4835.73	26.2%
I.10 Upstream effect (Million Euros)	47194.3	100.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	18619.41	100.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.41	100.0%
I.14c Share of protein supply (g/capita/day) (%)	0.32	100.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.7	100.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	100.0%
I.13f Quantity losses of wild forest products collected by households (kg)	1013.82	100.0%
I.14f Reduction in quantity sold by households (kg)	68.16	100.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	712.61	100.0%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	37.48	100.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	28	66.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	177.12	100.0%
I.20 Loss in EU ecosystem service flow (%)	2.4	96.0%
I.21 Loss in EU community biodiversity (%)	0.0045	36.0%
I.22 EU protected areas with host plants (%)	15.6	100.0%
I.23 Weighted count of IUCN host species (#)	5.22	100.0%
I.24 Increase in pesticide use (level)	0	0.0%

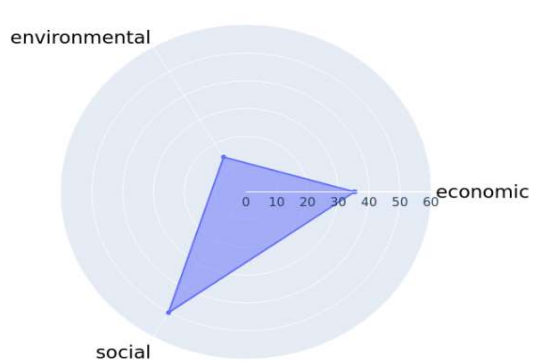
Anoplophora chinensis

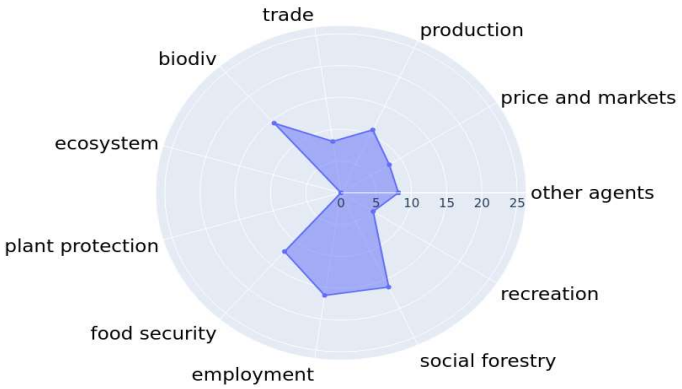
Pest affecting: Crops and trees

Type of organism: Insect

I2P2 Score: 0.51 Rank: 1 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	1.72	2.46	3.47
Hardwood in forest plantations	0	0	0	3.07	4.76	7.13
Hazelnuts [F4200]	0	0	0	11.5	15.22	18.89
Trees in urban areas	0	0	0	9.11	14.96	22.39

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	46	81	143
Detection Time (m)	90	114	135.6

Indicator Values:

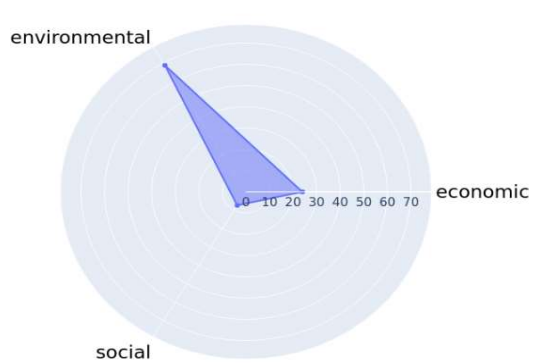
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	18742.57	100.0%
I.2 Share of EU production value affected (%)	27.4	100.0%
I.3 Difficulty of eradication (meters)	769.5	20.8%
I.4. Number of importing countries banning trade (#)	148	100.0%
I.5 Value of export losses (Million Euros)	1285.88	100.0%
I.6 Share of export losses over total production (%)	0.06	3.8%
I.7 Trade dispersion (dimensionless)	0.88	100.0%
I.8 Change in domestic price (%)	26.88	100.0%
I.9 Change in domestic production over imports (%)	4835.73	26.2%
I.10 Upstream effect (Million Euros)	47194.3	100.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	18619.41	100.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.41	100.0%
I.14c Share of protein supply (g/capita/day) (%)	0.32	100.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.7	100.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	100.0%
I.13f Quantity losses of wild forest products collected by households (kg)	1013.82	100.0%
I.14f Reduction in quantity sold by households (kg)	68.16	100.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	712.61	100.0%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	37.48	100.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	28	66.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	177.12	100.0%
I.20 Loss in EU ecosystem service flow (%)	2.4	96.0%
I.21 Loss in EU community biodiversity (%)	0.0045	36.0%
I.22 EU protected areas with host plants (%)	15.6	100.0%
I.23 Weighted count of IUCN host species (#)	5.22	100.0%
I.24 Increase in pesticide use (level)	0	0.0%

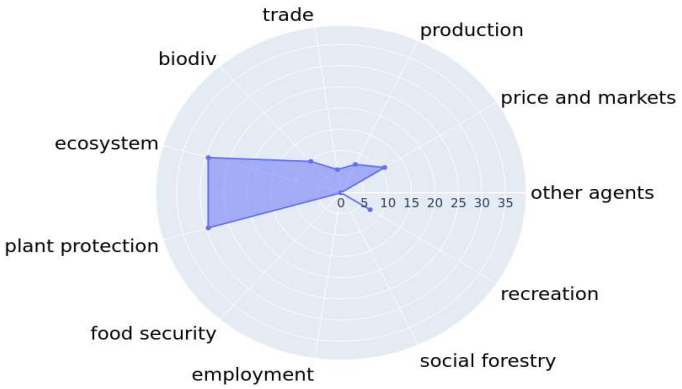
Aromia bungii

Pest affecting: Crops and trees
Type of organism: Insect

I2P2 Score: 0.37 Rank: 2 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Almonds [F4300]	0	0	0	1.11	1.89	2.89
Apricots [F1230]	0	0	0	1.78	3.02	4.62
Cherries [F1240]	0	0	0	2.67	4.53	6.93
Peaches and nectarines [F1210_1220]	0	0	0	1.78	3.02	4.62
Plums [F1250]	0	0	0	2.78	4.72	7.22
Prunus spp. in forest	0	0	0	1	2.1	3.9
Prunus spp. in urban areas	0	0	0	5.8	10	15.4

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	159	309	537
Detection Time (m)	108	144	168

Indicator Values:

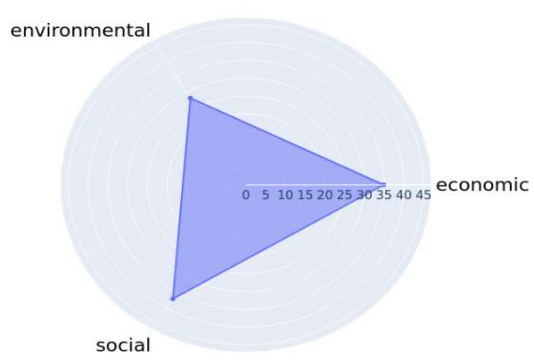
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	354.37	1.9%
I.2 Share of EU production value affected (%)	5.1	18.6%
I.3 Difficulty of eradication (meters)	3708	100.0%
I.4. Number of importing countries banning trade (#)	148	100.0%
I.5 Value of export losses (Million Euros)	568.74	44.2%
I.6 Share of export losses over total production (%)	1.67	100.0%
I.7 Trade dispersion (dimensionless)	0.82	93.3%
I.8 Change in domestic price (%)	12.09	45.0%
I.9 Change in domestic production over imports (%)	18470.71	100.0%
I.10 Upstream effect (Million Euros)	592.79	1.3%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	14364.06	77.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.13	30.8%
I.14c Share of protein supply (g/capita/day) (%)	0.08	25.1%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.15	21.6%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	100.0%
I.13f Quantity losses of wild forest products collected by households (kg)	0	0.0%
I.14f Reduction in quantity sold by households (kg)	0	0.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	0.42	0.1%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	0.9	2.4%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	42	100.0%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	56.88	32.1%
I.20 Loss in EU ecosystem service flow (%)	2.5	100.0%
I.21 Loss in EU community biodiversity (%)	0.0125	100.0%
I.22 EU protected areas with host plants (%)	6.6	42.3%
I.23 Weighted count of IUCN host species (#)	2.75	52.7%
I.24 Increase in pesticide use (level)	0.1	100.0%

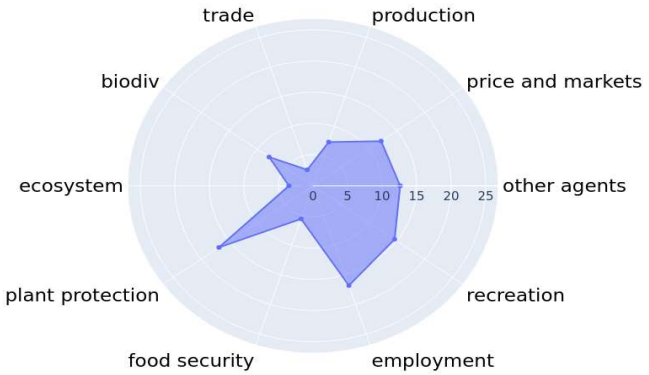
Xylella fastidiosa

Pest affecting: Crops
Type of organism: Bacteria

I2P2 Score: 0.66 Rank: 1 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Almonds [F4300] (Low/high susceptibility)	0	0	0	6.59	10.65	14.83
Citrus fruits [T0000]	0	0	0	1.75	3.05	4.62
Grapes for table use [W1200]	0	0	0	0.26	0.52	0.99
Grapes for wines [W1100]	0	0	0	0.91	1.55	2.32
Olives [01000] (Low/high susceptibility)	0	0	0	14.36	18.08	21.73

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1300	2000	3000
Detection Time (m)	42.9	54.7	68.4

Indicator Values:

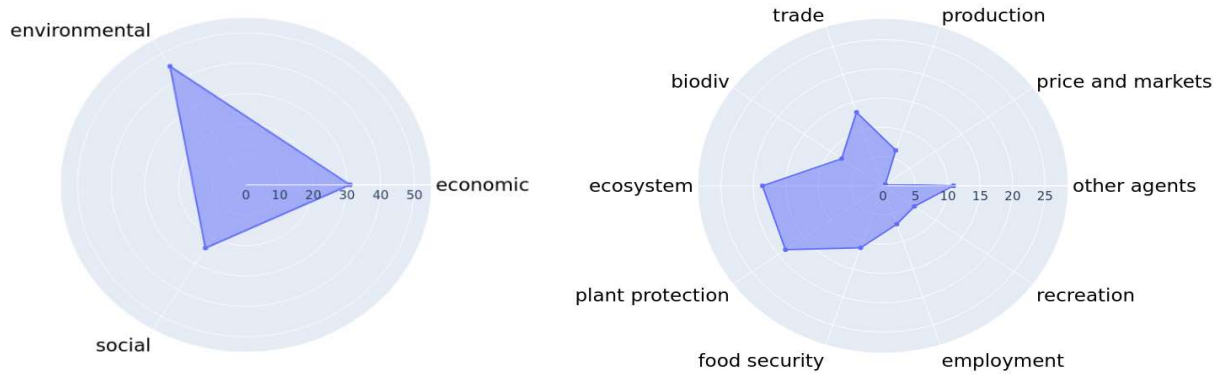
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	7057.44	94.8%
I.2 Share of EU production value affected (%)	53.04	79.3%
I.3 Difficulty of eradication (meters)	9116.67	2.1%
I.4. Number of importing countries banning trade (#)	143	91.1%
I.5 Value of export losses (Million Euros)	1376.45	11.8%
I.6 Share of export losses over total production (%)	2.17	10.7%
I.7 Trade dispersion (dimensionless)	0.79	83.5%
I.8 Change in domestic price (%)	109.15	93.4%
I.9 Change in domestic production over imports (%)	857326.9	100.0%
I.10 Upstream effect (Million Euros)	17063.48	100.0%
I.11 Downstream effect (%)	92.4	100.0%
I.12 Number of jobs lost (#)	540608.3	100.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.56	19.9%
I.14c Share of protein supply (g/capita/day) (%)	0.36	13.3%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.99	100.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.86	96.1%
I.18 Number of products covered by EU quality labels (#)	64	82.1%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	59	100.0%
I.20 Loss in EU ecosystem service flow (%)	1.8	20.7%
I.21 Loss in EU community biodiversity (%)	0.0056	9.3%
I.22 EU protected areas with host plants (%)	6.1	30.7%
I.23 Weighted count of IUCN host species (#)	16	100.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

Listronotus bonariensis

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.59 Rank: 2 Max Rank: 1

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Cereals (excluding rice) for the production of grain	0	0	0	7.54	11.4	17.19
Permanent grassland [J0000]	0	0	0	9.74	19.02	31.64

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	8100	15700	27100
Detection Time (m)	40.8	68.4	103.2

Indicator Values:

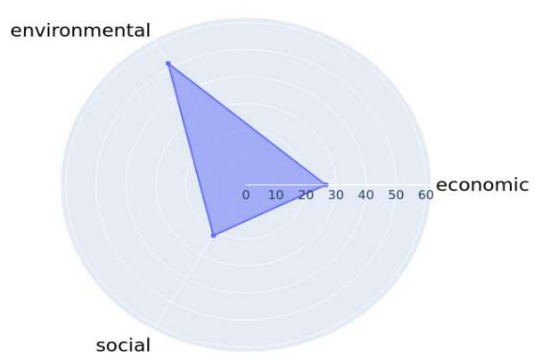
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	7448.3	100.0%
I.2 Share of EU production value affected (%)	12.75	19.1%
I.3 Difficulty of eradication (meters)	89490	20.2%
I.4. Number of importing countries banning trade (#)	157	100.0%
I.5 Value of export losses (Million Euros)	11701.06	100.0%
I.6 Share of export losses over total production (%)	16.28	80.4%
I.7 Trade dispersion (dimensionless)	0.94	100.0%
I.8 Change in domestic price (%)	8.79	7.5%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	16998.91	99.6%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	200684.2	37.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	2.81	100.0%
I.14c Share of protein supply (g/capita/day) (%)	2.71	100.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.39	40.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.84	96.1%
I.18 Number of products covered by EU quality labels (#)	8	10.3%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	5.5	9.3%
I.20 Loss in EU ecosystem service flow (%)	8.7	100.0%
I.21 Loss in EU community biodiversity (%)	0.0603	100.0%
I.22 EU protected areas with host plants (%)	5.4	27.1%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

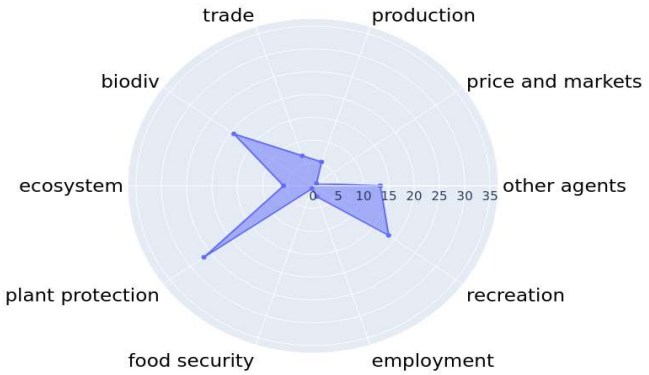
Popillia japonica

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.41 Rank: 3 Max Rank: 2

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Grain maize and corn-cob-mix [C1500]	0	0	0	0.39	0.78	1.4
Grapes [W1000]	0	0	0	2.96	5.06	8.01
Other vegetables cultivated for fruit n.e.c. [V3900] (Sweet	0	0	0	0.34	0.68	1.23
Stone fruits [F1200] - Cherries [F1240]	0	0	0	1.74	2.78	4.08
Strawberries [S0000] + Berries (excluding	0	0	0	10.09	18.32	29.19
Turf	0	0	0	1.09	2.18	3.67

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	4000	7000	10000
Detection Time (m)	72	84	108

Indicator Values:

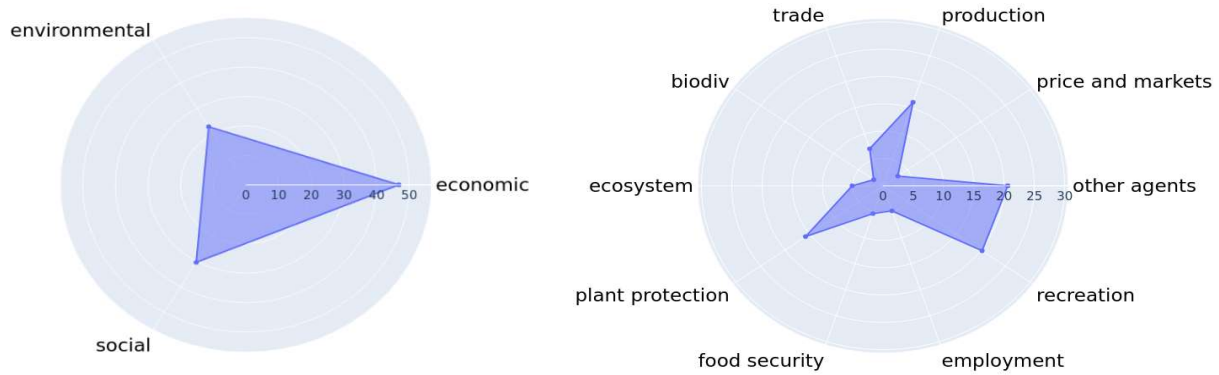
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	3403.85	45.7%
I.2 Share of EU production value affected (%)	18.69	27.9%
I.3 Difficulty of eradication (meters)	49000	11.1%
I.4. Number of importing countries banning trade (#)	156	99.4%
I.5 Value of export losses (Million Euros)	2977.7	25.4%
I.6 Share of export losses over total production (%)	5.59	27.7%
I.7 Trade dispersion (dimensionless)	0.9	95.2%
I.8 Change in domestic price (%)	11.21	9.6%
I.9 Change in domestic production over imports (%)	125.54	0.0%
I.10 Upstream effect (Million Euros)	5730.16	33.6%
I.11 Downstream effect (%)	92.4	100.0%
I.12 Number of jobs lost (#)	50932.05	9.4%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.13	4.7%
I.14c Share of protein supply (g/capita/day) (%)	0.06	2.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.04	3.6%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.61	95.2%
I.18 Number of products covered by EU quality labels (#)	41	52.6%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	48.88	82.8%
I.20 Loss in EU ecosystem service flow (%)	1.9	21.8%
I.21 Loss in EU community biodiversity (%)	0.0349	57.9%
I.22 EU protected areas with host plants (%)	19.9	100.0%
I.23 Weighted count of IUCN host species (#)	9.6	60.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

Spodoptera litura

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.35 Rank: 4 Max Rank: 3

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Eggplants [V3410]	0	0	0	4.67	8.53	13.13
Grapes [W1000]	0	0	0	4.12	7.78	12.6
Peppers (capsicum) [V3600]	0	0	0	5.19	9.48	14.59
Potatoes (including seed potatoes) [R1000]	0	0	0	8.4	16.2	25.7
Soya [I1130]	0	0	0	5.92	9.13	12.84
Tobacco [I3000]	0	0	0	4.09	7.46	11.6
Tomatoes [V3100]	0	0	0	6.22	11.38	17.51

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	420900	700700	1035700
Detection Time (m)	3.9	6.2	8.7

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	7396.66	99.3%
I.2 Share of EU production value affected (%)	16.2	24.2%
I.3 Difficulty of eradication (meters)	362028.3	81.8%
I.4. Number of importing countries banning trade (#)	135	86.0%
I.5 Value of export losses (Million Euros)	3127.88	26.7%
I.6 Share of export losses over total production (%)	2.46	12.2%
I.7 Trade dispersion (dimensionless)	0.88	93.5%
I.8 Change in domestic price (%)	30.7	26.3%
I.9 Change in domestic production over imports (%)	1163.24	0.1%
I.10 Upstream effect (Million Euros)	12606.43	73.9%
I.11 Downstream effect (%)	92.4	100.0%
I.12 Number of jobs lost (#)	82767.6	15.3%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.8	28.5%
I.14c Share of protein supply (g/capita/day) (%)	0.82	30.1%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.1	9.7%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.86	96.2%
I.18 Number of products covered by EU quality labels (#)	58	74.4%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	23.12	39.2%
I.20 Loss in EU ecosystem service flow (%)	1.4	16.1%
I.21 Loss in EU community biodiversity (%)	0.002	3.3%
I.22 EU protected areas with host plants (%)	0.35	1.8%
I.23 Weighted count of IUCN host species (#)	2.07	12.9%
I.24 Increase in pesticide use (level)	0.05	50.0%

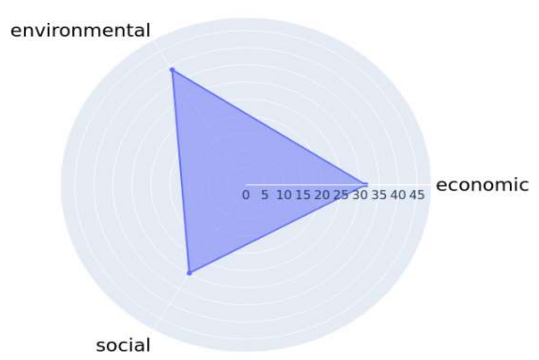
Thaumatotibia leucotreta

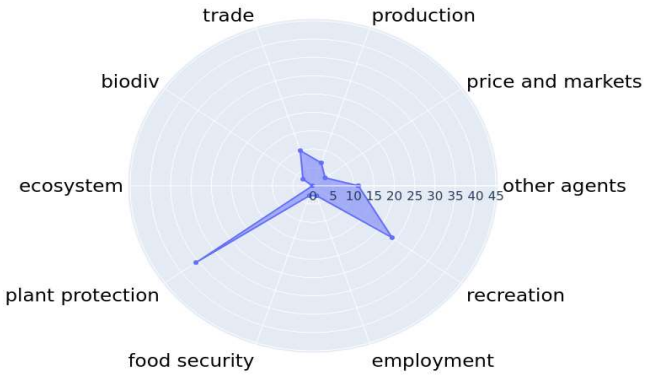
Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 0.31 Rank: 5 Max Rank: 4

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Avocados [F2300]	0	0	0	1.03	1.71	2.41
Citrus fruits [T0000] excluding Lemons and acid limes [T3000]	0	0	0	5.7	7.74	10.05
Fruits from subtropical and tropical climate zones [F2000]	0	0	0	4.94	7.35	10.26
Grain maize and corn-cob-mix [C1500]	0	0	0	0.46	1.31	2.79
Other vegetables cultivated for fruit n.e.c. [V3900] (Sweet corn)	0	0	0	3.61	5.72	8.36
Peaches and nectarines [F1210_1220]	0	0	0	5.56	8.28	11.55
Peppers (capsicum) [V3600]	0	0	0	5.5	8.72	12.65

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	836	1409	2375
Detection Time (m)	9.6	16.1	24.1

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	2717.63	36.5%
I.2 Share of EU production value affected (%)	26.17	39.1%
I.3 Difficulty of eradication (meters)	1890.41	0.4%
I.4. Number of importing countries banning trade (#)	119	75.8%
I.5 Value of export losses (Million Euros)	3335.62	28.5%
I.6 Share of export losses over total production (%)	7.43	36.7%
I.7 Trade dispersion (dimensionless)	0.9	95.1%
I.8 Change in domestic price (%)	33.25	28.4%
I.9 Change in domestic production over imports (%)	101.13	0.0%
I.10 Upstream effect (Million Euros)	4737.65	27.8%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	43600.72	8.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.42	15.0%
I.14c Share of protein supply (g/capita/day) (%)	0.19	7.2%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.1	10.2%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	26.9	100.0%
I.18 Number of products covered by EU quality labels (#)	41	52.6%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	30	50.8%
I.20 Loss in EU ecosystem service flow (%)	0.03	0.4%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0.26	1.3%
I.23 Weighted count of IUCN host species (#)	3.9	24.4%
I.24 Increase in pesticide use (level)	0.1	100.0%

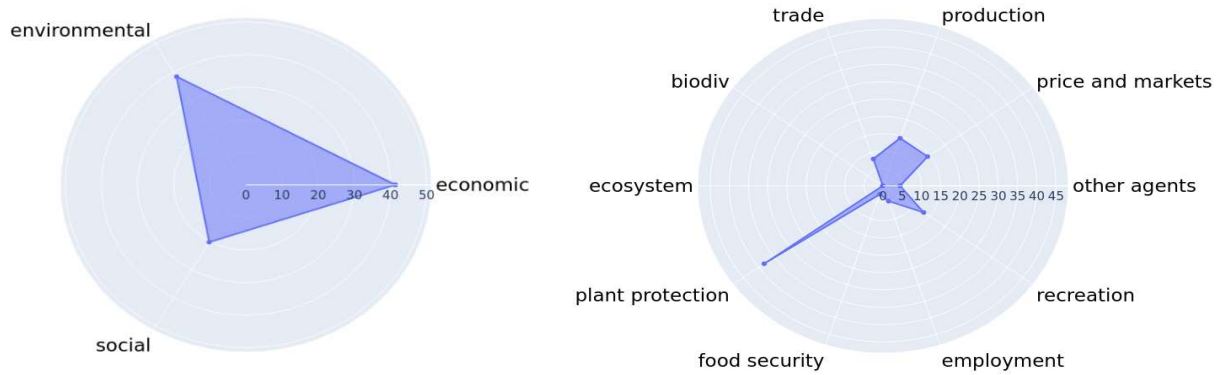
Candidatus liberibacter

Pest affecting: Crops

Type of organism: Bacteria

I2P2 Score: 0.29 Rank: 6 Max Rank: 4

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	14.07	19.82	24.3

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	8000	15000	22000
Detection Time (m)	14.2	20.1	27.3

Indicator Values:

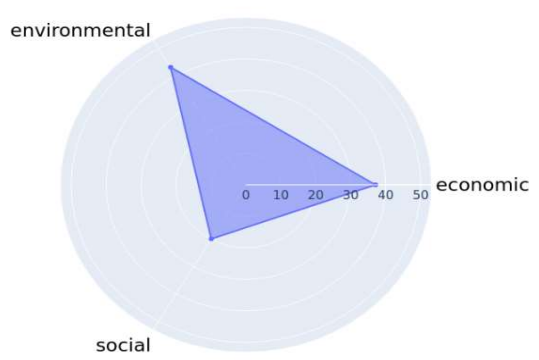
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	3400.92	45.7%
I.2 Share of EU production value affected (%)	66.9	100.0%
I.3 Difficulty of eradication (meters)	25125	5.7%
I.4. Number of importing countries banning trade (#)	96	61.1%
I.5 Value of export losses (Million Euros)	881.47	7.5%
I.6 Share of export losses over total production (%)	7.71	38.1%
I.7 Trade dispersion (dimensionless)	0.8	85.0%
I.8 Change in domestic price (%)	116.91	100.0%
I.9 Change in domestic production over imports (%)	300.75	0.0%
I.10 Upstream effect (Million Euros)	5360.35	31.4%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	66144.19	12.2%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.44	15.8%
I.14c Share of protein supply (g/capita/day) (%)	0.21	7.7%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.04	4.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.65	91.6%
I.18 Number of products covered by EU quality labels (#)	23	29.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	12.12	20.6%
I.20 Loss in EU ecosystem service flow (%)	0.02	0.2%
I.21 Loss in EU community biodiversity (%)	0.00019	0.3%
I.22 EU protected areas with host plants (%)	0.04	0.2%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

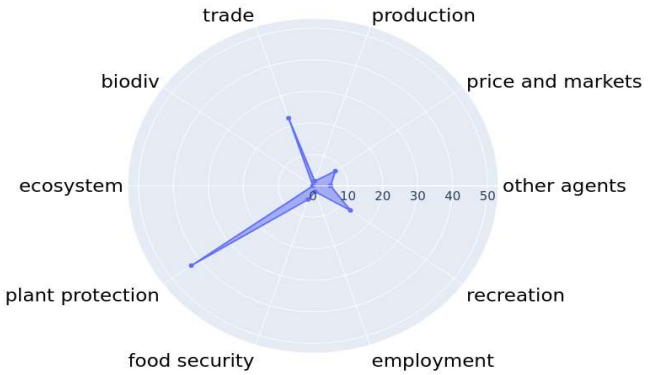
Porphyrophora tritici

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.25 Rank: 7 Max Rank: 6

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Barley [C1300]	0	0	0	1.25	2.41	4.33
Wheat and spelt [C1100]	0	0	0	1.25	2.41	4.33

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	9.1	50.3	164.5
Detection Time (m)	78	120	165.6

Indicator Values:

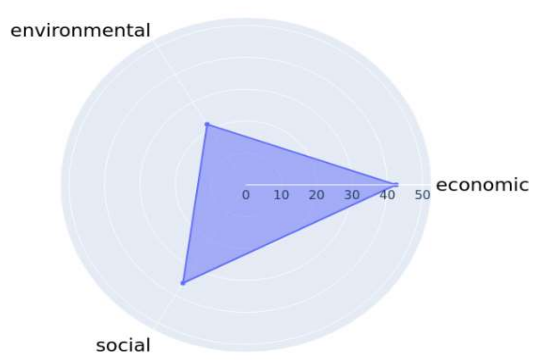
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1025.55	13.8%
I.2 Share of EU production value affected (%)	2.5	3.7%
I.3 Difficulty of eradication (meters)	503	0.1%
I.4. Number of importing countries banning trade (#)	139	88.5%
I.5 Value of export losses (Million Euros)	9542.13	81.5%
I.6 Share of export losses over total production (%)	20.23	100.0%
I.7 Trade dispersion (dimensionless)	0.93	98.8%
I.8 Change in domestic price (%)	58.1	49.7%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	2407.99	14.1%
I.11 Downstream effect (%)	20.84	22.6%
I.12 Number of jobs lost (#)	24940.48	4.6%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.5	17.9%
I.14c Share of protein supply (g/capita/day) (%)	0.49	18.1%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.07	7.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.84	96.1%
I.18 Number of products covered by EU quality labels (#)	7	9.0%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	3.75	6.4%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

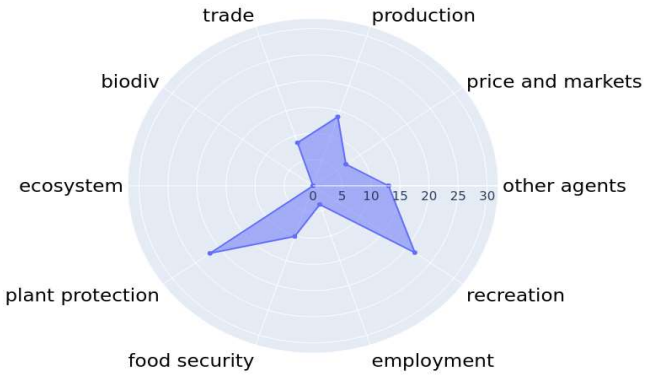
Ralstonia pseudosolanacearum

Pest affecting: Crops
Type of organism: Bacteria

I2P2 Score: 0.25 Rank: 8 Max Rank: 5

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Eggplants [V3410]	0	0	0	13.33	17.73	22.2
Peppers (capsicum) [V3600]	0	0	0	14.81	19.7	24.67
Potatoes (including seed potatoes) [R1000]	0	0	0	13.1	18.9	25.3
Tomatoes [V3100]	0	0	0	17.78	23.64	29.6

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	436	765	1191
Detection Time (m)	0.533333333	0.7	0.866666667

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	6565.64	88.1%
I.2 Share of EU production value affected (%)	26.6	39.8%
I.3 Difficulty of eradication (meters)	44.62	0.0%
I.4. Number of importing countries banning trade (#)	106	67.5%
I.5 Value of export losses (Million Euros)	1832.36	15.7%
I.6 Share of export losses over total production (%)	2.52	12.4%
I.7 Trade dispersion (dimensionless)	0.86	91.1%
I.8 Change in domestic price (%)	50.36	43.1%
I.9 Change in domestic production over imports (%)	1403.88	0.2%
I.10 Upstream effect (Million Euros)	11090.77	65.0%
I.11 Downstream effect (%)	18.22	19.7%
I.12 Number of jobs lost (#)	46531.21	8.6%
I.13c Share of caloric supply (kcal/capita/day) (%)	1.05	37.3%
I.14c Share of protein supply (g/capita/day) (%)	1.17	43.2%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.13	12.7%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.86	96.2%
I.18 Number of products covered by EU quality labels (#)	45	57.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	7.38	12.5%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

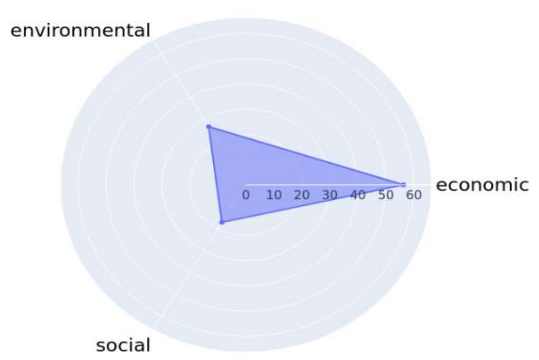
Helicoverpa zea

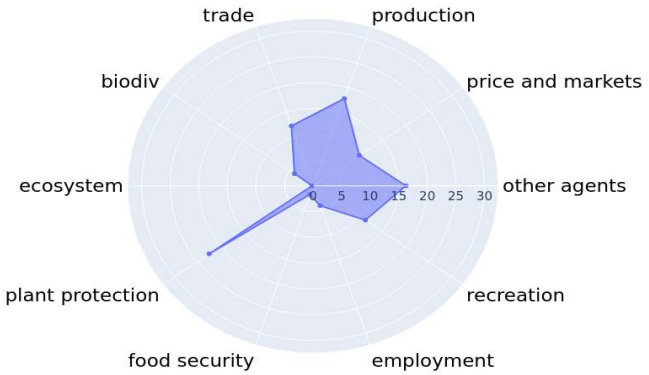
Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 0.24 Rank: 9 Max Rank: 4

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Cotton fibre [I2300]	0	0	0	2.09	3.41	4.97
Grain maize and corn-cob-mix [C1500]	0	0	0	0.78	1.63	3.03
Soya [I1130]	0	0	0	2.52	4.41	7.56
Tomatoes [V3100]	0	0	0	19.91	31.47	44.09

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	289200	630000	1164000
Detection Time (m)	2	3.4	5.4

Indicator Values:

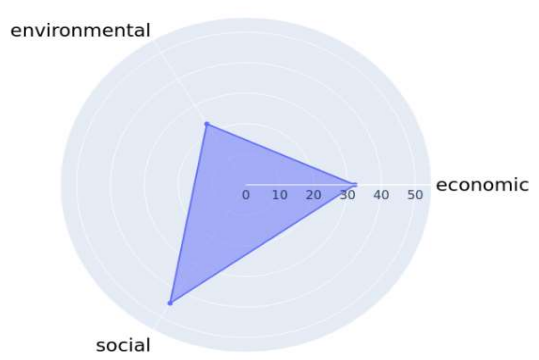
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	4968.21	66.7%
I.2 Share of EU production value affected (%)	35.4	52.9%
I.3 Difficulty of eradication (meters)	178500	40.3%
I.4. Number of importing countries banning trade (#)	122	77.7%
I.5 Value of export losses (Million Euros)	2933.9	25.1%
I.6 Share of export losses over total production (%)	6.82	33.7%
I.7 Trade dispersion (dimensionless)	0.9	95.5%
I.8 Change in domestic price (%)	70.15	60.0%
I.9 Change in domestic production over imports (%)	755.05	0.1%
I.10 Upstream effect (Million Euros)	6923.28	40.6%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	49051.59	9.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.16	5.6%
I.14c Share of protein supply (g/capita/day) (%)	0.2	7.5%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.03	3.4%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.1	93.3%
I.18 Number of products covered by EU quality labels (#)	7	9.0%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	2.88	4.9%
I.20 Loss in EU ecosystem service flow (%)	0.03	0.4%
I.21 Loss in EU community biodiversity (%)	0.00034	0.6%
I.22 EU protected areas with host plants (%)	2.52	12.7%
I.23 Weighted count of IUCN host species (#)	2.16	13.5%
I.24 Increase in pesticide use (level)	0.05	50.0%

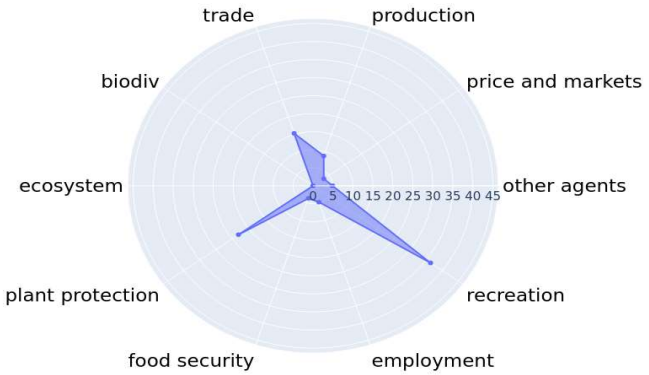
Conotrachelus nenuphar

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.24 Rank: 10 Max Rank: 3

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Pome fruits [F1100]	0	0	0	14.1	23.7	35.6
Stone fruits [F1200]	0	0	0	12.53	21.07	31.64

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	247	413	618
Detection Time (m)	60	88.8	121.2

Indicator Values:

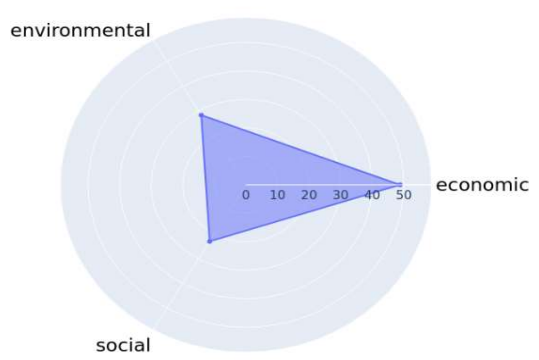
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	3077.29	41.3%
I.2 Share of EU production value affected (%)	23.7	35.4%
I.3 Difficulty of eradication (meters)	3056.2	0.7%
I.4. Number of importing countries banning trade (#)	151	96.2%
I.5 Value of export losses (Million Euros)	2465.91	21.1%
I.6 Share of export losses over total production (%)	13.38	66.1%
I.7 Trade dispersion (dimensionless)	0.91	96.0%
I.8 Change in domestic price (%)	23.69	20.3%
I.9 Change in domestic production over imports (%)	207.57	0.0%
I.10 Upstream effect (Million Euros)	4850.26	28.4%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	56072.71	10.4%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.42	14.9%
I.14c Share of protein supply (g/capita/day) (%)	0.15	5.4%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.12	12.1%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.25	93.9%
I.18 Number of products covered by EU quality labels (#)	78	100.0%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	41.62	70.6%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

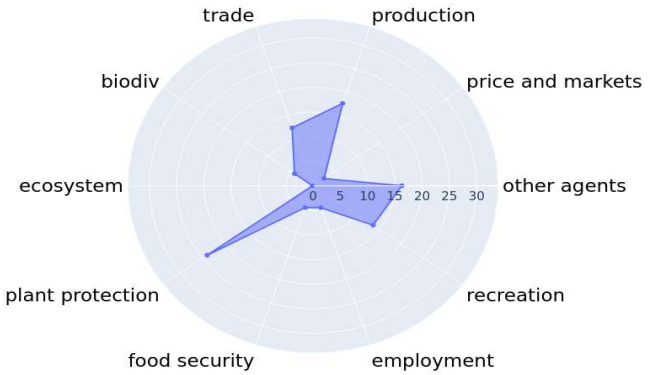
Diabrotica undecimpunctata howardi

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.23 Rank: 11 Max Rank: 7

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Courgettes and marrows [V3420]	0	0	0	7.5	12.96	20.56
Cucumbers [V3200]	0	0	0	8.1	14	22.2
Gherkins [V3300]	0	0	0	5.7	9.85	15.62
Gourds and pumpkins [V3430]	0	0	0	6	10.37	16.44
Grain maize and corn-cob-mix [C1500]	0	0	0	7.47	11.59	16.33
Muskmelons [V3510]	0	0	0	4.8	8.3	13.16
Watermelons [V3520]	0	0	0	5.1	8.81	13.98

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	241600	469300	792000
Detection Time (m)	5.1	10.1	17.2

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	2806.96	37.7%
I.2 Share of EU production value affected (%)	14.9	22.3%
I.3 Difficulty of eradication (meters)	394994.2	89.3%
I.4. Number of importing countries banning trade (#)	128	81.5%
I.5 Value of export losses (Million Euros)	2118.82	18.1%
I.6 Share of export losses over total production (%)	7.24	35.8%
I.7 Trade dispersion (dimensionless)	0.89	94.0%
I.8 Change in domestic price (%)	17.5	15.0%
I.9 Change in domestic production over imports (%)	82.3	0.0%
I.10 Upstream effect (Million Euros)	5895.47	34.6%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	53044.56	9.8%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.41	14.4%
I.14c Share of protein supply (g/capita/day) (%)	0.46	17.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.08	8.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.1	93.3%
I.18 Number of products covered by EU quality labels (#)	12	15.4%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	4.62	7.8%
I.20 Loss in EU ecosystem service flow (%)	0.02	0.2%
I.21 Loss in EU community biodiversity (%)	0.00202	3.3%
I.22 EU protected areas with host plants (%)	3.9	19.6%
I.23 Weighted count of IUCN host species (#)	0.52	3.2%
I.24 Increase in pesticide use (level)	0.05	50.0%

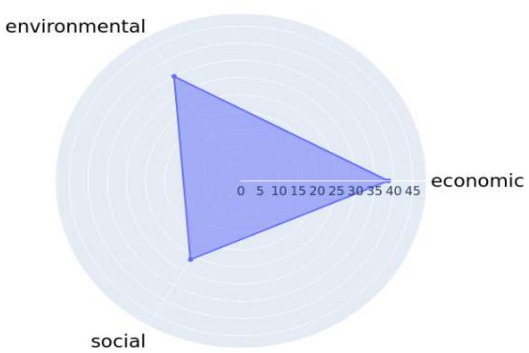
Spodoptera frugiperda

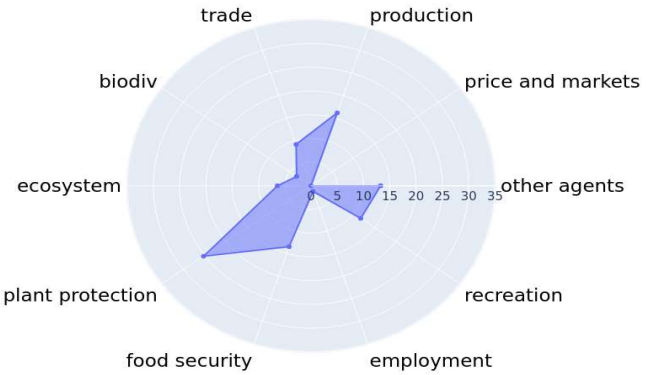
Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 0.22 Rank: 12 Max Rank: 10

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Grain maize and corn-cob-mix [C1500]	0	0	0	1.32	2.7	4.74
Green maize [G3000] (Forage maize and biofuel)	0	0	0	0.87	1.51	2.38
Other vegetables cultivated for fruit n.e.c. [V3900] (Sweet	0	0	0	3.21	6.17	10.18
Rice [C2000]	0	0	0	0.88	1.57	2.48
Sorghum [C1700]	0	0	0	0.95	1.96	3.44

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	674900	931700	1178700
Detection Time (m)	4.2	5.7	7.3

Indicator Values:

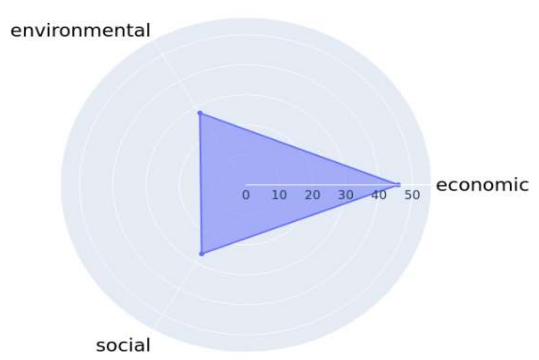
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1141.9	15.3%
I.2 Share of EU production value affected (%)	10.33	15.4%
I.3 Difficulty of eradication (meters)	442557.5	100.0%
I.4. Number of importing countries banning trade (#)	56	35.7%
I.5 Value of export losses (Million Euros)	1565.5	13.4%
I.6 Share of export losses over total production (%)	1.42	7.0%
I.7 Trade dispersion (dimensionless)	0.86	91.2%
I.8 Change in domestic price (%)	1.4	1.2%
I.9 Change in domestic production over imports (%)	9.81	0.0%
I.10 Upstream effect (Million Euros)	2396.84	14.0%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	13457.03	2.5%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.11	3.7%
I.14c Share of protein supply (g/capita/day) (%)	0.07	2.5%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.01	1.2%
I.16c Ability to produce fungal toxins (y=1/n=0)	1	100.0%
I.17 Share of holdings with other gainful activities (%)	24.58	91.4%
I.18 Number of products covered by EU quality labels (#)	11	14.1%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	2.5	4.2%
I.20 Loss in EU ecosystem service flow (%)	1.1	12.6%
I.21 Loss in EU community biodiversity (%)	0.0024	4.0%
I.22 EU protected areas with host plants (%)	3.2	16.1%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

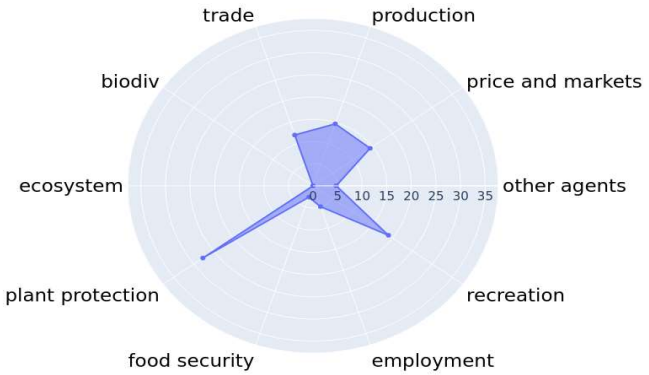
Phyllosticta citricarpa

Pest affecting: Crops
Type of organism: Fungi

I2P2 Score: 0.20 Rank: 13 Max Rank: 12

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	9.48	14.52	19.26

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	384	1018	2163
Detection Time (m)	11	20	32

Indicator Values:

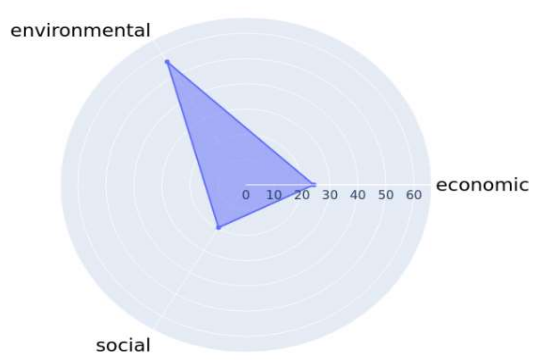
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	2490.96	33.4%
I.2 Share of EU production value affected (%)	49	73.2%
I.3 Difficulty of eradication (meters)	1696.67	0.4%
I.4. Number of importing countries banning trade (#)	110	70.1%
I.5 Value of export losses (Million Euros)	898.98	7.7%
I.6 Share of export losses over total production (%)	7.86	38.8%
I.7 Trade dispersion (dimensionless)	0.81	85.8%
I.8 Change in domestic price (%)	81.26	69.5%
I.9 Change in domestic production over imports (%)	209.04	0.0%
I.10 Upstream effect (Million Euros)	3926.11	23.0%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	48446.42	9.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.33	11.6%
I.14c Share of protein supply (g/capita/day) (%)	0.15	5.6%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.03	2.9%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.65	91.6%
I.18 Number of products covered by EU quality labels (#)	23	29.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	12.12	20.6%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

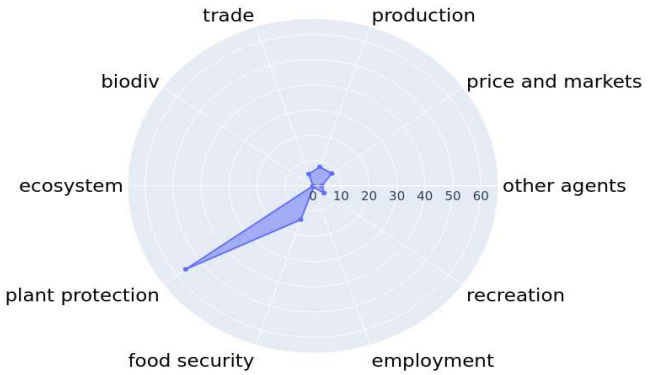
Anthonomus eugenii

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.19 Rank: 14 Max Rank: 7

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Peppers (capsicum) [V3600] (Indoor/outdoor)	0	0	0	11.86	21.88	32.97

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	878	1548	2424
Detection Time (m)	13.2	19.2	27.6

Indicator Values:

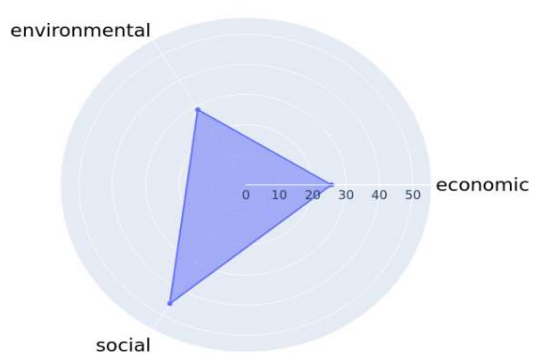
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	874.31	11.7%
I.2 Share of EU production value affected (%)	30.54	45.6%
I.3 Difficulty of eradication (meters)	2476.8	0.6%
I.4. Number of importing countries banning trade (#)	90	57.3%
I.5 Value of export losses (Million Euros)	578.99	4.9%
I.6 Share of export losses over total production (%)	9.42	46.6%
I.7 Trade dispersion (dimensionless)	0.41	43.3%
I.8 Change in domestic price (%)	46.77	40.0%
I.9 Change in domestic production over imports (%)	261.51	0.0%
I.10 Upstream effect (Million Euros)	1900.99	11.1%
I.11 Downstream effect (%)	9.42	10.2%
I.12 Number of jobs lost (#)	5643.17	1.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.01	0.3%
I.14c Share of protein supply (g/capita/day) (%)	0.01	0.3%
I.15c Share of fat supply quantity (g/capita/day) (%)	0	0.2%
I.16c Ability to produce fungal toxins (y=1/n=0)	1	100.0%
I.17 Share of holdings with other gainful activities (%)	22.55	83.8%
I.18 Number of products covered by EU quality labels (#)	13	16.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

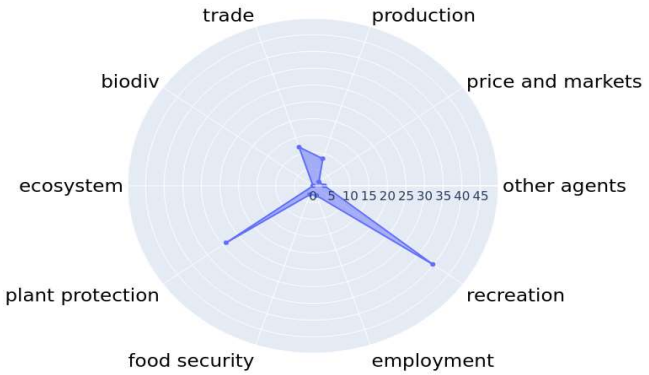
Bactrocera zonata

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.19 Rank: 15 Max Rank: 8

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	1.6	3.26	5.66
Other fruits from subtropical and tropical climate zones	0	0	0	3.69	5.32	7.38
Stone fruits [F1200]	0	0	0	3.93	5.68	7.86

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	4200	7700	12400
Detection Time (m)	43.1	81.5	138.2

Indicator Values:

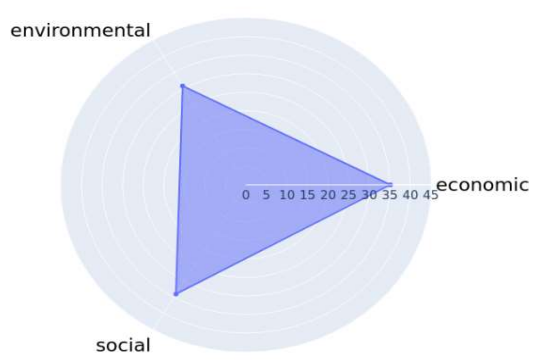
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1569.6	21.1%
I.2 Share of EU production value affected (%)	19.04	28.5%
I.3 Difficulty of eradication (meters)	52295.83	11.8%
I.4. Number of importing countries banning trade (#)	137	87.3%
I.5 Value of export losses (Million Euros)	1412.65	12.1%
I.6 Share of export losses over total production (%)	6.33	31.3%
I.7 Trade dispersion (dimensionless)	0.81	85.7%
I.8 Change in domestic price (%)	11.94	10.2%
I.9 Change in domestic production over imports (%)	39.16	0.0%
I.10 Upstream effect (Million Euros)	2473.92	14.5%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	28929.91	5.4%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.25	8.8%
I.14c Share of protein supply (g/capita/day) (%)	0.11	4.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.07	6.9%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.31	94.1%
I.18 Number of products covered by EU quality labels (#)	63	80.8%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	34.88	59.1%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

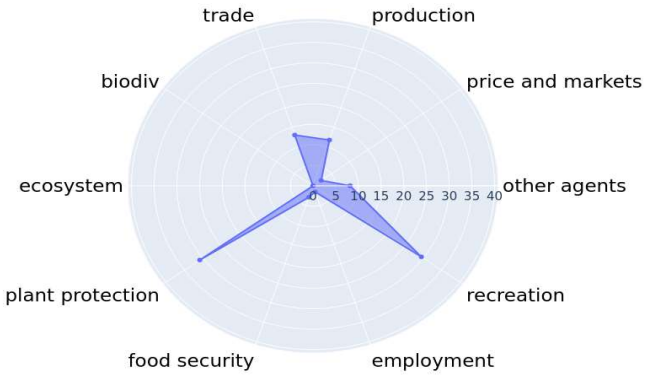
Bactericera cockerelli

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.18 Rank: 16 Max Rank: 10

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Peppers (capsicum) [V3600]	0	0	0	1.85	2.96	4.37
Potatoes (including seed potatoes) [R1000]	0	0	0	4.9	8.2	12.7
Tomatoes [V3100]	0	0	0	4.36	7.38	11.02

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	50000	104000	219000
Detection Time (m)	14.9	19.3	25

Indicator Values:

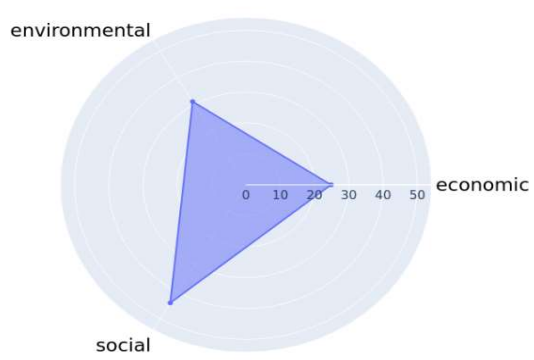
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	2147.75	28.8%
I.2 Share of EU production value affected (%)	8.3	12.4%
I.3 Difficulty of eradication (meters)	167266.7	37.8%
I.4. Number of importing countries banning trade (#)	141	89.8%
I.5 Value of export losses (Million Euros)	1841.64	15.7%
I.6 Share of export losses over total production (%)	2.78	13.8%
I.7 Trade dispersion (dimensionless)	0.89	94.7%
I.8 Change in domestic price (%)	12.49	10.7%
I.9 Change in domestic production over imports (%)	473.22	0.1%
I.10 Upstream effect (Million Euros)	3626.79	21.3%
I.11 Downstream effect (%)	18.22	19.7%
I.12 Number of jobs lost (#)	14166.99	2.6%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.27	9.7%
I.14c Share of protein supply (g/capita/day) (%)	0.22	8.1%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.02	2.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.86	96.2%
I.18 Number of products covered by EU quality labels (#)	42	53.8%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	6.88	11.7%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

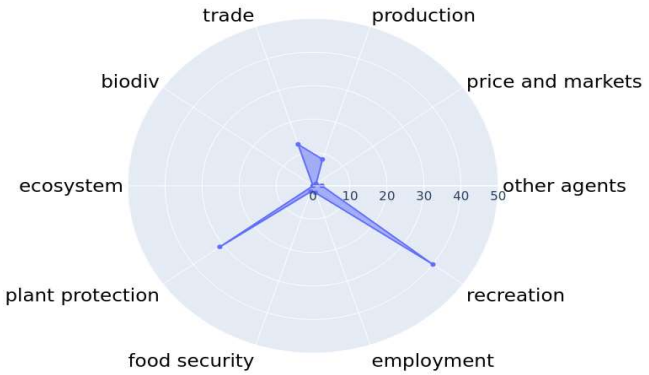
Bactrocera dorsalis

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.17 Rank: 17 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	1.6	3.26	5.66
Other fruits from subtropical and tropical climate zones	0	0	0	3.75	5.41	7.5
Stone fruits [F1200]	0	0	0	1.32	2.41	3.94

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	5200	9600	15400
Detection Time (m)	27.8	55.8	112.1

Indicator Values:

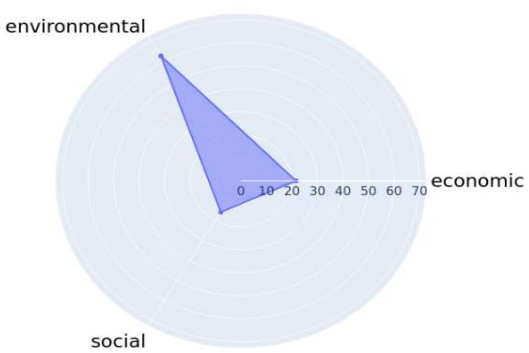
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1164.77	15.6%
I.2 Share of EU production value affected (%)	20.15	30.1%
I.3 Difficulty of eradication (meters)	44640	10.1%
I.4. Number of importing countries banning trade (#)	93	59.2%
I.5 Value of export losses (Million Euros)	1408.84	12.0%
I.6 Share of export losses over total production (%)	6.33	31.3%
I.7 Trade dispersion (dimensionless)	0.81	85.7%
I.8 Change in domestic price (%)	6.47	5.5%
I.9 Change in domestic production over imports (%)	21.23	0.0%
I.10 Upstream effect (Million Euros)	1835.85	10.8%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	19431.41	3.6%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.16	5.8%
I.14c Share of protein supply (g/capita/day) (%)	0.07	2.7%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.04	3.9%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.65	91.6%
I.18 Number of products covered by EU quality labels (#)	63	80.8%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	34.88	59.1%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

Prodiplosis longifila

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.17 Rank: 18 Max Rank: 8

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Asparagus [V2600]	0	0	0	8.79	14.62	22.17
Tomatoes [V3100]	0	0	0	9.16	13.07	17.96

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	701.3	1088.5	1539.4
Detection Time (m)	21.4	34.8	50.4

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	2117.03	28.4%
I.2 Share of EU production value affected (%)	18.8	28.1%
I.3 Difficulty of eradication (meters)	3156.65	0.7%
I.4. Number of importing countries banning trade (#)	140	89.2%
I.5 Value of export losses (Million Euros)	762.71	6.5%
I.6 Share of export losses over total production (%)	2.3	11.4%
I.7 Trade dispersion (dimensionless)	0.48	50.3%
I.8 Change in domestic price (%)	26.82	22.9%
I.9 Change in domestic production over imports (%)	252.95	0.0%
I.10 Upstream effect (Million Euros)	3066.51	18.0%
I.11 Downstream effect (%)	9.42	10.2%
I.12 Number of jobs lost (#)	19294.26	3.6%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.33	11.6%
I.14c Share of protein supply (g/capita/day) (%)	0.51	18.8%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.06	6.2%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	22.35	83.1%
I.18 Number of products covered by EU quality labels (#)	25	32.1%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

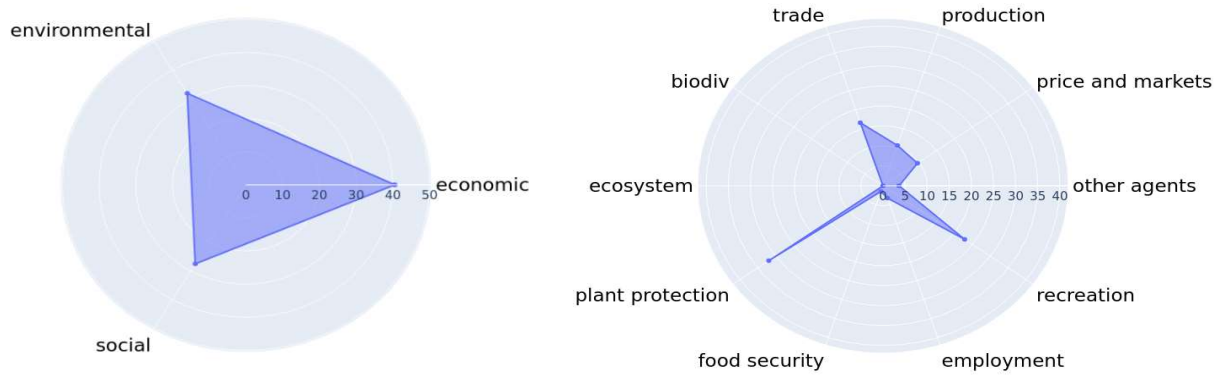
Rhagoletis pomonella

Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 0.17 Rank: 19 Max Rank: 15

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Apples [F1110]	0	0	0	14.05	28.75	46.66

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	390	618	980
Detection Time (m)	25	35	49

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1682.01	22.6%
I.2 Share of EU production value affected (%)	30.42	45.5%
I.3 Difficulty of eradication (meters)	1802.5	0.4%
I.4. Number of importing countries banning trade (#)	140	89.2%
I.5 Value of export losses (Million Euros)	875.3	7.5%
I.6 Share of export losses over total production (%)	8.88	43.9%
I.7 Trade dispersion (dimensionless)	0.91	95.9%
I.8 Change in domestic price (%)	47.8	40.9%
I.9 Change in domestic production over imports (%)	836.83	0.1%
I.10 Upstream effect (Million Euros)	2651.09	15.5%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	27747.37	5.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.18	6.2%
I.14c Share of protein supply (g/capita/day) (%)	0.04	1.3%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.02	2.4%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.62	91.5%
I.18 Number of products covered by EU quality labels (#)	30	38.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	9.75	16.5%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

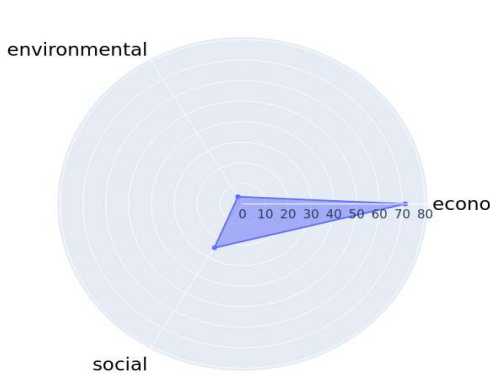
Phymatotrichopsis omnivora

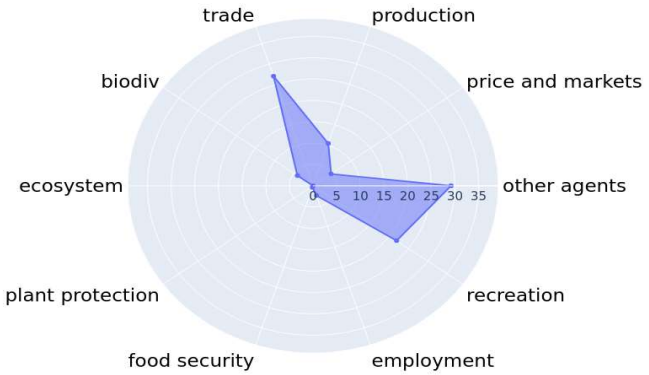
Pest affecting: Crops

Type of organism: Fungi

I2P2 Score: 0.17 Rank: 20 Max Rank: 5

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Apples [F1110]	0	0	0	0.64	1.05	1.55
Cotton fibre [I2300]	0	0	0	1.53	2.48	3.79
Lucerne [G2100]	0	0	0	1.79	2.95	4.39

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	0.6	1.7	3.5
Detection Time (m)	14.4	27.4	45.4

Indicator Values:

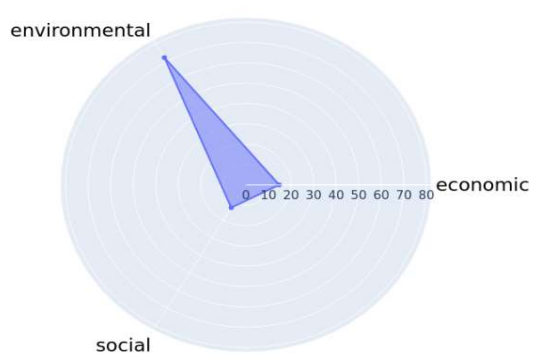
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1153.38	15.5%
I.2 Share of EU production value affected (%)	34.26	51.2%
I.3 Difficulty of eradication (meters)	3.88	0.0%
I.4. Number of importing countries banning trade (#)	157	100.0%
I.5 Value of export losses (Million Euros)	1598.91	13.7%
I.6 Share of export losses over total production (%)	4.24	21.0%
I.7 Trade dispersion (dimensionless)	0.92	97.8%
I.8 Change in domestic price (%)	17.23	14.7%
I.9 Change in domestic production over imports (%)	50778.78	5.9%
I.10 Upstream effect (Million Euros)	3754.3	22.0%
I.11 Downstream effect (%)	91.8	99.3%
I.12 Number of jobs lost (#)	20297.64	3.8%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.03	1.0%
I.14c Share of protein supply (g/capita/day) (%)	0.04	1.6%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.01	0.6%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.34	90.5%
I.18 Number of products covered by EU quality labels (#)	30	38.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	10	16.9%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0.0052	8.6%
I.22 EU protected areas with host plants (%)	0.2	1.0%
I.23 Weighted count of IUCN host species (#)	1.5	9.4%
I.24 Increase in pesticide use (level)	0	0.0%

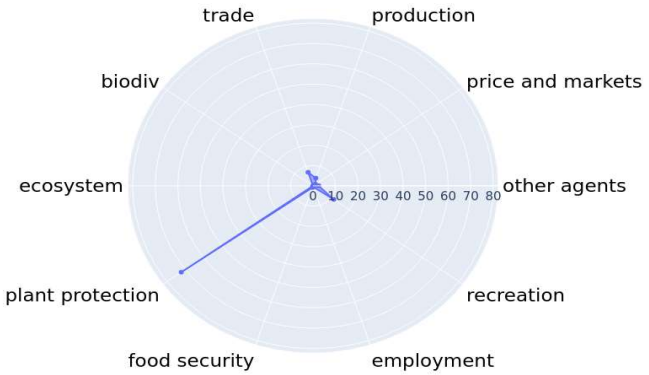
Thrips palmi

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.15 Rank: 21 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Courgettes and marrows [V3420]	0.6	1.31	2.39	1.03	1.46	2.06
Cucumbers [V3200] (Indoor/outdoor)	1.92	4.15	7.59	3.27	4.63	6.55
Eggplants [V3410]	1.58	2.81	4.52	1.03	1.46	2.06
Flowers and ornamental plants (excluding nurseries) [N0000]	0	0	0	0.44	0.96	1.8
Gherkins [V3300]	0.39	0.84	1.53	0.66	0.93	1.32
Gourds and pumpkins [V3430]	0.31	0.67	1.22	0.52	0.74	1.05
Lettuces[V2300] (Indoor/outdoor)	0	0	0	0.25	0.45	0.74
Muskmelons [V3510] plus Watermelons [V3520]	0.6	1.31	2.39	1.03	1.46	2.06
Peppers (capsicum) [V3600] (Indoor/outdoor)	1.58	3.42	6.24	2.7	3.81	5.39
Spinach [V2500]	0	0	0	0.13	0.24	0.39

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	605	1003	1494
Detection Time (m)	8.2	11	14.7

Indicator Values:

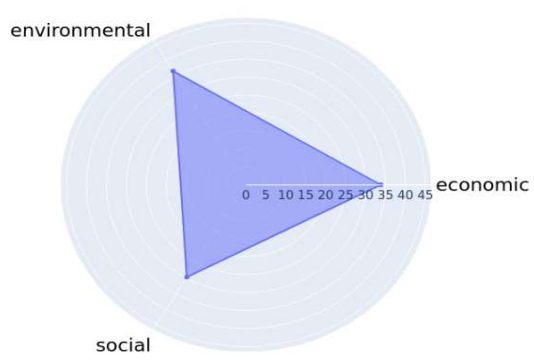
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	685.28	9.2%
I.2 Share of EU production value affected (%)	10.33	15.4%
I.3 Difficulty of eradication (meters)	919.42	0.2%
I.4. Number of importing countries banning trade (#)	85	54.1%
I.5 Value of export losses (Million Euros)	1588.39	13.6%
I.6 Share of export losses over total production (%)	6.84	33.8%
I.7 Trade dispersion (dimensionless)	0.46	49.1%
I.8 Change in domestic price (%)	7.03	6.0%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	905.13	5.3%
I.11 Downstream effect (%)	9.42	10.2%
I.12 Number of jobs lost (#)	5442.03	1.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.05	1.8%
I.14c Share of protein supply (g/capita/day) (%)	0.08	3.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.01	1.0%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	22.04	81.9%
I.18 Number of products covered by EU quality labels (#)	31	39.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	4.88	8.3%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.1	100.0%

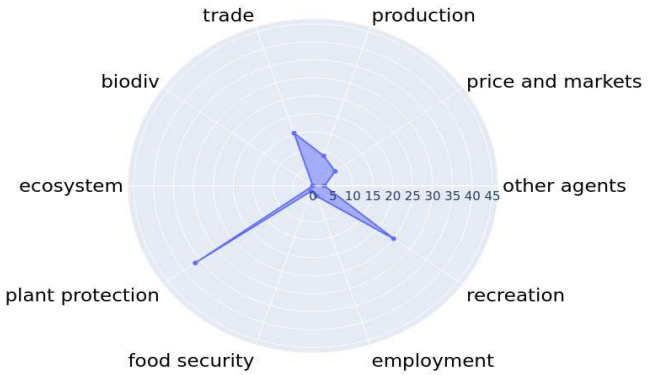
Xanthomonas citri

Pest affecting: Crops
Type of organism: Bacteria

I2P2 Score: 0.15 Rank: 22 Max Rank: 18

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	4.65	6.81	9.54

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	57	119	212
Detection Time (m)	13	17	21

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	1169.23	15.7%
I.2 Share of EU production value affected (%)	23	34.4%
I.3 Difficulty of eradication (meters)	168.58	0.0%
I.4. Number of importing countries banning trade (#)	94	59.9%
I.5 Value of export losses (Million Euros)	872.76	7.5%
I.6 Share of export losses over total production (%)	7.63	37.7%
I.7 Trade dispersion (dimensionless)	0.8	84.7%
I.8 Change in domestic price (%)	30.35	26.0%
I.9 Change in domestic production over imports (%)	78.08	0.0%
I.10 Upstream effect (Million Euros)	1842.87	10.8%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	22740.16	4.2%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.15	5.4%
I.14c Share of protein supply (g/capita/day) (%)	0.07	2.6%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.01	1.4%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.65	91.6%
I.18 Number of products covered by EU quality labels (#)	23	29.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	12.12	20.6%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0.00001	0.0%
I.22 EU protected areas with host plants (%)	0.04	0.2%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

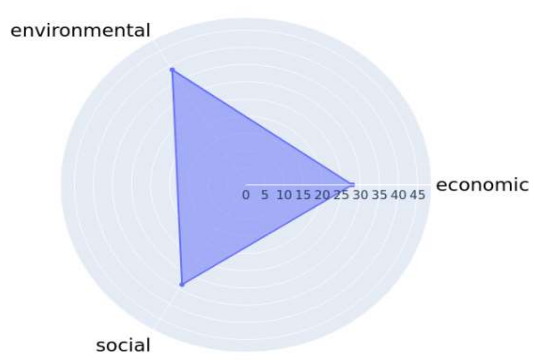
Anastrepha ludens

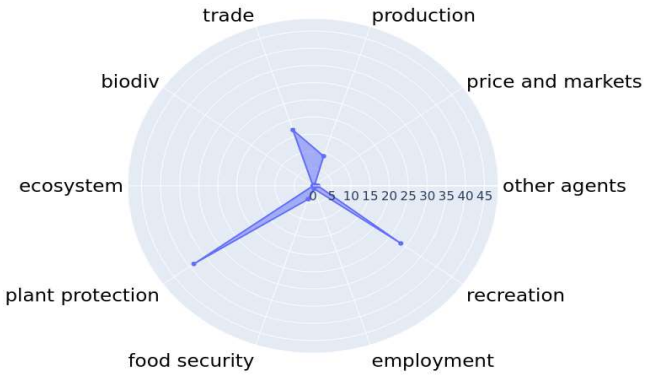
Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 0.14 Rank: 23 Max Rank: 16

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Citrus fruits [T0000]	0	0	0	0.89	1.45	2.4
Other fruits from subtropical and tropical climate zones	0	0	0	3.69	5.32	7.38

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	3800	6300	9700
Detection Time (m)	66.5	117.9	191.3

Indicator Values:

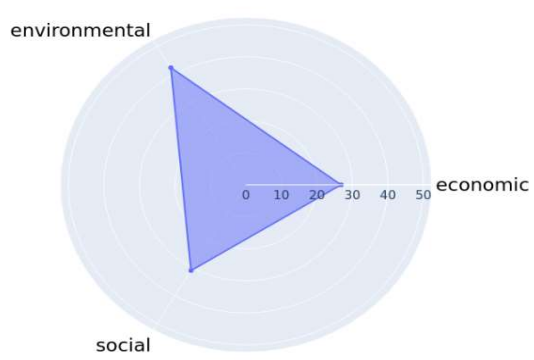
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	511.55	6.9%
I.2 Share of EU production value affected (%)	19.04	28.5%
I.3 Difficulty of eradication (meters)	61897.5	14.0%
I.4. Number of importing countries banning trade (#)	122	77.7%
I.5 Value of export losses (Million Euros)	1014.51	8.7%
I.6 Share of export losses over total production (%)	7.79	38.5%
I.7 Trade dispersion (dimensionless)	0.82	86.5%
I.8 Change in domestic price (%)	3.56	3.0%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	806.28	4.7%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	6702.31	1.2%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.26	9.2%
I.14c Share of protein supply (g/capita/day) (%)	0.11	4.1%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.08	8.5%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.03	93.0%
I.18 Number of products covered by EU quality labels (#)	23	29.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	12.12	20.6%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

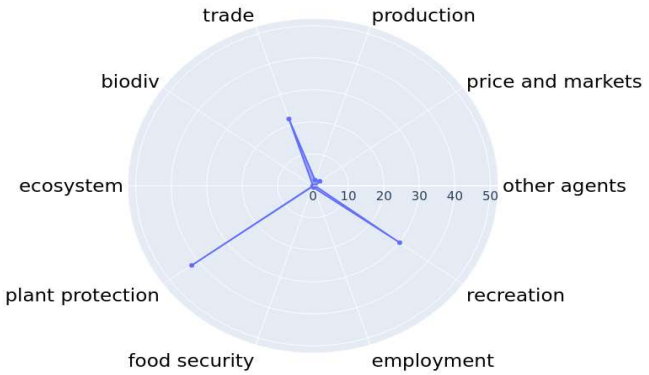
Acleris minuta

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.13 Rank: 24 Max Rank: 21

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Apples [F1110]	0	0	0	2.12	4.14	7.03

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1000	2100	3800
Detection Time (m)	33.6	58.8	84

Indicator Values:

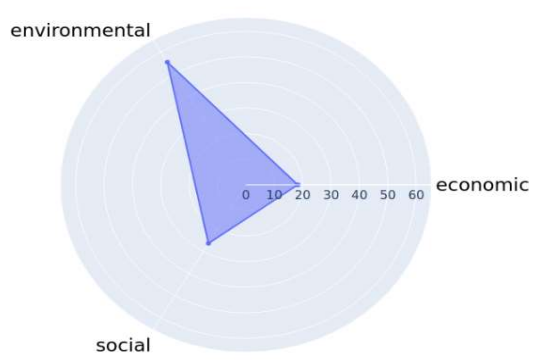
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	237.78	3.2%
I.2 Share of EU production value affected (%)	4.3	6.4%
I.3 Difficulty of eradication (meters)	10290	2.3%
I.4. Number of importing countries banning trade (#)	139	88.5%
I.5 Value of export losses (Million Euros)	871.68	7.4%
I.6 Share of export losses over total production (%)	8.86	43.8%
I.7 Trade dispersion (dimensionless)	0.91	95.8%
I.8 Change in domestic price (%)	10.11	8.6%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	374.77	2.2%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	3917.32	0.7%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.02	0.9%
I.14c Share of protein supply (g/capita/day) (%)	0	0.2%
I.15c Share of fat supply quantity (g/capita/day) (%)	0	0.3%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.62	91.5%
I.18 Number of products covered by EU quality labels (#)	30	38.5%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	9.75	16.5%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

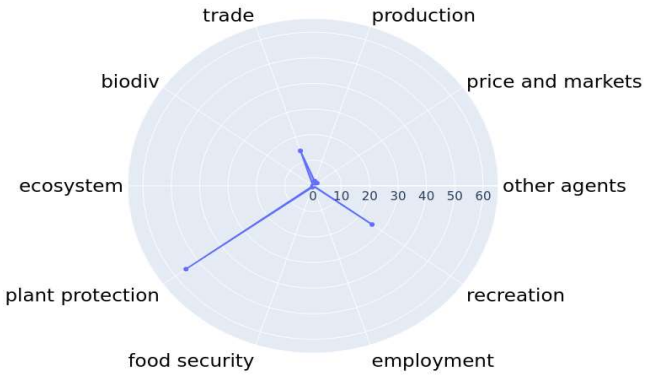
Choristoneura parallela

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 0.10 Rank: 25 Max Rank: 24

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Berries (excluding strawberries) [F3000]	0	0	0	1.31	2.7	4.72

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1900	3300	5400
Detection Time (m)	27.6	46.8	70.8

Indicator Values:

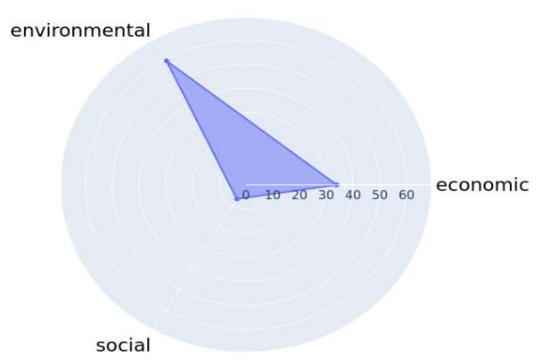
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	87.93	1.2%
I.2 Share of EU production value affected (%)	4.02	6.0%
I.3 Difficulty of eradication (meters)	12870	2.9%
I.4. Number of importing countries banning trade (#)	88	56.1%
I.5 Value of export losses (Million Euros)	340.57	2.9%
I.6 Share of export losses over total production (%)	6.2	30.6%
I.7 Trade dispersion (dimensionless)	0.63	67.1%
I.8 Change in domestic price (%)	6.4	5.5%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	138.59	0.8%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	590.68	0.1%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.03	1.1%
I.14c Share of protein supply (g/capita/day) (%)	0.01	0.5%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.01	1.1%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.55	91.3%
I.18 Number of products covered by EU quality labels (#)	1	1.3%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	10.62	18.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

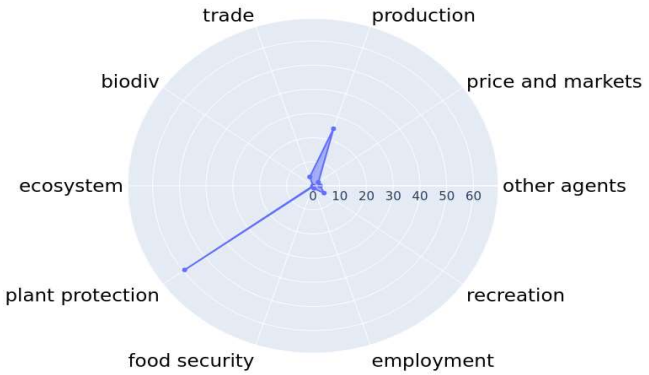
Keiferia lycopersicella

Pest affecting: Crops
Type of organism: Insect

I2P2 Score: 9.36 Rank: 26 Max Rank: 24

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Tomatoes [V3100]	0	0	0	2.93	5.33	8.89

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	85200	140600	208800
Detection Time (m)	15.2	25.5	38.4

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	769.87	10.3%
I.2 Share of EU production value affected (%)	6	9.0%
I.3 Difficulty of eradication (meters)	298775	67.5%
I.4. Number of importing countries banning trade (#)	91	58.0%
I.5 Value of export losses (Million Euros)	694.14	5.9%
I.6 Share of export losses over total production (%)	2.28	11.3%
I.7 Trade dispersion (dimensionless)	0.45	47.8%
I.8 Change in domestic price (%)	7.89	6.7%
I.9 Change in domestic production over imports (%)	84.88	0.0%
I.10 Upstream effect (Million Euros)	1046.76	6.1%
I.11 Downstream effect (%)	6.06	6.6%
I.12 Number of jobs lost (#)	5674.6	1.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.02	0.7%
I.14c Share of protein supply (g/capita/day) (%)	0.03	1.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0	0.4%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	22.35	83.1%
I.18 Number of products covered by EU quality labels (#)	6	7.7%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0.05	50.0%

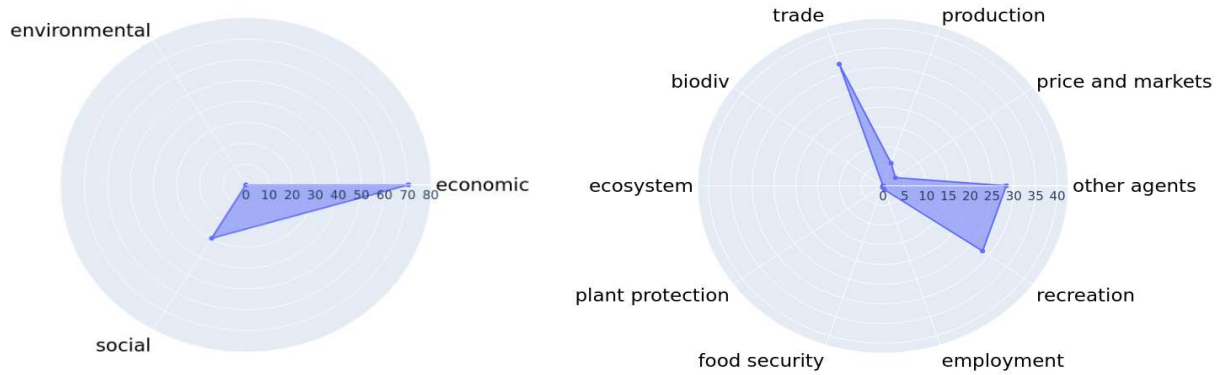
Diabrotica virgifera zeae

Pest affecting: Crops

Type of organism: Insect

I2P2 Score: 8.66 Rank: 27 Max Rank: 17

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Grain maize and corn-cob-mix [C1500]	0	0	0	0.47	1.4	3.19

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	24100	40900	69500
Detection Time (m)	15.8	20.9	26.1

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	244.82	3.3%
I.2 Share of EU production value affected (%)	1.8	2.7%
I.3 Difficulty of eradication (meters)	71234.17	16.1%
I.4. Number of importing countries banning trade (#)	123	78.3%
I.5 Value of export losses (Million Euros)	1506.69	12.9%
I.6 Share of export losses over total production (%)	7.45	36.8%
I.7 Trade dispersion (dimensionless)	0.9	95.1%
I.8 Change in domestic price (%)	9.82	8.4%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	507.22	3.0%
I.11 Downstream effect (%)	54.48	59.0%
I.12 Number of jobs lost (#)	4587.65	0.8%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.02	0.9%
I.14c Share of protein supply (g/capita/day) (%)	0.02	0.6%
I.15c Share of fat supply quantity (g/capita/day) (%)	0	0.5%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	25.1	93.3%
I.18 Number of products covered by EU quality labels (#)	1	1.3%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	1.75	3.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	0.0%

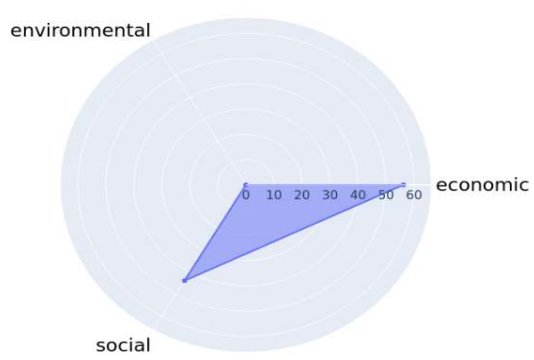
Nepovirus myrtilli

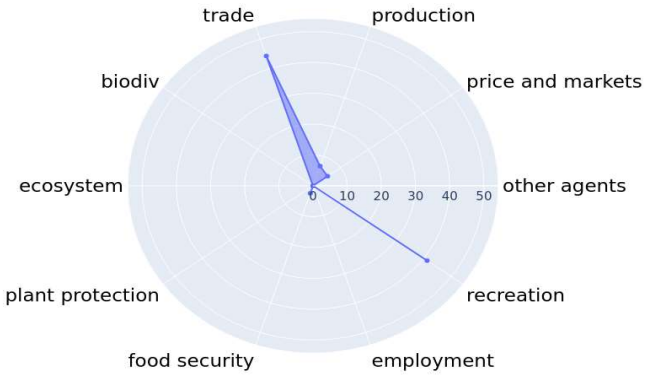
Pest affecting: Crops

Type of organism: Virus

I2P2 Score: 5.23 Rank: 28 Max Rank: 25

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Blueberries [F3300]	0	0	0	2.2	3.88	6.84

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	500	1100	2600
Detection Time (m)	252	354	463.2

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	40.8	0.5%
I.2 Share of EU production value affected (%)	5.24	7.8%
I.3 Difficulty of eradication (meters)	32450	7.3%
I.4. Number of importing countries banning trade (#)	55	35.0%
I.5 Value of export losses (Million Euros)	131.58	1.1%
I.6 Share of export losses over total production (%)	12.05	59.6%
I.7 Trade dispersion (dimensionless)	0.7	74.2%
I.8 Change in domestic price (%)	9.07	7.8%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	64.31	0.4%
I.11 Downstream effect (%)	5.81	6.3%
I.12 Number of jobs lost (#)	259.24	0.0%
I.13c Share of caloric supply (kcal/capita/day) (%)	0.06	2.2%
I.14c Share of protein supply (g/capita/day) (%)	0.03	1.0%
I.15c Share of fat supply quantity (g/capita/day) (%)	0.02	2.3%
I.16c Ability to produce fungal toxins (y=1/n=0)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	24.37	90.6%
I.18 Number of products covered by EU quality labels (#)	1	1.3%
I.19 Presence of affected hosts on cultural heritage landmarks (#)	6.12	10.4%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	0.0%

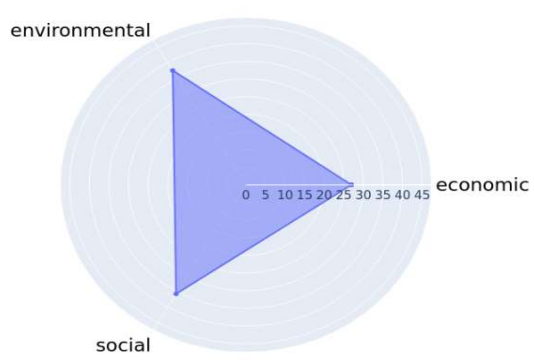
Dendrolimus sibiricus

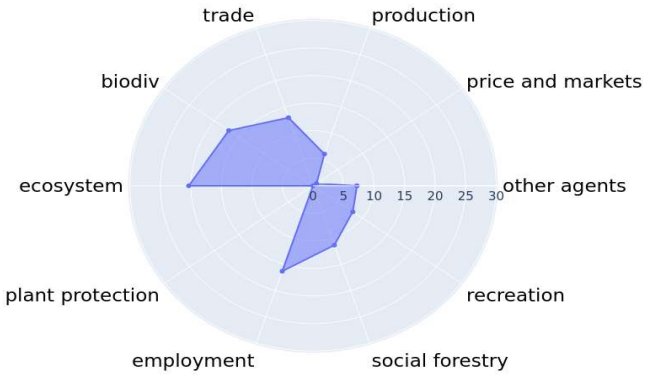
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.54 Rank: 1 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Coniferous	0	0	0	2.16	4.61	8.49

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	2700	4400	6600
Detection Time (m)	106.8	175.2	286.8

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	62497.42	94.4%
I.2 Share of EU production value affected (%)	6.25	7.1%
I.3 Difficulty of eradication (meters)	64240	17.8%
I.4. Number of importing countries banning trade (#)	149	100.0%
I.5 Value of export losses (Million Euros)	7000.59	100.0%
I.6 Share of export losses over total production (%)	0.22	40.4%
I.7 Trade dispersion (dimensionless)	0.89	100.0%
I.8 Change in domestic price (%)	36.25	7.2%
I.9 Change in domestic production over imports (%)	5107.52	2.2%
I.10 Upstream effect (Million Euros)	159135.7	94.4%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	18192.42	80.1%
I.13f Quantity losses of wild forest products collected by households (kg)	1513.41	16.4%
I.14f Reduction in quantity sold by households (kg)	88.19	36.2%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	10997.01	100.0%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	91.07	70.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	78	79.2%
I.20 Loss in EU ecosystem service flow (%)	11.6	100.0%
I.21 Loss in EU community biodiversity (%)	0.08072	100.0%
I.22 EU protected areas with host plants (%)	7.5	51.4%
I.23 Weighted count of IUCN host species (#)	9	100.0%
I.24 Increase in pesticide use (level)	0	100.0%

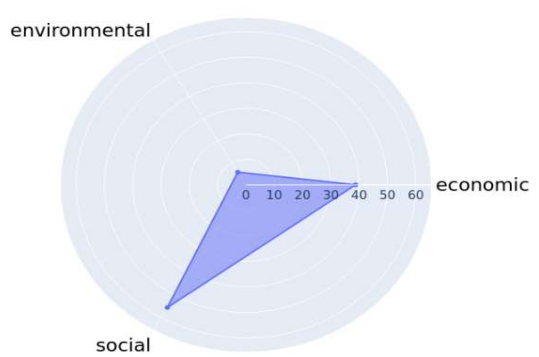
Agrilus anxius

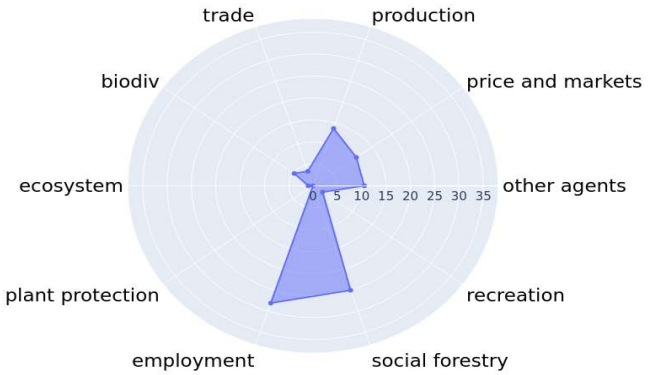
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.39 Rank: 2 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Betula spp.	0	0	0	67.41	76.11	83.43

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	524	1298	2738
Detection Time (m)	50.4	62.4	79.2

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	66225.37	100.0%
I.2 Share of EU production value affected (%)	82.2	93.8%
I.3 Difficulty of eradication (meters)	6749.6	1.9%
I.4. Number of importing countries banning trade (#)	45	30.2%
I.5 Value of export losses (Million Euros)	80.52	1.2%
I.6 Share of export losses over total production (%)	0.05	10.2%
I.7 Trade dispersion (dimensionless)	0.48	54.6%
I.8 Change in domestic price (%)	472.65	93.5%
I.9 Change in domestic production over imports (%)	25430.4	11.0%
I.10 Upstream effect (Million Euros)	168628.1	100.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	22705.7	100.0%
I.13f Quantity losses of wild forest products collected by households (kg)	9216.25	100.0%
I.14f Reduction in quantity sold by households (kg)	243.95	100.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	6176.45	56.2%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	130.08	100.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	17.12	17.4%
I.20 Loss in EU ecosystem service flow (%)	0.4	3.4%
I.21 Loss in EU community biodiversity (%)	0.0122	15.1%
I.22 EU protected areas with host plants (%)	0.6	4.1%
I.23 Weighted count of IUCN host species (#)	2.85	31.7%
I.24 Increase in pesticide use (level)	0	100.0%

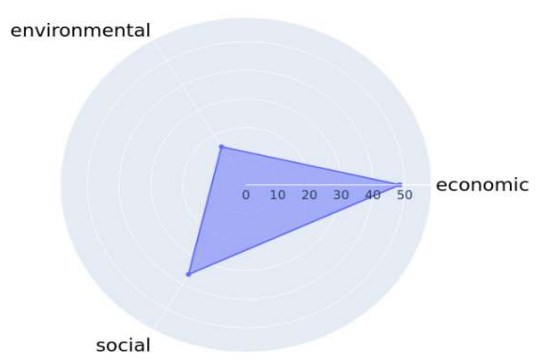
Choristoneura fumiferana

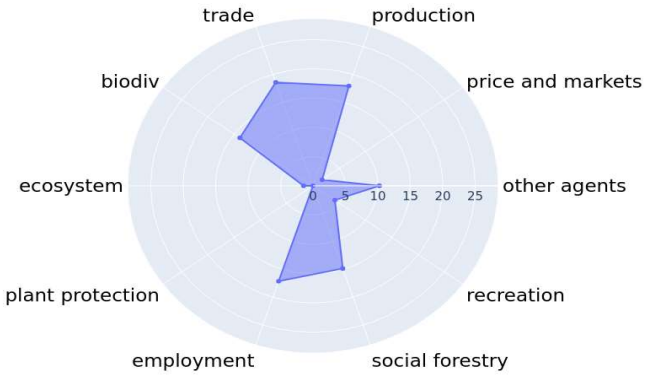
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.27 Rank: 3 Max Rank: 3

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Abies spp	0	0	0	2.83	4.61	7
Picea spp	0	0	0	4.34	7.07	10.73

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	24300	52300	97100
Detection Time (m)	52.8	82.8	122.4

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	44536.5	67.2%
I.2 Share of EU production value affected (%)	8.3	9.5%
I.3 Difficulty of eradication (meters)	360870	100.0%
I.4. Number of importing countries banning trade (#)	133	89.3%
I.5 Value of export losses (Million Euros)	4800.11	68.6%
I.6 Share of export losses over total production (%)	0.53	100.0%
I.7 Trade dispersion (dimensionless)	0.67	75.7%
I.8 Change in domestic price (%)	45.01	8.9%
I.9 Change in domestic production over imports (%)	5952.39	2.6%
I.10 Upstream effect (Million Euros)	113402.2	67.2%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	9592.98	42.2%
I.13f Quantity losses of wild forest products collected by households (kg)	665.67	7.2%
I.14f Reduction in quantity sold by households (kg)	67.46	27.7%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	7115.21	64.7%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	61.12	47.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	20.25	20.6%
I.20 Loss in EU ecosystem service flow (%)	0.42	3.6%
I.21 Loss in EU community biodiversity (%)	0.00366	4.5%
I.22 EU protected areas with host plants (%)	6.6	45.2%
I.23 Weighted count of IUCN host species (#)	4.8	53.3%
I.24 Increase in pesticide use (level)	0	100.0%

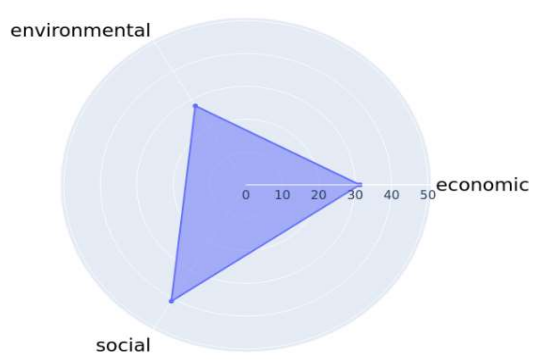
Polygraphus proximus

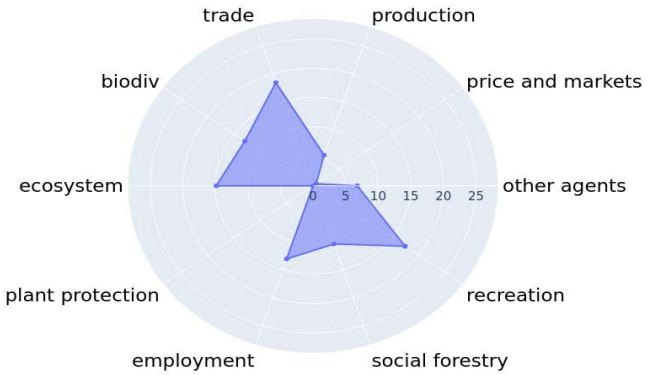
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.25 Rank: 4 Max Rank: 3

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Abies sibirica	0	0	0	0.51	0.88	1.34
Other than Abies sybirica	0	0	0	1.3	2.5	4.35

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1800	3400	5600
Detection Time (m)	48	72	96

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	27149.61	41.0%
I.2 Share of EU production value affected (%)	2.7	3.1%
I.3 Difficulty of eradication (meters)	20400	5.7%
I.4. Number of importing countries banning trade (#)	147	98.7%
I.5 Value of export losses (Million Euros)	6146.51	87.8%
I.6 Share of export losses over total production (%)	0.19	36.6%
I.7 Trade dispersion (dimensionless)	0.87	98.2%
I.8 Change in domestic price (%)	14.06	2.8%
I.9 Change in domestic production over imports (%)	1980.66	0.9%
I.10 Upstream effect (Million Euros)	69130.41	41.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	6719.93	29.6%
I.13f Quantity losses of wild forest products collected by households (kg)	498.12	5.4%
I.14f Reduction in quantity sold by households (kg)	33.4	13.7%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	3700.3	33.6%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	53.84	41.4%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	78	79.2%
I.20 Loss in EU ecosystem service flow (%)	3.9	33.6%
I.21 Loss in EU community biodiversity (%)	0.0095	11.8%
I.22 EU protected areas with host plants (%)	11.1	76.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

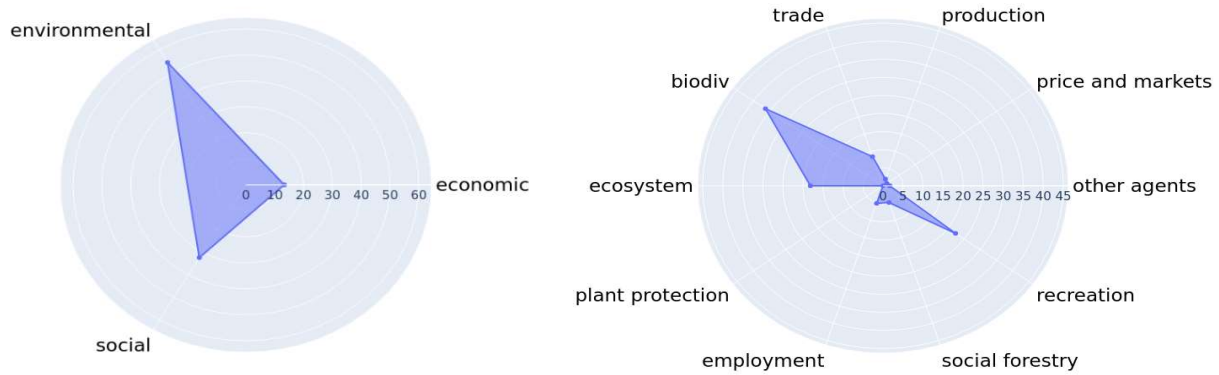
Anoplophora glabripennis

Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.24 Rank: 5 Max Rank: 2

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Forests	0	0	0	4.07	6.39	10.17
Trees in urban areas	0	0	0	17.05	23.34	29.83

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	52	93	168
Detection Time (m)	75.6	93.6	110.4

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	6629.63	10.0%
I.2 Share of EU production value affected (%)	6.57	7.5%
I.3 Difficulty of eradication (meters)	725.4	0.2%
I.4. Number of importing countries banning trade (#)	74	49.7%
I.5 Value of export losses (Million Euros)	59.56	0.9%
I.6 Share of export losses over total production (%)	0.03	4.7%
I.7 Trade dispersion (dimensionless)	0.85	95.4%
I.8 Change in domestic price (%)	30.71	6.1%
I.9 Change in domestic production over imports (%)	2106.28	0.9%
I.10 Upstream effect (Million Euros)	16880.86	10.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	2595.16	11.4%
I.13f Quantity losses of wild forest products collected by households (kg)	795.62	8.6%
I.14f Reduction in quantity sold by households (kg)	19.69	8.1%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	431.75	3.9%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	29.72	22.8%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	98.5	100.0%
I.20 Loss in EU ecosystem service flow (%)	4.7	40.5%
I.21 Loss in EU community biodiversity (%)	0.0366	45.3%
I.22 EU protected areas with host plants (%)	14.6	100.0%
I.23 Weighted count of IUCN host species (#)	8.8	97.8%
I.24 Increase in pesticide use (level)	0	100.0%

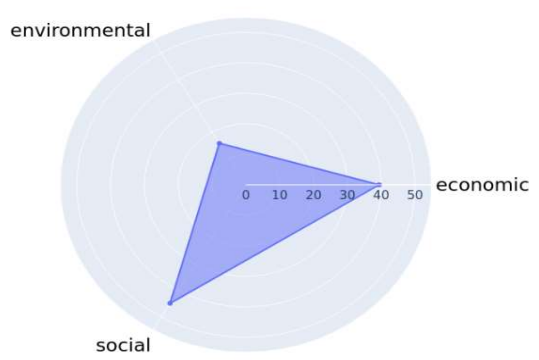
Pissodes strobi

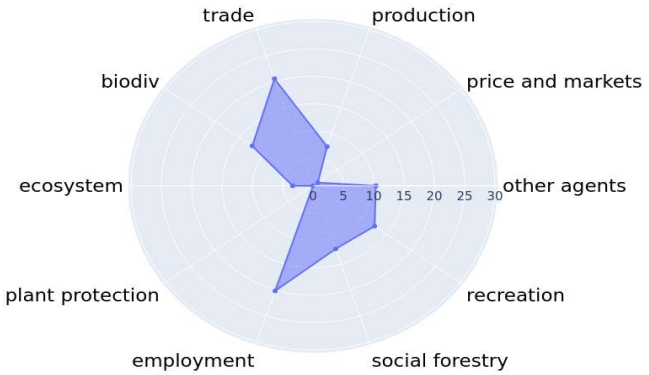
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.22 Rank: 6 Max Rank: 4

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
European Picea and Pinus spp.	0	0	0	2.59	3.8	5.28

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	208	361	664
Detection Time (m)	60	72	84

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	37531.15	56.7%
I.2 Share of EU production value affected (%)	4.01	4.6%
I.3 Difficulty of eradication (meters)	2166	0.6%
I.4. Number of importing countries banning trade (#)	147	98.7%
I.5 Value of export losses (Million Euros)	5629.21	80.4%
I.6 Share of export losses over total production (%)	0.32	60.4%
I.7 Trade dispersion (dimensionless)	0.75	84.0%
I.8 Change in domestic price (%)	21.14	4.2%
I.9 Change in domestic production over imports (%)	2759.97	1.2%
I.10 Upstream effect (Million Euros)	95564.66	56.7%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	9400.72	41.4%
I.13f Quantity losses of wild forest products collected by households (kg)	749.45	8.1%
I.14f Reduction in quantity sold by households (kg)	50.71	20.8%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	5330.66	48.5%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	28.69	22.1%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	50.75	51.5%
I.20 Loss in EU ecosystem service flow (%)	0.8	6.9%
I.21 Loss in EU community biodiversity (%)	0.0036	4.5%
I.22 EU protected areas with host plants (%)	10.4	71.2%
I.23 Weighted count of IUCN host species (#)	0.04	0.4%
I.24 Increase in pesticide use (level)	0	100.0%

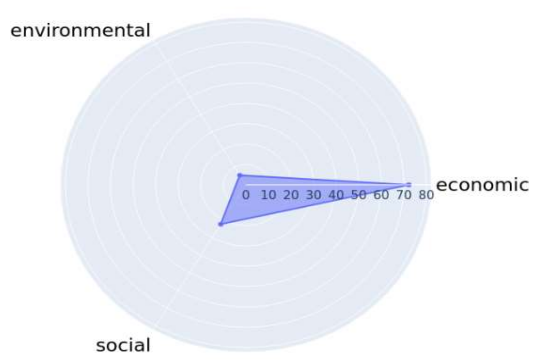
Agrilus planipennis

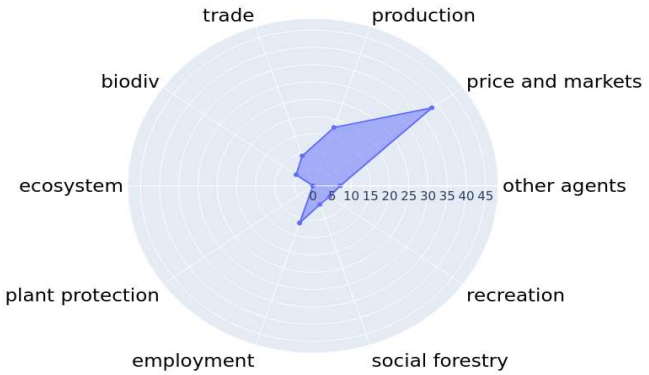
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.21 Rank: 7 Max Rank: 1

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Fraxinus spp.	0	0	0	81.9	87.6	92.5

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	524	1298	2738
Detection Time (m)	49.2	62.4	80.4

Indicator Values:

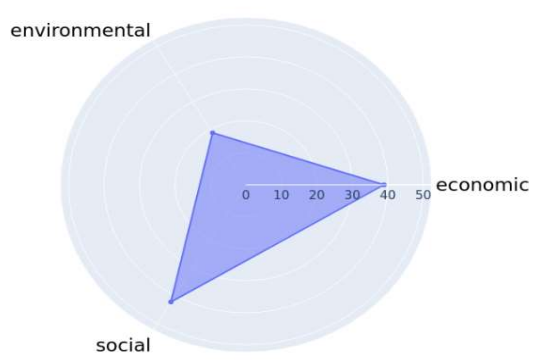
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	24500.92	37.0%
I.2 Share of EU production value affected (%)	87.6	100.0%
I.3 Difficulty of eradication (meters)	6749.6	1.9%
I.4. Number of importing countries banning trade (#)	56	37.6%
I.5 Value of export losses (Million Euros)	21.28	0.3%
I.6 Share of export losses over total production (%)	0.02	4.5%
I.7 Trade dispersion (dimensionless)	0.8	89.9%
I.8 Change in domestic price (%)	505.27	100.0%
I.9 Change in domestic production over imports (%)	231521.9	100.0%
I.10 Upstream effect (Million Euros)	62386.11	37.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	5035.79	22.2%
I.13f Quantity losses of wild forest products collected by households (kg)	0	0.0%
I.14f Reduction in quantity sold by households (kg)	0	0.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	236.47	2.2%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	55.07	42.3%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	20.62	20.9%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0.0037	4.6%
I.22 EU protected areas with host plants (%)	0.9	6.2%
I.23 Weighted count of IUCN host species (#)	1.9	21.1%
I.24 Increase in pesticide use (level)	0	100.0%

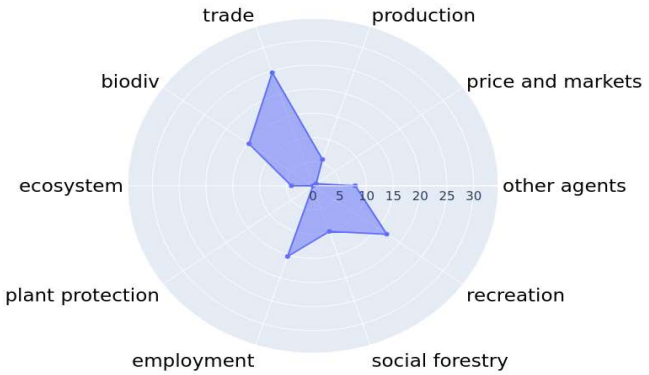
Pissodes nemorensis

Pest affecting: Trees
Type of organism: Insect

I2P2 Score: 0.19 Rank: 8 Max Rank: 6

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
European Cedrus, Picea and Pinus	0	0	0	1.39	2.42	3.75

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	108	150	239
Detection Time (m)	108	120	144

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	23892.02	36.1%
I.2 Share of EU production value affected (%)	2.61	3.0%
I.3 Difficulty of eradication (meters)	1500	0.4%
I.4. Number of importing countries banning trade (#)	147	98.7%
I.5 Value of export losses (Million Euros)	5629.21	80.4%
I.6 Share of export losses over total production (%)	0.32	60.4%
I.7 Trade dispersion (dimensionless)	0.75	84.0%
I.8 Change in domestic price (%)	12.78	2.5%
I.9 Change in domestic production over imports (%)	1668.67	0.7%
I.10 Upstream effect (Million Euros)	60835.69	36.1%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	5984.45	26.4%
I.13f Quantity losses of wild forest products collected by households (kg)	477.09	5.2%
I.14f Reduction in quantity sold by households (kg)	32.28	13.2%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	3393.5	30.9%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	24.41	18.8%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	57.5	58.4%
I.20 Loss in EU ecosystem service flow (%)	0.8	6.9%
I.21 Loss in EU community biodiversity (%)	0.0036	4.5%
I.22 EU protected areas with host plants (%)	10.4	71.2%
I.23 Weighted count of IUCN host species (#)	0.02	0.2%
I.24 Increase in pesticide use (level)	0	100.0%

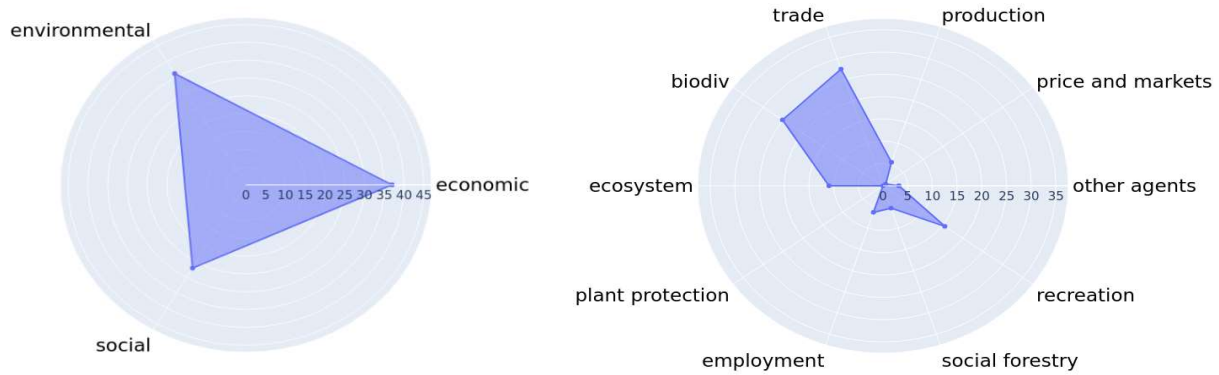
Bursaphelenchus xylophilus

Pest affecting: Trees

Type of organism: Nematode

I2P2 Score: 0.12 Rank: 9 Max Rank: 4

Domain- & Sub-Domain Contributions:



Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
pinus	0	0	0	2.48	4.44	6.97

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1900	2900	4300
Detection Time (m)	132	204	276

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	6276.5	9.5%
I.2 Share of EU production value affected (%)	1.37	1.6%
I.3 Difficulty of eradication (meters)	49300	13.7%
I.4. Number of importing countries banning trade (#)	135	90.6%
I.5 Value of export losses (Million Euros)	2209.42	31.6%
I.6 Share of export losses over total production (%)	0.17	32.0%
I.7 Trade dispersion (dimensionless)	0.87	98.3%
I.8 Change in domestic price (%)	7.65	1.5%
I.9 Change in domestic production over imports (%)	1043.96	0.5%
I.10 Upstream effect (Million Euros)	15981.71	9.5%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	1567.64	6.9%
I.13f Quantity losses of wild forest products collected by households (kg)	419.2	4.5%
I.14f Reduction in quantity sold by households (kg)	8.54	3.5%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	1040.68	9.5%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	7.49	5.8%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	33.62	34.1%
I.20 Loss in EU ecosystem service flow (%)	1.4	12.1%
I.21 Loss in EU community biodiversity (%)	0.0285	35.3%
I.22 EU protected areas with host plants (%)	6.1	41.8%
I.23 Weighted count of IUCN host species (#)	0.55	6.1%
I.24 Increase in pesticide use (level)	0	100.0%

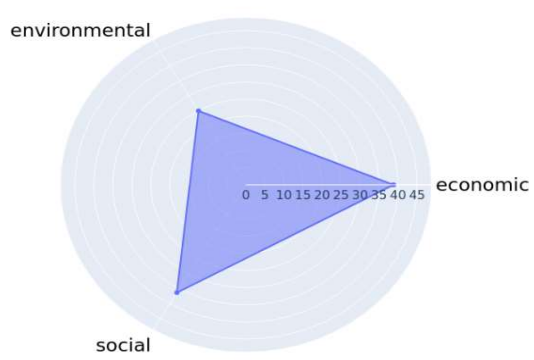
Bretziella fagacearum

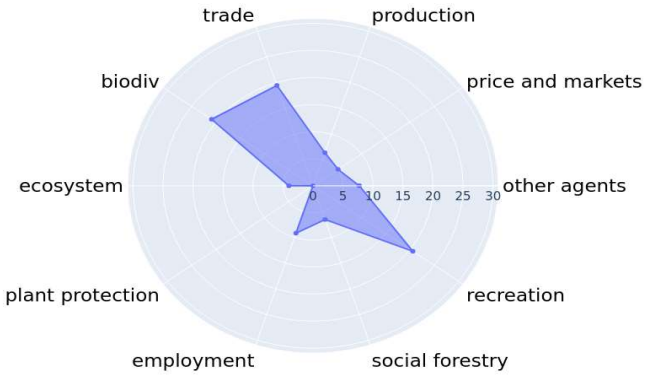
Pest affecting: Trees

Type of organism: Fungi

I2P2 Score: 9.53 Rank: 10 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Quercus sp.	0	0	0	1.6	3.2	5.7

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	96	254	540
Detection Time (m)	108	156	204

Indicator Values:

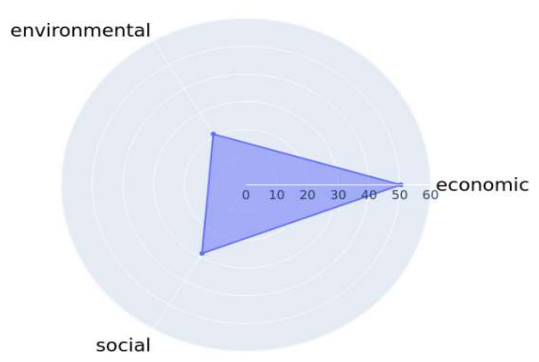
Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	11687.85	17.6%
I.2 Share of EU production value affected (%)	3.2	3.7%
I.3 Difficulty of eradication (meters)	3302	0.9%
I.4. Number of importing countries banning trade (#)	132	88.6%
I.5 Value of export losses (Million Euros)	571.43	8.2%
I.6 Share of export losses over total production (%)	0.07	13.6%
I.7 Trade dispersion (dimensionless)	0.6	67.4%
I.8 Change in domestic price (%)	18.05	3.6%
I.9 Change in domestic production over imports (%)	19059.06	8.2%
I.10 Upstream effect (Million Euros)	29760.51	17.6%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	1791.54	7.9%
I.13f Quantity losses of wild forest products collected by households (kg)	381.61	4.1%
I.14f Reduction in quantity sold by households (kg)	25.71	10.5%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	405.98	3.7%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	5.33	4.1%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	34.75	35.3%
I.20 Loss in EU ecosystem service flow (%)	0.4	3.4%
I.21 Loss in EU community biodiversity (%)	0.0125	15.5%
I.22 EU protected areas with host plants (%)	5.1	34.9%
I.23 Weighted count of IUCN host species (#)	0.3	3.3%
I.24 Increase in pesticide use (level)	0	100.0%

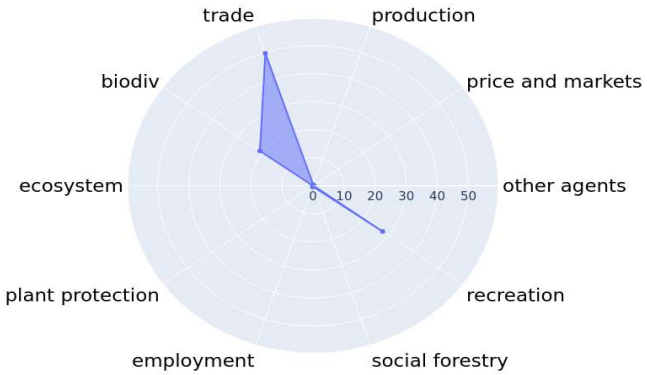
Pseudocercospora pini-densiflorae

Pest affecting: Trees
Type of organism: Fungi

I2P2 Score: 6.84 Rank: 11 Max Rank: 10

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
EU Pinus spp.	0	0	0	0.08	0.17	0.3

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	52	129	263
Detection Time (m)	147.6	200.4	254.4

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	279.64	0.4%
I.2 Share of EU production value affected (%)	0.06	0.1%
I.3 Difficulty of eradication (meters)	2154.3	0.6%
I.4. Number of importing countries banning trade (#)	123	82.6%
I.5 Value of export losses (Million Euros)	2287.01	32.7%
I.6 Share of export losses over total production (%)	0.17	32.2%
I.7 Trade dispersion (dimensionless)	0.87	98.2%
I.8 Change in domestic price (%)	0.6	0.1%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	712.04	0.4%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	63.73	0.3%
I.13f Quantity losses of wild forest products collected by households (kg)	18.81	0.2%
I.14f Reduction in quantity sold by households (kg)	0.5	0.2%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	41.54	0.4%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	0.29	0.2%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	33.62	34.1%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	5.7	39.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

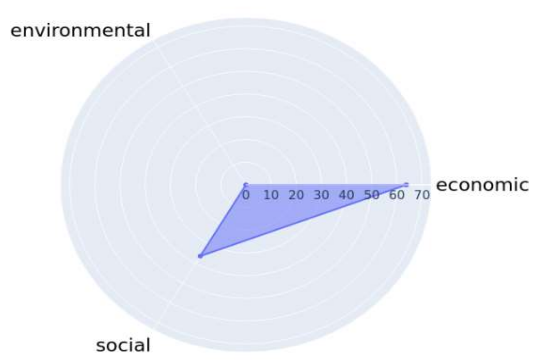
Pissodes nitidus

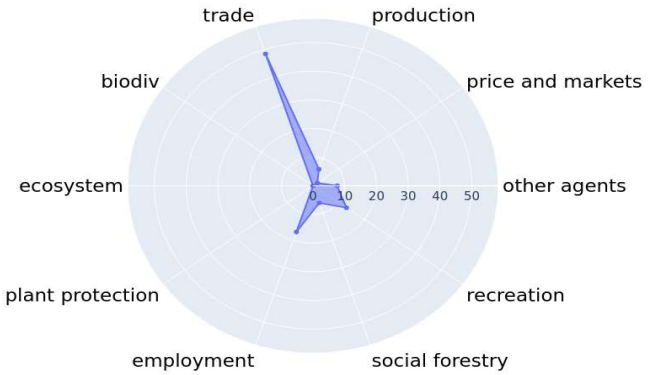
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 0.06 Rank: 12 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Pinus strobus and Pinus sylvestris	0	0	0	0.93	1.56	2.49

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	108	150	239
Detection Time (m)	72	96	120

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	7995.96	12.1%
I.2 Share of EU production value affected (%)	1.94	2.2%
I.3 Difficulty of eradication (meters)	1200	0.3%
I.4. Number of importing countries banning trade (#)	136	91.3%
I.5 Value of export losses (Million Euros)	1896.09	27.1%
I.6 Share of export losses over total production (%)	0.15	28.5%
I.7 Trade dispersion (dimensionless)	0.87	97.6%
I.8 Change in domestic price (%)	10.27	2.0%
I.9 Change in domestic production over imports (%)	1416.44	0.6%
I.10 Upstream effect (Million Euros)	20359.93	12.1%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	2284.67	10.1%
I.13f Quantity losses of wild forest products collected by households (kg)	157.16	1.7%
I.14f Reduction in quantity sold by households (kg)	7.51	3.1%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	838.47	7.6%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	3.36	2.6%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	15.25	15.5%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

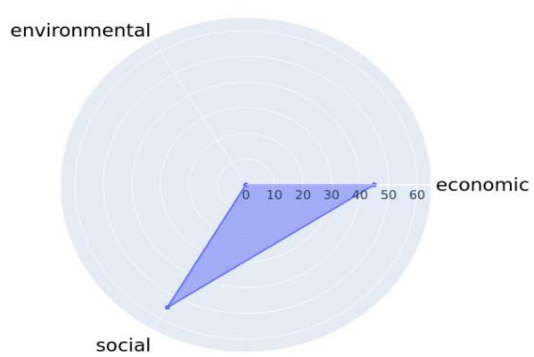
Arrhenodes minutus

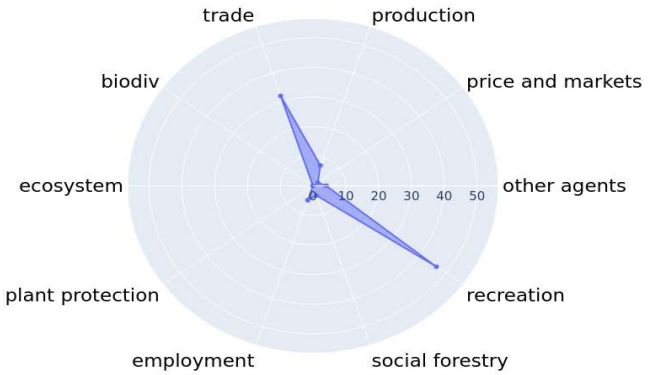
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 6.35 Rank: 13 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Oak and Poplar for timber production	0	0	0	0.5	0.96	1.66

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	1500	2600	4000
Detection Time (m)	120	156	192

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	4072.92	6.2%
I.2 Share of EU production value affected (%)	1.08	1.2%
I.3 Difficulty of eradication (meters)	33800	9.4%
I.4. Number of importing countries banning trade (#)	132	88.6%
I.5 Value of export losses (Million Euros)	590.72	8.4%
I.6 Share of export losses over total production (%)	0.08	14.2%
I.7 Trade dispersion (dimensionless)	0.66	74.7%
I.8 Change in domestic price (%)	5.74	1.1%
I.9 Change in domestic production over imports (%)	3778.5	1.6%
I.10 Upstream effect (Million Euros)	10370.78	6.2%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	664.62	2.9%
I.13f Quantity losses of wild forest products collected by households (kg)	124.98	1.4%
I.14f Reduction in quantity sold by households (kg)	8.6	3.5%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	140.98	1.3%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	2.2	1.7%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	52.38	53.2%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

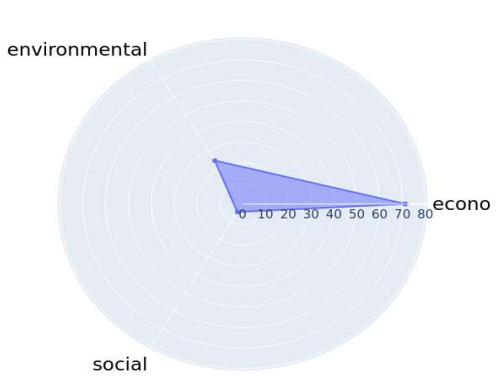
Acleris semipurpurana

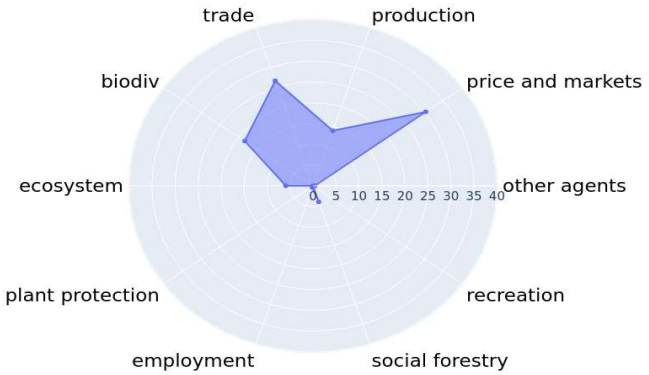
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 6.18 Rank: 14 Max Rank: 9

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Red oak trees	0	0	0	5.62	8.94	12.52

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	2000	4100	7800
Detection Time (m)	133.2	196.8	267.6

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	385.61	0.6%
I.2 Share of EU production value affected (%)	10.5	12.0%
I.3 Difficulty of eradication (meters)	67240	18.6%
I.4. Number of importing countries banning trade (#)	117	78.5%
I.5 Value of export losses (Million Euros)	5.47	0.1%
I.6 Share of export losses over total production (%)	0.06	11.8%
I.7 Trade dispersion (dimensionless)	0.59	67.0%
I.8 Change in domestic price (%)	60.25	11.9%
I.9 Change in domestic production over imports (%)	76473.87	33.0%
I.10 Upstream effect (Million Euros)	981.87	0.6%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	58.26	0.3%
I.13f Quantity losses of wild forest products collected by households (kg)	12.16	0.1%
I.14f Reduction in quantity sold by households (kg)	0.58	0.2%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	7.48	0.1%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	11.2	8.6%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0.38	3.3%
I.21 Loss in EU community biodiversity (%)	0.00094	1.2%
I.22 EU protected areas with host plants (%)	4.3	29.5%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

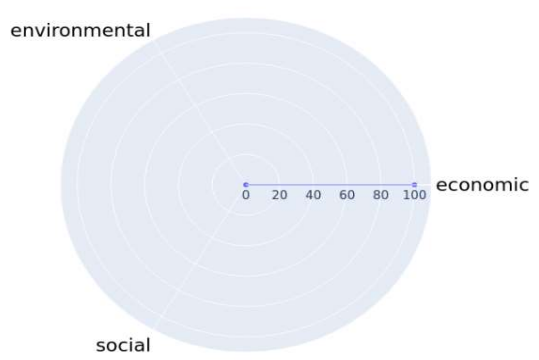
Pissodes terminalis

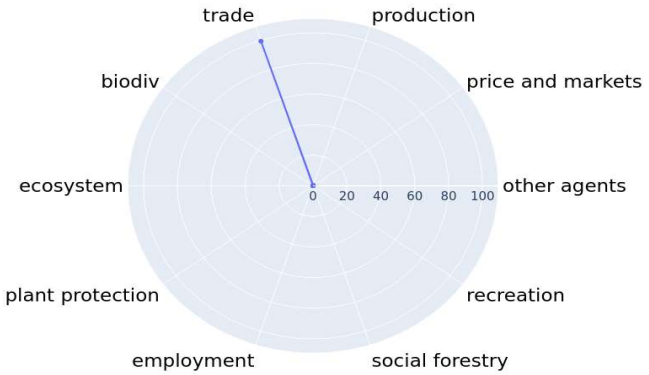
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 2.83 Rank: 15 Max Rank: 15

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Pinus contorta	0	0	0	0	0	0
Pinus radiata	0	0	0	0	0	0

Spread Characteristics:

	Q25	**Q50**	**Q75**
Spread Rate (m/y)	165	250	398
Detection Time (m)	84	96	120

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	0	0.0%
I.2 Share of EU production value affected (%)	0	0.0%
I.3 Difficulty of eradication (meters)	2000	0.6%
I.4. Number of importing countries banning trade (#)	138	92.6%
I.5 Value of export losses (Million Euros)	34.7	0.5%
I.6 Share of export losses over total production (%)	0.18	34.6%
I.7 Trade dispersion (dimensionless)	0.89	100.0%
I.8 Change in domestic price (%)	1.06	0.2%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	0	0.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	0	0.0%
I.13f Quantity losses of wild forest products collected by households (kg)	0	0.0%
I.14f Reduction in quantity sold by households (kg)	0	0.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	0	0.0%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

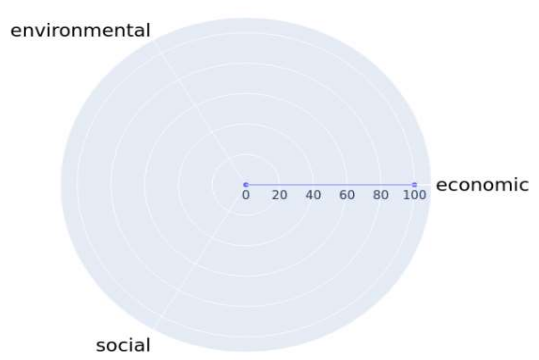
Pissodes yunnanensis

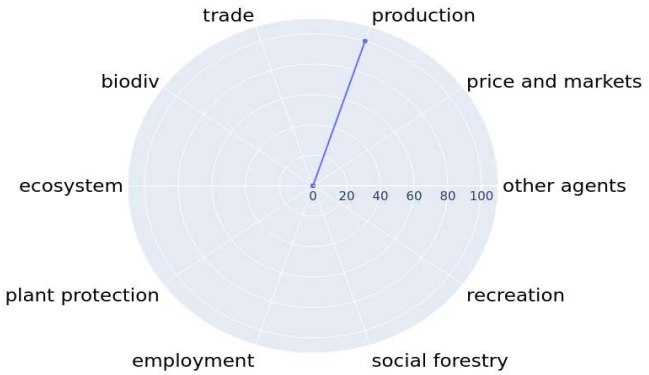
Pest affecting: Trees

Type of organism: Insect

I2P2 Score: 2.11 Rank: 16 Max Rank: 16

Domain- & Sub-Domain Contributions:





Host Impacts:

Host	Q LOSS Q25	Q LOSS Q50	Q LOSS Q75	Y LOSS Q25	Y LOSS Q50	Y LOSS Q75
Pinus yunnanensis	0	0	0	0	0	0

Spread Characteristics:

	Q25	Q50	Q75
Spread Rate (m/y)	85	100	152
Detection Time (m)	96	120	144

Indicator Values:

Indicator	Value	Percentage of max value
I.1 Maximum value of production losses (Million Euros)	0	0.0%
I.2 Share of EU production value affected (%)	0	0.0%
I.3 Difficulty of eradication (meters)	1000	0.3%
I.4. Number of importing countries banning trade (#)	139	93.3%
I.5 Value of export losses (Million Euros)	0	0.0%
I.6 Share of export losses over total production (%)	0	0.0%
I.7 Trade dispersion (dimensionless)	0	0.0%
I.8 Change in domestic price (%)	0	0.0%
I.9 Change in domestic production over imports (%)	0	0.0%
I.10 Upstream effect (Million Euros)	0	0.0%
I.11 Downstream effect (%)	69.22	100.0%
I.12 Number of jobs lost (#)	0	0.0%
I.13f Quantity losses of wild forest products collected by households (kg)	0	0.0%
I.14f Reduction in quantity sold by households (kg)	0	0.0%
I.15f Losses in PM2.5 accumulation capacity affecting forests (tons)	0	0.0%
I.16f Losses in PM2.5 accumulation capacity street trees and parks (tons)	0	0.0%
I.17 Share of holdings with other gainful activities (%)	100	100.0%
I.18 Number of products covered by EU quality labels (#)	-	-
I.19 Presence of affected hosts on cultural heritage landmarks (#)	0	0.0%
I.20 Loss in EU ecosystem service flow (%)	0	0.0%
I.21 Loss in EU community biodiversity (%)	0	0.0%
I.22 EU protected areas with host plants (%)	0	0.0%
I.23 Weighted count of IUCN host species (#)	0	0.0%
I.24 Increase in pesticide use (level)	0	100.0%

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