The evolution of plant health and pest risk assessment in the EU

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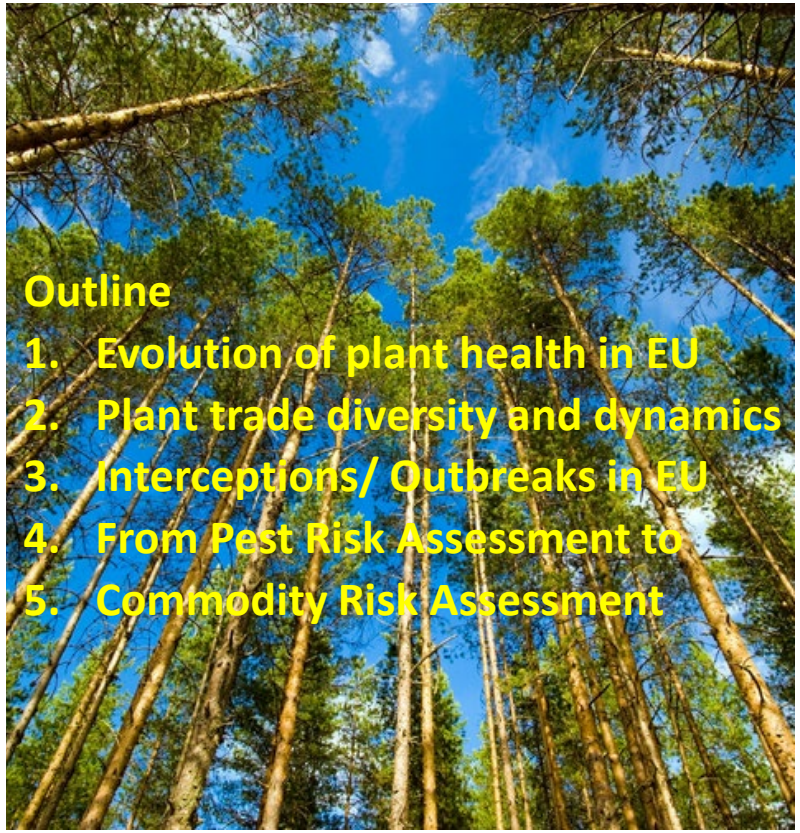


Implementation of Biosecurity

WORLD TRADE ORGANIZATION

WTO-SPS (1994)
Sanitary and Phytosanitary Measures Agreement

Closed----------Plant Health System ---------- **Open**


EU

Ban on import, unless it is proven to be safe

Import allowed as long as there is no evidence of risk

Commodity

Commodity Risk Assessment
Permit for import

Pest

Pest Risk Assessment
Requirements for Pathways

Milestones in History of Plant Health

- **1881**: first Plant Health law (FR, IT) targeting Phylloxera in vineyards

- **1899**: first Plant Protection Service (Wageningen, NL) *(San Jose Scale,* Apple, US*) Export certification of nursery rootstock*

- **1951** International Plant Protection Convention

aims to prevent the introduction and spread of pests of plants and plant products, and to promote appropriate measures for their control

Milestones in History of Plant Health

- **1951**: first Regional Plant Protection Service (EPPO, 15 European countries) – Development of International Standards

- **1977** first Plant Health Directive (77/73/EEC) with harmonized list of quarantine pests of 9 countries (BE, FR, DE, IT, LU, NL, DK, IR, UK)

WORLD TRADE ORGANIZATION

- **1995** SPS agreement on the application of Sanitary and Phytosanitary Measures in trade based on risk assessment

Milestones in History of Plant Health

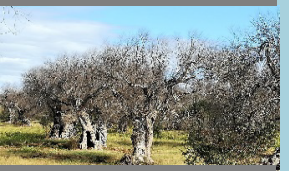
- **2000**: EU harmonized Plant Health Law (EU/2000/29); Internal market without borders, focus on pests

- **2006** EFSA Plant Health Panel starts to advice EU Commission on Plant Health matters

- **2016** Complete revision of EU Plant Health Law.

Numerous outbreaks in natural environment

Buxus moth (Buxus)



Xylella fastidiosa (olive)

Rynchophorus (palms)

Aromia bungii (Prunus)

Geosmithia (walnut)

Dryocosmus (Castanea)

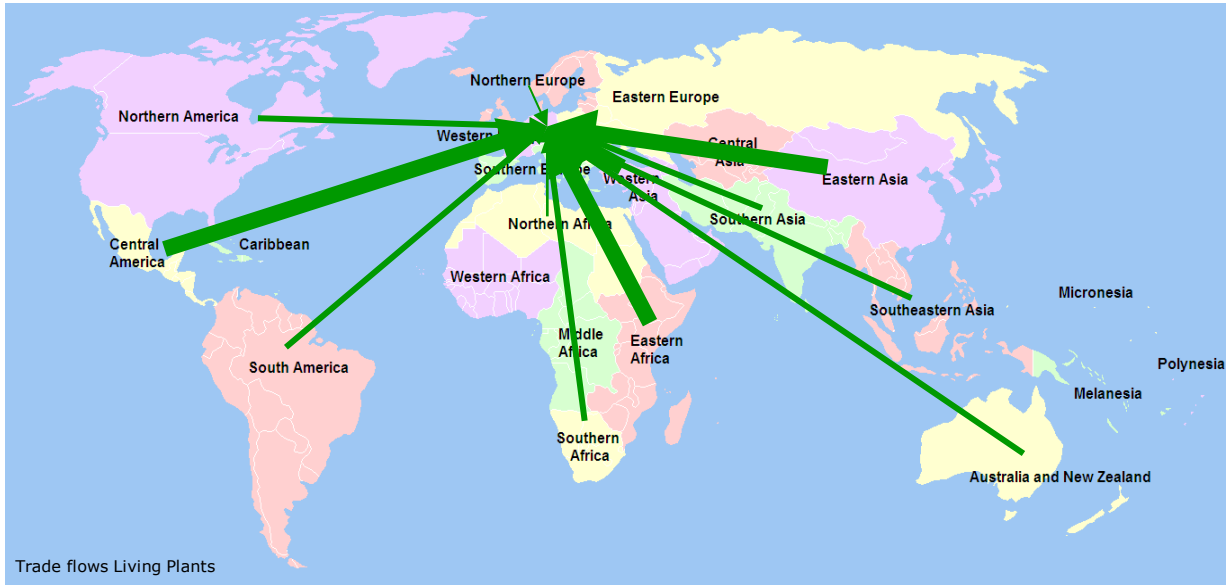
P.ramorum (Fagus)

Gibberella (Pinus)

Anoplophiora (Acer)

Pine wood Nematode (Pinus)

Diversity and Dynamics in Plant Trade



Commodity	Plant Genera	Trading partners	Trade flows (genus-country)	Import Volume 2019
Living Plants	925	50	2534	1 Mio Tonnes
Fruit & Vegetables	119	141	1648	16 Mio Tonnes
Cut flowers	43	37	183	3 Mio Tonnes

Eurostat 2019; NVWA Client_Import

Trade Dynamics - Import Plants for Planting

Country@Plant_Genus	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CR@OSTEOSPERMUM	131	84	24	4	5	1	2		16	1	4				
CR@OXALIS				1		6									
CR@OXYPETALUM					1										
CR@PACHIRA		3		8	3	7	8	7	4	5	3		3		
CR@PACHYPHYTUM				3	5	4	3	6	6	6	6		1	2	
CR@PACHYSANDRA	5	2													
CR@PANDANUS	4	9	10	9	2		1	6	2	1			1		
CR@PANTACANTHA		1													
CR@PASSIFLORA		1			3		1								
CR@PAULLINIA					1										
CR@PEDILANTHUS	49	39	18	2		1	5	3	3						
CR@PELARGONIUM	1			2											
CR@PENNISETUM	6	1			2								1		
CR@PENSTEMON	4	3													
CR@PENTAGONIA					2										
CR@PEPEROMIA	40	33	15	24	44	69	55	62	42	13	14	11	16	4	10
CR@PERICALLIS	2														
CR@PERILLA	1	4	6												
CR@PEROVSKIA	11	16	2				3								
CR@PERSEA					3										
CR@PERSICARIA	4	4													
CR@PESCATORIA			2												
CR@PETREA					1										
CR@PETUNIA	8	2	1												
CR@PHAIUS								1							
CR@PHALAENOPSIS				1			1								
CR@PHALARIS	1														
CR@PHILODENDRON	24	6	2		12	1	2	2	4	4	8	24	22	18	12
CR@PHLEBODIUM					2										
CR@PHLOX	76	89	42	1	3		1	1	1	1				1	1
CR@PHOENIX	636	557	550	472	516	340	6	2	2					519	559
CR@PHORMIUM	12	17	6	3	2	6	10	20	33	27	22	25	20	33	18
CR@PHYGELIUS	2	3													
CR@PHYLLANTHUS					2										
CR@PHYLLITIS	1														
CR@PICRASMA					1										
CR@PILEA	9	1	11	28	40	33	33	18						1	
CR@PINANGA							1								
CR@PIPER		1			6		1		3						
CR@PITHECELLOBIUM					1										
CR@PITYROGRAMMA					2										
CR@PLATYCERIUM	2				3										
CR@PLATYMISCIUM					1										
CR@PLECTRANTHUS	1	1											7	5	17
CR@PLEOMELE	77	60	31	11	14		2	1		1					
CR@PLEUROTHALLIS			2												
CR@PLINIA								1							

Present in previous year Absent in previous year

Diversity (2024)

987 Plant genera
97 Trading partners (Countries)
2915 Genus-Country combinations

Trade Dynamics (2024)

- 2111 Regular trade flows
- 804 New trade flows (28%)
  - 52 New Plant Genera

Volume (2024)

72.000 Consignments; 3,7 Billion pieces
New trade: 1% volume
Few new trade flows become regular

Trade Dynamics – New imported Genera

PLANT GENUS	Family	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ADONIS	Ranunculaceae						1									
AETHEORHIZA	Compositae						1									
AKANIA	Akaniaceae						1									
ALOPHIA	Iridaceae						1									
AMMANNIA	Lythraceae						53	58	54	51	21		1		1	
ANAGYRIS	Leguminosae						1									
ANAPALINA	Iridaceae						1									
ARONIA	Rosaceae						1	2				1				1
BERLANDIERA	Compositae						1									
BILLBERGIA	Bromeliaceae						2	1	1			6	8	12	8	9
BUTOMUS	Butomaceae						1	5	4	4						
CRYPTOGRAMMA	Pteridaceae						1		1							
DIERVILLA	Caprifoliaceae						2	1			2	1	7	9	1	1
DISPORUM	Colchicaceae						1		1	2						1
ELETTARIA	Zingiberaceae						1									
EPIPHYLLUM	Cactaceae						2	2	10	15	47	79	94	106	67	80
ERIOSYCE	Cactaceae						1									2
ERYTHROXYLUM	Erythroxylaceae						1									
GOMPHOSTIGMA	Scrophulariaceae						1									
HAAGEOCEREUS	Cactaceae						1		2		3					1
HAKONECHLOA	Poaceae						7	17	25	32	24	17	25	20	23	31
HALOGETON	Amaranthaceae						1									
HYDRILLA	Hydrocharitaceae						1									
HYPECOUM	Papaveraceae						1									
ISOPLEXIS	Plantaginaceae						1					1	3	5	3	3
JACKSONIA	Leguminosae						1									
JUANIA	Arecaceae						1	1								
KADSURA	Schisandraceae						2	2	1			1		2	3	
LARIX	Pinaceae						2									
LONCHOCARPUS	Leguminosae						1									
LUCULIA	Rubiaceae						2	6						1		

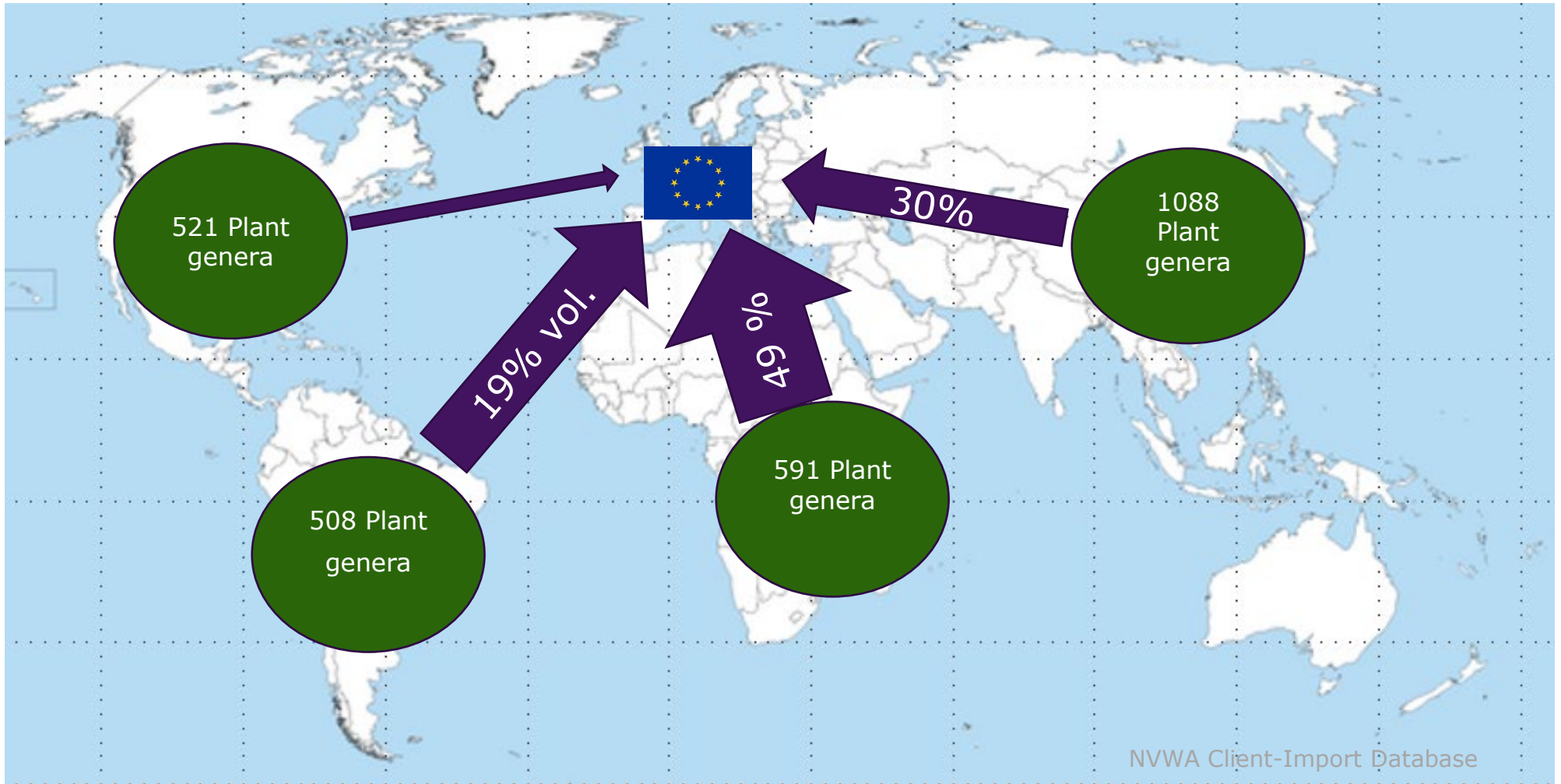
2015
52 Newly imported Plant genera (absent in 2010-2014)

Most new trade stops

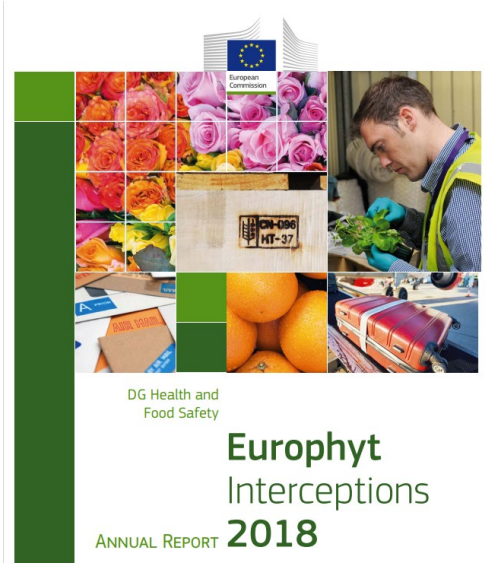
Few develop in regular trade

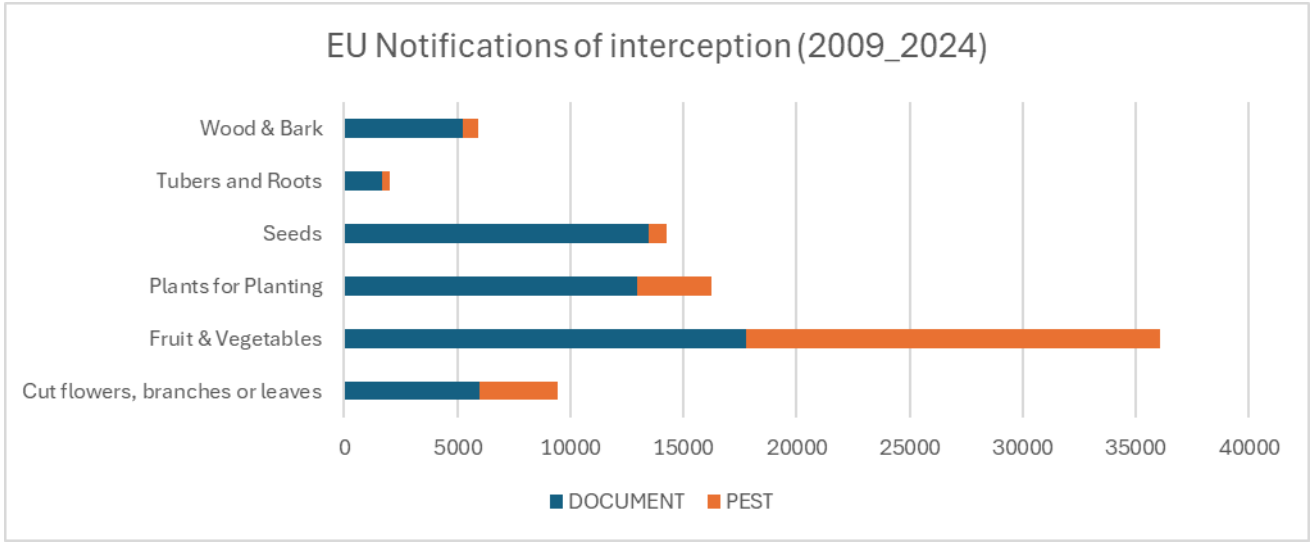
NVWA import database; imported consignments

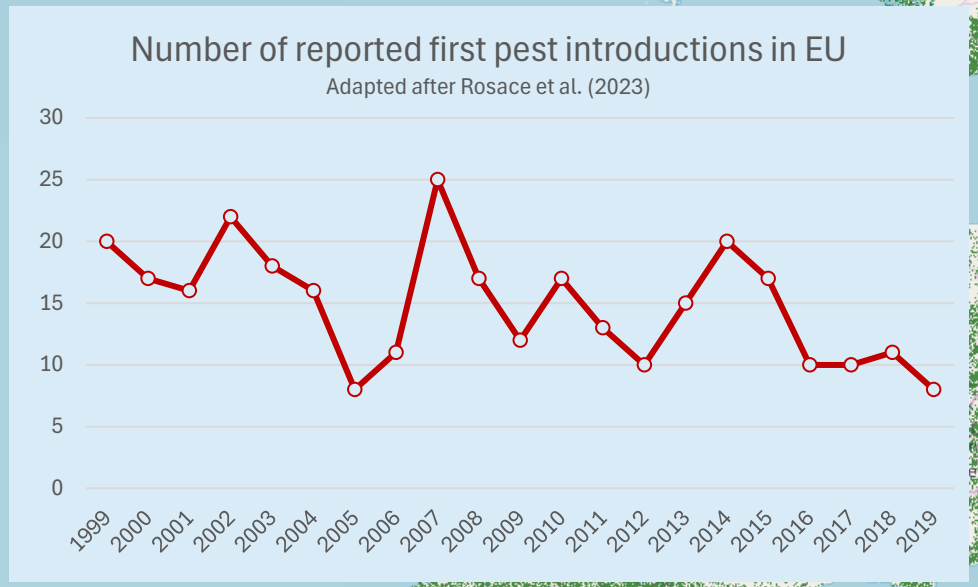
Trade in Living Plants (0602)



Import Interceptions at EU Border





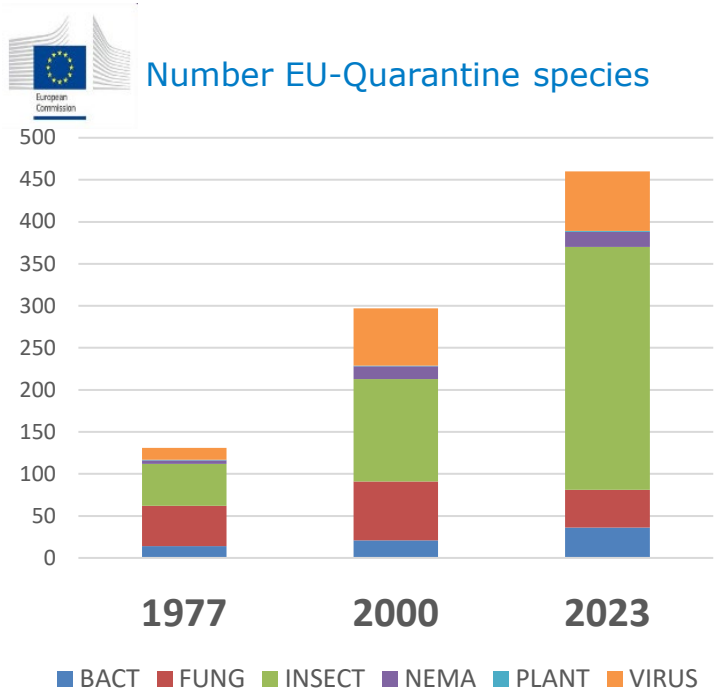


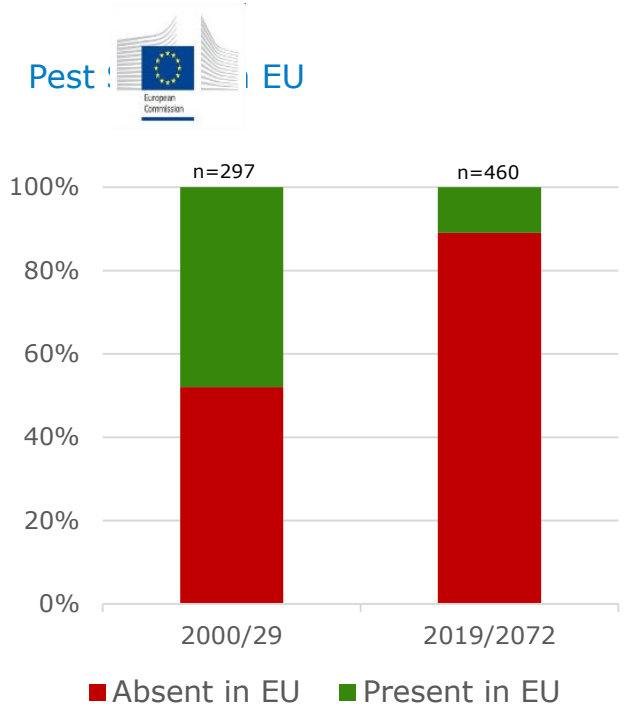
European Commission

Regulation (EU) 2016/2031 on protective measures against plant pests

- More focus on pests not present in EU
- Harmonized surveillance & eradication programs
- Strengthening requirements for import

More Regulated Pests, More Focus on Absent Pests





Legislation targeting the import of "HIGH RISK PLANTS"

Article 42 of Regulation (EU) 2016/2031 on protective measures against plant pests

Focus on new emerging pests in the natural environment

45 Plant genera prohibited for import pending risk assessment

Acacia, ***Acer****,* ***Albizia, Alnus,*** *Annona, Bauhinia,* ***Berberis, Betula****, Caesalpinia, Cassia, Castanea,* ***Cornus, Corylus, Crataegus,*** *Cycas, Diospyros, Eucalyptus,* ***Fagus, Ficus caricum, Fraxinus, Hamamelis, Jasminum, Juglans, Ligustrum, Lonicera, Malus, Nerium,*** *Ostrya,* ***Persea, Populus, Prunus, Quercus, Robinia, Salix, Sorbus,*** *Syringa,* ***Taxus, Tilia,*** *Ulmus, Abies,* ***Pinus,*** *Picea, Chamaecyparis, Larix, Pseudotsuga*

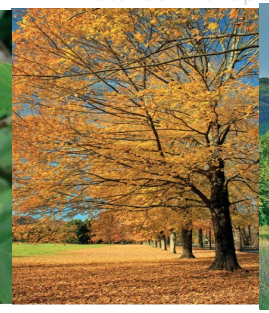
Pictures: European atlas of forest tree species

Pinus pinaster

Quercus ilex

Fagus sylvatica

Alnus incana



Acer platanoides

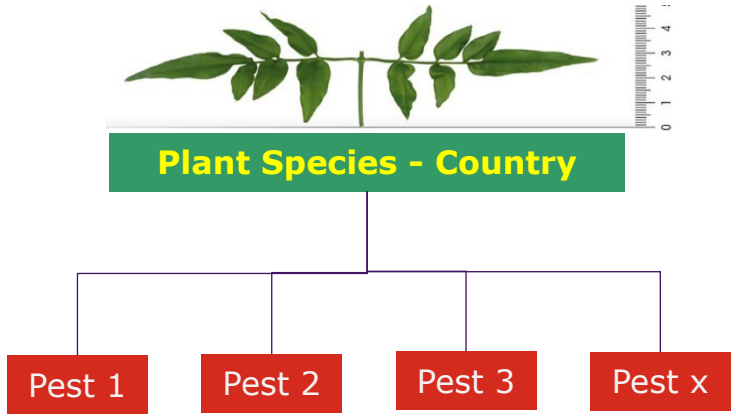
Tilia cordata

Commodity Risk Assessment

efsa EUROPEAN FOOD SAFETY AUTHORITY

Relevant pest has to fulfill all selection criteria to be selected:

- ✓ the pest is present in export country
- ✓ the pest is absent in the EU
- ✓ Plant species is a host of the pest
- ✓ one or more life stages of the pest can be associated with the commodity exported
- ✓ Evidence of potential impact



So far (30 dossiers from 9 countries)

152 relevant pests selected

➢ **86 unknown pests (not regulated in EU)**

GBIF Global Biodiversity Information Facility

EPPO Global Database

SCALENET

CABI Digital Library

Commodity Risk Assessments by EFSA

EFSA High Risk Plants Evaluation (Sept 2025): 60 dossiers evaluated, 28 plant genera from 9 countries

Acacia, ***Acer****,* ***Albizia****, Alnus, Annona, Bauhinia,* ***Berberis****, Betula, Caesalpinia, Cassia, Castanea, Cornus,* ***Corylus, Crataegus****, Cycas, Diospyros, Eucalyptus,* ***Fagus, Ficus caricum****, Fraxinus, Hamamelis,* ***Jasminum, Juglans, Ligustrum, Lonicera, Malus, Nerium****, Ostrya,* ***Persea****, Populus,* ***Prunus, Quercus, Robinia****, Salix, Sorbus, Syringa, Taxus, Tilia, Ulmus; Abies,* ***Pinus****, Picea, Chamaecyparis, Larix, Pseudotsuga*

12274	• Pest species with host plant records
54%	• Absent in export country
36%	• Present in EU
3%	• Commodity not a pathway
6%	• No evidence of impact
152	• Relevant pest for commodity
86	• Pest not regulated in EU (new pest)

86 non-regulated new harmful pests identified so far:
62 Insects, 18 Fungi, 4 Nematode, 1 virus, 1 Plant

Implementation of Biosecurity

WORLD TRADE ORGANIZATION

WTO-SPS (1994)
Sanitary and Phytosanitary Measures Agreement

Closed Plant Health System **Open**

EU/2016/2031

Commodity

Pest 1 | Pest 2 | Pest 2 | Pest 2

Commodity Risk Assessment
Permit for import

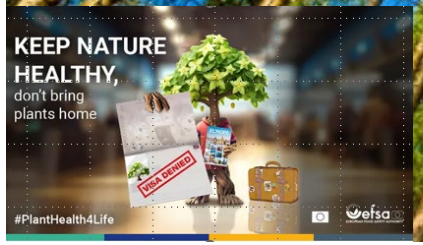
Pest species

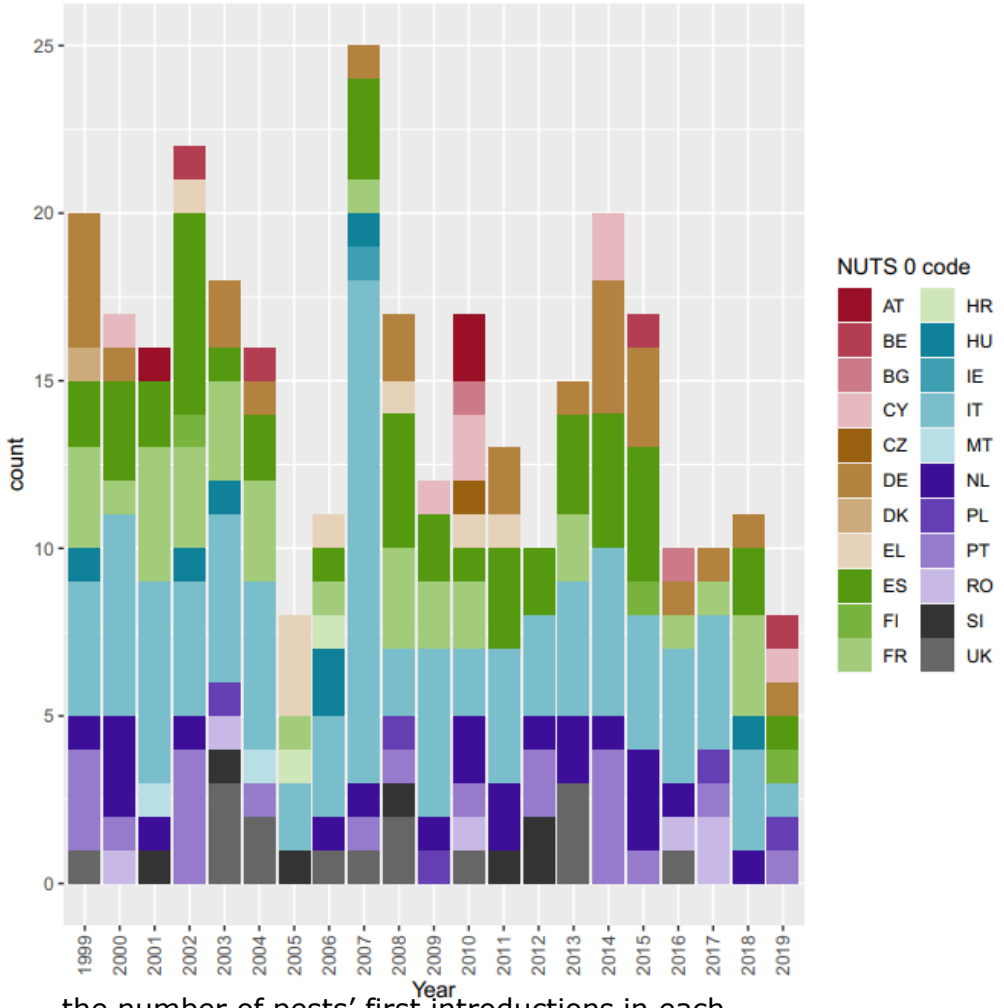
Pathway1 | Pathway2 | Pathway3

Pest Risk Assessment
Requirements for Pathways

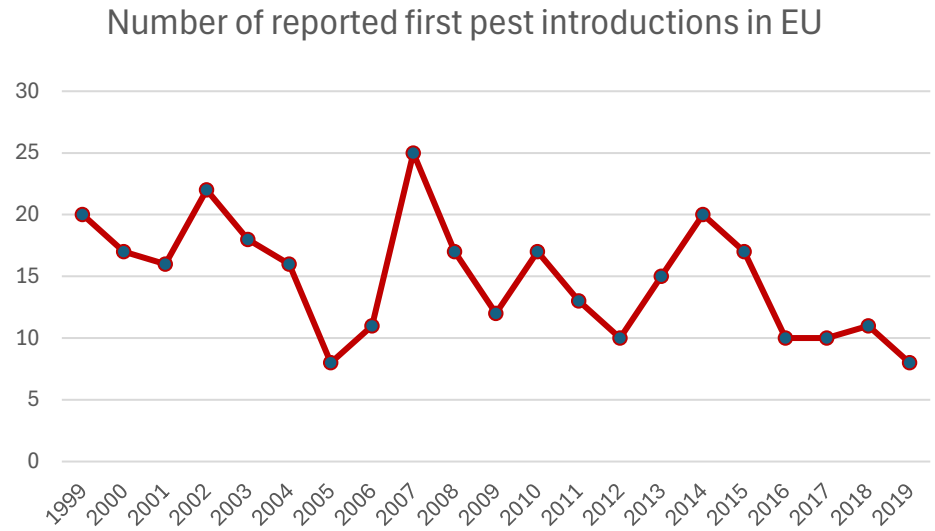
Thank you for the attention

Special thanks to members of the EPPO PPM and EFSA PLH Panels



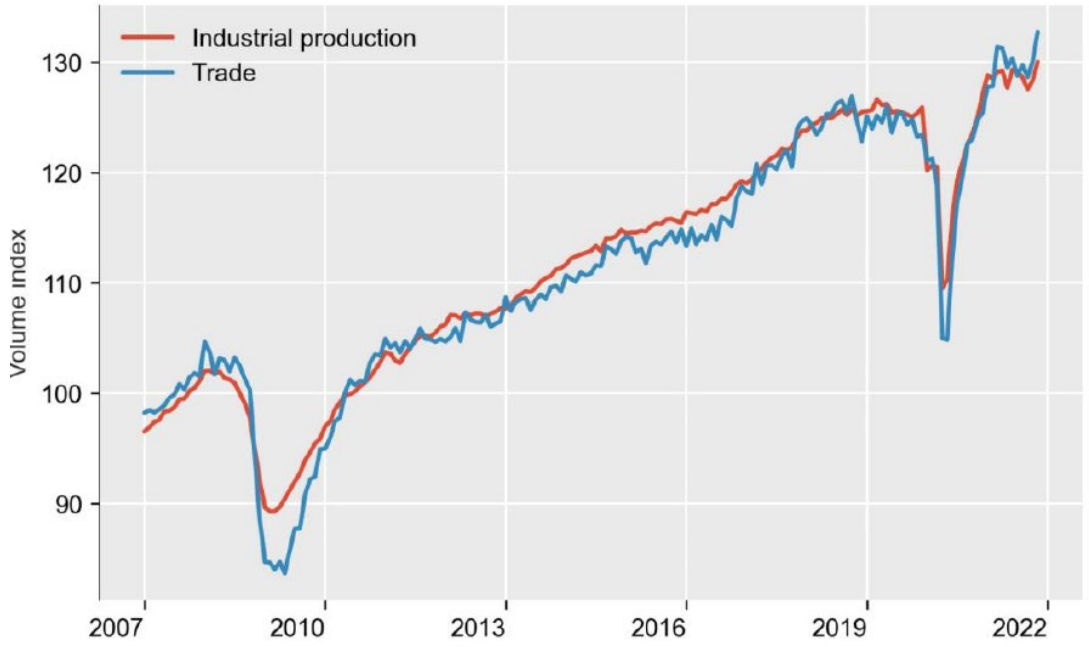


the number of pests' first introductions in each EU MS per year

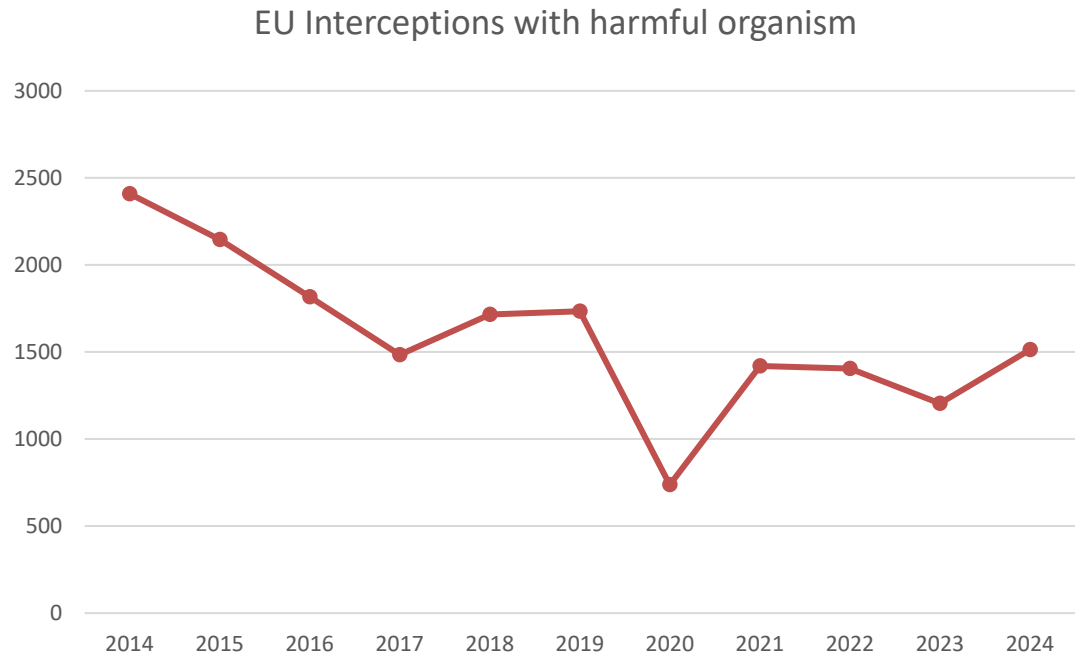


Rosace et al. (2023) A spatio-temporal dataset of plant pests' first introductions across the EU and potential entry pathways

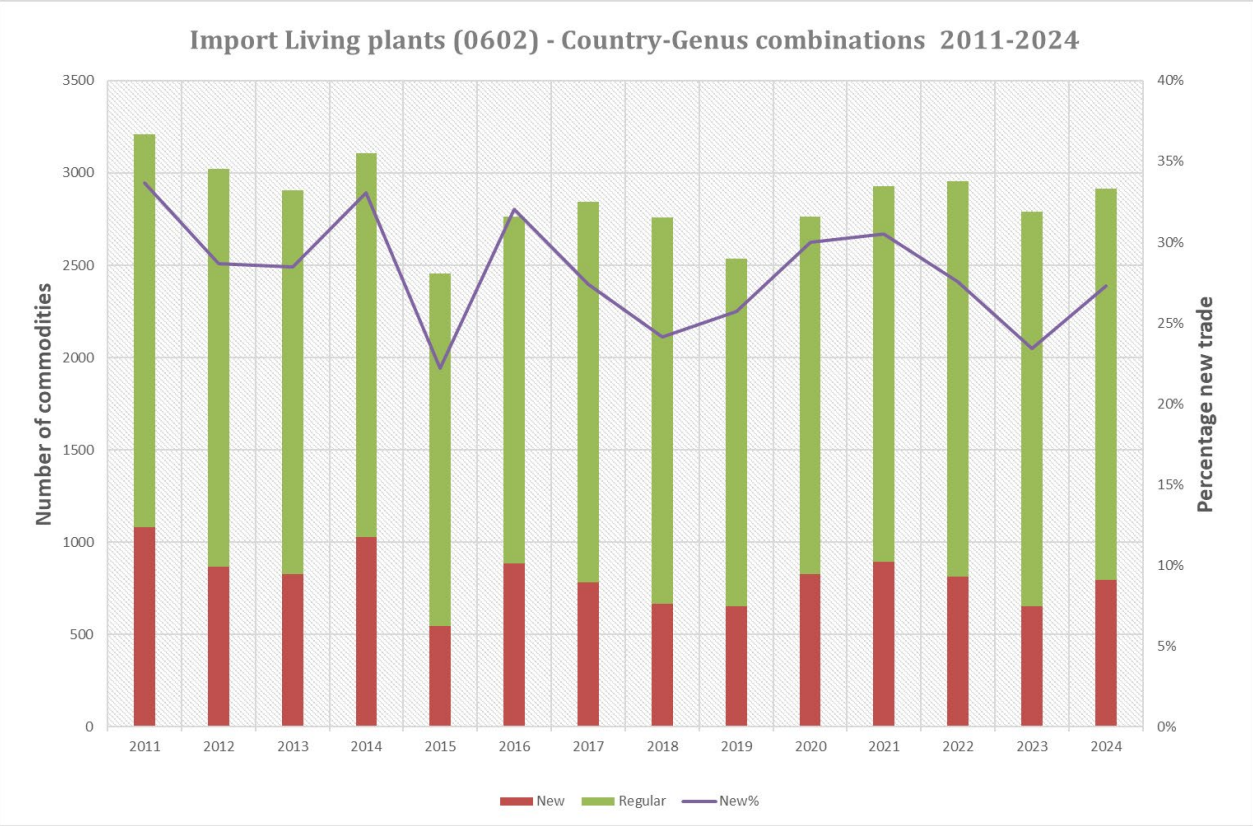
Effect of Covid epidemic on Border Security

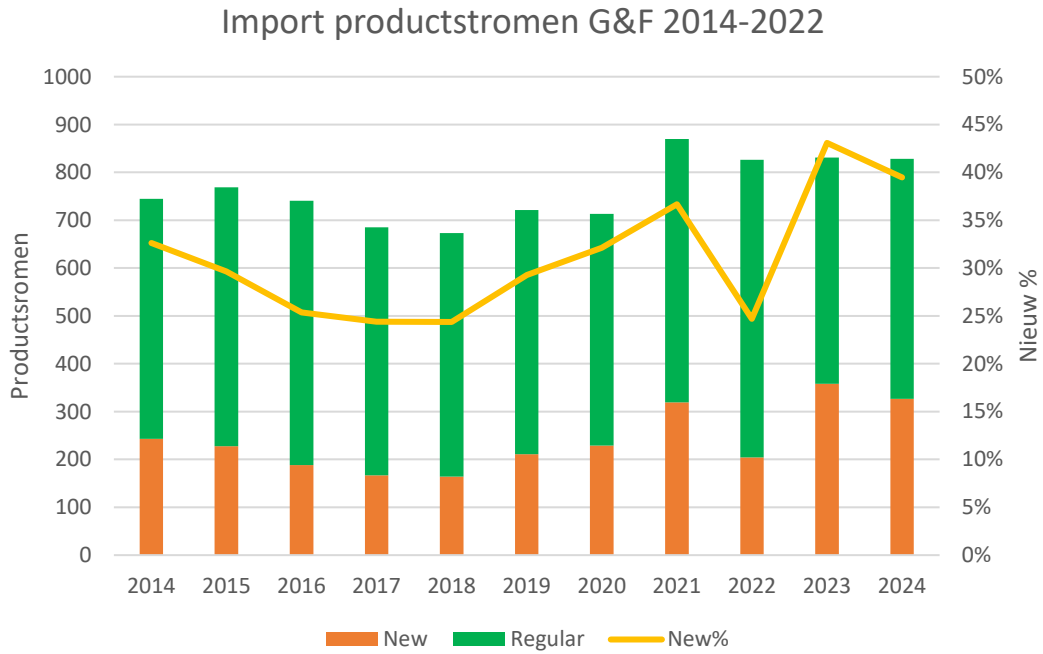


OECD (2022) calculations based on CPB World Trade Monitor.



Trade dynamics





Host range of pests and pathogens

Ceroplastes ceriferus (Hemiptera: Coccidae)

Host plant list

Acer japonicum (Host); Acer negundo (Host); Acer palmatum (Host); Berberis (Host); Berberis bealei (Host); Buxus (Host); Citrus (Host); Cornus (Host); Cydonia oblonga (Host); Deutzia (Host); Elaeocarpus joga (Host); Euonymus alatus (Host); Ficus (Host); Ficus carica (Host); Ficus microcarpa (Host); Ilex aquifolium (Host); Lagerstroemia (Host); Laurus (Host); Laurus nobilis (Host); Liriodendron tulipifera (Host); Magnolia (Host); Magnolia grandiflora (Host); Malus domestica (Host); Morus (Host); Morus alba (Host); Persea americana (Host); Photinia x fraseri (Host); Platanus (Host); Podocarpus macrophyllus (Host); Populus (Host); Prunus domestica (Host); Prunus laurocerasus (Host); Punica granatum (Host); Pyracantha sp. (Host); Pyrus communis (Host); Rhododendron (Host); Ribes (Host); Rosa (Host); Salix (Host); Salix babylonica (Host); Salix caprea (Host); Vaccinium (Host); Viburnum (Host); Weigela hybrids (Host)

44 records
33 Plant Genera
21 Plant Families

Indicator of Polyphagy

USDA Fungal Databases
U.S. DEPARTMENT OF AGRICULTURE
https://fungi.ars.usda.gov/

25.078 Fungal species
136.464 host plant records

EPPO Global Database

1.884 pest species (86% Q)
33.201 host plant records
(VIR, BAC, NEM, INS, FUN)

Natural History Museum Data Portal
HOSTS - a Database of the World's Lepidopteran Hostplants

25.047 Lepidopteran species
73.651 host plant records

efsa EUROPEAN FOOD SAFETY AUTHORITY
Host plants of non-EU Scolytinae on non-coniferous hosts

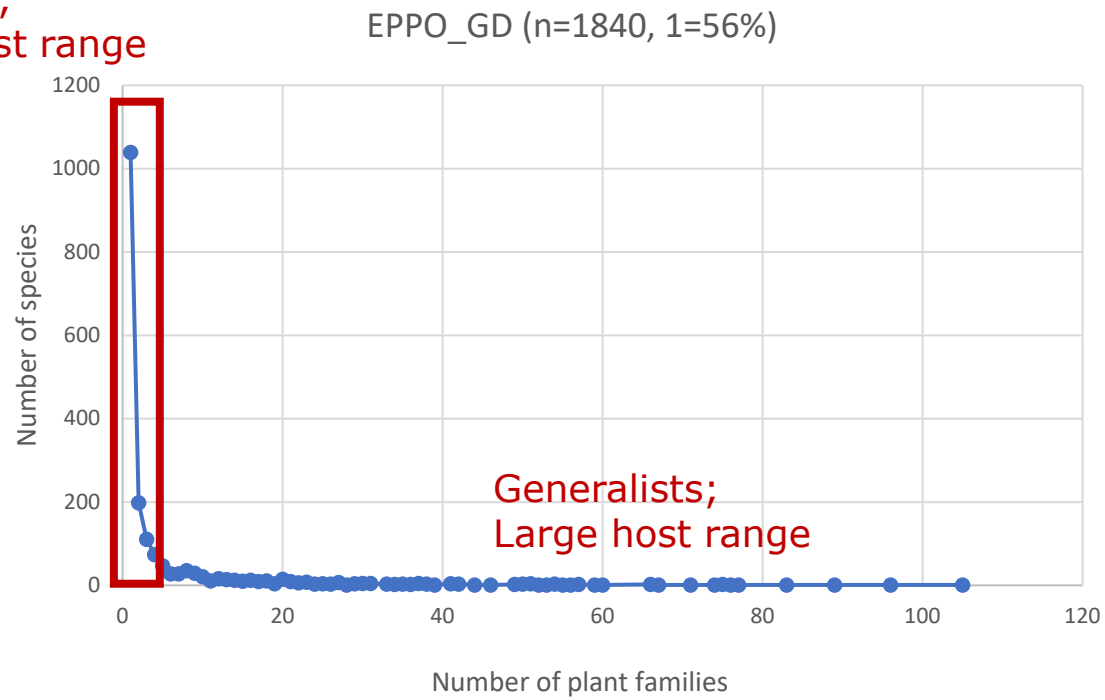
3.457 Bark beetle species
11.343 host plant records

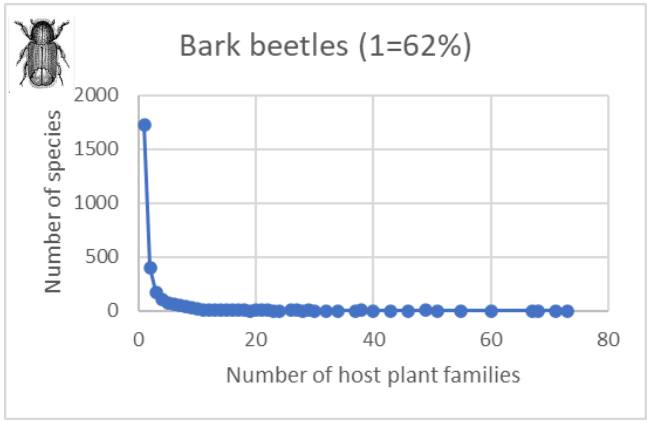
EPPO Global Database –Focus on pest species

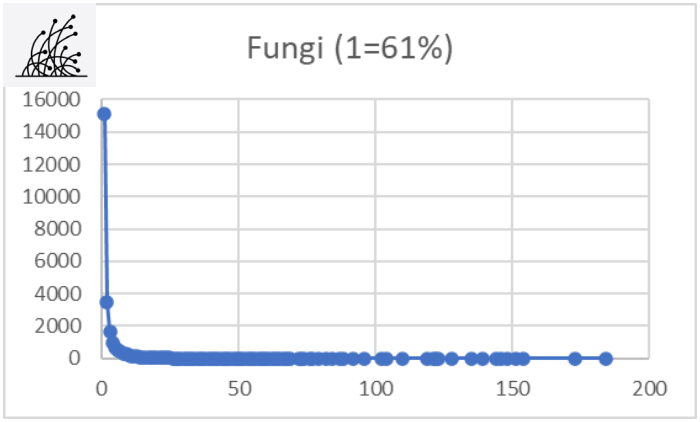
EPPO Global Database

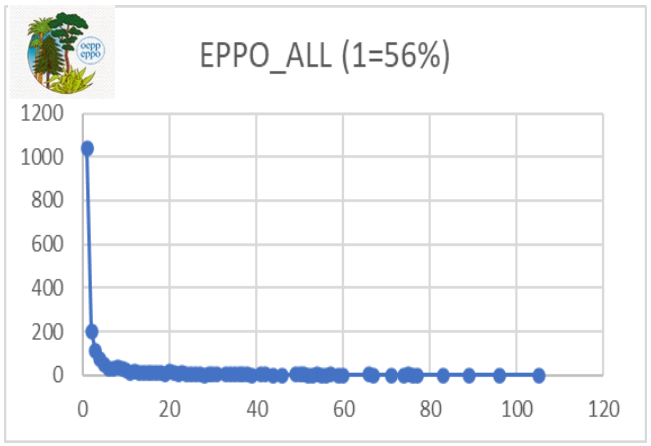
Group	Species	Q-status (World)	Host plant records
Acari	1264	147	38
Bacteria	1473	236	159
Chromista	896	75	45
Fungi	11232	827	313
Gastropoda	601	43	8
Insecta	28608	2021	921
Nematoda	1019	161	58
Platyhelminthes	78	1	
Protozoa	179	5	4
Viruses and viroids	2151	518	338
Eindtotaal	**47501**	**4034**	**1884**

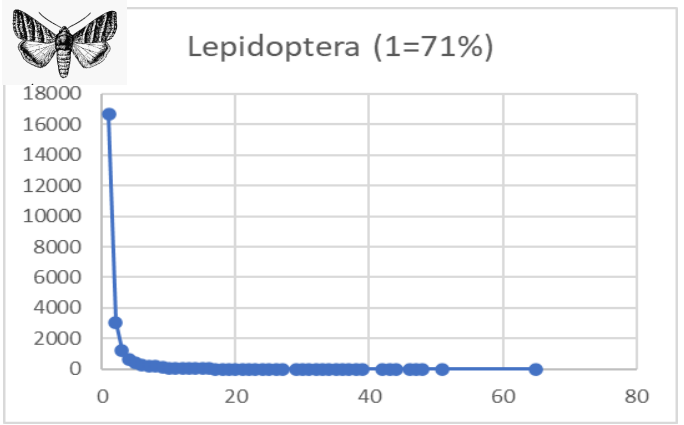
Specialists;
Narrow host range











- All datasets have same curve: more specialists than generalists
- Regulated species curve has more generalists than expected

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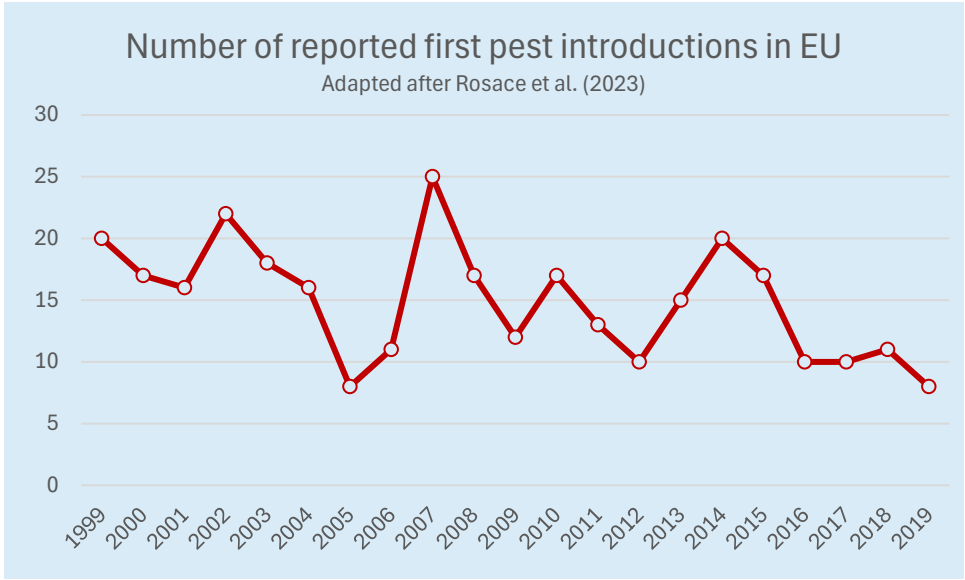
Article 42 High Risk Plants

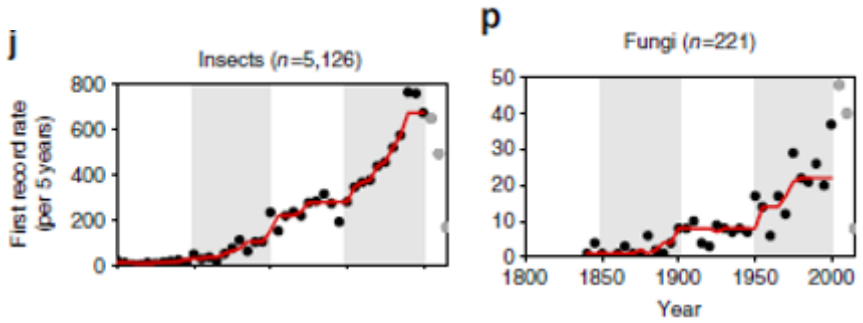
- (Preamble 25) In addition to the measures taken to manage the unacceptable risk of the plants, plant products and other objects thereof, this Regulation should provide risk-based and preventive measures to protect the Union territory from pests that a plant, plant product or other object originating from a third country might introduce, on the basis of a preliminary assessment of that high risk. That preliminary assessment should take into account specific criteria appropriate for the plant, plant product or other object concerned. For that purpose scientific opinions or studies of the IPPC, the European and Mediterranean Plant Protection Organisation (EPPO), the European Food Safety Authority (EFSA) or Member State authorities should be taken into account. On the basis of that preliminary assessment, a list of those high-risk plants, plant products or other objects should be established and their introduction into the Union territory should be prohibited, pending a risk assessment carried out in accordance with IPPC standards. Those plants, plant products or other objects should not include those whose introduction in the Union territory is prohibited or subject to special and equivalent requirements, on the basis of a pest risk analysis, or which are subject to the temporary prohibitions set out in this Regulation.
- (Preamble 31) The international trade of plants, plant products and other objects with which there is limited phytosanitary experience can potentially involve unacceptable risks of the establishment of quarantine pests which are not yet listed as Union quarantine pests and for which no measures have been adopted pursuant to this Regulation. In order to ensure swift and effective action against those newly identified or suspected pest risks associated with plants, plant products and other objects which are not subject to permanent requirements or prohibitions, but may qualify for such permanent measures, the Commission should have the possibility to adopt temporary measures in accordance with the precautionary principle and identify those plants, plant products and other objects taking into account objective and established elements.

Abstract

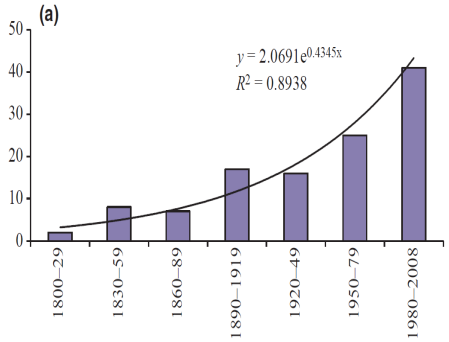
- **The evolution of plant health and pest risk analysis in the EU**
- The European Union (EU) has a long history of dealing with plant pests that threaten its (agro)ecosystems. In contrast to other parts of the world the EU has a very open market for trade in living plants, fruits and vegetables. An overview will be given of the diversity and dynamics of plant trade as well as the number of interceptions and outbreaks. In response to the continuing number of outbreaks the EU has recently strengthened its plant health regulations. The evolution of plant health and pest risk assessment in the EU will be discussed, indicating that the EU is shifting from pest risk assessment to commodity risk assessment. The European Food Safety Authority (EFSA) has been mandated by the European Commission to conduct commodity risk assessments (CRA) of specific imports of high risk plant genera. An overview of the results of these CRA's will be given.



Adapted from Rosace et al. (2023) A spatio-temporal dataset of plant pests' first introductions across the EU and potential entry pathways



Seebens et al. (2017) No saturation in the accumulation of alien species Worldwide. Nature Communications DOI: 10.1038/ncomms14435



Number of new forest pathogens in Europe
Santini et al.(2013)

Santini et al. (2013) Biogeographical patterns and determinants of invasion by forest pathogens in Europe New Phytologist https://doi.org/10.1111/j.1469-8137.2012.04364.x

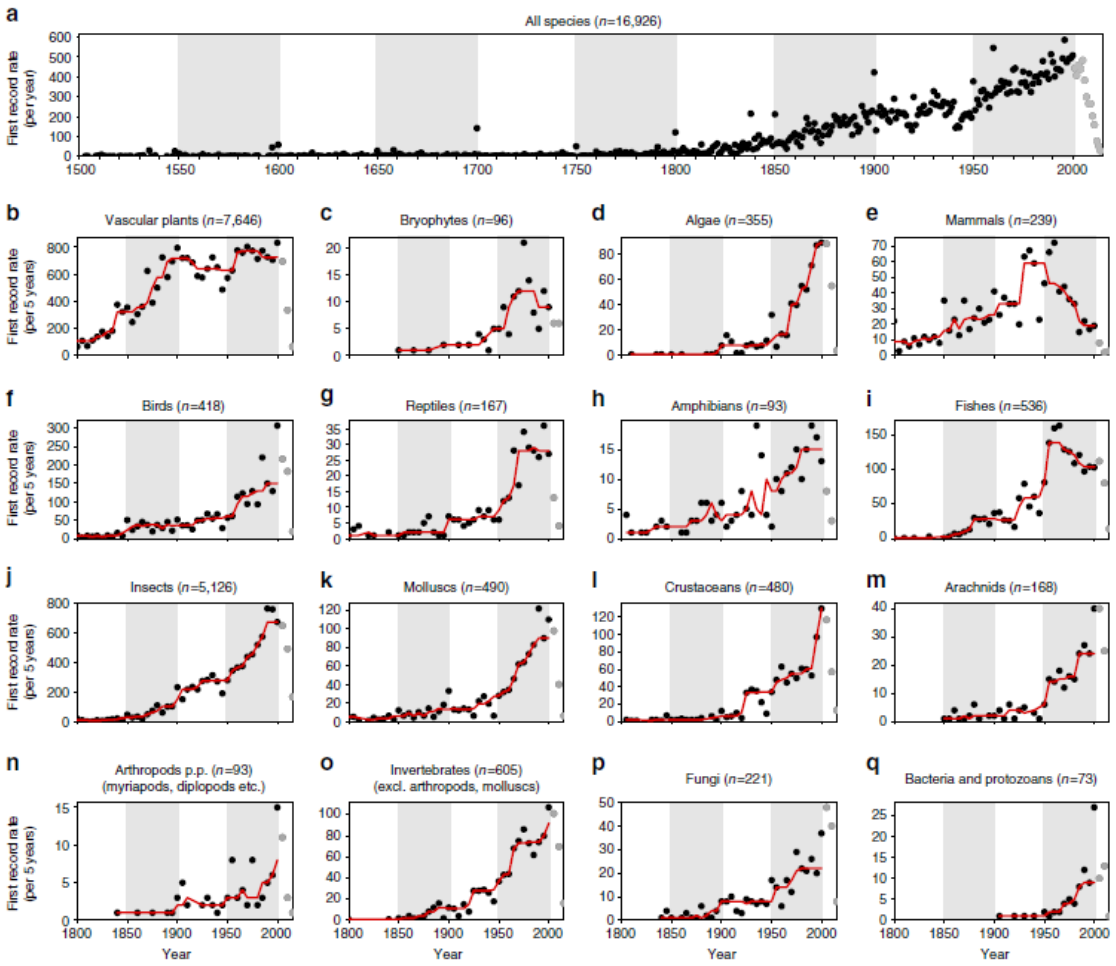
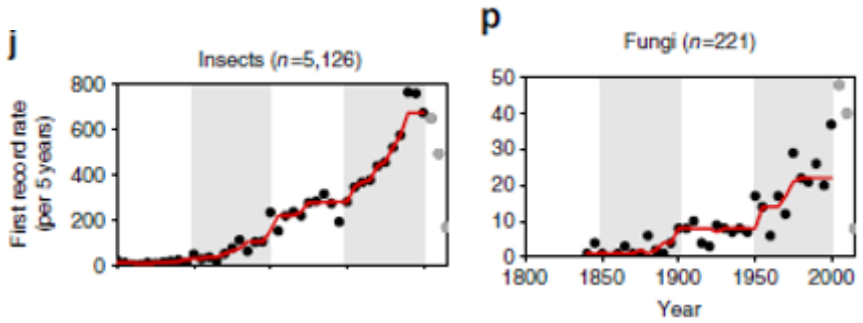
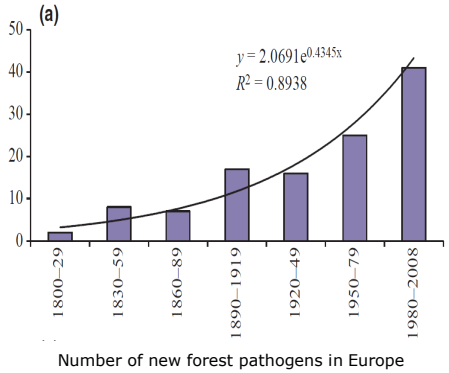


Figure 2 | Global temporal trends in first record rates. Global temporal trends in first record rates (dots) for all species (**a**) and taxonomic groups (**b–q**) with the total number of established alien species during the respective time periods given in parentheses. Data after 2000 (grey dots) are incomplete because of the delay between sampling and publication, and therefore not included in the analysis. As first record rates were recorded on a regional scale, species may be included multiple times in one plot. (**a**) First record rates are the number of first records per year during 1500–2014. (**b–q**) First record rates constitute the number of first records per 5 years during 1800–2014 for various taxonomic groups. The trend is indicated by a running median with 25-year moving window (red line). For visualization, 50-year periods are distinguished by white/grey shading.

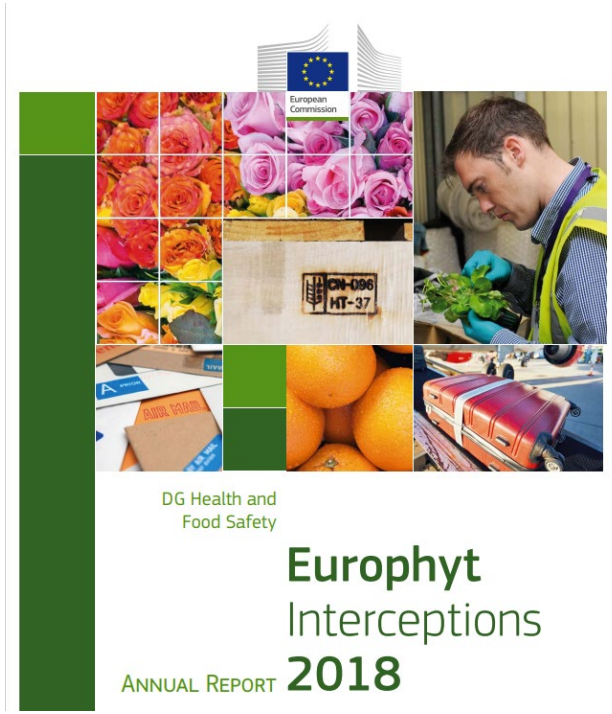


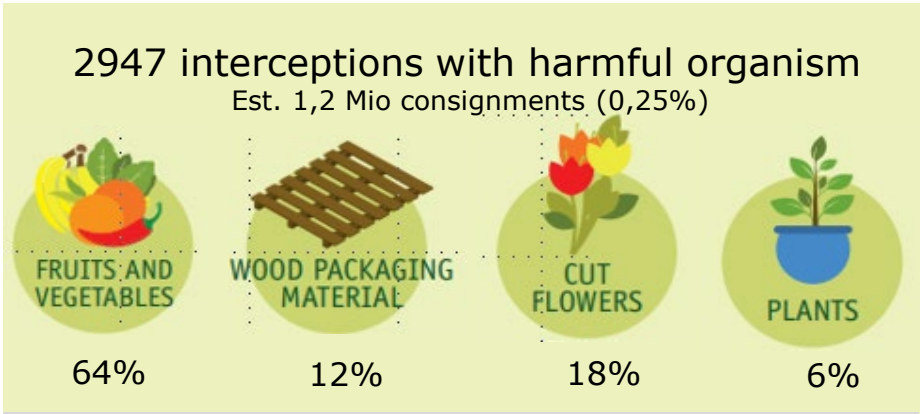
Seebens et al. (2017) No saturation in the accumulation of alien species Worldwide. Nature Communications DOI: 10.1038/ncomms14435

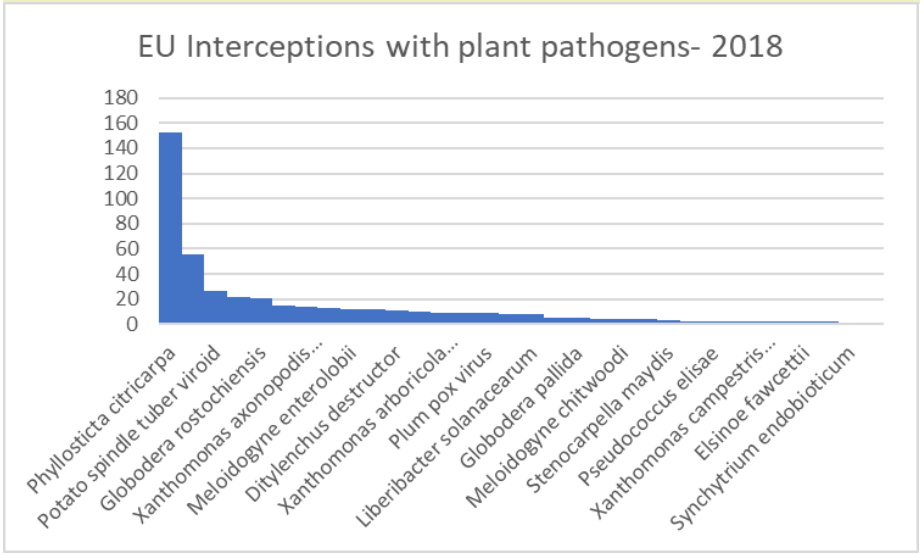


Santini et al. (2013) Biogeographical patterns and determinants of invasion by forest pathogens in Europe New Phytologist https://doi.org/10.1111/j.1469-8137.2012.04364.x

Import Interceptions at EU Border







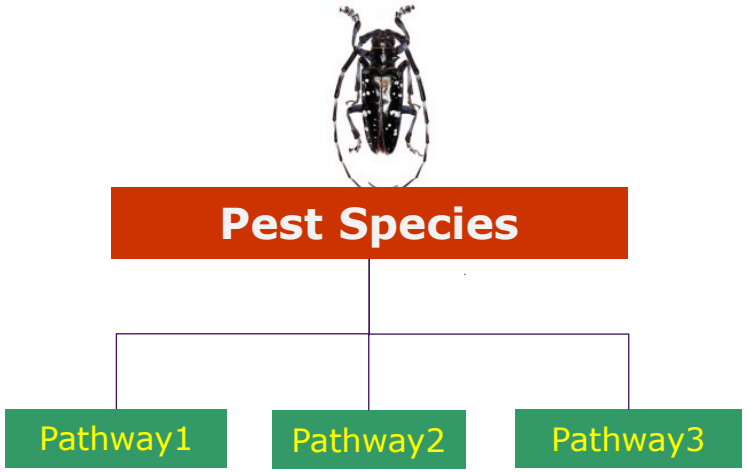
EU Emergency Measures 2000-2023

Emergency Measure	Group	Initiation	Reason
Bursaphelenchus xylophilus	NEM	2000	outbreak
Pepino mosaic virus	VIR	2000	outbreak
Phytophthora ramorum	FUN	2002	outbreak
Diabrotica virgifera virgifera	INS	2003	outbreak
Guignardia citricarpa	FUN	2004	interceptions
Anoplophora glabripennis	INS	2005	outbreak
Dryocosmus kuriphilus	INS	2006	outbreak
Gibberella circinata	FUN	2007	outbreak
Potato spindle tuber viroid	VIR	2007	outbreak
Rhynchophorus ferrugineus	INS	2007	outbreak
Anoplophora chinensis	INS	2008	outbreak
Epitrix spp.	INS	2012	outbreak
Pomacea spp.	GAS	2012	outbreak
Pseudom syringae pv. actinidiae	BAC	2012	outbreak
Wood Packaging Material- China	CMD	2013	interceptions
Xylella fastidiosa	BAC	2014	outbreak
Aromia bungii	INS	2018	outbreak
Spodoptera frugiperda	INS	2018	Alert
Phyllocoptes fructiphilus	INS	2019	Alert
Emaravirus rosae	VIR	2019	Alert
Tomato brown rugose fruit virus	VIR	2019	outbreak
Agrilus planipennis	INS	2020	Alert
Ceratocystis platani	FUN	2022	Containment
Meloidogyne graminicola	NEM	2022	outbreak
Aleurocanthus spiniferus	INS	2022	Containment
Chloridea virescens	INS	2022	interceptions
Leucinodes pseudorbonalis	INS	2022	interceptions
Leucinodes orbonalis	INS	2022	interceptions
Resseliella citrifrugis	INS	2022	interceptions
Spodoptera ornithogalli	INS	2022	interceptions

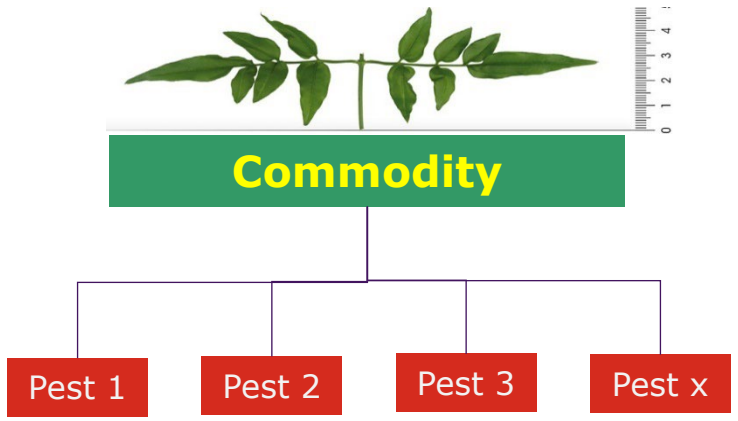
2000-2018 (EU/2000/29):
EU **reactive** regulation as reponse to outbreaks (18 EM in 18 yrs)

From 2018: new Plant Health Law (EU/2016/2031)
EU **pro-active** responding to interceptions and pest alerts (12 EM in 4 yrs)

From Pest to Commodity Risk Assessment

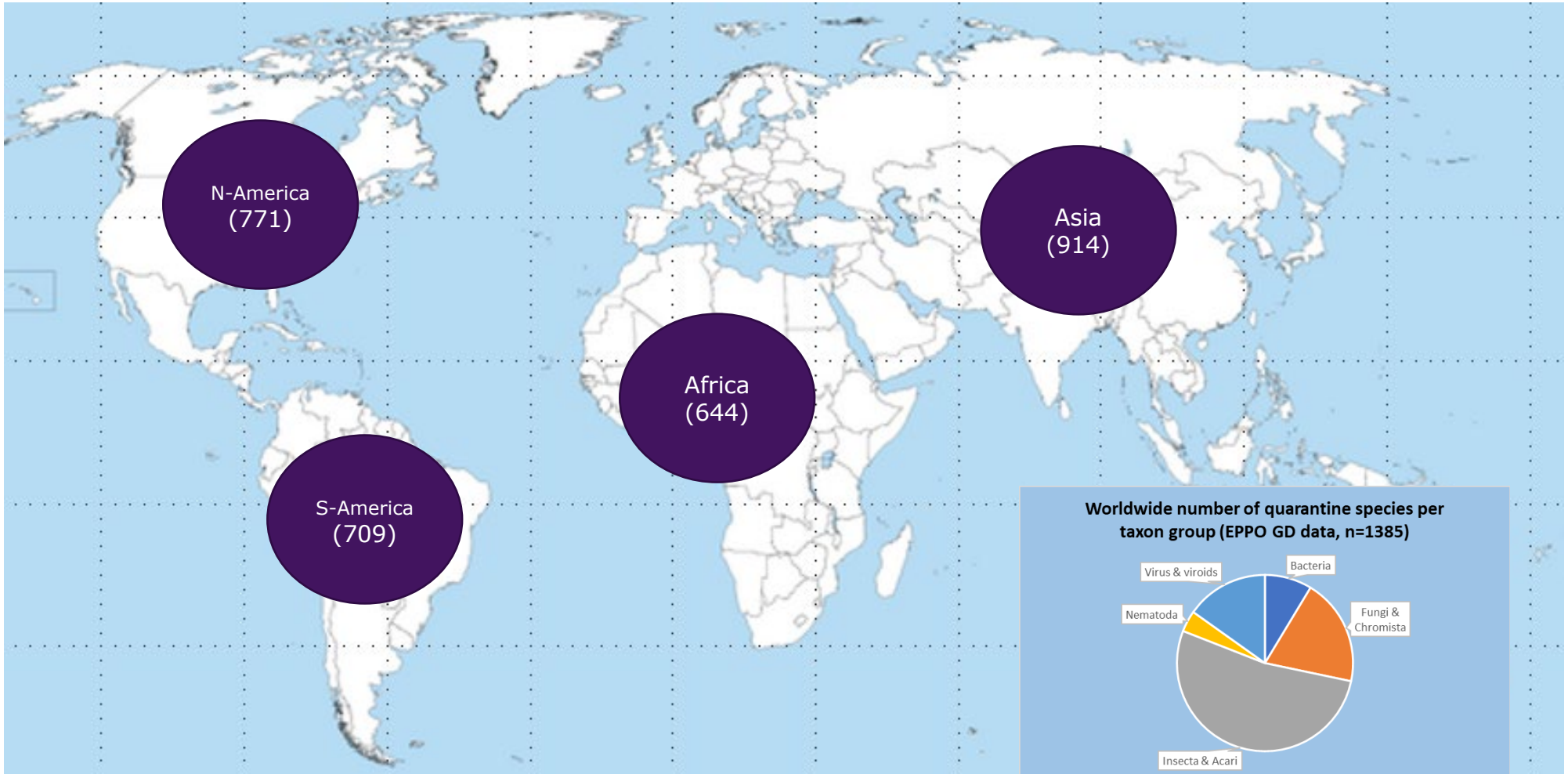


Pest Risk Assessment
Focus on pathways

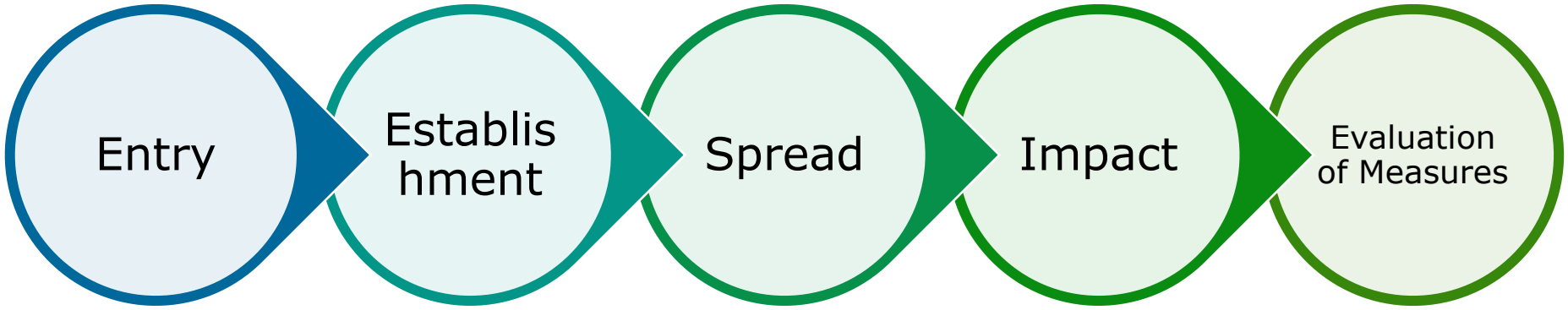


Commodity Risk Assessment
Focus on pest species

Potential sources of new (regulated) pests



Pest Risk Assessment



Guidelines for pest risk assessment
EPPO (1993) Check-list of information required for pest risk analysis (PRA)
IPPC (2003) ISPM 11 Pest risk analysis for quarantine pests
EPPO (2011) PM 5/3 (5) Guidelines on Pest Risk Analysis
EFSA (2018) Guidance in quantitative pest risk assessment

PRA 1996

One of the first structural PRA

Bulletin OEPP/EPPO Bulletin **26**, 199–249 (1996)

Pest Risk Analysis (PRA) for the territories of the European Union (as PRA area) on *Bursaphelenchus xylophilus* and its vectors in the genus *Monochamus*

by H. F. EVANS*, D. G. McNAMARA†, H. BRAASCH‡, J. CHADOEUF§ and C. MAGNUSSON¶

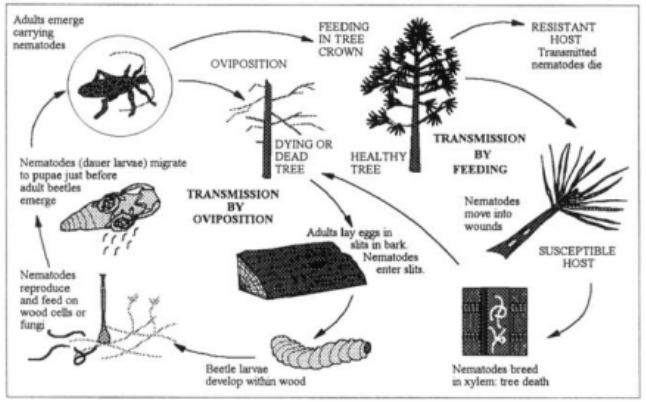
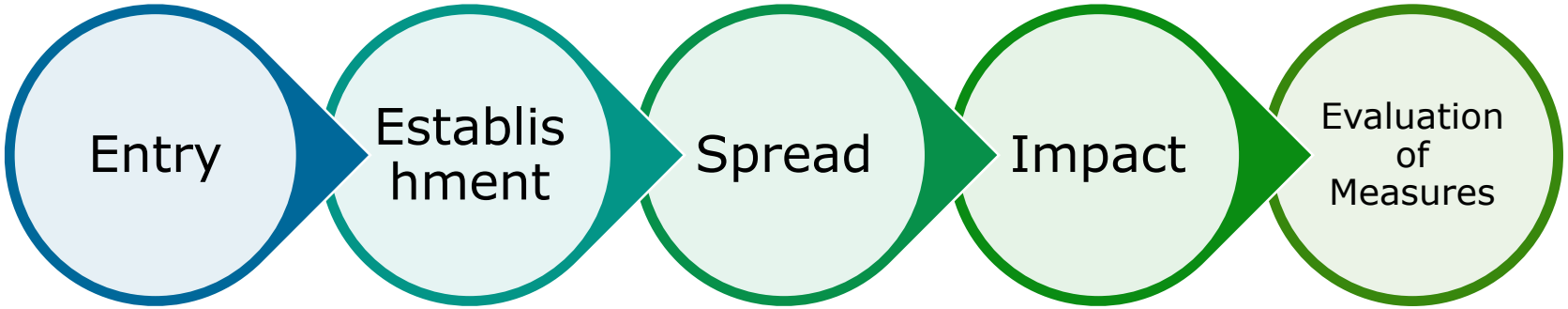


Fig. 1. The relationships between the life cycles of *Bursaphelenchus xylophilus* and its vectors in the genus *Monochamus*.
Relation entre le cycle biologique de *B. xylophilus* et celui de ses vecteurs du genre *Monochamus*.

- Part A: Background information
- Part B: Trade pathways
- Part C: Phytosanitary measures
- Part D: Conclusion

- Narrative, no probabilities, no uncertainties
- Basis for structural PRA

PRA 2010
Qualitative expression of risk in PRA



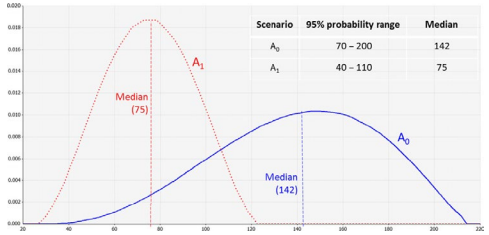
EPPO (2010) Pest Risk Analysis for *Meloidogyne enterolobii*

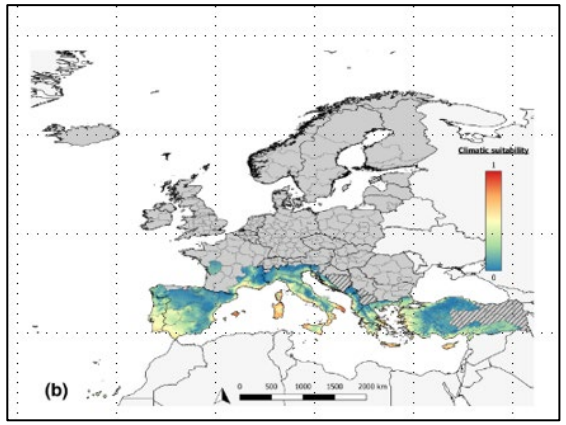
Probability of entry with plants *is considered* ***high*** *taking into account the likelihood of association and concentration of the pest at origin with the pathway and the volumes of trade*

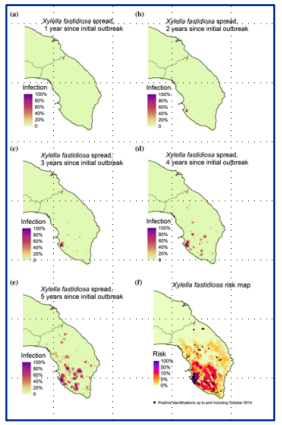
The main ***uncertainties are****….*

PRA 2020
Quantitative Pest Risk Assessment

- Quantification of risk
- Uncertainty analysis
- Pathway modelling
- Scenario Modelling
- Risk mapping
- Expert Knowledge Elicitation







EUROPEAN FOOD SAFETY AUTHORITY

https://.inrae.fr/CBGP/spmwebwww1.montpellier

Alain MIGEON, Elodie NOUGUIER, Franck DORKELD (2011) Spider Mites Web: a comprehensive database for the Tetranychidae. Trends in Acarology: 557-560.

efsa EUROPEAN FOOD SAFETY AUTHORITY

Pest categorisation of non-EU Scolytinae on non-coniferous hosts

SCALENET

García Morales M, Denno BD, Miller DR, Miller GL, Ben-Dov Y, Hardy NB. 2016. ScaleNet: A literature-based model of scale insect biology and systematics. Database. doi: 10.1093/database/bav118. http://scalenet.info

USDA U.S. DEPARTMENT OF AGRICULTURE USDA Fungal Databases

https://fungi.ars.usda.gov/

EPPO Global Database

https://gd.eppo.int/

Natural History Museum Data Portal

HOSTS - a Database of the World's Lepidopteran Hostplants

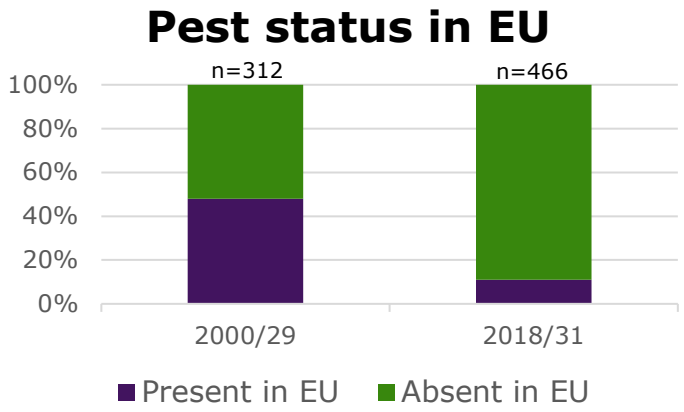
https://data.nhm.ac.uk/dataset/hosts

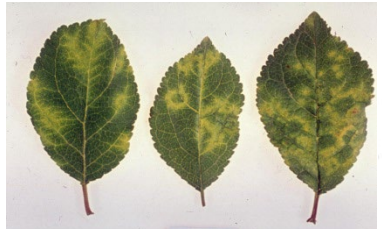
Gaden S. Robinson; Phillip R. Ackery; Ian Kitching; George W Beccaloni; Luis M. Hernández (2023). *HOSTS - a Database of the World's Lepidopteran Hostplants* [Data set]. Natural History Museum. https://doi.org/10.5519/havt50xw

EU: Focus on Quarantine Pest List

Pest Group	
Bacteria	22
Fungi	68
Insect	137
Nematode	14
Virus	71

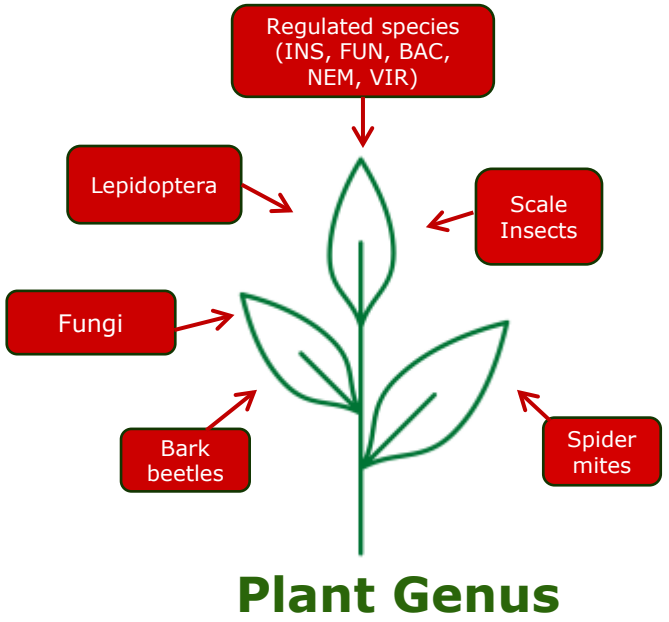
Sector	
Fruit	86
Forest	74
Citrus	40
Vegetables	36
Other	76



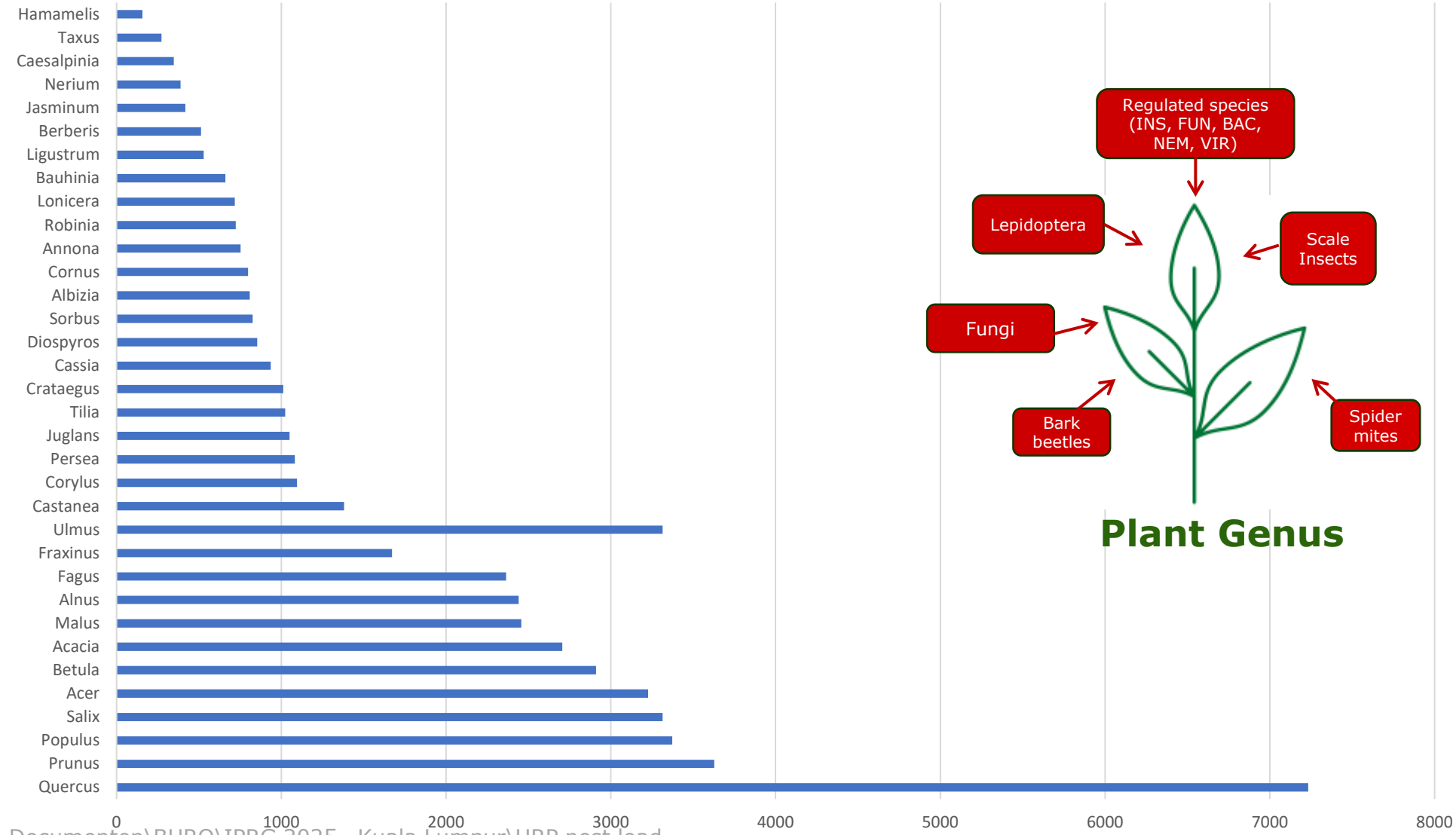


Potential Pest Load of plant genus



Number of associated species per HRP genus

EPPO-GD, USDA Fungal Database, Lepidoptera, Scale Insects, Barkbeetles, Spider mites



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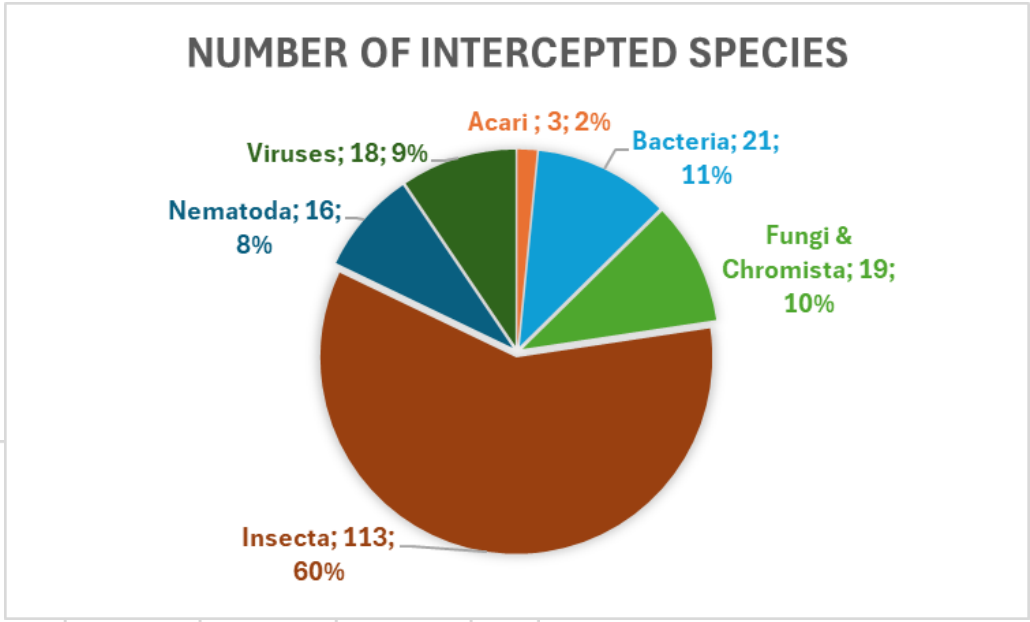
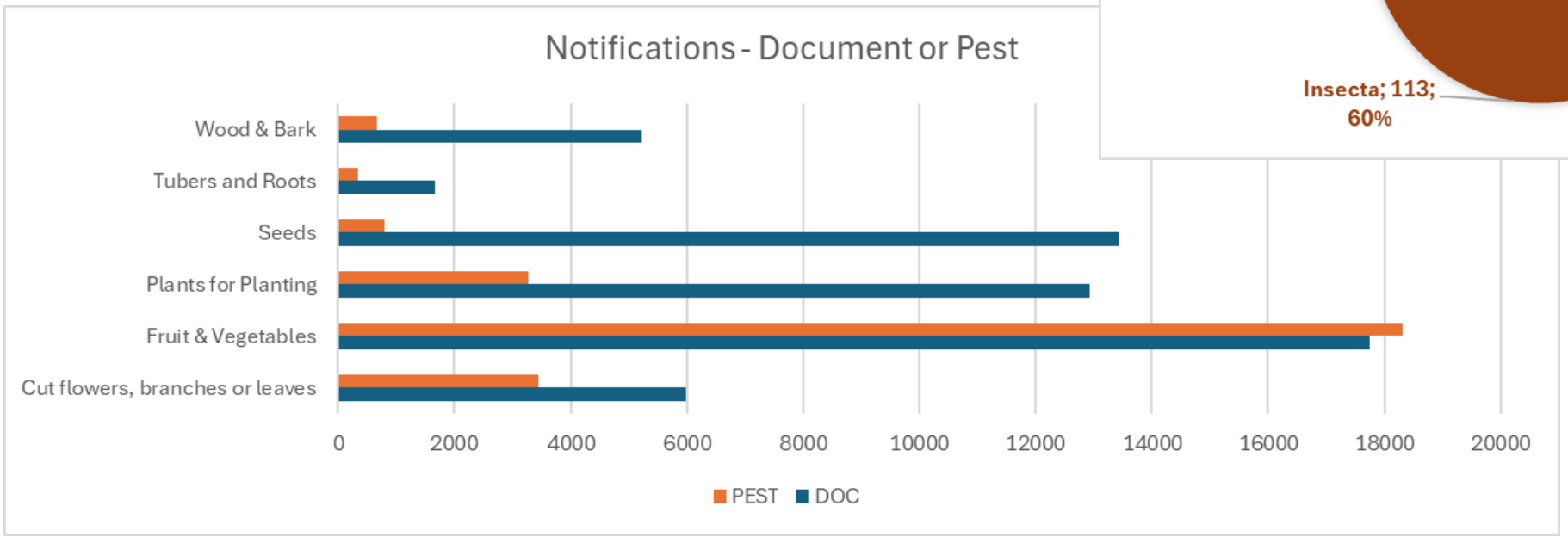
Interceptions at Import

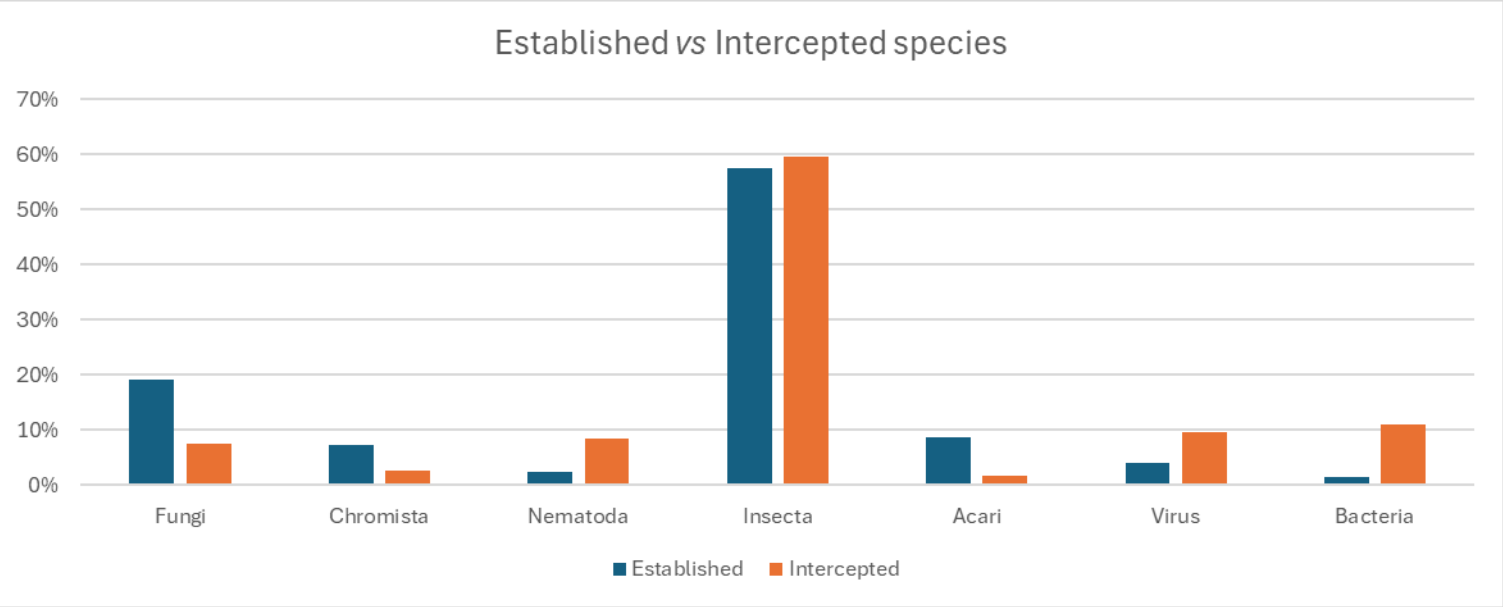
Compare intercepted Piechart with that of EOL world species, EFSA CRA and EPPO regulated





Taxonomic composition of Established vs Intercepted pest groups in EU

Add
Overview of establishment Studies
Numbers and period



Interception of pest species in EU: Europhyt/Traces data 2009_2024

Establishment of alien species in EU: data adapted from Rosace (2024) and Eschen (2014)

Insect Herbivores – Feeding Ecology

Fruit borers

Rhagoletis indifferens

Leaf miners

Liriomyza trifolii

Leaf chewers

Phloem feeders

Gall makers

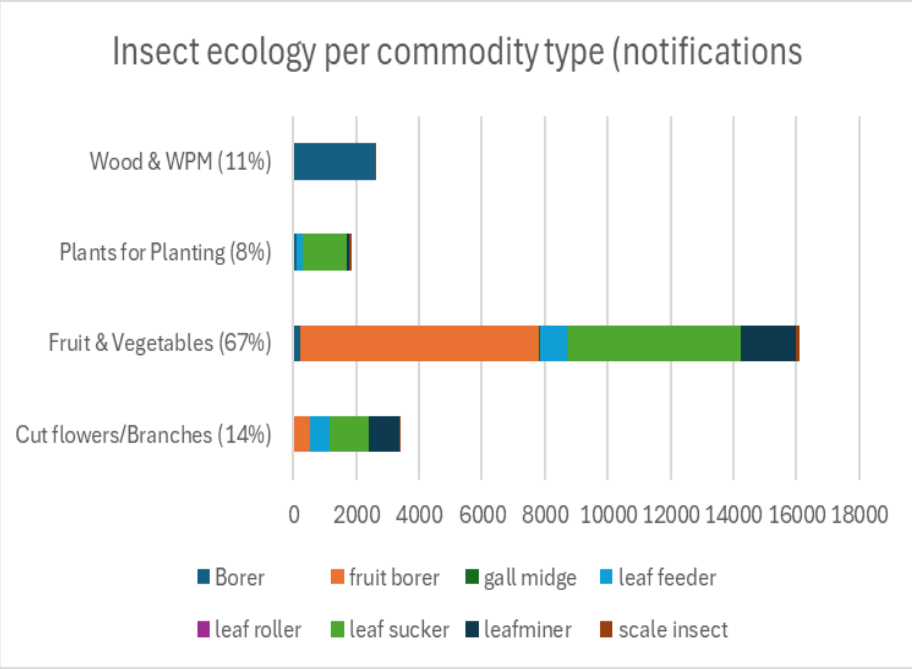
Dryocosmus kuriphilus

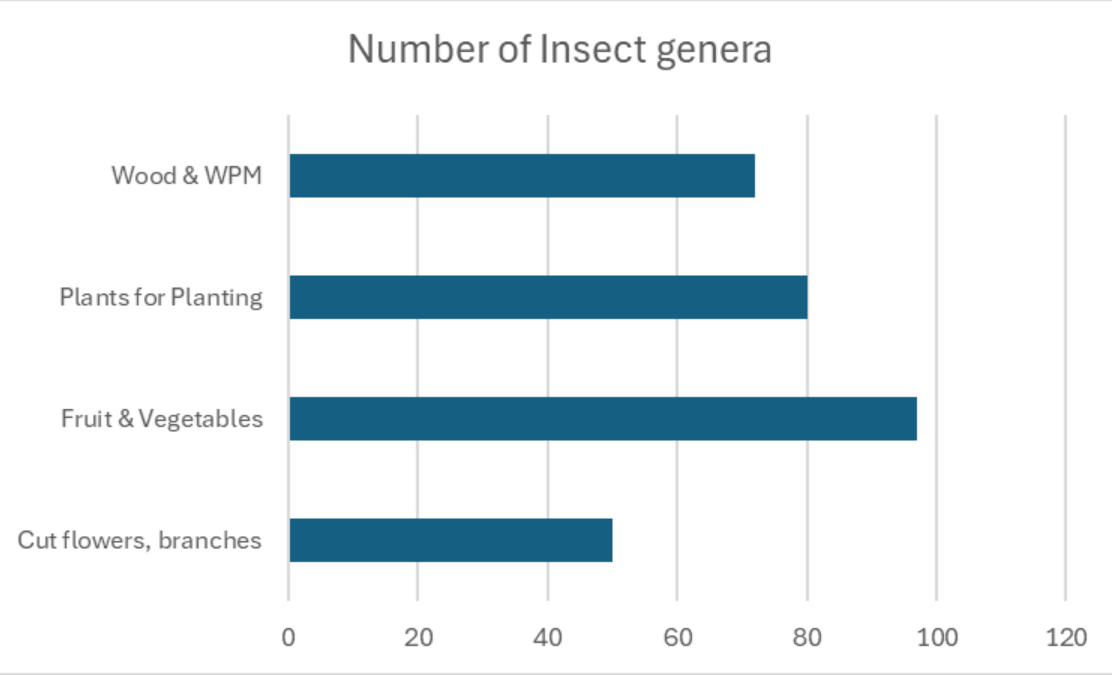
Wood borers

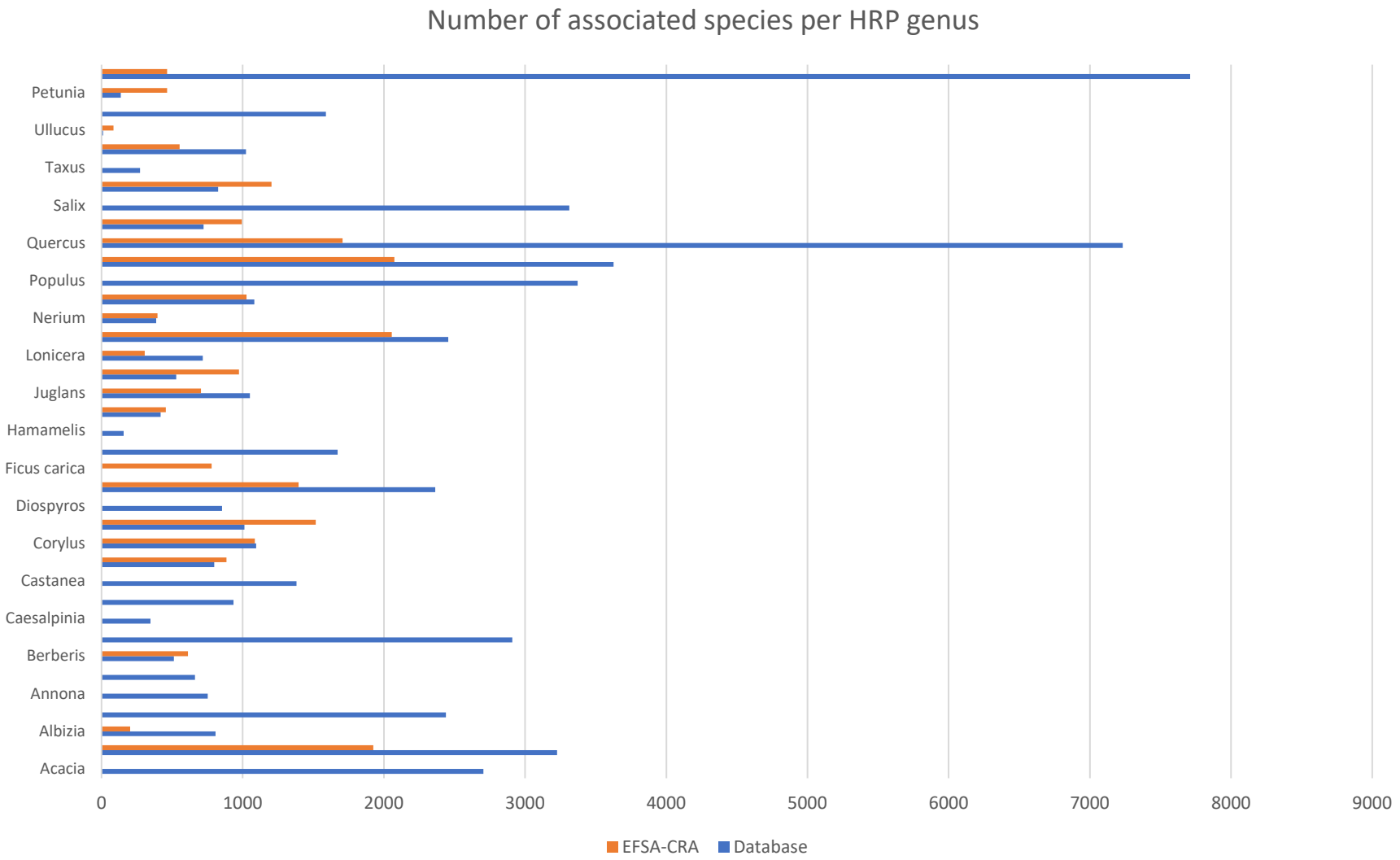
Stem borers

Leaf rollers

Intercepted Insect Herbivores – Feeding Ecology







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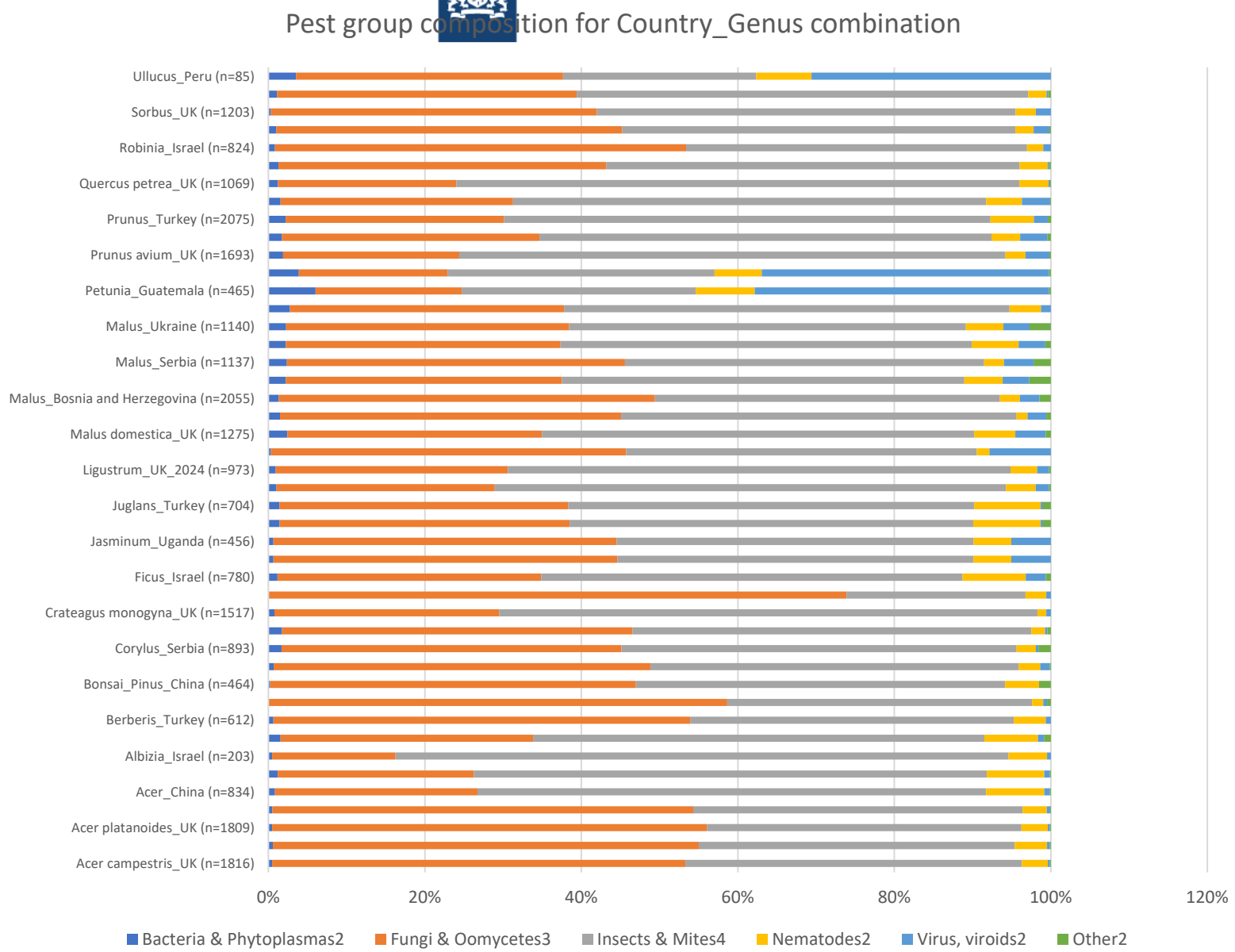

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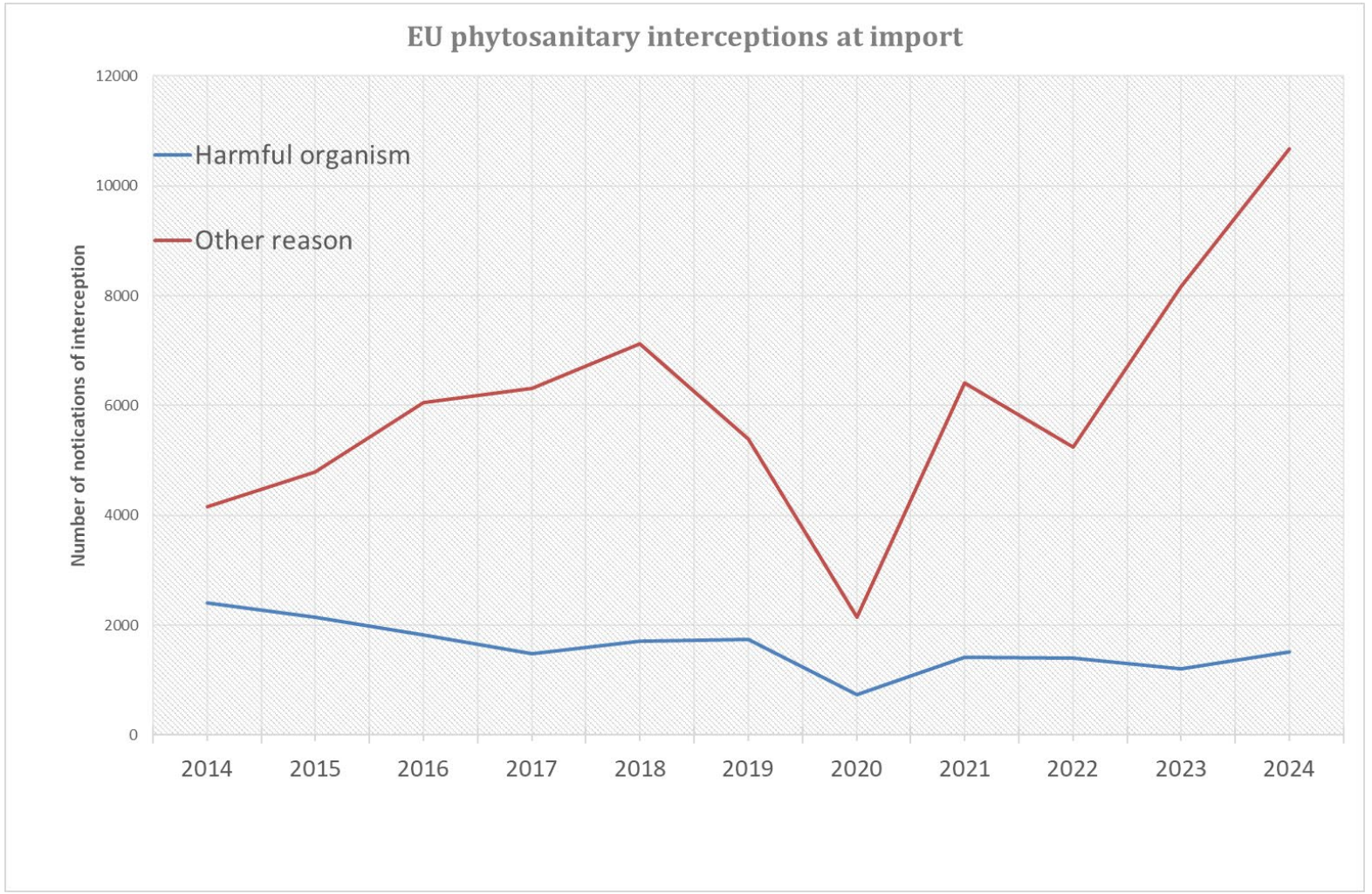


"R:\Mijn Documenten\EFSA\WG1 HRP DOSSIERS\EFSA database\Interceptions_Outbreak data\Europhyt_2020_2024 website&Traces.xlsx"

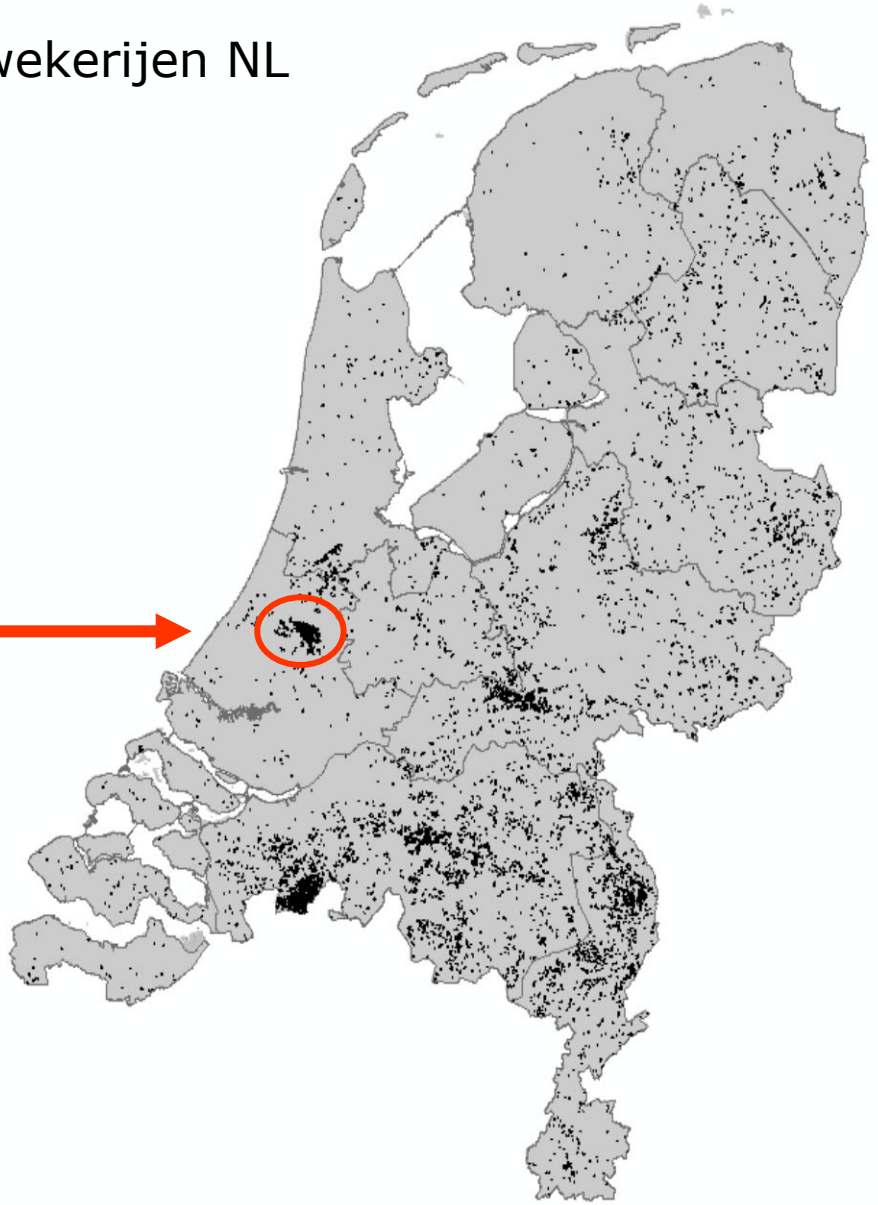
https://food.ec.europa.eu/plants/plant-health-and-biosecurity/europhyt/interceptions_en

Boom kwekerijen NL

Boskoop area:

500 companies

Historic tree nursery center

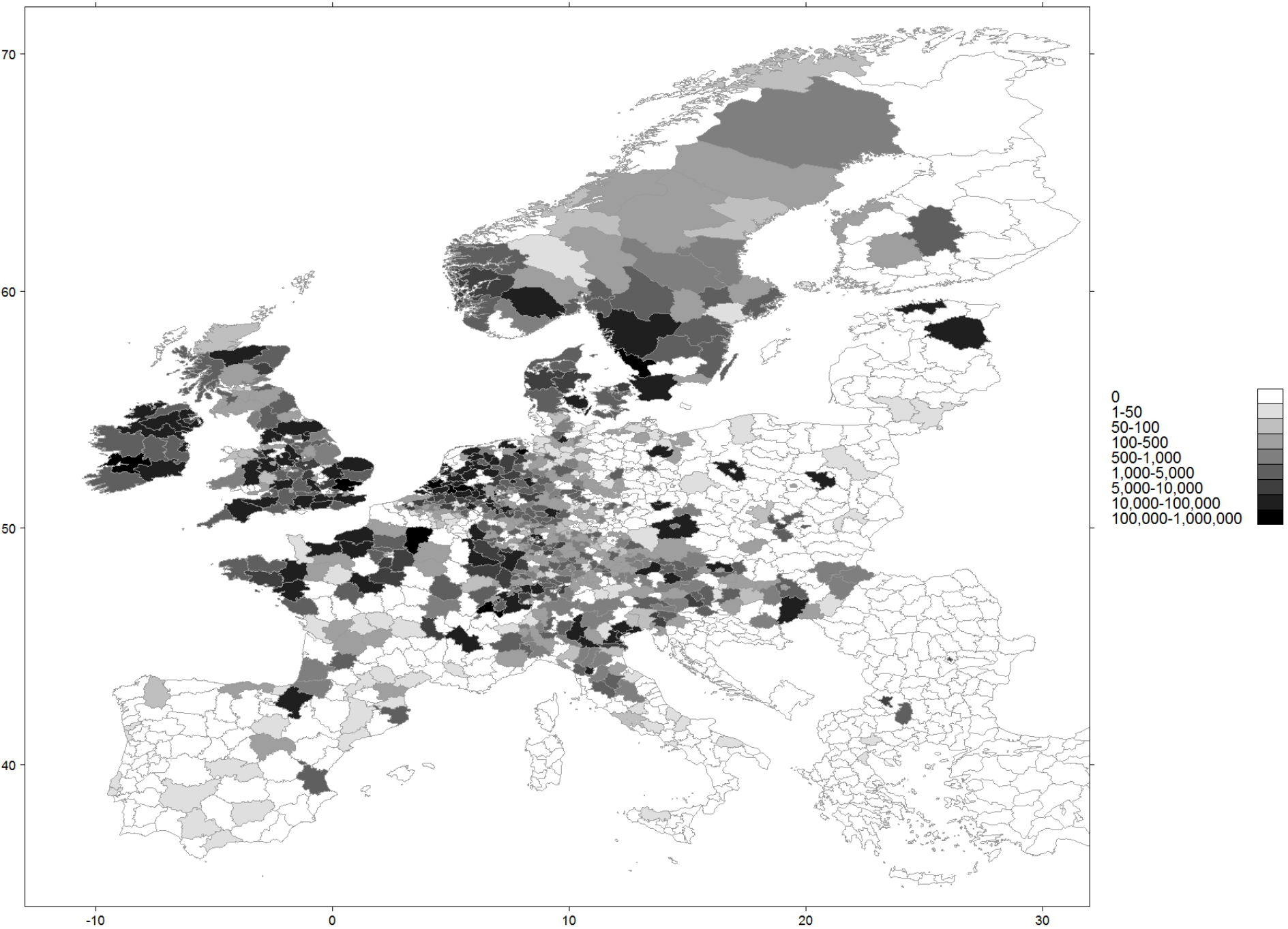


4 a-c. Results - genera

Top 10 tree genera as assessed using four different methods.

3a. Quick assessment of species use	4a. Number of priority forest habitats in which they occur	4b. Area of priority habitat (ha)	4c. Area in Europe (ha)
Salix	*Quercus*	*Pinus*	*Pinus*
Quercus	*Pinus*	*Betula*	*Quercus*
Populus	*Juniperus*	*Picea*	*Fagus sylvatica*
Betula	*Betula*	*Frangula*	*Betula*
Prunus	*Ilex*	*Populus*	*Picea*
Alnus	*Sorbus*	*Ulmus*	*Alnus*
Pinus	*Acer*	*Fraxinus*	*Abies*
Acer	*Alnus*	*Alnus*	*Larix*
Crataegus	*Fraxinus*	*Salix*	*Populus*
Ulmus	*Prunus*	*Acer*	*Pseudotsuga menziesii*

Ruth Mitchell (2016, COST Global Warning, Novi Sad)



Boskoop

2009

Afzet Acer in EU door 500 bedrijven in afgebakend gebied