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Characterisation of conifers in the EU: a tool for crop-based survey of Union quarantine pests

European Food Safety Authority (EFSA), Andrea Battisti[1], Francesco Pecori[1], Davide Rassati[1], Alberto Santini[2], Alice Delbianco[3], Ignazio Graziosi[3], Melanie Camilleri[3]

[1] Department of Agronomy, Food, Natural Resources, Animals and Environment (DAFNAE, University of Padova, Italy)
[2] Institute for Sustainable Plant Protection, National Research Council of Italy (IPSP-CNR), Sesto Fiorentino, Florence, Italy
[3] European Food Safety Authority (EFSA)

Abstract

This technical report was prepared in the context of EFSA's mandate on plant pest surveillance (M-2020-0114), at the request of the European Commission. Its purpose is to support the Member States in the planning and preparation of crop-based surveys of regulated pests in line with Commission Implementing Regulation (EU) 2019/2072. In particular, the report includes the list of the conifer tree species reported as hosts of the regulated pests targeted by the grant GP/EFSA/PLANTS/2022/05 - 'Development of crop-based survey tools for plants pests of fruit trees, conifers, and palms and ornamentals in the EU'. In addition, the pests associated with each of them, a classification of their occurrence in the EU, information on the main phenological stages, their main use in EU countries, and the regulatory requirements are reported. Finally, trade patterns involving conifer trees are also discussed. In total, 158 conifer tree species are reported as hosts of at least one of the EU-regulated pests. Among them, 14 are native to the EU, 23 are non-native but widely occurring in the EU, 62 are non-native and only occasionally occurring in the EU, and 59 are considered to be absent from the EU except for some records in private collections or botanical gardens. All but one of the conifer tree species present in the EU are used for ornamental purposes in parks and gardens, whereas only 21 are widely present in natural settings. Similarly, only 26 out the 99 are also used on plantations for production. Considering species used as Christmas trees, Denmark, Germany, Poland and Belgium are the countries that produce and export the highest number, and Germany and France are the most active importers.

Keywords: plant pest, pest detection, crop-based surveillance, crop characterisation, Union quarantine pest

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Correspondence: PLANTS@efsa.europa.eu

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1 Introduction

The scope of this report is to characterise the conifer tree species reported as hosts of the regulated[1] pests (Table 1) targeted in the STOP ('Survey tools for conifer pests') project funded under the grant: GP/EFSA/PLANTS/2022/05 – 'Development of crop-based survey tools for plants pests of fruit trees, conifers, and palms and ornamentals in the EU' – Lot 2 'Pests of coniferous trees'. In particular, the report includes a list of these tree species, the pests associated with each of them, and a classification of their occurrence in the EU. Furthermore, for each species, information on the main phenological stages, their main use in EU countries and the regulatory requirements have been provided. Trade patterns are also discussed. This information is organised in the following seven chapters: 1) plant species; 2) phenology; 3) main uses; 4) management; 5) climatic suitability and distribution; 6) regulation; 7) trade and import.

Table 1: List of the regulated pests

#	Scientific name	Category	EPPO code
1	*Aschistonyx eppoi* Inouye	Insects	[ASCXEP]
2	*Oligonychus perditus* Pritchard and Baker	Mites	[OLIGPD]
3	*Choristoneura* spp.:	Insects	[1CHONG]
	1. *Choristoneura carnana* Barnes & Busck	Insects	[CHONCA]
	2. *Choristoneura conflictana* Walker	Insects	[ARCHCO]
	3. *Choristoneura fumiferana* Clemens	Insects	[CHONFU]
	4. *Choristoneura lambertiana* Busck	Insects	[TORTLA]
	5. *Choristoneura occidentalis biennis* Freeman	Insects	-
	6. *Choristoneura occidentalis occidentalis* Freeman	Insects	[CHONOC]
	7. *Choristoneura orae* Freeman	Insects	[CHONOR]
	8. *Choristoneura parallela* Robinson	Insects	[CHONPA]
	9. *Choristoneura pinus* Freeman	Insects	[CHONPI]
	10. *Choristoneura retiniana* Walsingham	Insects	[CHONRE]
	11. *Choristoneura rosaceana* Harris	Insects	[CHONRO]
4	*Atropellis* spp.	Fungi	[1ATRPG]
5	*Coniferiporia sulphurascens* (Pilát) L.W. Zhou & Y.C. Dai	Fungi	[PHELSU]
6	*Coniferiporia weirii* (Murrill) L.W. Zhou & Y.C. Dai	Fungi	[INONWE]
7	*Cronartium* spp. (except: *Cronartium gentianeum* (Thümen), *Cronartium pini* (Willdenow) Jørstad, *Cronartium ribicola* Fischer)	Fungi	[1CRONG]
8	*Gremmeniella abietina* (Lagerberg) Morelet	Fungi	[GREMAB]
9	*Guignardia laricina* (Sawada) W. Yamam& Kaz. Itô	Fungi	[GUIGLA]
10	*Melampsora farlowii* (Arthur) Davis	Fungi	[MELMFA]
11	*Mycodiella laricis-leptolepidis* (Kaz. Itô, K. Satô & M. Ota) Crous	Fungi	[MYCOLL]
12	*Phytophthora ramorum* Werres, De Cock & Man in 't Veld	Fungi	[PHYTRA]
13	*Pseudocercospora pini-densiflorae* (Hori & Nambu) Deighton	Fungi	[CERSPD]
14	*Arceuthobium* spp. (except: *Arceuthobium azoricum* Wiens & Hawksworth, *Arceuthobium gambyi* Fridl, *Arceuthobium oxycedri* DC. M. Bieb.)	Mistletoes	[1AREG]

2 Plant species

In total, 158 conifer tree species are reported as being hosts of at least one of the targeted pests (Table 2). These 158 species were assigned to four different categories based on their occurrence in the EU, i.e. native, non-native widely occurring, non-native occasional, and virtually absent.

[1] Commission Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019. OJ L 319, 10.12.2019, p. 1–279.

The category 'native' refers to conifer tree species native to the EU. The category 'non-native widely occurring' refers to species that are non-native but widely occurring in the EU. The category 'non-native occasional' refers to species that are non-native and only occasionally occurring in the EU. The category 'virtually absent' refers to species that are considered to be absent from the EU except for some records in private collections or botanical gardens. The information needed to include a certain conifer tree species in a certain category was gathered from CABI (online) and GBIF (online). Among the 158 conifer tree species, 14 were assigned to the category 'native', 23 to the category 'non-native widely occurring', 62 to the category 'non-native occasional' and 59 to the category 'virtually absent'.

Table 2: List of coniferous tree species, assigned occurrence in the EU and targeted pests (Table 1) known to use them as hosts. NAT: native; NNO: Non-native occasional; NNW: Non-native widely occurring; VA: Virtually absent

Tree species	Occurrence	Pests
Abies alba	NAT	*Phytophthora ramorum*
Juniperus communis	NAT	*Oligonychus perditus*
Juniperus sabina	NAT	*Oligonychus perditus*
Larix decidua	NAT	*Arceuthobium laricis*
		Arceuthobium tsugense
		Guignardia laricina
		Mycodiella laricis-leptolepidis
		Phytophthora ramorum
Picea abies	NAT	*Arceuthobium campylopodum*
		Arceuthobium laricis
		Gremmeniella abietina
		Guignardia laricina
Pinus canariensis	NAT*	*Cronartium fusiforme*
		Pseudocercospora pini-densiflorae
Pinus cembra	NAT	*Cronartium kamtschaticum*
		Gremmeniella abietina
Pinus halepensis	NAT	*Arceuthobium campylopodum*
		Arceuthobium occidentale
		Cronartium fusiforme
		Cronartium harknessii
		Gremmeniella abietina
		Pseudocercospora pini-densiflorae
Pinus mugo	NAT	*Arceuthobium americanum*
		Cronartium comandrae
		Cronartium comptoniae
		Cronartium harknessii
		Gremmeniella abietina
Pinus nigra	NAT	*Atropellis pinicola*
		Atropellis piniphila
		Atropellis tingens
		Cronartium coleosporioides
		Cronartium comandrae
		Cronartium comptoniae
		Cronartium fusiforme
		Cronartium harknessii
		Cronartium orientale
		Cronartium quercuum
		Gremmeniella abietina
Pinus pinaster	NAT	*Arceuthobium campylopodum*
		Arceuthobium occidentale
		Atropellis tingens
		Cronartium comandrae

Tree species	Occurrence	Pests
		Cronartium comptoniae
		Cronartium orientale
		Gremmeniella abietina
Pinus pinea	NAT	*Arceuthobium occidentale*
		Cronartium fusiforme
		Gremmeniella abietina
Pinus sylvestris	NAT	*Arceuthobium americanum*
		Arceuthobium campylopodum
		Arceuthobium laricis
		Arceuthobium occidentale
		Arceuthobium pini
		Arceuthobium tsugense
		Arceuthobium vaginatum
		Atropellis pinicola
		Atropellis tingens
		Choristoneura pinus
		Cronartium coleosporioides
		Cronartium comandrae
		Cronartium comptoniae
		Cronartium harknessii
		Cronartium orientale
		Cronartium quercuum
		Gremmeniella abietina
		Pseudocercospora pini-densiflorae
Taxus baccata	NAT	*Phytophthora ramorum*
Abies concolor	NNW	*Arceuthobium abietinum*
		Arceuthobium campylopodum
		Arceuthobium douglasii
		Choristoneura carnana
		Choristoneura occidentalis
		Choristoneura retiniana
		Coniferiporia sulphurascens
		Phytophthora ramorum
Cedrus deodara	NNW	*Guignardia laricina*
Cedrus libani	NNW	*Gremmeniella abietina*
Chamaecyparis lawsoniana	NNW	*Phytophthora ramorum*
Cryptomeria japonica	NNW	*Oligonychus perditus*
Larix kaempferi	NNW	*Arceuthobium laricis*
		Gremmeniella abietina
		Guignardia laricina
		Mycodiella laricis-leptolepidis
		Phytophthora ramorum
Larix x eurolepis	NNW	*Guignardia laricina*
		Phytophthora ramorum
Picea glauca	NNW	*Arceuthobium americanum*
		Arceuthobium laricis
		Arceuthobium pusillum
		Arceuthobium tsugense
		Choristoneura conflictana
		Choristoneura fumiferana
		Choristoneura rosaceana
		Gremmeniella abietina
Picea pungens	NNW	*Arceuthobium americanum*
		Arceuthobium douglasii
		Arceuthobium pusillum
Picea sitchensis	NNW	*Arceuthobium tsugense*
		Choristoneura orae
		Coniferiporia sulphurascens

Tree species	Occurrence	Pests
		Phytophthora ramorum
Pinus contorta	NNW	*Arceuthobium abietinum*
		Arceuthobium americanum
		Arceuthobium campylopodum
		Arceuthobium cyanocarpum
		Arceuthobium laricis
		Arceuthobium littorum
		Arceuthobium siskiyouense
		Arceuthobium tsugense
		Arceuthobium vaginatum
		Atropellis pinicola
		Atropellis piniphila
		Atropellis tingens
		Choristoneura lambertiana
		Choristoneura pinus
		Coniferiporia sulphurascens
		Cronartium coleosporioides
		Cronartium comandrae
		Cronartium comptoniae
		Cronartium fusiforme
		Cronartium harknessii
		Gremmeniella abietina
Pinus ponderosa	NNW	*Arceuthobium americanum*
		Arceuthobium campylopodum
		Arceuthobium cyanocarpum
		Arceuthobium laricis
		Arceuthobium occidentale
		Arceuthobium siskiyouense
		Arceuthobium vaginatum
		Atropellis piniphila
		Coniferiporia sulphurascens
		Cronartium arizonicum
		Cronartium coleosporioides
		Cronartium comandrae
		Cronartium filamentosum
		Cronartium fusiforme
		Cronartium harknessii
		Cronartium quercuum
		Gremmeniella abietina
Pinus radiata	NNW	*Arceuthobium littorum*
		Arceuthobium occidentale
		Arceuthobium tsugense
		Cronartium fusiforme
		Cronartium harknessii
		Gremmeniella abietina
		Pseudocercospora pini-densiflorae
Pinus strobus	NNW	*Arceuthobium pusillum*
		Atropellis pinicola
		Atropellis tingens
		Choristoneura conflictana
		Choristoneura pinus
		Cronartium kamtschaticum
		Cronartium occidentale
		Cronartium yamabense
		Gremmeniella abietina
		Guignardia laricina
		Pseudocercospora pini-densiflorae
		Arceuthobium minutissimum

Tree species	Occurrence	Pests
Pinus wallichiana	NNW	*Gremmeniella abietina*
		Pseudocercospora pini-densiflorae
Platycladus orientalis	NNW	*Oligonychus perditus*
Pseudotsuga menziesii	NNW	*Arceuthobium americanum*
		Arceuthobium douglasii
		Arceuthobium tsugense
		Choristoneura carnana
		Choristoneura occidentalis
		Choristoneura retiniana
		Choristoneura rosaceana
		Coniferiporia sulphurascens
		Gremmeniella abietina
		Guignardia laricina
		Phytophthora ramorum
Sequoia sempervirens	NNW	*Phytophthora ramorum*
Sequoiadendron giganteum	NNW	*Coniferiporia sulphurascens*
Taxodium distichum	NNW	*Guignardia laricina*
Thuja occidentalis	NNW	*Guignardia laricina*
Thuja plicata	NNW	*Coniferiporia weirii*
Tsuga heterophylla	NNW	*Arceuthobium tsugense*
		Choristoneura occidentalis
		Choristoneura rosaceana
		Coniferiporia sulphurascens
		Phytophthora ramorum
Abies amabilis	NNO	*Arceuthobium abietinum*
		Arceuthobium douglasii
		Arceuthobium laricis
		Arceuthobium tsugense
		Choristoneura occidentalis
		Choristoneura orae
Abies balsamea	NNO	*Arceuthobium pusillum*
		Choristoneura fumiferana
		Choristoneura rosaceana
Abies firma	NNO	*Guignardia laricina*
Abies grandis	NNO	*Arceuthobium abietinum*
		Arceuthobium campylopodum
		Arceuthobium douglasii
		Arceuthobium laricis
		Arceuthobium tsugense
		Choristoneura occidentalis
		Choristoneura retiniana
		Coniferiporia sulphurascens
		Phytophthora ramorum
Abies homolepis	NNO	*Guignardia laricina*
Abies lasiocarpa	NNO	*Arceuthobium abietinum*
		Arceuthobium douglasii
		Arceuthobium laricis
		Arceuthobium tsugense
		Choristoneura fumiferana
		Choristoneura occidentalis biennis
		Choristoneura occidentalis
		Coniferiporia sulphurascens
Abies magnifica	NNO	*Coniferiporia sulphurascens*
Abies procera	NNO	*Arceuthobium tsugense*
		Coniferiporia sulphurascens
		Phytophthora ramorum
Abies sachalinensis	NNO	*Coniferiporia sulphurascens*
		Gremmeniella abietina

Tree species	Occurrence	Pests
		Guignardia laricina
Calocedrus decurrens	NNO	*Coniferiporia weirii*
Chamaecyparis obtusa	NNO	*Guignardia laricina*
		Oligonychus perditus
Chamaecyparis pisifera	NNO	*Guignardia laricina*
		Oligonychus perditus
Cupressus funebris	NNO	*Oligonychus perditus*
Cupressus nootkatensis	NNO	*Coniferiporia weirii*
Juniperus chinensis	NNO	*Oligonychus perditus*
Juniperus procera	NNO	*Arceuthobium juniperi-procerae*
Juniperus rigida	NNO	*Oligonychus perditus*
Juniperus virginiana	NNO	*Oligonychus perditus*
Larix gmelinii	NNO	*Guignardia laricina*
		Mycodiella laricis-leptolepidis
Larix laricina	NNO	*Arceuthobium pusillum*
		Choristoneura fumiferana
		Guignardia laricina
Larix sibirica	NNO	*Coniferiporia sulphurascens*
		Guignardia laricina
Picea breweriana	NNO	*Arceuthobium abietinum*
		Arceuthobium monticola
		Arceuthobium tsugense
Picea crassifolia	NNO	*Arceuthobium sichuanense*
Picea engelmannii	NNO	*Arceuthobium americanum*
		Arceuthobium cyanocarpum
		Arceuthobium douglasii
		Arceuthobium laricis
		Arceuthobium tsugense
		Choristoneura fumiferana
		Choristoneura occidentalis biennis
		Choristoneura occidentalis
		Coniferiporia sulphurascens
Picea glehnii	NNO	*Guignardia laricina*
Picea jezoensis	NNO	*Coniferiporia sulphurascens*
Picea likiangensis	NNO	*Arceuthobium sichuanense*
Picea mariana	NNO	*Arceuthobium americanum*
		Arceuthobium pusillum
		Choristoneura fumiferana
Picea purpurea	NNO	*Arceuthobium sichuanense*
Picea rubens	NNO	*Arceuthobium pusillum*
		Choristoneura fumiferana
		Gremmeniella abietina
Pinus albicaulis	NNO	*Arceuthobium americanum*
		Arceuthobium cyanocarpum
		Arceuthobium laricis
		Arceuthobium tsugense
		Atropellis piniphila
		Choristoneura occidentalis
Pinus aristata	NNO	*Arceuthobium americanum*
		Arceuthobium cyanocarpum
		Arceuthobium vaginatum
Pinus attenuata	NNO	*Arceuthobium americanum*
		Arceuthobium campylopodum
		Arceuthobium occidentale
		Arceuthobium siskiyouense
		Cronartium harknessii
Pinus banksiana	NNO	*Arceuthobium americanum*
		Arceuthobium laricis

Tree species	Occurrence	Pests
		Arceuthobium occidentale
		Arceuthobium pusillum
		Atropellis piniphila
		Atropellis tingens
		Choristoneura conflictana
		Choristoneura pinus
		Cronartium coleosporioides
		Cronartium comandrae
		Cronartium comptoniae
		Cronartium harknessii
		Cronartium quercuum
		Gremmeniella abietina
		Guignardia laricina
Pinus bungeana	NNO	*Arceuthobium occidentale*
Pinus cembroides	NNO	*Arceuthobium divaricatum*
		Cronartium occidentale
Pinus coulteri	NNO	*Arceuthobium campylopodum*
		Arceuthobium occidentale
Pinus densiflora	NNO	*Atropellis piniphila*
		Atropellis tingens
		Cronartium quercuum
		Gremmeniella abietina
		Guignardia laricina
		Pseudocercospora pini-densiflorae
Pinus echinata	NNO	*Atropellis apiculata*
		Atropellis piniphila
		Atropellis tingens
		Cronartium quercuum
Pinus flexilis	NNO	*Arceuthobium americanum*
		Arceuthobium apachecum
		Arceuthobium blumeri
		Arceuthobium cyanocarpum
		Arceuthobium vaginatum
		Choristoneura lambertiana
		Choristoneura occidentalis
		Gremmeniella abietina
Pinus gerardiana	NNO	*Arceuthobium minutissimum*
Pinus greggii	NNO	*Pseudocercospora pini-densiflorae*
Pinus hartwegii	NNO	*Arceuthobium globosum*
		Arceuthobium globosum
		Arceuthobium vaginatum
Pinus jeffreyi	NNO	*Arceuthobium americanum*
		Arceuthobium campylopodum
		Arceuthobium monticola
		Arceuthobium occidentale
		Arceuthobium siskiyouense
		Atropellis piniphila
		Cronartium coleosporioides
Pinus koraiensis	NNO	*Guignardia laricina*
Pinus lambertiana	NNO	*Arceuthobium abietinum*
		Arceuthobium californicum
		Arceuthobium monticola
		Arceuthobium tsugense
		Atropellis pinicola
		Choristoneura lambertiana
		Coniferiporia sulphurascens
Pinus montezumae	NNO	*Arceuthobium aureum*
		Arceuthobium globosum

Tree species	Occurrence	Pests
		Arceuthobium vaginatum
		Cronartium conigenum
Pinus monticola	NNO	*Arceuthobium abietinum*
		Arceuthobium californicum
		Arceuthobium cyanocarpum
		Arceuthobium laricis
		Arceuthobium monticola
		Arceuthobium tsugense
		Atropellis pinicola
		Atropellis piniphila
		Atropellis tingens
		Coniferiporia sulphurascens
		Cronartium yamabense
		Gremmeniella abietina
Pinus muricata	NNO	*Arceuthobium littorum*
		Cronartium harknessii
Pinus pumila	NNO	*Cronartium kamtschaticum*
		Cronartium yamabense
Pinus resinosa	NNO	*Arceuthobium campylopodum*
		Arceuthobium laricis
		Arceuthobium pusillum
		Atropellis tingens
		Choristoneura pinus
		Cronartium quercuum
		Gremmeniella abietina
		Pseudocercospora pini-densiflorae
Pinus rigida	NNO	*Atropellis tingens*
		Cronartium comptoniae
		Cronartium fusiforme
		Cronartium quercuum
		Gremmeniella abietina
		Guignardia laricina
Pinus roxburghii	NNO	*Cronartium himalayense*
		Cronartium opheliae
		Pseudocercospora pini-densiflorae
Pinus sabiniana	NNO	*Arceuthobium campylopodum*
		Arceuthobium occidentale
		Gremmeniella abietina
Pinus serotina	NNO	*Atropellis tingens*
		Cronartium fusiforme
Pinus taeda	NNO	*Atropellis apiculata*
		Atropellis piniphila
		Atropellis tingens
		Cronartium fusiforme
Pinus virginiana	NNO	*Arceuthobium occidentale*
		Atropellis apiculata
		Atropellis piniphila
		Atropellis tingens
		Cronartium appalachianum
		Cronartium quercuum
Taxus media	NNO	*Phytophthora ramorum*
Torreya californica	NNO	*Phytophthora ramorum*
Tsuga canadensis	NNO	*Arceuthobium tsugense*
		Melampsora farlowi
Tsuga diversifolia	NNO	*Coniferiporia sulphurascens*
		Guignardia laricina
Tsuga mertensiana	NNO	*Arceuthobium cyanocarpum*
		Arceuthobium laricis

Tree species	Occurrence	Pests
		Arceuthobium tsugense
		Coniferiporia sulphurascens
Abies durangensis	VA	*Arceuthobium abietinum*
Abies forrestii	VA	*Arceuthobium tibetense*
Abies mariesii	VA	*Coniferiporia sulphurascens*
Abies religiosa	VA	*Arceuthobium abietis-religiosae*
Abies vejarii	VA	*Arceuthobium abietis-religiosae*
Fokienia hodginsii	VA	*Oligonychus perditus*
Juniperus formosana	VA	*Oligonychus perditus*
Keteleeria evelyniana	VA	*Arceuthobium chinense*
Larix occidentalis	VA	*Arceuthobium campylopodum*
		Arceuthobium laricis
		Arceuthobium tsugense
		Choristoneura occidentalis
		Guignardia laricina
Picea spinulosa	VA	*Arceuthobium sichuanense*
Pinus arizonica	VA	*Arceuthobium gillii*
		Arceuthobium globosum
		Arceuthobium vaginatum
		Arceuthobium verticilliflora
Pinus ayacahuite	VA	*Arceuthobium abietinum*
		Arceuthobium blumeri
		Arceuthobium guatemalense
		Pseudocercospora pini-densiflorae
Pinus balfouriana	VA	*Arceuthobium cyanocarpum*
Pinus caribaea	VA	*Arceuthobium aureum*
		Arceuthobium occidentale
		Pseudocercospora pini-densiflorae
Pinus chihuahuana	VA	*Cronartium conigenum*
Pinus clausa	VA	*Atropellis tingens*
		Cronartium quercuum
		Pseudocercospora pini-densiflorae
Pinus cooperi	VA	*Arceuthobium gillii*
		Arceuthobium globosum
		Arceuthobium rubrum
		Arceuthobium vaginatum
		Arceuthobium verticilliflora
Pinus culminicola	VA	*Arceuthobium vaginatum*
Pinus devoniana	VA	*Arceuthobium aureum*
		Arceuthobium globosum
		Arceuthobium rubrum
Pinus discolor	VA	*Arceuthobium pendens*
Pinus douglasiana	VA	*Arceuthobium globosum*
Pinus durangensis	VA	*Arceuthobium globosum*
		Arceuthobium rubrum
		Arceuthobium vaginatum
		Arceuthobium verticilliflora
		Arceuthobium yecorense
Pinus edulis	VA	*Arceuthobium divaricatum*
		Cronartium occidentale
Pinus elliottii	VA	*Atropellis apiculata*
		Atropellis tingens
		Cronartium fusiforme
		Cronartium strobilinum
		Pseudocercospora pini-densiflorae
Pinus engelmannii	VA	*Arceuthobium globosum*
		Arceuthobium rubrum
		Arceuthobium strictum

Tree species	Occurrence	Pests
		Arceuthobium vaginatum
		Arceuthobium verticilliflora
		Arceuthobium yecorense
Pinus glabra	VA	*Cronartium quercuum*
Pinus herrerae	VA	*Arceuthobium gillii*
		Arceuthobium rubrum
		Arceuthobium vaginatum
		Arceuthobium yecorense
Pinus johannis	VA	*Arceuthobium divaricatum*
Pinus kesiya	VA	*Cronartium quercuum*
		Pseudocercospora pini-densiflorae
Pinus lawsonii	VA	*Arceuthobium gillii*
		Arceuthobium globosum
		Arceuthobium rubrum
		Arceuthobium vaginatum
Pinus leiophylla	VA	*Arceuthobium gillii*
		Arceuthobium strictum
		Arceuthobium yecorense
		Cronartium conigenum
Pinus luchuensis	VA	*Cronartium quercuum*
		Pseudocercospora pini-densiflorae
Pinus lumholtzii	VA	*Arceuthobium gillii*
		Arceuthobium yecorense
Pinus massoniana	VA	*Cronartium quercuum*
		Pseudocercospora pini-densiflorae
Pinus maximinoi	VA	*Arceuthobium globosum*
		Arceuthobium hondurense
Pinus merkusii	VA	*Pseudocercospora pini-densiflorae*
Pinus monophylla	VA	*Arceuthobium divaricatum*
		Cronartium occidentale
Pinus occidentalis	VA	*Arceuthobium bicarinatum*
Pinus oocarpa	VA	*Arceuthobium aureum*
		Arceuthobium hondurense
		Cronartium conigenum
		Pseudocercospora pini-densiflorae
Pinus orizabensis	VA	*Arceuthobium pendens*
Pinus palustris	VA	*Arceuthobium occidentale*
		Atropellis apiculata
		Cronartium strobilinum
Pinus parviflora var. pentaphylla	VA	*Guignardia laricina*
Pinus patula	VA	*Arceuthobium aureum*
		Arceuthobium gillii
		Arceuthobium globosum
		Arceuthobium vaginatum
Pinus pringlei	VA	*Arceuthobium globosum*
Pinus pseudostrobus	VA	*Arceuthobium aureum*
		Arceuthobium gillii
		Arceuthobium globosum
		Arceuthobium rubrum
		Cronartium conigenum
		Pseudocercospora pini-densiflorae
Pinus pungens	VA	*Arceuthobium campylopodum*
		Atropellis tingens
		Cronartium quercuum
Pinus quadrifolia	VA	*Arceuthobium divaricatum*
Pinus strobiformis	VA	*Arceuthobium apachecum*
		Arceuthobium blumeri
		Arceuthobium vaginatum

Tree species	Occurrence	Pests
		Cronartium yamabense
Pinus tabuliformis	VA	*Arceuthobium pini*
		Cronartium quercuum
Pinus teocote	VA	*Arceuthobium globosum*
		Arceuthobium rubrum
		Arceuthobium strictum
		Arceuthobium vaginatum
Pinus thunbergii	VA	*Arceuthobium occidentale*
		Cronartium quercuum
		Gremmeniella abietina
		Guignardia laricina
		Pseudocercospora pini-densiflorae
Pinus torreyana	VA	*Arceuthobium occidentale*
Pinus yunnanensis	VA	*Arceuthobium pini*
Pseudotsuga macrocarpa	VA	*Choristoneura carnana*
Taxus brevifolia	VA	*Coniferiporia sulphurascens*
		Phytophthora ramorum
Taxus cuspidata	VA	*Oligonychus perditus*
Thuja standishii	VA	*Guignardia laricina*
Thujopsis dolabrata var. hondai	VA	*Guignardia laricina*
Tsuga caroliniana	VA	*Melampsora farlowi*

* Considered as native even though it is endemic only to the Canary Islands.

3 Phenology

Data on the main phenological stages (Table 3), i.e. flowering and cone maturation, for the coniferous tree species known to be hosts of the pests included in Table 1 were obtained from Vidaković (1991), CABI (online) and the FEIS (Fire Effects Information System) website (USDA, online). Most of the literature refers to the natural (or close to natural) range of each species. This may lead to differences from what is occurring in the cultivated range, especially when trees are cultivated at a different latitude and on a different continent, as, for example, North American species grown in the EU.

Table 3: Timing of the main phenological stages for the conifer tree species known to be hosts of the pests included in Table 1. Cm: cone maturation occurring in the first year; Cm+: cone maturation occurring in the years following the first year; Fl: flowering. Assigned occurrence as in Table 2: NAT: Native; NNO: non-native occasional; NNW: non-native widespread; VA: virtually absent. NA: information not available

Tree species	Occurrence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Abies alba	NAT				Fl	Fl	Fl			Cm	Cm		
Juniperus communis	NAT				Fl	Fl			Cm+	Cm+	Cm+		
Juniperus sabina	NAT				Fl	Fl				Cm+	Cm+		
Larix decidua	NAT			Fl	Fl	Fl				Cm	Cm		
Picea abies	NAT				Fl	Fl				Cm	Cm		
Pinus canariensis	NAT				Fl	Fl				Cm+	Cm+		
Pinus cembra	NAT					Fl	Fl	Fl		Cm+	Cm+		

Pinus halepensis	NAT				Fl	Fl				Cm+	Cm+		
Pinus mugo	NAT					Fl	Fl				Cm+		
Pinus nigra	NAT					Fl				Cm+	Cm+		
Pinus pinaster	NAT				Fl					Cm+	Cm+		
Pinus pinea	NAT				Fl	Fl	Fl		Cm+	Cm+			
Pinus sylvestris	NAT					Fl	Fl			Cm+			
Taxus baccata	NAT		Fl	Fl						Cm	Cm		
Abies concolor	NNW					Fl	Fl			Cm	Cm		
Cedrus deodara	NNW									Fl	Fl, Cm+	Cm+	Cm+
Cedrus libani	NNW									Fl	Fl, Cm+	Cm+	Cm+
Chamaecyparis lawsoniana	NNW			Fl	Fl					Cm	Cm		
Cryptomeria japonica	NNW		Fl	Fl	Fl				Cm	Cm	Cm		
Larixkaempferi	NNW			Fl	Fl	Fl				Cm	Cm		
Larix x *eurolepis*	NNW			Fl	Fl					Cm	Cm		
Picea glauca	NNW					Fl			Cm	Cm			
Picea pungens	NNW					Fl	Fl			Cm	Cm		
Picea sitchensis	NNW				Fl	Fl	Fl			Cm			
Pinus contorta	NNW					Fl	Fl			Cm+	Cm+		
Pinus ponderosa	NNW				Fl	Fl	Fl		Cm+	Cm+	Cm+		
Pinus radiata	NNW	Fl	Fl									Cm+	
Pinus strobus	NNW					Fl	Fl		Cm+	Cm+			
Pinus wallichiana	NNW				Fl	Fl	Fl		Cm+	Cm+	Cm+		
Platycladus orientalis	NNW			Fl	Fl					Cm	Cm		
Pseudotsuga menziesii	NNW				Fl	Fl			Cm	Cm			
Sequoia sempervirens	NNW	Fl	Fl	Fl						Cm	Fl,Cm	Fl,Cm	Fl,Cm
Sequoiadendron giganteum	NNW				Fl	Fl				Cm+	Cm+		
Taxodium distichum	NNW			Fl	Fl						Cm		
Thuja occidentalis	NNW				Fl	Fl				Cm	Cm		
Thuja plicata	NNW				Fl	Fl			Cm	Cm	Cm		
Tsuga heterophylla	NNW				Fl	Fl	Fl			Cm	Cm		
Abies amabilis	NNO				Fl	Fl			Cm	Cm			
Abies balsamea	NNO					Fl			Cm	Cm			
Abies firma	NNO				Fl	Fl					Cm	Cm	
Abies grandis	NNO						Fl			Cm			

Abies homolepis	NNO					Fl	Fl			Cm			
Abies lasiocarpa	NNO						Fl	Fl		Cm	Cm		
Abies magnifica	NNO					Fl	Fl			Cm	Cm		
Abies procera	NNO					Fl	Fl			Cm			
Abies sachalinensis	NNO					Fl	Fl			Cm	Cm		
Calocedrus decurrens	NNO				Fl			Cm	Cm				
Chamaecyparis obtusa	NNO			Fl	Fl						Cm	Cm	
Chamaecyparis pisifera	NNO				Fl	Fl					Cm	Cm	
Cupressus funebris	NNO			Fl	Fl				Cm+	Cm+	Cm+		
Cupressus nootkatensis	NNO					Fl	Fl			Cm+	Cm+	Cm+	
Juniperus chinensis	NNO				Fl	Fl			Cm+	Cm+	Cm+		
Juniperus procera	NNO	NA											
Juniperus rigida	NNO	NA											
Juniperus virginiana	NNO			Fl	Fl	Fl				Cm+	Cm+		
Larix gmelinii	NNO					Fl				Cm	Cm	Cm	
Larix laricina	NNO				Fl	Fl			Cm	Cm			
Larix sibirica	NNO				Fl	Fl				Cm	Cm	Cm	
Picea breweriana	NNO	NA											
Picea crassifolia	NNO	NA											
Picea engelmannii	NNO					Fl	Fl	Fl		Cm			
Picea glehnii	NNO	NA											
Picea jezoensis	NNO					Fl	Fl			Cm			
Picea likiangensis	NNO	NA											
Picea mariana	NNO					Fl	Fl			Cm	Cm		
Picea purpurea	NNO				Fl	Fl				Cm	Cm		
Picea rubens	NNO				Fl	Fl				Cm	Cm		
Pinus albicaulis	NNO							Fl	Cm+	Cm+			
Pinus aristata	NNO							Fl	Fl	Cm+	Cm+		
Pinus attenuata	NNO	Cm+			Fl								Cm+
Pinus banksiana	NNO					Fl	Fl			Cm+			
Pinus bungeana	NNO	NA											
Pinus cembroides	NNO					Fl	Fl					Cm+	Cm+
Pinus coulteri	NNO					Fl	Fl			Cm+	Cm+		
Pinus densiflora	NNO				Fl	Fl			Cm+	Cm+			

Pinus echinata	NNO			Fl	Fl						Cm+	Cm+	
Pinus flexilis	NNO						Fl	Fl	Cm+	Cm+			
Pinus gerardiana	NNO					Fl	Fl			Cm+	Cm+		
Pinus greggii	NNO	Cm+		Fl	Fl	Fl							Cm+
Pinus hartwegii	NNO	NA											
Pinus jeffreyi	NNO						Fl	Fl	Cm+	Cm+			
Pinus koraiensis	NNO					Fl	Fl			Cm+			
Pinus lambertiana	NNO					Fl	Fl	Fl		Cm+			
Pinus montezumae	NNO	NA											
Pinus monticola	NNO						Fl	Fl	Cm+	Cm+			
Pinus muricata	NNO				Fl	Fl	Fl			Cm+			
Pinus pumila	NNO	NA											
Pinus resinosa	NNO				Fl	Fl	Fl		Cm+	Cm+			
Pinus rigida	NNO					Fl				Cm+			
Pinus roxburghii	NNO		Fl	Fl	Cm+	Cm+							
Pinus sabiniana	NNO			Fl	Fl						Cm+		
Pinus serotina	NNO			Fl	Fl					Cm+	Cm+		
Pinus taeda	NNO		Fl	Fl	Fl					Cm+	Cm+		
Pinus virginiana	NNO			Fl	Fl	Fl				Cm+	Cm+	Cm+	
Taxus media	NNO	NA											
Torreya californica	NNO			Fl	Fl	Fl				Cm	Cm	Cm	
Tsuga canadensis	NNO				Fl	Fl	Fl		Cm	Cm			
Tsuga diversifolia	NNO	NA											
Tsuga mertensiana	NNO						Fl	Fl		Cm	Cm		
Abies durangensis	VA	NA											
Abies forrestii	VA	NA											
Abies mariesii	VA						Fl			Cm	Cm		
Abies religiosa	VA		Fl	Fl						Cm	Cm		
Abies vejarii	VA	NA											
Fokienia hodginsii	VA					Cm+	Cm+	Cm+			Fl		
Juniperus formosana	VA	NA											
Keteleeria evelyniana	VA	NA											
Larix occidentalis	VA				Fl	Fl	Fl		Cm	Cm			
Picea spinulosa	VA	NA											

Pinus arizonica	VA	NA											
Pinus ayacahuite	VA	NA											
Pinus balfouriana	VA							Fl	Fl	Cm+	Cm+		
Pinus caribaea	VA	NA											
Pinus chihuahuana	VA	NA											
Pinus clausa	VA	NA											
Pinus cooperi	VA	NA											
Pinus culminicola	VA	NA											
Pinus devoniana	VA	NA											
Pinus discolor	VA	NA											
Pinusdouglasiana	VA	NA											
Pinus durangensis	VA	NA											
Pinus edulis	VA						Fl			Cm+			
Pinus elliottii	VA	Fl	Fl	Fl	Fl				Cm+	Cm+	Cm+		
Pinus engelmannii	VA					Fl					Cm+	Cm+	
Pinus glabra	VA			Fl						Cm+	Cm+		
Pinus herrerae	VA	NA											
Pinus johannis	VA	NA											
Pinus kesiya	VA	NA											
Pinus lawsonii	VA	NA											
Pinus leiophylla	VA	NA											
Pinus luchuensis	VA	NA											
Pinus lumholtzii	VA	NA											
Pinus massoniana	VA	NA											
Pinus maximinoi	VA	NA											
Pinus merkusii	VA	NA											
Pinus monophylla	VA					Fl			Cm+				
Pinus occidentalis	VA	NA											
Pinus oocarpa	VA	NA											
Pinus orizabensis	VA	NA											
Pinus palustris	VA		Fl	Fl						Cm+	Cm+		
Pinus parviflora var. pentaphylla	VA					Fl	Fl			Cm+			
Pinus pringlei	VA	NA											
Pinus pseudostrobus	VA	NA											

Pinus pungens	VA			Fl	Fl					Cm+	Cm+		
Pinus quadrifolia	VA						Fl			Cm+	Cm+		
Pinus strobiformis	VA						Fl			Cm+			
Pinus tabuliformis	VA	NA											
Pinus teocote	VA	NA											
Pinus thunbergii	VA				Fl	Fl					Cm+	Cm+	
Pinus torreyana	VA	Fl,Cm+	Fl,Cm+	Fl							Cm+	Cm+	Cm+
Pinus yunnanensis	VA				Fl	Fl					Cm+		
Pseudotsuga macrocarpa	VA		Fl	Fl	Fl						Cm		
Taxus brevifolia	VA						Fl		Cm	Cm			
Taxus cuspidata	VA				Fl	Fl	Fl			Cm	Cm		
Thuja standishii	VA	NA											
Thujopsis dolobrata var. hondai	VA	NA											
Tsuga caroliniana	VA			Fl	Fl				Cm	Cm			

4 Main uses

The 99 conifer tree species occurring in the EU can be assigned to three different categories based on their main uses, i.e. ornamental, natural/naturalised and plantations (Table 4). The category 'ornamental' refers to tree species planted in urban or peri-urban settings for ornamental purposes. The category 'natural/naturalised' refers to tree species that can be found in natural settings either because they are native or because they have become naturalised after introduction from other countries. The category 'plantations' refers to tree species that are cultivated on plantations for production. The information needed to include a certain conifer tree species in a certain category was gathered from CABI (online) and the literature. All but one of the conifer tree species considered in this project are used for ornamental purposes in parks, gardens, etc., whereas only 21 are also widely present in natural settings. Similarly, only 26 out the 99 are also grown on plantations for production.

Table 4: Main uses of the conifer tree species occurring in the EU known to be hosts of the pests included in Table 1. Assigned occurrence as in Table 2. NAT: Native NNO: non-native occasional; NNW: non-native widespread

Tree species	Occurrence	Ornamental	Natural/naturalised	Plantations
Abies alba	NAT	yes	yes	yes
Juniperus communis	NAT	yes	yes	no
Juniperus sabina	NAT	yes	yes	no
Larix decidua	NAT	yes	yes	yes
Picea abies	NAT	yes	yes	yes
Pinus canariensis	NAT	yes	yes	yes
Pinus cembra	NAT	yes	yes	yes
Pinus halepensis	NAT	yes	yes	yes
Pinus mugo	NAT	yes	yes	yes
Pinus nigra	NAT	yes	yes	yes
Pinus pinaster	NAT	yes	yes	yes

Tree species	Occurrence	Ornamental	Natural/naturalised	Plantations
Pinus pinea	NAT	yes	yes	yes
Pinus sylvestris	NAT	yes	yes	yes
Taxus baccata	NAT	yes	yes	no
Abies concolor	NNW	yes	no	no
Cedrus deodara	NNW	yes	no	yes
Cedrus libani	NNW	yes	no	yes
Chamaecyparis lawsoniana	NNW	yes	no	yes
Cryptomeria japonica	NNW	yes	no	no
Larix kaempferi	NNW	yes	no	yes
Larix x eurolepis	NNW	no	no	yes
Picea glauca	NNW	yes	no	no
Picea pungens	NNW	yes	no	yes
Picea sitchensis	NNW	yes	no	yes
Pinus contorta	NNW	yes	yes	yes
Pinus ponderosa	NNW	yes	no	no
Pinus radiata	NNW	yes	yes	yes
Pinus strobus	NNW	yes	yes	yes
Pinus wallichiana	NNW	yes	no	no
Platycladus orientalis	NNW	yes	yes	no
Pseudotsuga menziesii	NNW	yes	yes	yes
Sequoia sempervirens	NNW	yes	no	yes
Sequoiadendron giganteum	NNW	yes	no	no
Taxodium distichum	NNW	yes	no	yes
Thuja occidentalis	NNW	yes	yes	no
Thuja plicata	NNW	yes	no	no
Tsuga heterophylla	NNW	yes	yes	no
Abies amabilis	NNO	yes	no	no
Abies balsamea	NNO	yes	no	no
Abies firma	NNO	yes	no	no
Abies grandis	NNO	yes	no	yes
Abies homolepis	NNO	yes	no	no
Abies lasiocarpa	NNO	yes	no	no
Abies magnifica	NNO	yes	no	no
Abies procera	NNO	yes	no	no
Abies sachalinensis	NNO	yes	no	no
Calocedrus decurrens	NNO	yes	no	no
Chamaecyparis obtusa	NNO	yes	no	no
Chamaecyparis pisifera	NNO	yes	no	no
Cupressus funebris	NNO	yes	no	no
Cupressus nootkatensis	NNO	yes	no	no
Juniperus chinensis	NNO	yes	no	no
Juniperus procera	NNO	yes	no	no
Juniperus rigida	NNO	yes	no	no
Juniperus virginiana	NNO	yes	no	no
Larix gmelinii	NNO	yes	no	no
Larix laricina	NNO	yes	no	no
Larix sibirica	NNO	yes	no	yes
Picea breweriana	NNO	yes	no	no
Picea crassifolia	NNO	yes	no	no
Picea engelmannii	NNO	yes	no	no
Picea glehnii	NNO	yes	no	no
Picea jezoensis	NNO	yes	no	no
Picea likiangensis	NNO	yes	no	no
Picea mariana	NNO	yes	no	no
Picea purpurea	NNO	yes	no	no
Picea rubens	NNO	yes	no	no
Pinus albicaulis	NNO	yes	no	no
Pinus aristata	NNO	yes	no	no
Pinus attenuata	NNO	yes	no	no

Tree species	Occurrence	Ornamental	Natural/naturalised	Plantations
Pinus banksiana	NNO	yes	no	no
Pinus bungeana	NNO	yes	no	no
Pinus cembroides	NNO	yes	no	no
Pinus coulteri	NNO	yes	no	no
Pinus densiflora	NNO	yes	no	no
Pinus echinata	NNO	yes	no	no
Pinus flexilis	NNO	yes	no	no
Pinus gerardiana	NNO	yes	no	no
Pinus greggii	NNO	yes	no	no
Pinus hartwegii	NNO	yes	no	no
Pinus jeffreyi	NNO	yes	no	no
Pinus koraiensis	NNO	yes	no	no
Pinus lambertiana	NNO	yes	no	no
Pinus montezumae	NNO	yes	no	no
Pinus monticola	NNO	yes	no	no
Pinus muricata	NNO	yes	no	no
Pinus pumila	NNO	yes	no	no
Pinus resinosa	NNO	yes	no	no
Pinus rigida	NNO	yes	no	no
Pinus roxburghii	NNO	yes	no	no
Pinus sabiniana	NNO	yes	no	no
Pinus serotina	NNO	yes	no	no
Pinus taeda	NNO	yes	no	no
Pinus virginiana	NNO	yes	no	no
Taxus media	NNO	yes	no	no
Torreya californica	NNO	yes	no	no
Tsuga canadensis	NNO	yes	no	no
Tsuga diversifolia	NNO	yes	no	no
Tsuga mertensiana	NNO	yes	no	no

5 Management

European native conifer species are managed with different silvicultural practices depending on the environment in the Member States, and the respective regional and local uses and traditions. Therefore, summarising a production cycle applicable to all situations for a given species would be challenging. Even though conifers are generally managed as high forests, there are a number of variables which can vary significantly. These include treatment that can be even- or uneven-aged and, furthermore, within these two categories the cutting system may vary quite significantly, regeneration can be artificial or natural, etc. In view of all these variables, and for a more specific description and details for each species, please refer to CABI (online).

Numerous non-native conifers are solely used for ornamental purposes in parks, arboreta and botanical gardens. Some American species were introduced to the EU to assess their growth and wood production outside their native range with variable results. A few of them, such as *Pseudotsuga menziesii*, *Pinus radiata*, *Pinus strobus*, *Larix kaempferi* and *Picea sitchensis* are widely used in plantation forestry in various Member States. These kind of plantations are intensely managed for timber production. The sylvicultural system generally adopted is that of high forest, even-aged, clear-cut and with artificial regeneration made by replanting seedlings produced in specialised forest nurseries. For management description and details, please refer to the CABI Compendium (online).

6 Climate suitability and distribution

For each conifer tree species known to be hosts of the pests included in Table 1 and occurring in the EU, the distribution based on CABI (online) is reported. Additional countries that are not reported in CABI (online) but for which at least one human observation record exists (GBIF, online) are also listed. Whether the latter species have a sufficient distributional range or presence to support the invasion of the targeted pests remains uncertain.

6.1 Native

Abies alba

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Latvia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Finland, Luxembourg, the Netherlands.

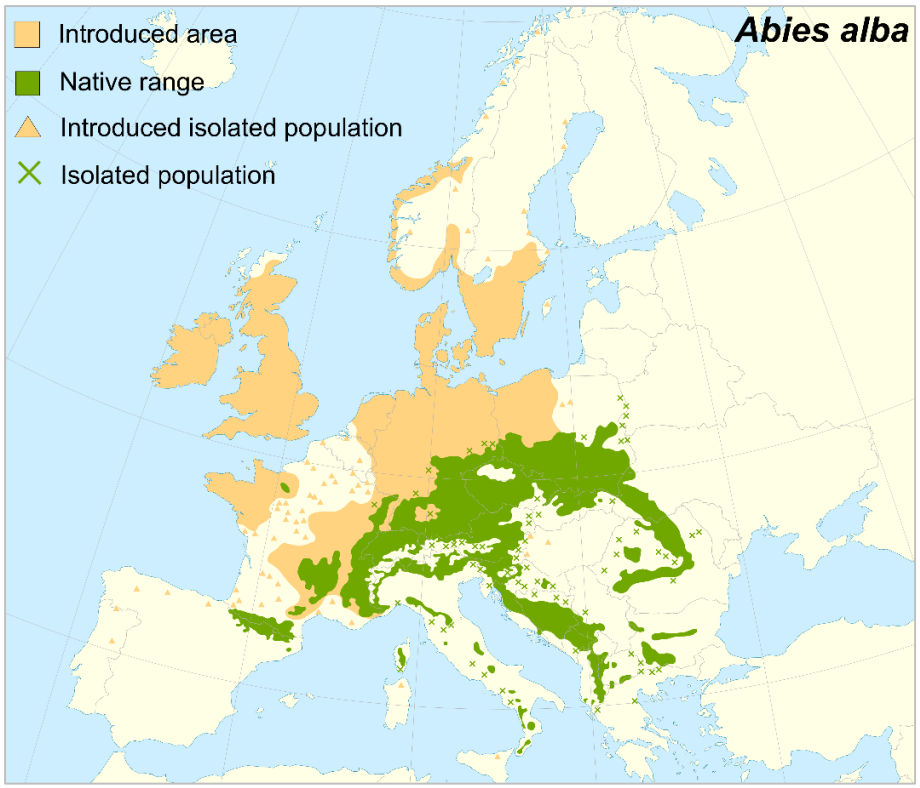

Figure 1: Distribution of *Abies alba* in Europe (map modified from Caudullo et al., 2017)

Juniperus communis

Distribution based on CABI: Austria, France, Germany, Hungary, Italy, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, Greece, Irleand, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania.

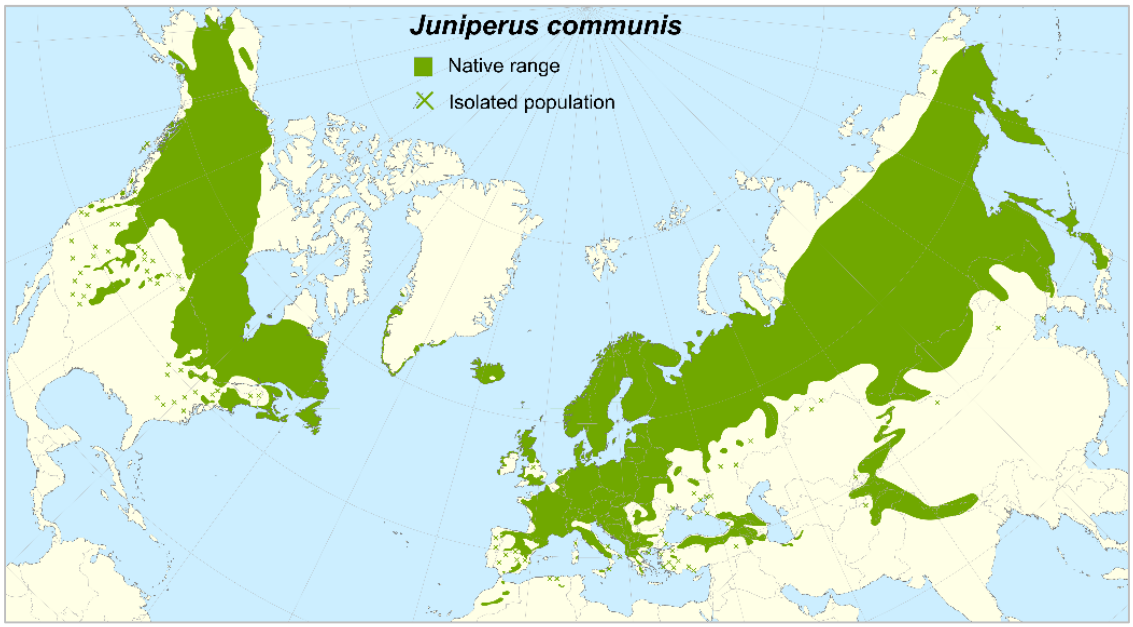

Figure 2: Distribution of *Juniperus communis* (map modified from Caudullo et al., 2017)

Juniperus sabina

Distribution based on CABI: Cyprus.

Additional records from GBIF: Austria, Bulgaria, Croatia, Czechia, Estonia, France, Germany, Greece, Italy, the Netherlands, Poland, Romania, Slovakia, Spain.

Larix decidua

Distribution based on CABI: Austria, Belgium, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden.

Additional records from GBIF: Hungary, Spain, Portugal.

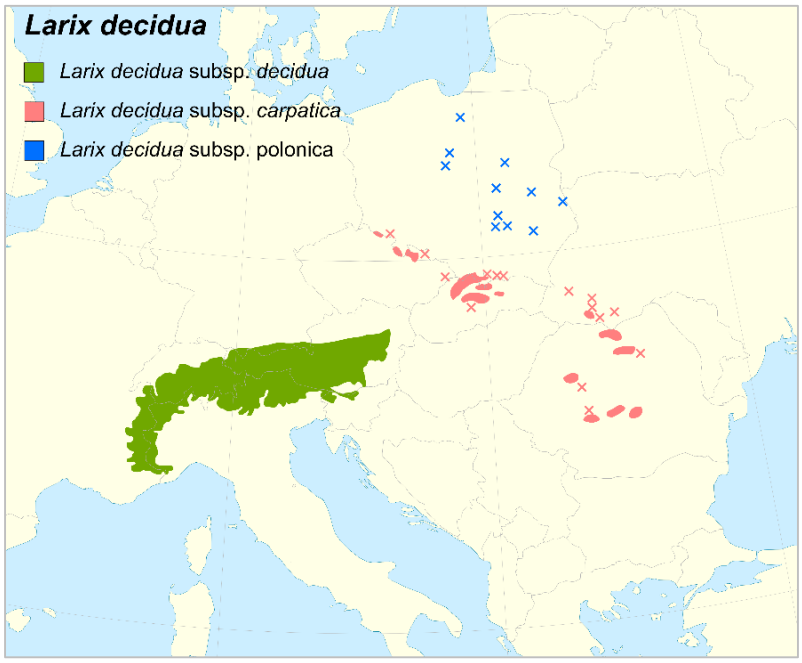

Figure 3: Distribution of *Larix decidua* and its subspecies in Europe (map modified from Caudullo et al., 2017)

Picea abies

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Romania, Slovakia, Slovenia, Spain.

Additional records from GBIF: Portugal, Sweden.

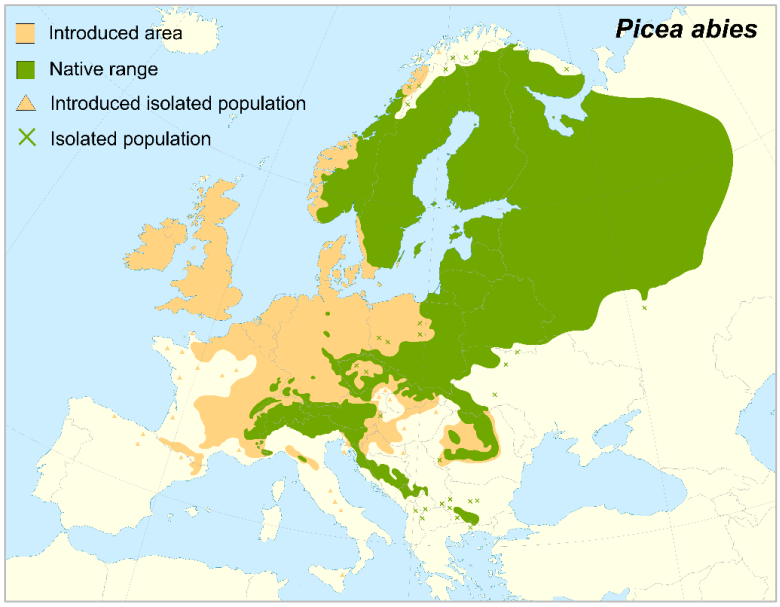

Figure 4: Native and non-native distribution of *Picea abies* in Europe (map modified from Caudullo et al., 2017)

Pinus canariensis

Distribution based on CABI: Cyprus, Italy, Portugal, Spain.

Additional records from GBIF: France, Greece.

Pinus cembra

Distribution based on CABI: Austria, Bulgaria, Denmark, Estonia, Finland, France, Germany, Italy, Poland, Romania, Slovakia, Slovenia, Sweden.

Additional records from GBIF: Czechia, Ireland, Luxembourg, Spain.

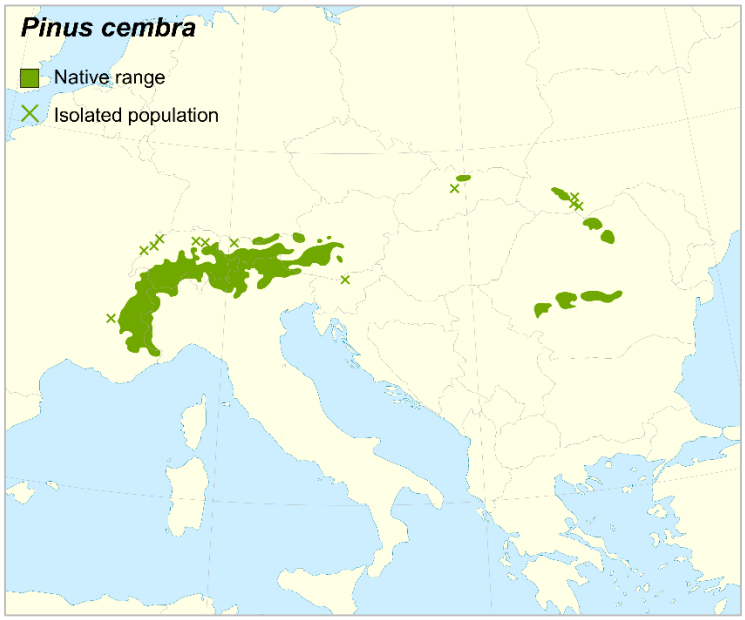

Figure 5: Native distribution of *Pinus cembra* in Europe (map modified from Caudullo et al., 2017)

Pinus halepensis

Distribution based on CABI: Croatia, Cyprus, France, Greece, Italy, Malta, Portugal, Spain.

Additional records from GBIF: Germany, Slovenia.

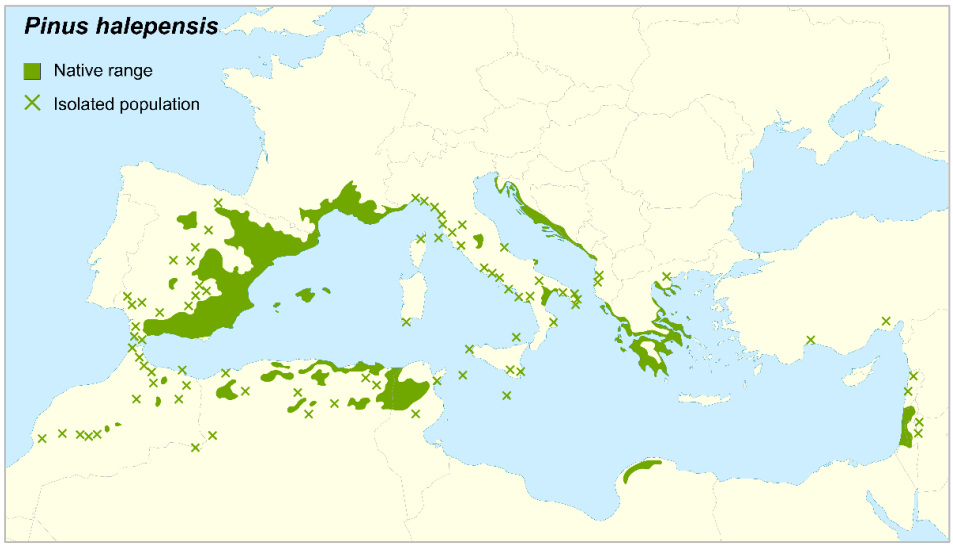

Figure 6: Distribution of *Pinus halepensis* in Europe (map modified from Caudullo et al., 2017)

Pinus mugo

Distribution based on CABI: Austria, Bulgaria, Croatia, Czechia, Estonia, France, Germany, Hungary, Italy, Lithuania, Poland, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Denmark, Finland, Ireland, Latvia, Luxembourg, the Netherlands.

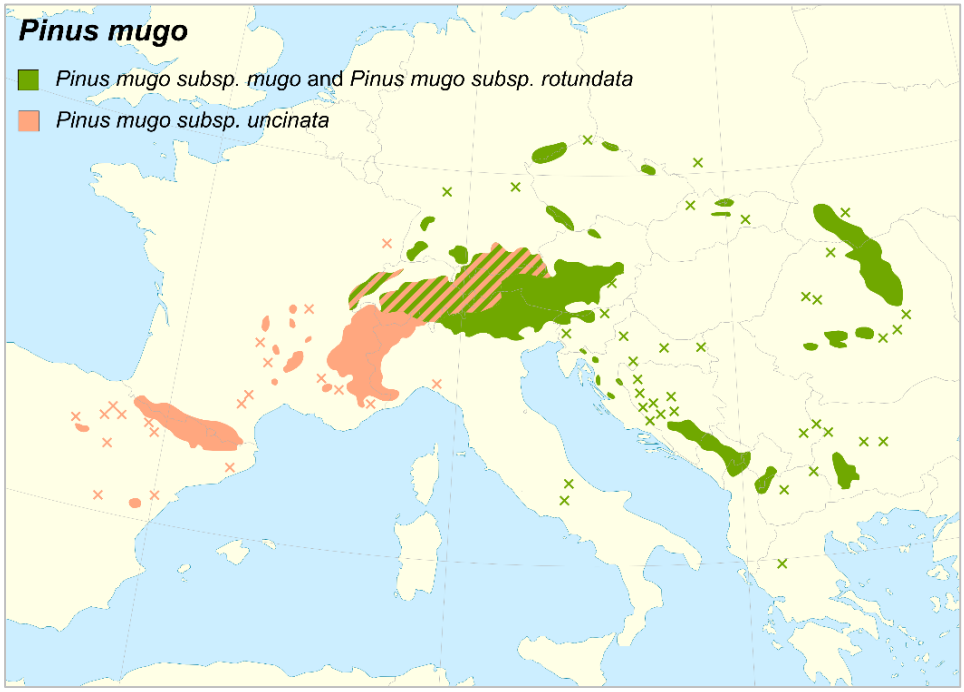

Figure 7: Distribution of *Pinus mugo* and its subspecies in Europe (map modified from Caudullo et al., 2017)

Pinus nigra

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Denmark, Luxembourg.

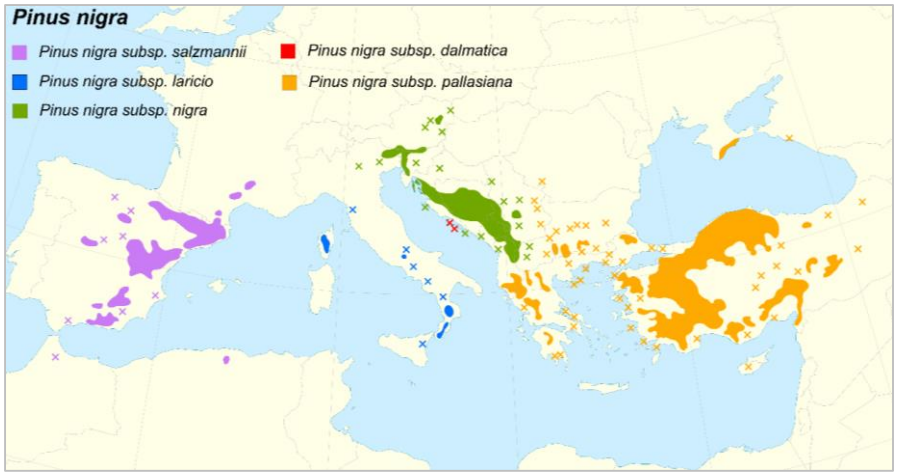

Figure 8: Distribution of *Pinus nigra* and its subspecies in Europe (map modified from Caudullo et al., 2017)

Pinus pinaster

Distribution based on CABI: Belgium, Bulgaria, France, Greece, Italy, Portugal, Spain.

Additional records from GBIF: Austria, Croatia, Germany, Irleand, the Netherlands.

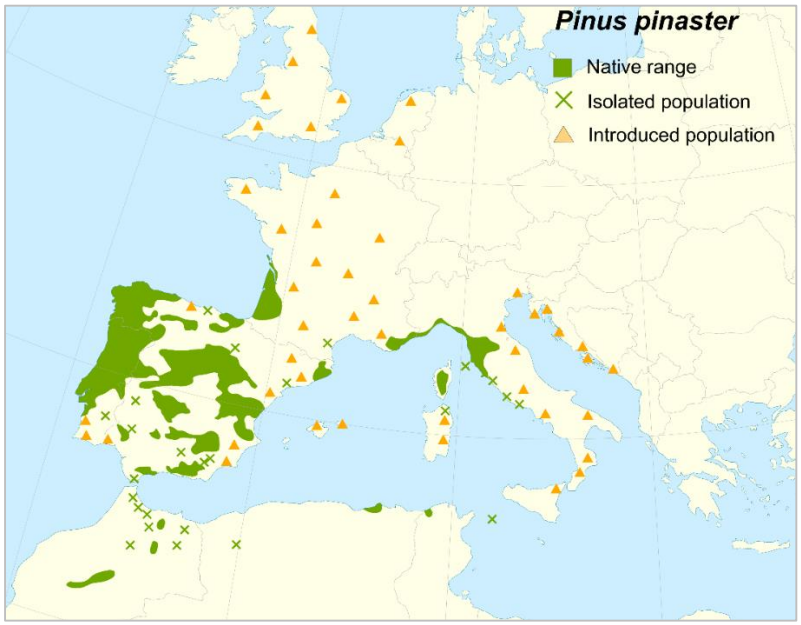

Figure 9: Distribution of *Pinus pinaster* in Europe (map modified from Caudullo et al., 2017)

Pinus pinea

Distribution based on CABI: Croatia, Cyprus, France, Greece, Italy, Portugal, Spain.

Additional records from GBIF: Germany, the Netherlands, Slovenia.

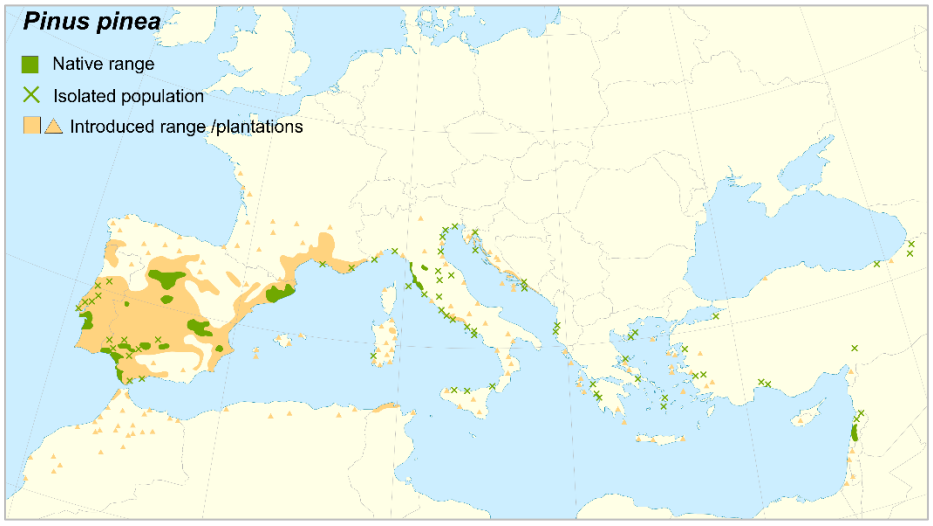

Figure 10: Distribution of *Pinus pinea* in Europe (map modified from Caudullo et al., 2017)

Pinus sylvestris

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Latvia.

Figure 11: Distribution of *Pinus sylvestris* (map modified from Caudullo et al., 2017)

Taxus baccata

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Latvia.

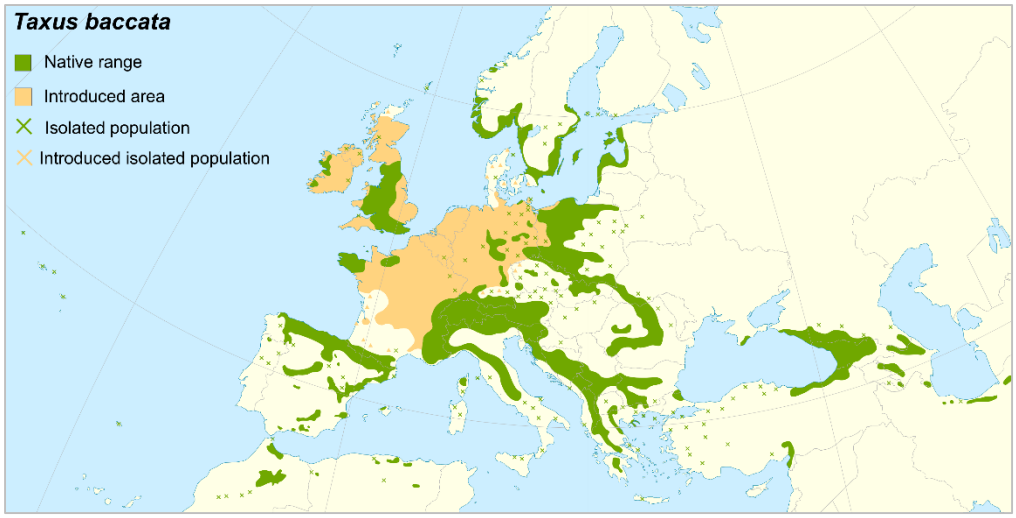

Figure 12: Distribution of *Taxus baccata* in Europe (map modified from Caudullo et al., 2017)

6.2 Non-native widespread

Abies concolor

Distribution based on CABI: Bulgaria, Denmark, Estonia, Finland, France, Germany, Latvia, the Netherlands, Poland, Slovakia, Slovenia, Sweden.

Additional records from GBIF: Hungary.

Cedrus deodara

Distribution based on CABI: France, Greece, Italy, the Netherlands, Portugal, Spain.

Additional records from GBIF: Belgium, Bulgaria, Croatia, Czechia, Denmark, Germany, Ireland, Luxembourg, Romania, Slovenia.

Cedrus libani

Distribution based on CABI: Cyprus, France.

Additional records from GBIF: Germany, Greece, Ireland, Italy, Luxembourg, Spain.

Chamaecyparis lawsoniana

Distribution based on CABI: Austria, Belgium, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, the Netherlands, Poland, Portugal, Slovakia, Spain, Sweden.

Additional records from GBIF: Estonia, Italy, Luxembourg, Slovenia, Romania.

Cryptomeria japonica

Distribution based on CABI: Belgium, Italy, Portugal, Sweden.

Additional records from GBIF: Croatia, Czechia, Denmark, France, Germany, Hungary, Ireland, Luxembourg, the Netherlands, Slovakia, Spain.

Larix kaempferi

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Greece, Luxembourg.

Larix x *eurolepis*

Distribution based on CABI: Belgium, Denmark, France, Germany, Sweden.

Additional records from GBIF: the Netherlands.

Picea glauca

Distribution based on CABI: Denmark, Estonia, Finland, Lithuania, Poland, Slovenia, Sweden.

Additional records from GBIF: Austria, Belgium, France, Germany.

Picea pungens

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: —

Picea sitchensis

Distribution based on CABI: Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, the Netherlands, Poland, Slovakia, Sweden.

Additional records from GBIF: Austria, Czechia, Luxembourg, Spain.

Pinus contorta

Distribution based on CABI: Czechia, Denmark, Estonia, Finland, France, Germany, Ireland, Latvia, the Netherlands, Poland, Slovakia, Sweden.

Additional records from GBIF: Italy, Luxembourg.

Pinus ponderosa

Distribution based on CABI: Belgium, Czechia, Estonia, Greece, Poland, Slovakia, Sweden.

Additional records from GBIF: Germany.

Pinus radiata

Distribution based on CABI: France, Italy, Portugal, Spain.

Additional records from GBIF: Ireland.

Pinus strobus

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Additional records from GBIF: Denmark, Estonia, Lithuania, Luxembourg.

Pinus wallichiana

Distribution based on CABI: France, Germany, Italy, Romania, Slovakia, Sweden.

Additional records from GBIF: Austria, Belgium, Estonia, Ireland, Luxembourg, the Netherlands.

Platycladus orientalis

Distribution based on CABI: Austria, Bulgaria, Czechia, Germany, Hungary, Italy, Romania, Slovakia.

Additional records from GBIF: Croatia, Greece, Latvia, Luxembourg, Malta, the Netherlands, Poland, Portugal.

Pseudotsuga menziesii

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden.

Additional records from GBIF: Slovenia.

Sequoia sempervirens

Distribution based on CABI: Austria, Belgium, Croatia, France, Germany, Hungary, Italy, Portugal, Spain.

Additional records from GBIF: Ireland, Luxembourg, the Netherlands.

Sequoiadendron giganteum

Distribution based on CABI: Austria, Belgium, Bulgaria, Croatia, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Romania, Spain, Sweden.

Additional records from GBIF: Czechia, Luxembourg, Slovakia, Slovenia.

Taxodium distichum

Distribution based on CABI: Belgium, Cyprus, Italy.

Additional records from GBIF: Austria, Bulgaria, Denmark, France, Czechia, Germany, Hungary, Ireland, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia, Spain.

Thuja occidentalis

Distribution based on CABI: Austria, Belgium, Czechia, Denmark, Estonia, France, Germany, Italy, Lithuania, the Netherlands, Romania, Slovakia, Sweden.

Additional records from GBIF: Croatia, Greece, Hungary, Luxembourg, Poland, Slovenia.

Thuja plicata

Distribution based on CABI: Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Ireland, Poland, Slovakia, Sweden.

Additional records from GBIF: Italy, Hungary, the Netherlands, Portugal.

Tsuga heterophylla

Distribution based on CABI: Austria, Belgium, Czechia, Denmark, Estonia, France, Germany, Ireland, Sweden.

Additional records from GBIF: Finland, Luxembourg, the Netherlands.

6.3 Non-native occasional

Abies amabilis

Distribution based on CABI: Germany, Ireland.

Additional records from GBIF: Poland.

Abies balsamea

Distribution based on CABI: Estonia, Finland, Germany, Latvia, Lithuania, Slovakia, Sweden.

Additional records from GBIF: —

Abies firma

Distribution based on CABI: Slovakia.

Additional records from GBIF: —

Abies grandis

Distribution based on CABI: Austria, Belgium, Czechia, France, Germany, Slovakia, Sweden.

Additional records from GBIF: Denmark, Irleand, Italy, Luxembourg, the Netherlands, Poland, Slovenia.

Abies homolepis

Distribution based on CABI: Belgium, France, Germany.

Additional records from GBIF: Luxembourg.

Abies lasiocarpa

Distribution based on CABI: Finland, Sweden.

Additional records from GBIF: —

Abies magnifica

Distribution based on CABI: —

Additional records from GBIF: France.

Abies procera

Distribution based on CABI: Denmark, France, Germany, Ireland, Poland, Sweden.

Additional records from GBIF: Czechia, the Netherlands, Luxembourg.

Abies sachalinensis

Distribution based on CABI: Finland.

Additional records from GBIF: Estonia.

Calocedrus decurrens

Distribution based on CABI: —

Additional records from GBIF: France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Spain.

Chamaecyparis obtusa

Distribution based on CABI: —

Additional records from GBIF: Belgium, France, Germany, Luxembourg, the Netherlands, Spain.

Chamaecyparis pisifera

Distribution based on CABI: —

Additional records from GBIF: Austria, Belgium, Czechia, Estonia, France, Germany, Luxembourg, Poland, Portugal.

Cupressus funebris

Distribution based on CABI: —

Additional records from GBIF: France, Spain.

Cupressus nootkatensis

Distribution based on CABI: Belgium, Slovakia, Sweden.

Additional records from GBIF: France, Germany.

Juniperus chinensis

Distribution based on CABI: France, Italy, Sweden.

Additional records from GBIF: Germany.

Juniperus procera

Distribution based on CABI: France.

Additional records from GBIF: —

Juniperus rigida

Distribution based on CABI: —

Additional records from GBIF: Spain.

Juniperus virginiana

Distribution based on CABI: Belgium, Poland, Romania.

Additional records from GBIF: France, Germany, Hungary, Italy, Luxembourg, Netherlands, Slovenia, Spain.

Larix gmelinii

Distribution based on CABI: Poland, Sweden.

Additional records from GBIF: Germany.

Larix laricina

Distribution based on CABI: Finland, Sweden.

Additional records from GBIF: Estonia, Germany, Norway.

Larix sibirica

Distribution based on CABI: Denmark, Estonia, Finland, Lithuania, Sweden.

Additional records from GBIF: —

Picea breweriana

Distribution based on CABI: —

Additional records from GBIF: Germany, Ireland, Luxembourg.

Picea crassifolia

Distribution based on CABI: —

Additional records from GBIF: Germany.

Picea engelmannii

Distribution based on CABI: Denmark, Slovakia, Sweden.

Additional records from GBIF: France, Germany.

Picea glehnii

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Picea jezoensis

Distribution based on CABI: —

Additional records from GBIF: Germany, Poland.

Picea likiangensis

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Picea mariana

Distribution based on CABI: Czechia, Finland, Sweden.

Additional records from GBIF: Denmark, Estonia, France, Germany, Spain.

Picea purpurea

Distribution based on CABI: -

Additional records from GBIF: France, Germany

Picea rubens

Distribution based on CABI: Finland, Slovakia.

Additional records from GBIF: Germany.

Pinus albicaulis

Distribution based on CABI: —

Additional records from GBIF: France.

Pinus aristata

Distribution based on CABI: Czechia.

Additional records from GBIF: Germany.

Pinus attenuata

Distribution based on CABI: France.

Additional records from GBIF: —

Pinus banksiana

Distribution based on CABI: Czechia, Estonia, Germany, Lithuania, Poland.

Additional records from GBIF: Austria, Denmark, France, Irleand, the Netherlands, Romania, Slovakia.

Pinus bungeana

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Pinus cembroides

Distribution based on CABI: —

Additional records from GBIF: France.

Pinus coulteri

Distribution based on CABI: —

Additional records from GBIF: France, Spain.

Pinus densiflora

Distribution based on CABI: Croatia, Italy, Romania.

Additional records from GBIF: —

Pinus echinata

Distribution based on CABI: —

Additional records from GBIF: Germany.

Pinus flexilis

Distribution based on CABI: —

Additional records from GBIF: Estonia.

Pinus gerardiana

Distribution based on CABI: —

Additional records from GBIF: France.

Pinus greggii

Distribution based on CABI: Italy.

Additional records from GBIF: —

Pinus hartwegii

Distribution based on CABI: —

Additional records from GBIF: Germany.

Pinus jeffreyi

Distribution based on CABI: Czechia, Slovakia.

Additional records from GBIF: Germany, Estonia.

Pinus koraiensis

Distribution based on CABI: —

Additional records from GBIF: Germany, Estonia.

Pinus lambertiana

Distribution based on CABI: Ireland.

Additional records from GBIF: —

Pinus montezumae

Distribution based on CABI: —

Additional records from GBIF: Ireland.

Pinus monticola

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Pinus muricata

Distribution based on CABI: Greece, Ireland, Italy.

Additional records from GBIF: —

Pinus pumila

Distribution based on CABI: —

Additional records from GBIF: Germany.

Pinus resinosa

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Pinus rigida

Distribution based on CABI: Belgium, Czechia.

Additional records from GBIF: Denmark, France, Germany, Italy, the Netherlands, Poland.

Pinus roxburghii

Distribution based on CABI: Sweden.

Additional records from GBIF: —

Pinus sabiniana

Distribution based on CABI: —

Additional records from GBIF: Germany.

Pinus serotina

Distribution based on CABI: France.

Additional records from GBIF: —

Pinus taeda

Distribution based on CABI: —

Additional records from GBIF: France.

Pinus virginiana

Distribution based on CABI: —

Additional records from GBIF: Germany.

Taxus media

Distribution based on CABI: Sweden.

Additional records from GBIF: Austria, Denmark, Germany, Poland.

Torreya californica

Distribution based on CABI: —

Additional records from GBIF: France.

Tsuga canadensis

Distribution based on CABI: Belgium, Germany, Lithuania, Poland, Sweden.

Additional records from GBIF: Austria, Czechia, Denmark, Estonia, France, Luxembourg, the Netherlands, Slovenia.

Tsuga diversifolia

Distribution based on CABI: —

Additional records from GBIF: France, Germany.

Tsuga mertensiana

Distribution based on CABI: —

Additional records from GBIF: Germany.

7 Regulation

7.1 Overview

The import of tree species into the EU is mainly regulated by:

(i) Regulation (EU) 2016/2031[2] on protective measures against pests of plants (Plant Health Law). This Regulation establishes rules to determine the phytosanitary risks posed by any species, strain or biotype of pathogenic agents, animals or parasitic plants injurious to plants or plant products ('pests') and measures to reduce those risks to an acceptable level.

(ii) Commission Implementing Regulation (EU) 2019/2072[3] establishing uniform conditions for the implementation of Regulation (EU) 2016/2031, as regards protective measures against pests of plants. This Regulation implements Regulation (EU) 2016/2031, as regards the listing of Union quarantine pests, protected zone quarantine pests and EU-regulated non-quarantine pests, and the measures to be implemented for plants, plant products and other objects to reduce the risks of those pests to an acceptable level.

(iii) Commission Implementing Regulation (EU) 2018/2019[4] establishing a provisional list of high-risk plants, plant products or other objects, within the meaning of Regulation (EU) 2016/2031 Article 42 and a list of plants for which phytosanitary certificates are not required for introduction into the EU, within the meaning of Article 73 of that Regulation. The plants, plant products and other objects listed in Annex I are considered to be high-risk plants, plant products

[2] Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants, amending Regulations (EU) No 228/2013, (EU) No 652/2014 and (EU) No 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC, 98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC. OJ L 317 23.11.2016, p. 4-104.
[3] Commission Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019. OJ L 319, 10.12.2019, p. 1–279.
[4] Commission Implementing Regulation (EU) 2018/2019 of 18 December 2018 establishing a provisional list of high risk plants, plant products or other objects, within the meaning of Article 42 of Regulation (EU) 2016/2031 and a list of plants for which phytosanitary certificates are not required for introduction into the Union, within the meaning of Article 73 of that Regulation. C/2018/8877 OJ L 323, 19.12.2018, p. 10–15.

and other objects within the meaning of Regulation (EU) 2016/2031 Article 42(1), and their introduction into EU territory is prohibited pending a risk assessment. Article 2 states that a phytosanitary certificate is required for the introduction into the EU of plants, other than the plants included in the list referred to in of Regulation (EU) 2016/2031 Article 72(1). However, fruit listed in Annex II are excluded from this requirement.

7.2 General regulations for conifers (Pinales)

The import of conifers into the EU is mainly regulated by Commission Implementing Regulation (EU) 2019/2072 in the following annexes:

(A) Annex XI:

The introduction of conifer plants and plant parts from certain third countries requires a phytosanitary certificate. This applies to:

1 plants for planting, other than seeds (Part A, Point 2), from all third countries other than Switzerland;
2 parts of plants, other than fruit and seeds (Part A, Point 3), including foliage, branches and other parts of conifer (Pinales) plants, without flowers or flower buds, being goods of a kind suitable for bouquets or for ornamental purposes, fresh from all third countries other than Switzerland;
3 isolated bark (Part A, Point 11), including vegetable products of bark from third countries other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, the Canary Islands, the Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Turkey and Ukraine;
4 wood, including wood which has not kept its natural round surface (Part A, Point 12), including fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; sawdust and wood waste and scrap, whether or not agglomerated into logs, briquettes, pellets or similar forms, from Kazakhstan, Russia and Turkey and other third countries other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, the Canary Islands, the Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland and Ukraine.

(B) Annex VII:

The introduction of plants, plant products and other objects from certain third countries must be accompanied by an official statement that they have undergone an appropriate heat, fumigation or chemical treatment. This applies to:

1 wood, except that of *Thuja* L. and *Taxus* L., other than in the form of chips, particles, sawdust, shavings, wood waste and scrap (Point 76) from Canada, China, Japan, the Republic of Korea, Mexico, Taiwan and the United States, where *Bursaphelenchus xylophilus* (Steiner et Bührer) Nickle et al. is known to occur;
2 wood in the form of chips, particles, sawdust, shavings, wood waste and scrap obtained in whole or part from these conifers (Point 77) from Canada, China, Japan, the Republic of

Korea, Mexico, Taiwan and the USA, where *Bursaphelenchus xylophilus* (Steiner et Bührer) Nickle et al. is known to occur;

3 wood, other than in the form of chips, particles, sawdust, shavings, wood waste, scrap and wood packaging material (Point 79) from Kazakhstan, Russia and Turkey;

4 wood, other than in the form of chips, particles, sawdust, shavings, wood waste, scrap and wood packaging material (Point 80) from third countries, other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, the Canary Islands, the Faeroe Islands, Georgia, Iceland, Liechtenstein, Kazakhstan, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia, San Marino, Serbia, Switzerland, Turkey, and Ukraine; Canada, China, Japan, the Republic of Korea, Mexico, Taiwan and the United States, where *Bursaphelenchus xylophilus* (Steiner et Bührer) Nickle et al. is known to occur;

5 wood in the form of chips, particles, sawdust, shavings, wood waste and scrap obtained in whole or in part from conifers (Point 81) from third countries other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, the Canary Islands, the Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland and Ukraine; and other than Canada, China, Japan, the Republic of Korea, Mexico, Taiwan and USA, where *Bursaphelenchus xylophilus* (Steiner et Bührer) Nickle et al. is known to occur.

Table 5: Specific regulatory requirements/restrictions for commodities of the coniferous tree species known to be hosts of at least one of the species listed in Table 1

Species	Regulation
Abies alba *Abies amabilis* *Abies balsamea* *Abies concolor* *Abies durangensis* *Abies firma* *Abies forrestii* *Abies grandis* *Abies homolepis* *Abies lasiocarpa* *Abies magnifica* *Abies mariesii* *Abies procera* *Abies religiosa* *Abies sachalinensis* *Abies vejarii*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Abies* Mill. plants from certain third countries is prohibited (Point 1 of Annex VI)
Calocedrus decurrens	(i) General regulations for conifers
Cedrus deodara *Cedrus libani*	(i) General requirements for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Cedrus* Trew plants from certain third countries is prohibited (Point 1 of Annex VI)
Chamaecyparis lawsoniana *Chamaecyparis obtusa* *Chamaecyparis pisifera*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Chamaecyparis* Spach plants from certain third countries is prohibited (Point 1 of Annex VI)
Cryptomeria japonica	(i) General regulations for conifers
Cupressus nootkatensis *(Xanthocyparis nootkatensis)* *Cupressus funebris*	(i) General regulations for conifers
Fokienia hodginsii	(i) General regulations for conifers
Juniperus chinensis *Juniperus communis* *Juniperus formosana* *Juniperus procera* *Juniperus rigida* *Juniperus sabina*	(i) General regulations for conifer (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Juniperus* L. plants from certain third countries is prohibited (Point 1 of Annex VI)
Keteleeria evelyniana	(i) General regulations for conifers

Species	Regulation
Larix decidua *Larix gmelinii* *Larix kaempferi* *Larix laricina* *Larix sibirica* *Larix x eurolepis*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Larix* Mill. plants from certain third countries is prohibited (Point 1 of Annex VI)
Picea abies *Picea breweriana* *Picea crassifolia* *Picea engelmannii* *Picea glauca* *Picea glauca albertiana* *Picea glehnii* *Picea jezoensis* *Picea likiangensis* *Picea mariana* *Picea pungens* *Picea purpurea* *Picea rubens* *Picea sitchensis* *Picea spinulosa*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Picea* A. Dietr. plants from certain third countries is prohibited (Point 1 of Annex VI)
Pinus spp.	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Pinus* L. plants from certain third countries is prohibited (Point 1 of Annex VI)
Platycladus orientalis	(i) General regulations for conifers
Pseudotsuga macrocarpa *Pseudotsuga menziesii*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Pseudotsuga* Carr. plants from certain third countries is prohibited (Point 1 of Annex VI) and the introduction of *Pseudotsuga menziesii* (Mirbel) specific plant parts, from the United States requires a phytosanitary certificate (Point 3 of Annex XI)
Sequoia sempervirens	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction of *Sequoia sempervirens* (Lamb. ex D. Don) specific plant parts, from the United States requires a phytosanitary certificate (Point 3 of Annex XI)
Sequoiadendron giganteum	(i) General regulations for conifers
Taxodium distichum	(i) General regulations for conifers

Species	Regulation
Taxus baccata *Taxus brevifolia* *Taxus cuspidata* *Taxus media*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. wood of *Thuja* L. and *Taxus* L., other than in the form of chips, particles, sawdust, shavings, wood waste, scrap and wood packaging material, from certain third countries must be accompanied by an official statement that they have undergone an appropriate heat, fumigation or chemical treatment (Annex VII point 78) and the introduction into EU territory of *Taxus* L. plants and plant parts, originating from all third countries is prohibited pending a risk assessment (Article 1, Annex I)
Thuja occidentalis *Thuja plicata* *Thuja standishii*	(i) General regulations for conifers (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. wood of *Thuja* L. and *Taxus* L., other than in the form of chips, particles, sawdust, shavings, wood waste, scrap and wood packaging material, from certain third countries must be accompanied by an official statement that they have undergone an appropriate heat, fumigation or chemical treatment (Annex VII point 78)
Thujopsis dolabrata var. hondai	(i) General regulations for conifers
Torreya californica	(i) General regulations for conifers
Tsuga canadensis *Tsuga caroliniana* *Tsuga diversifolia* *Tsuga heterophylla* *Tsuga mertensiana*	(i) General regulations for conifer (ii) Commission Implementing Regulation (EU) 2019/2072, i.e. the introduction into EU territory of *Tsuga* Carr. plants and plant parts, originating from all third countries shall be prohibited pending a risk assessment (Article 1, Annex I)

8 Trade and import

No specific database is available to date on the main flows and hubs of conifer trees at the European state level. There is information on the plants for planting pathway as a whole (Table 6), thus without distinguishing between conifer and broadleaf trees. More detailed information exists (Hübner, 2018) on the trade of Christmas trees and branches of conifers (Tables 7 and 8). Denmark, Germany, Poland and Belgium are the countries producing and exporting the highest number of Christmas trees, and Germany and France are the most active importers.

Table 6: The quantity of plants for planting expressed in kilogrammes imported into each EU Member State from extra-EU countries and from other EU Member States. Values were obtained from a database produced by the EFSA-funded project HOPPI (Hotspots for Plant Pest Introductions), which in turn was based on Eurostat. The category 'plants for planting' considered here includes: (i) already and not yet planted, bonsai, aquatic plants and carnivorous plants; (ii) cuttings; (iii) underground organs

State	Extra-EU	Intra-EU	Total
Austria	73,710	4,215,148	2,296,456
Belgium	85,364	8,204,155	3,007,866
Bulgaria	149,283	282,451	217,744

State	Extra-EU	Intra-EU	Total
Croatia	171,283	1,730,186	949,434
Cyprus	82,302	303,914	181,161
Czechia	52,126	2,535,671	1,030,982
Denmark	74,754	2,823,684	1,319,785
Estonia	4,157	322,321	213,561
Finland	37,605	1,672,976	923,795
France	50,575	11,984,590	3,818,382
Germany	105,077	27,895,107	7,908,267
Greece	36,612	1,037,155	600,298
Hungary	70,646	1,647,707	699,604
Ireland	43,245	1,715,731	862,033
Italy	187,930	5,933,207	2,022,523
Latvia	15,415	710,641	460,580
Lithuania	32,382	1,635,030	1,055,349
Luxembourg	2,234	696,534	585,347
Malta	7,363	483,800	336,638
Netherlands	1,298,536	11,595,427	3,897,607
Poland	52,555	4,989,772	1,982,822
Portugal	82,794	2,401,673	1,027,047
Romania	144,128	3,035,451	1,866,718
Slovakia	83961.37	965884.88	665506.97
Slovenia	76,761.38	639,007.76	404,824.41
Spain	256,231	3,557,123	1,218,653
Sweden	29,046	3,892,587	1,846,898

Table 7: Movement of Christmas trees within the EU of the top 15 countries in 2020. Values are expressed in 1,000 Euro (Hübner, 2018)

Countries	Total export	Exporting to (value)
Denmark	49,469	Germany (23,774) / France (5,644) / Sweden (4,760)
Germany	14,681	Netherlands (6,001) / Czechia (2,235) / Austria (1,645)
Poland	13,822	Germany (5,602) / Denmark (4,944) / France (1,077)
Belgium	10,424	France (9,151) / Denmark (340) / Germany (288)
Netherlands	5,563	Germany (2,998) / Austria (388) / France (303)
Czechia	2,922	Germany (1,841) / Slovakia (453) / Austria (356)
Estonia	841	Denmark (691) / Finland (96) / Sweden (26)

Lithuania	798	Denmark (796) / Netherlands (2)
Luxembourg	735	Belgium (368) / France (366) / Germany (1)
France	705	Denmark (420) / Belgium (164) / Germany (69)
Hungary	658	Romania (528) / Denmark (70) / Germany (29)
Austria	469	Hungary (201) / Slovenia (173) / Italy (39)
Italy	231	Germany (131) / Spain (51) / Denmark (11)
Slovakia	135	Lithuania (111) / Netherlands (11) / Germany (9)
Sweden	131	Denmark (84) / Finland (37) / Germany (7)
Others	448	NA
Total	102,032	NA

Table 8: Movement of Christmas trees within the EU of the top 15 countries in 2020. Values are expressed in 1,000 Euro (Hübner, 2018)

Countries	**Total export**	**Exporting to (value)**
Germany	34,831	Denmark (23,774) / Poland (5,602) / Netherlands (2,998)
France	16,744	Belgium (9,151) / Denmark (5,644) / Poland (1,077)
Netherlands	9,336	Germany (6,001) / Denmark (2,219) / Poland (924)
Denmark	8,808	Poland (4,944) / Germany (1,042) / Lithuania (796)
Sweden	5,110	Denmark (4,760) / Netherlands (174) / Germany (132)
Czechia	4,785	Germany (2,235) / Denmark (1,871) / Poland (497)
Romania	4,203	Denmark (2,721) / Hungary (528) / Germany (485)
Austria	4,192	Germany (1,645) / Denmark (1,579) / Netherlands (388)
Belgium	2,581	Denmark (1,809) / Luxembourg (368) / Netherlands (169)
Slovakia	2,458	Germany (1,389) / Czechia (453) / Denmark (346)
Italy	2,082	Denmark (1,112) / Germany (310) / Belgium (268)
Poland	1,703	Denmark (1,160) / Germany (359) / Netherlands (126)
Hungary	1,261	Denmark (533) / Germany (374) / Austria (201)
Lithuania	1,080	Denmark (592) / Netherlands (169) / Poland (144)

Luxembourg	752	Germany (354) / Denmark (313) / Belgium (39)
Others	2,107	NA
Total	102,032	NA

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Relevant EFSA outputs

- Index of the EFSA Plant Pest Survey Toolkit: https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/index