

# Forest Condition in Europe

## The 2022 Assessment

### Online Supplementary Material

ICP Forests Technical Report under the UNECE Convention  
on Long-range Transboundary Air Pollution (Air Convention)

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### Recommended citation

Michel A, Kirchner T, Prescher A-K, Schwärzel K, editors (2022) Forest Condition in Europe: The 2022 Assessment. ICP Forests Technical Report under the UNECE Convention on Long-range Transboundary Air Pollution (Air Convention). Online supplementary material, 48 p. Eberswalde: Thünen Institute. Available at <http://icp-forests.net/page/icp-forests-technical-report>

United Nations Economic Commission for Europe (UNECE)  
Convention on Long-range Transboundary Air Pollution (Air Convention)  
International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)

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# CONTENTS

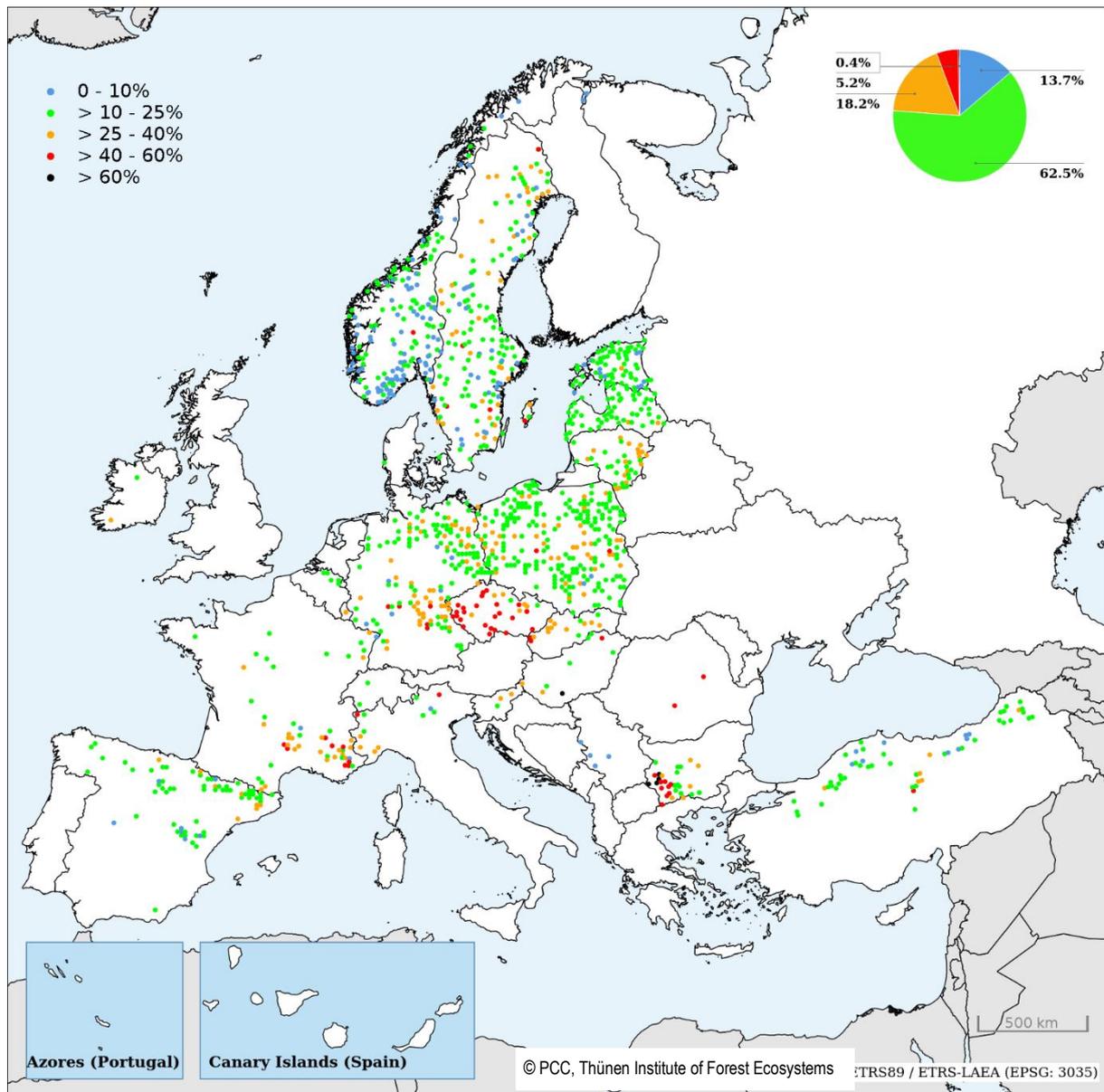
- S1 TREE CROWN CONDITION AND DAMAGE CAUSES – ADDITIONAL TABLES AND MAPS ..... 4**
  - S1-1 Mean plot defoliation of main tree species in 2021 ..... 4
  - S1-2 Trends in mean plot defoliation of the main tree species 2011–2021 ..... 13
  - S1-3 Damage from various damaging agent groups reported in 2021 ..... 21
  
- S2 RESULTS OF THE NATIONAL CROWN CONDITION SURVEYS.....27**
  - S2-1 Information on the monitoring design for the national crown condition surveys in the participating countries in 2021 ..... 27
  - S2-2 Tree defoliation (%) in different defoliation classes from national crown condition surveys in 2021 ..... 28
  - S2-3 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – All species..... 32
  - S2-4 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – Conifers..... 33
  - S2-5 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – Broadleaves..... 34
  - S2-6 Change of tree defoliation over time (1992–2021) per country..... 35

## S1 TREE CROWN CONDITION AND DAMAGE CAUSES – ADDITIONAL TABLES AND MAPS

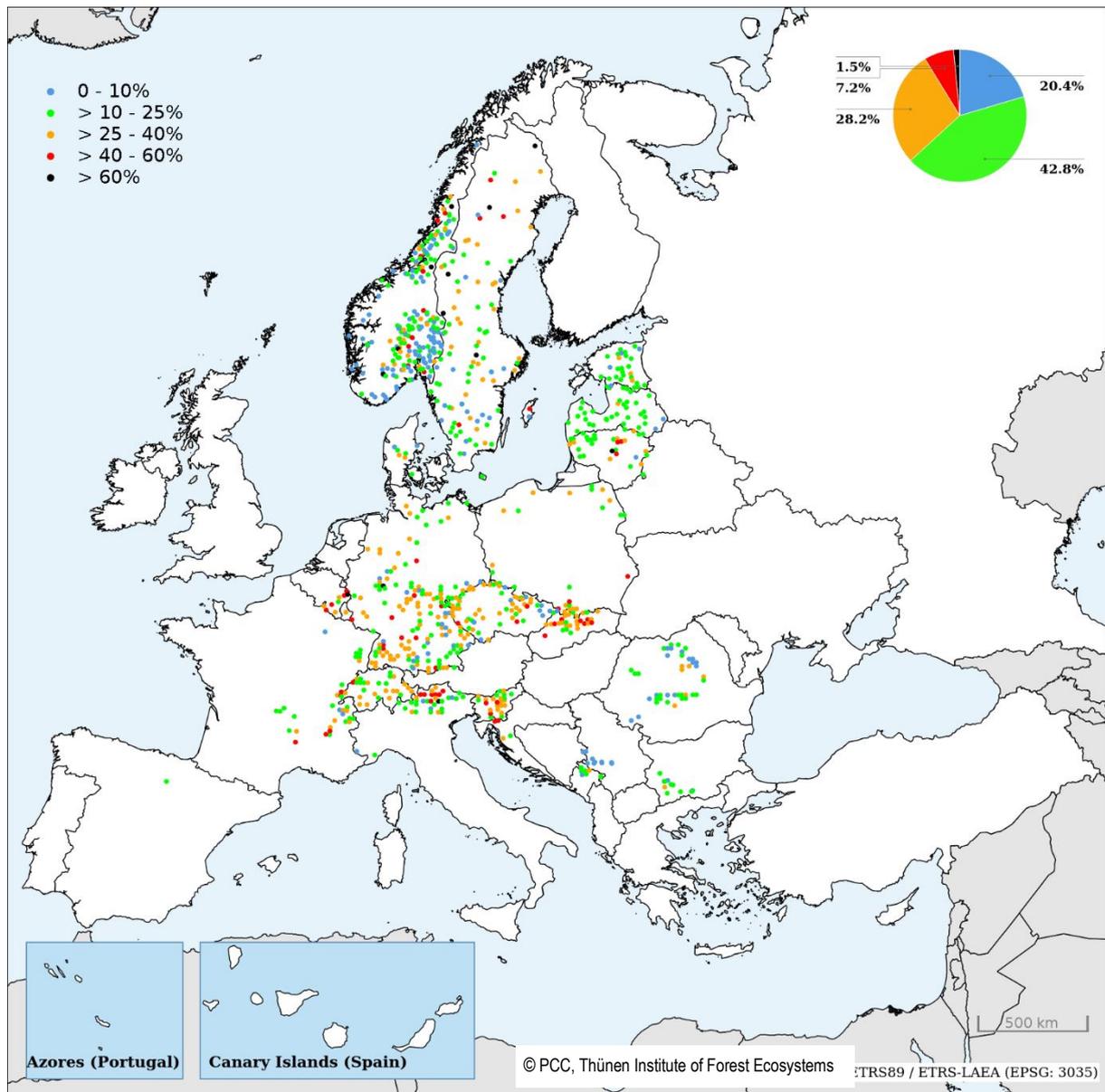
### S1-1 Mean plot defoliation of main tree species in 2021

**Table S1-1: Percentage of plots with mean plot defoliation in defoliation classes 0-3 (class 2 subdivided) for the main species or species groups (n trees pr. plot >2) and the number of plots in each group in 2021. Dead trees are not included.**

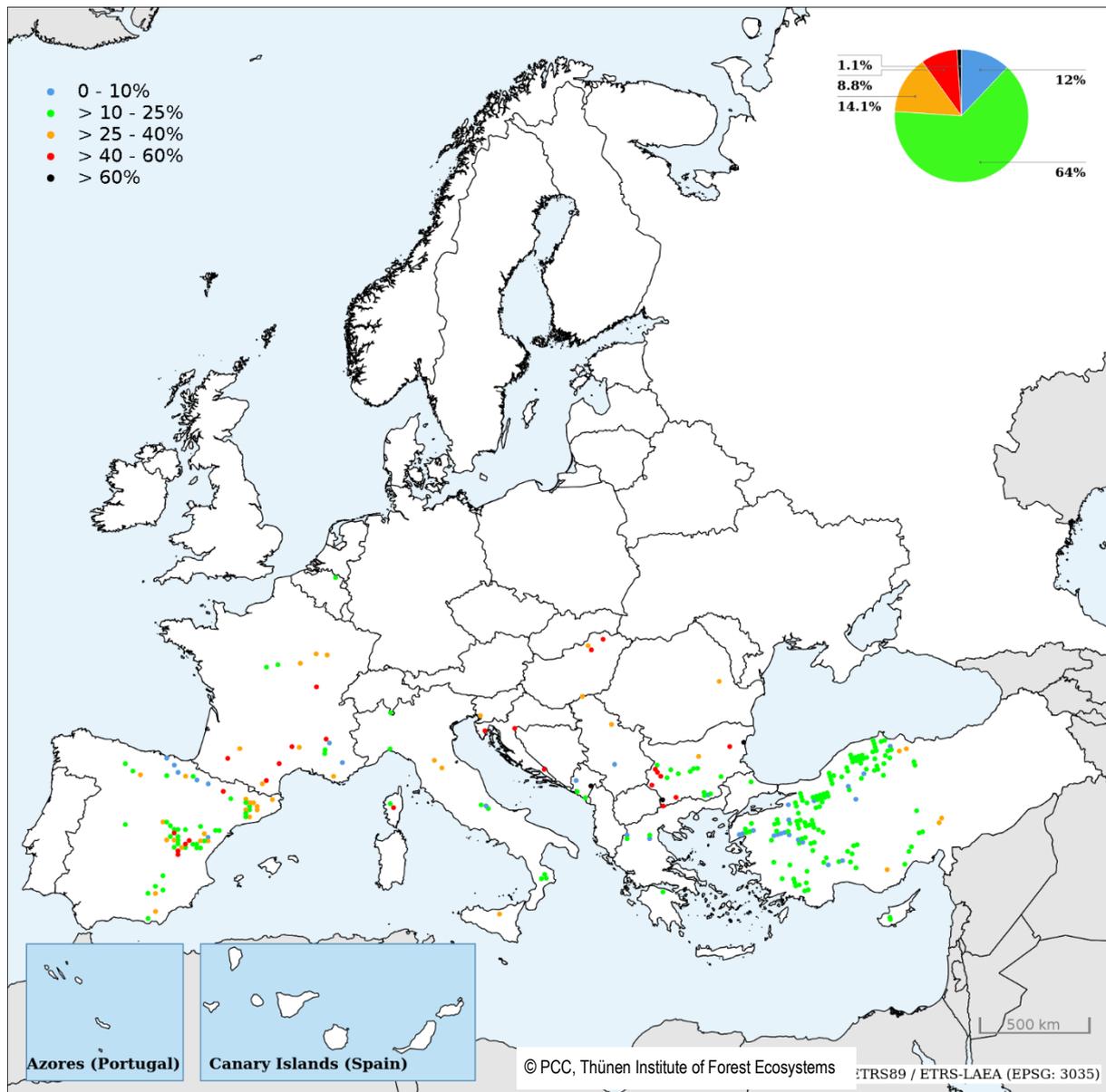
Main species or species groups	Class 0 0-10%	Class 1 >10-25%	Class 2-1 >25-40%	Class 2-2 >40-60%	Class 3 >60%	No. of plots
Scots pine ( <i>Pinus sylvestris</i> )	13.7	62.5	18.2	5.2	0.4	1 219
Norway spruce ( <i>Picea abies</i> )	20.4	42.8	28.2	7.2	1.5	894
Austrian pine ( <i>Pinus nigra</i> )	12.0	64.0	14.1	8.8	1.1	284
Mediterranean lowland pines	3.3	68.5	22.0	5.9	0.3	391
Common beech ( <i>Fagus sylvatica</i> )	20.5	46.5	22.2	7.0	3.8	716
Deciduous temperate oaks	7.2	42.7	32.8	14.7	2.6	655
Dec. (sub-) Mediterranean oaks	14.3	51.0	23.9	9.2	1.6	489
Evergreen oaks	0.8	54.3	32.0	11.7	1.2	247



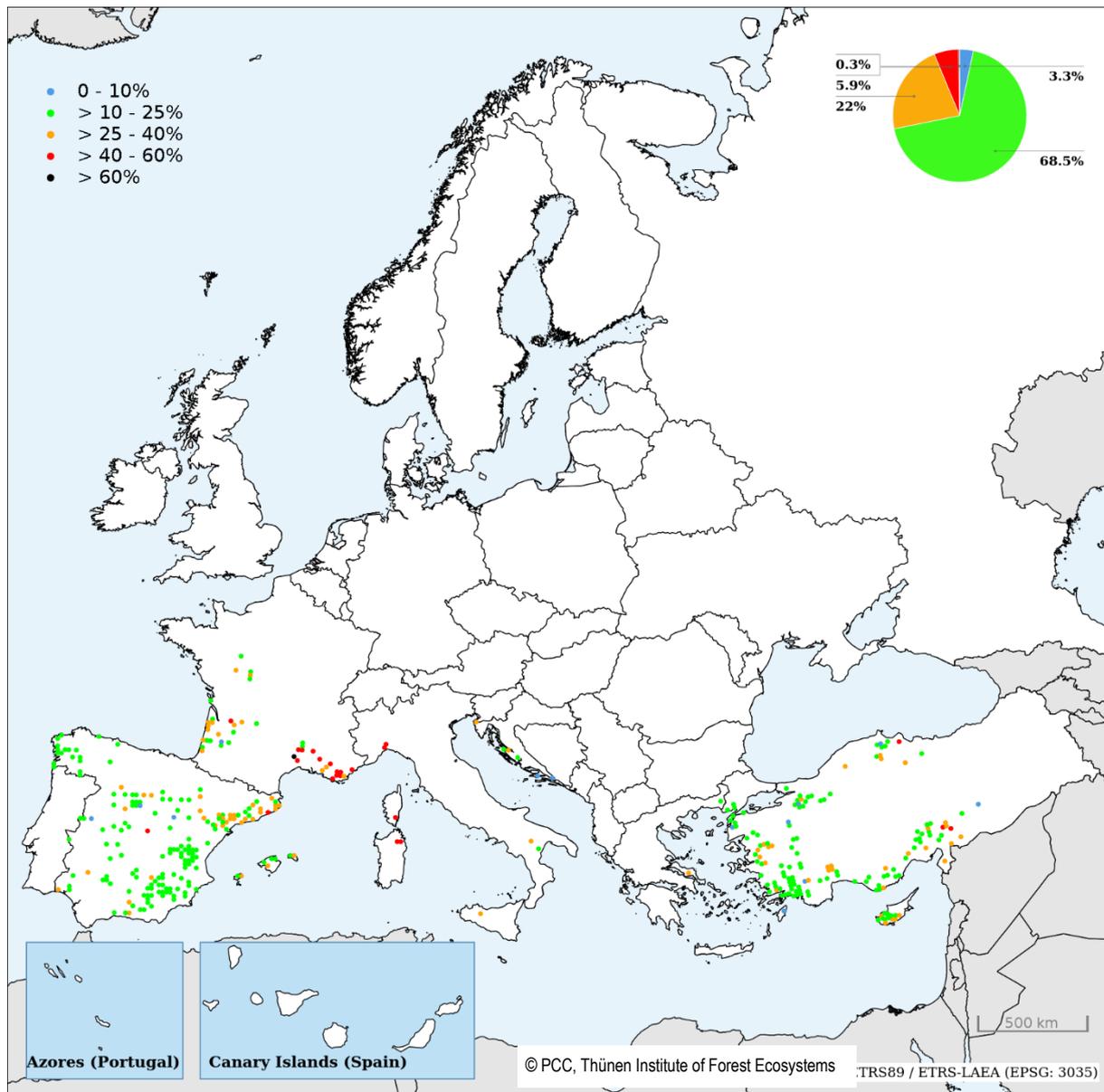
**Figure S1-1: Mean plot defoliation of Scots pine (*Pinus sylvestris*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.



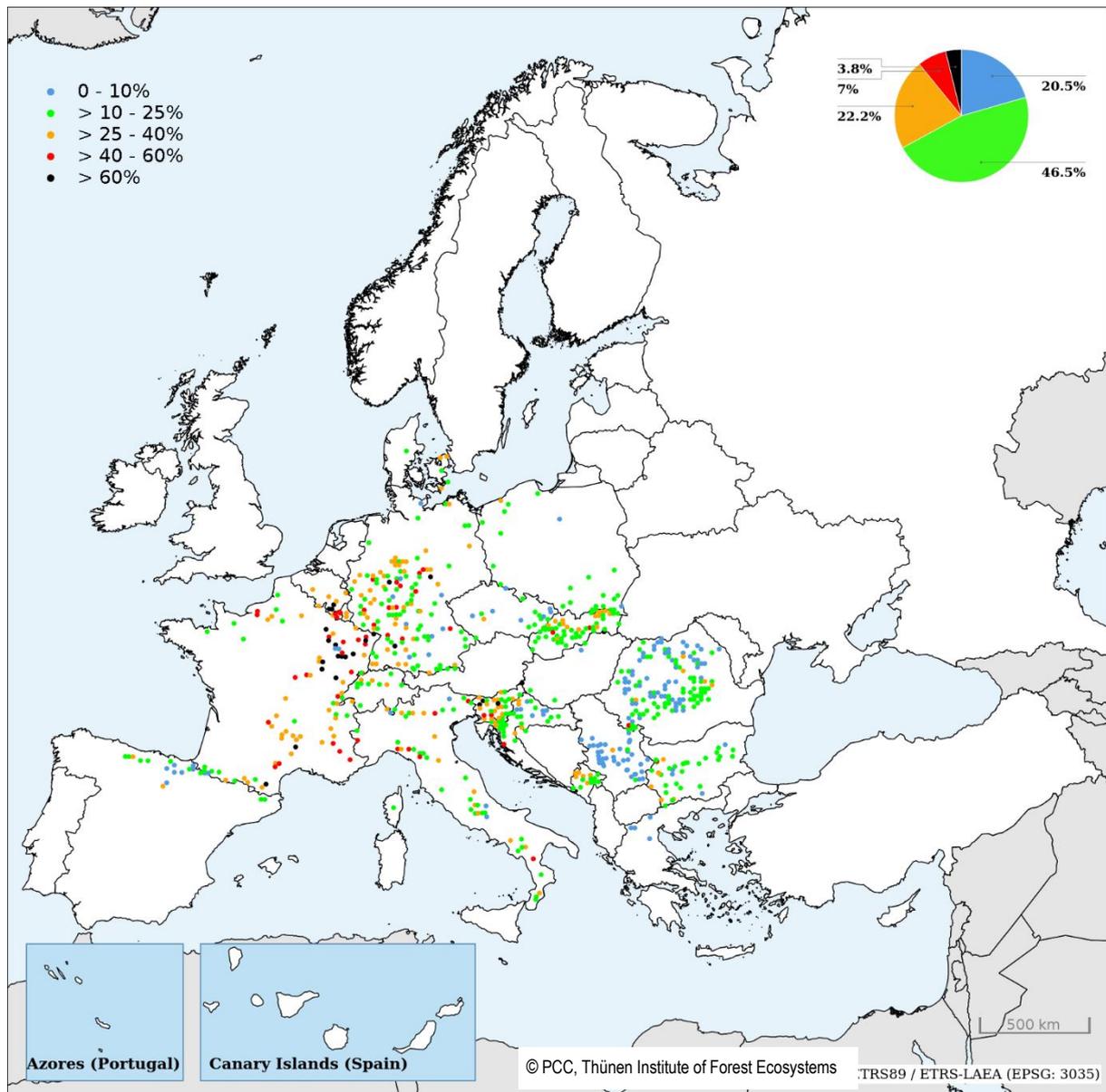
**Figure S1-2: Mean plot defoliation of Norway spruce (*Picea abies*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.



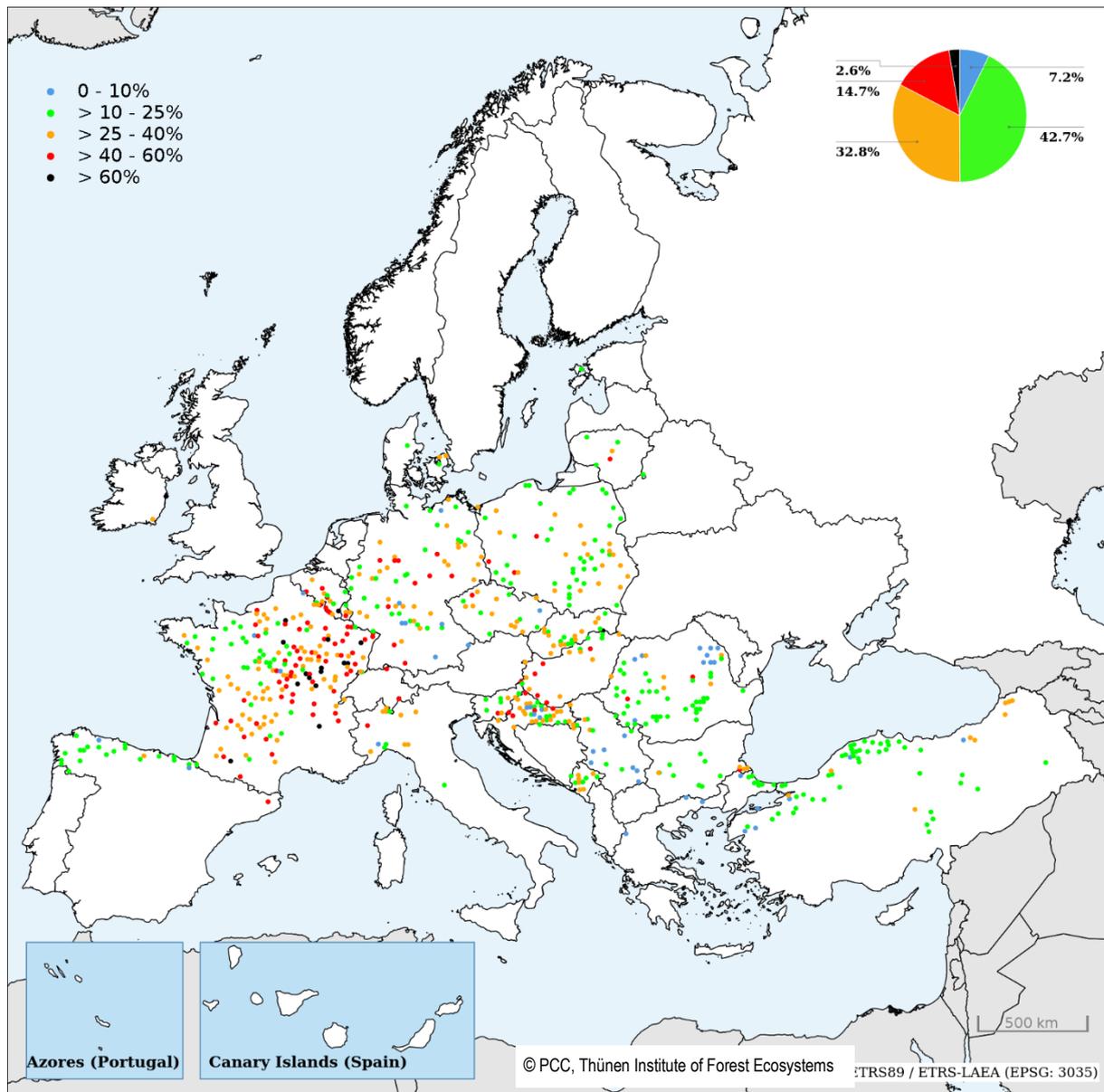
**Figure S1-3: Mean plot defoliation of Austrian pine (*Pinus nigra*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.



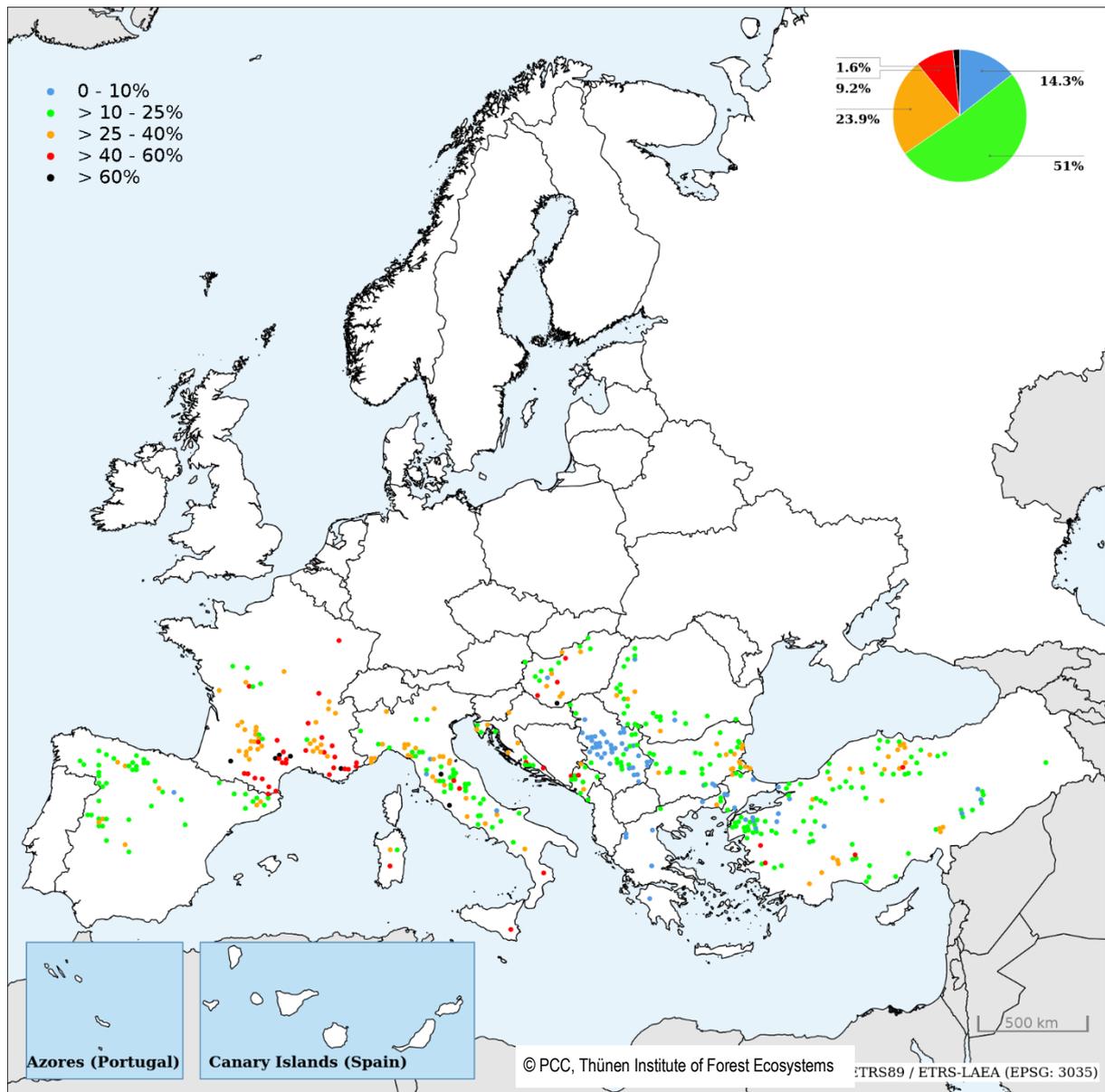
**Figure S1-4: Mean plot defoliation of Mediterranean lowland pines (*Pinus halepensis*, *P. pinaster*, *P. pinea*, *P. brutia*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.



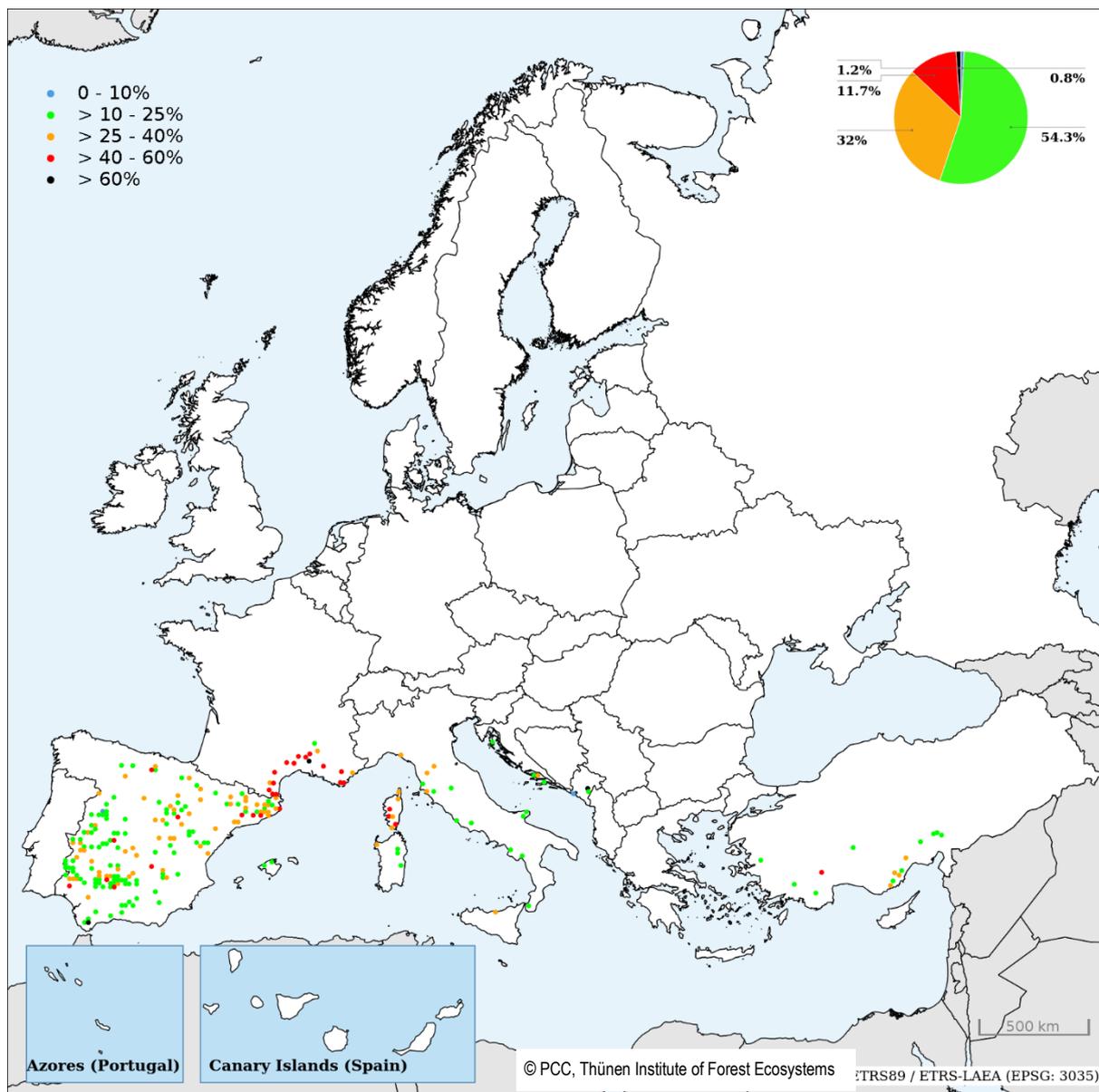
**Figure S1-5: Mean plot defoliation of common beech (*Fagus sylvatica*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.



**Figure S1-6: Mean plot defoliation of deciduous temperate oaks (*Quercus robur* and *Q. petraea*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

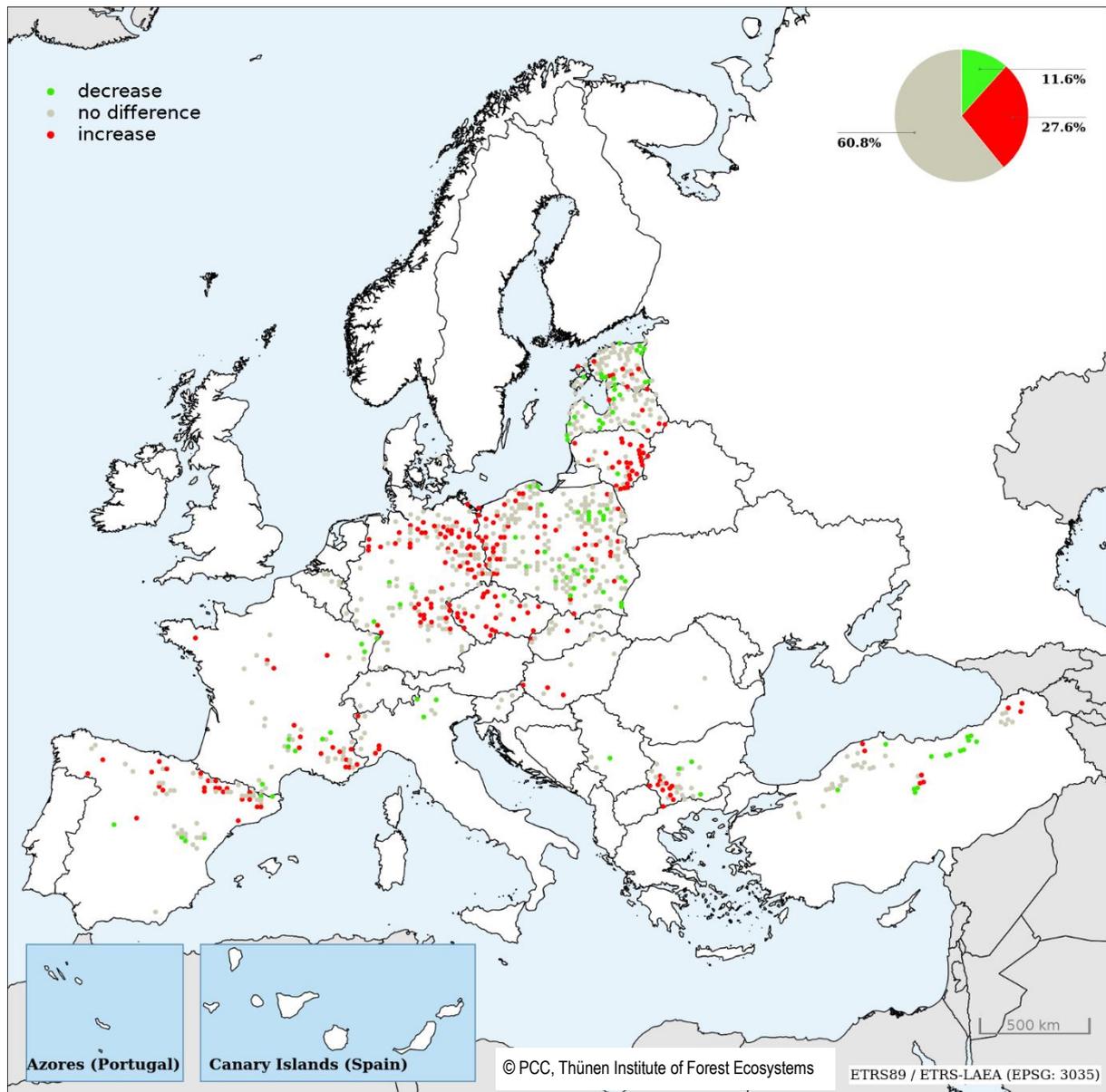


**Figure S1-7: Mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris*, *Q. frainetto*, *Q. pubescens*, *Q. pyrenaica*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

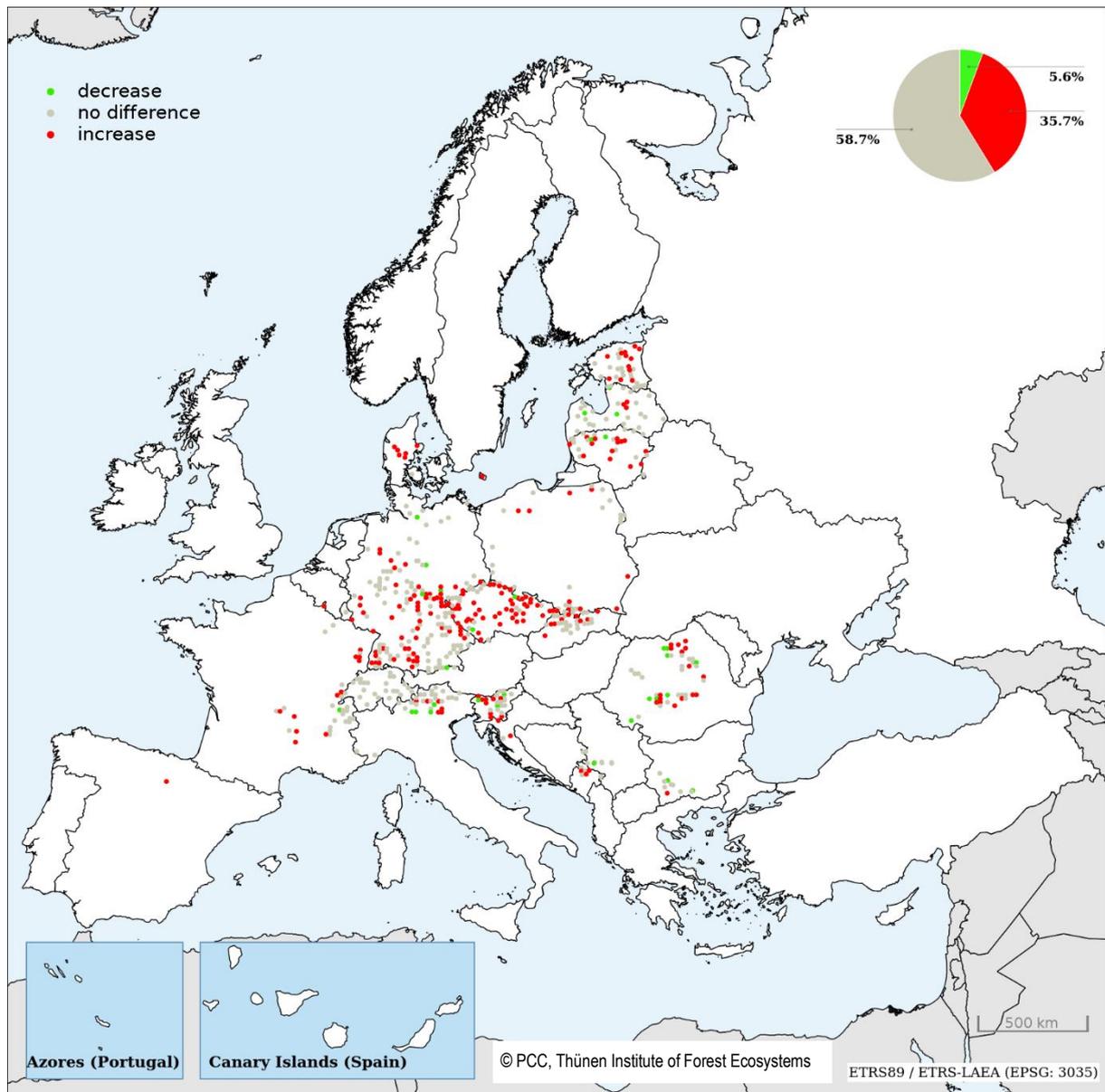


**Figure S1-8: Mean plot defoliation of evergreen oaks (*Quercus coccifera*, *Q. ilex*, *Q. rotundifolia*, *Q. suber*) in 2021.** Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

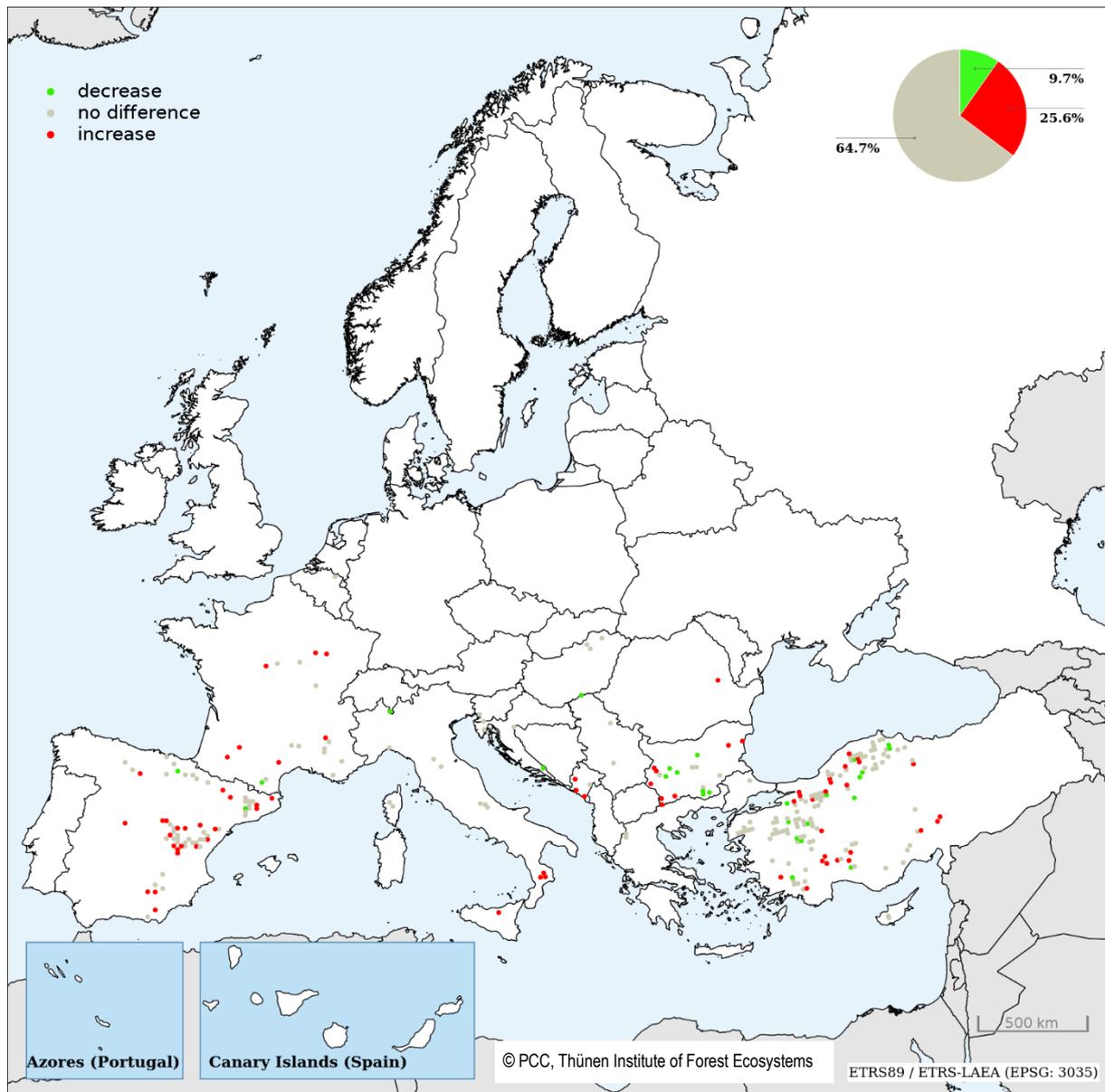
## S1-2 Trends in mean plot defoliation of the main tree species 2011–2021



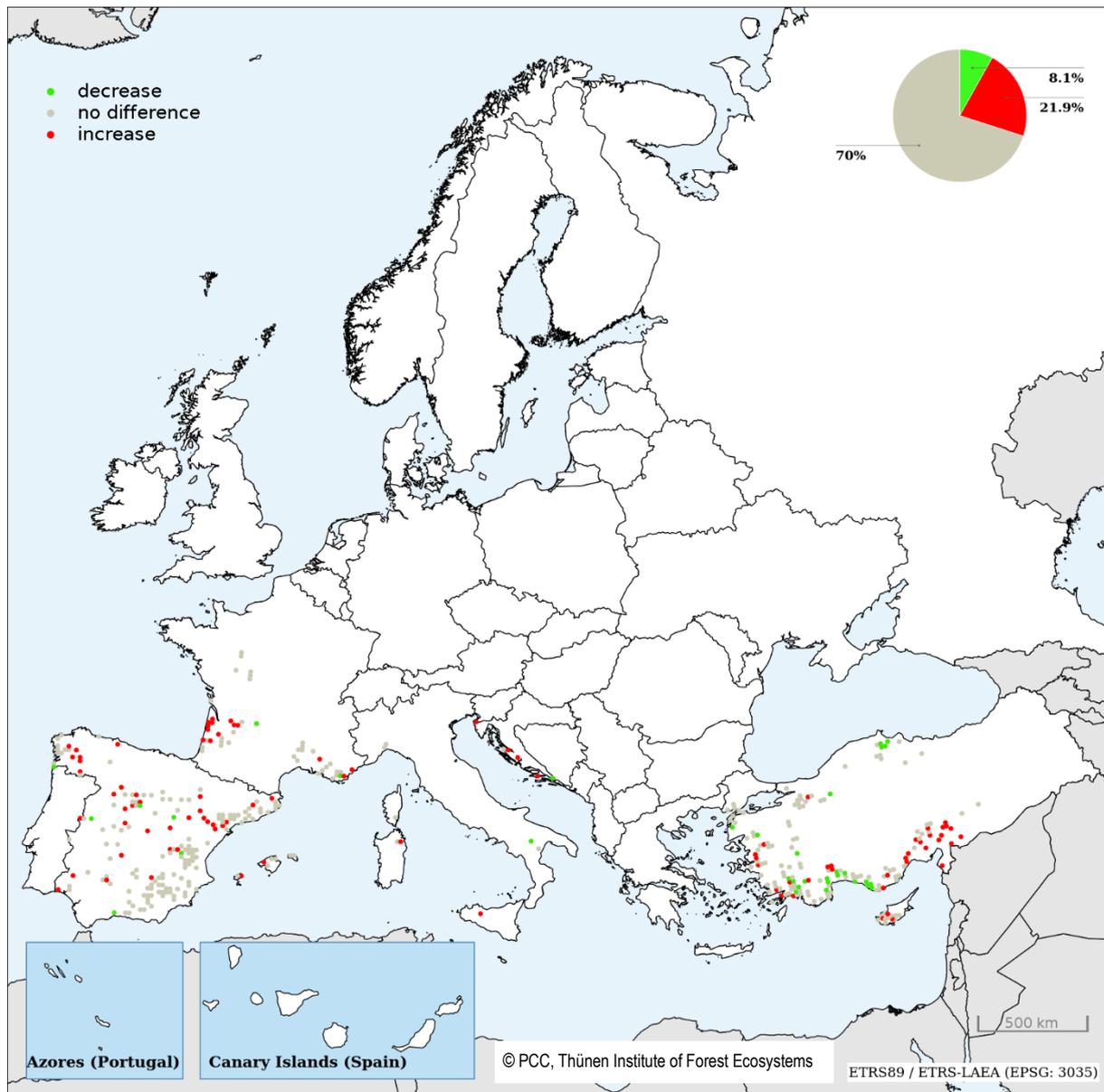
**Figure S1-9: Trends in mean plot defoliation of Scots pine (*Pinus sylvestris*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



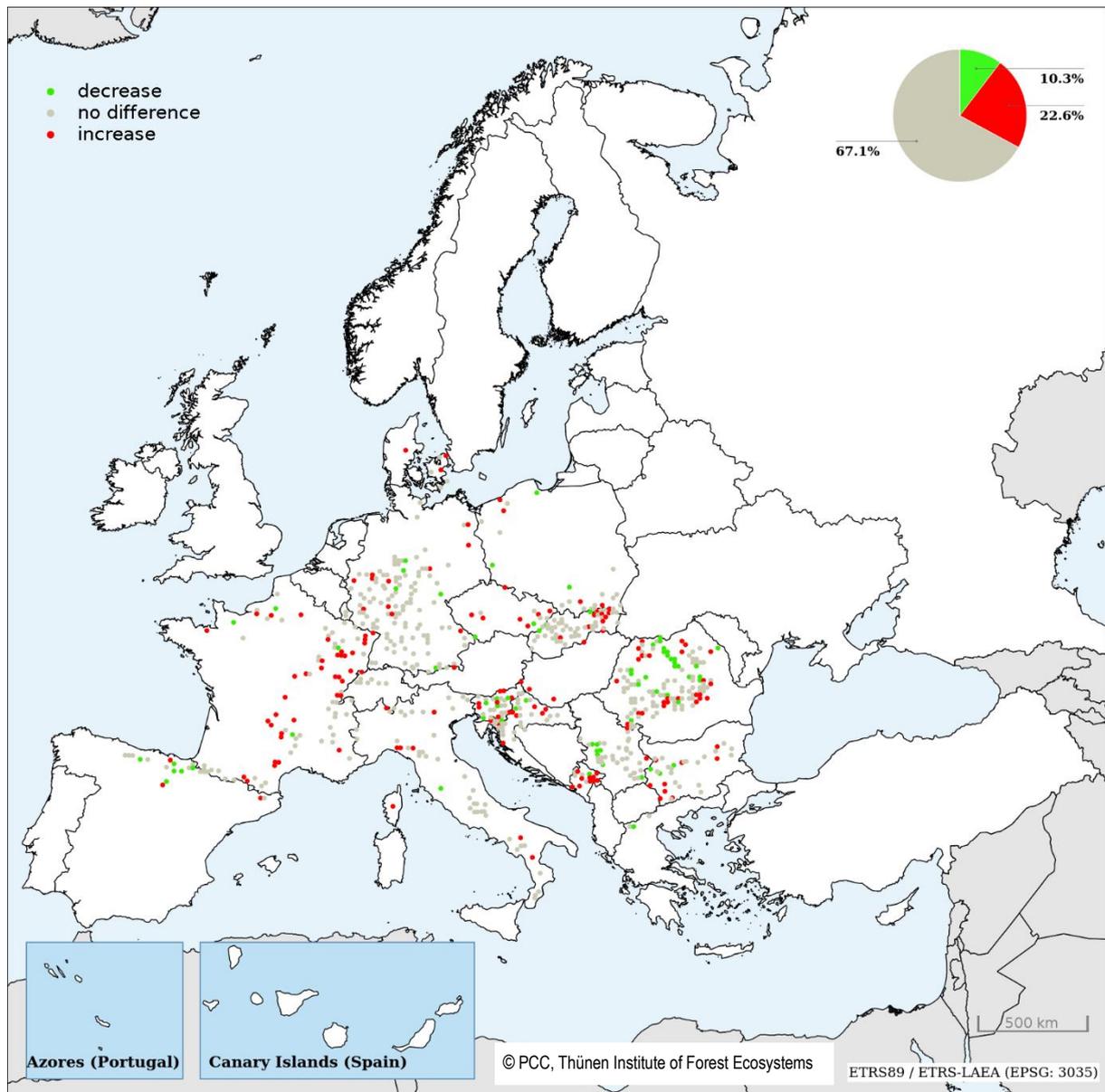
**Figure S1-10: Trends in mean plot defoliation of Norway spruce (*Picea abies*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



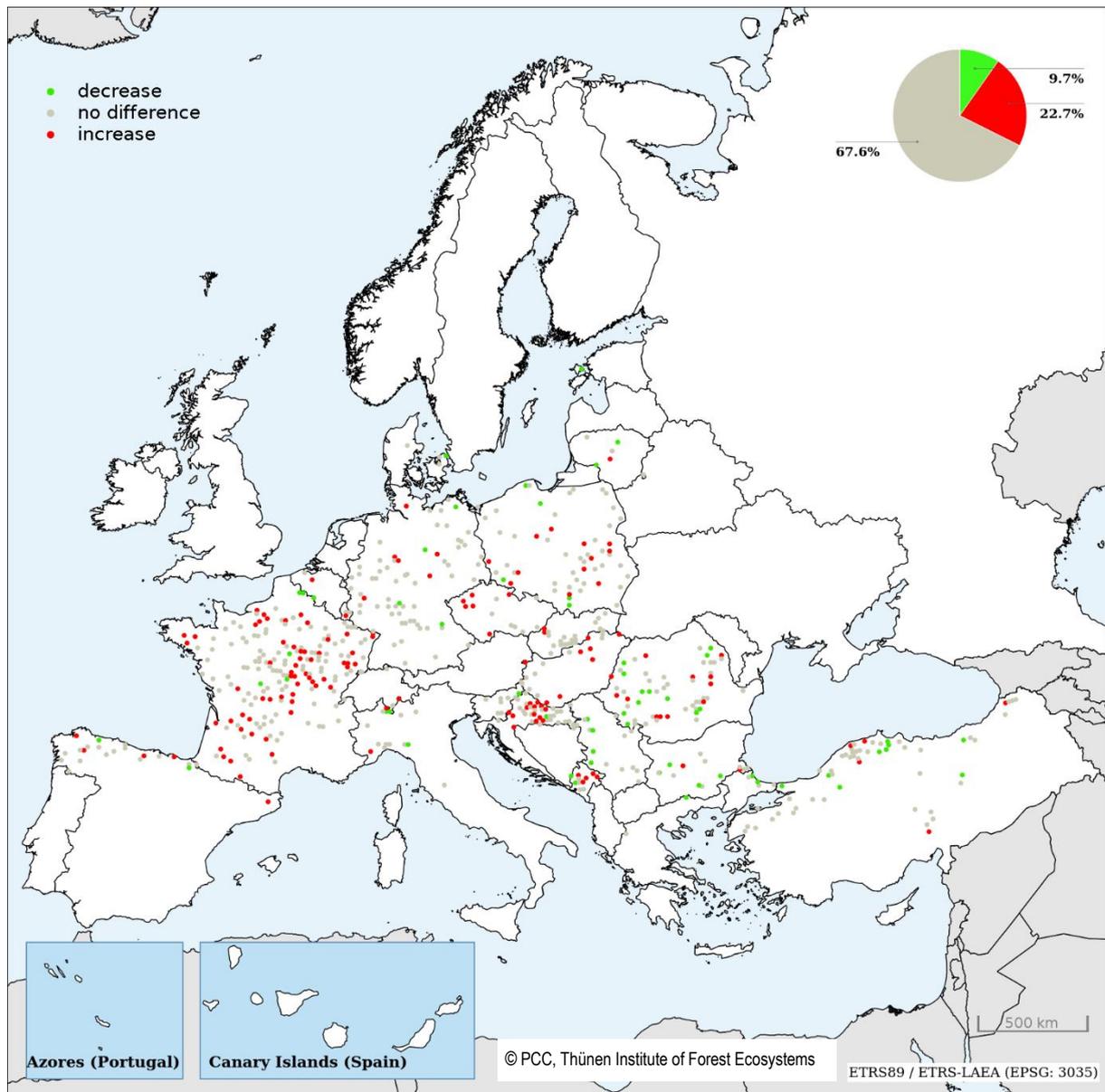
**Figure S1-11: Trends in mean plot defoliation of Austrian pine (*Pinus nigra*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



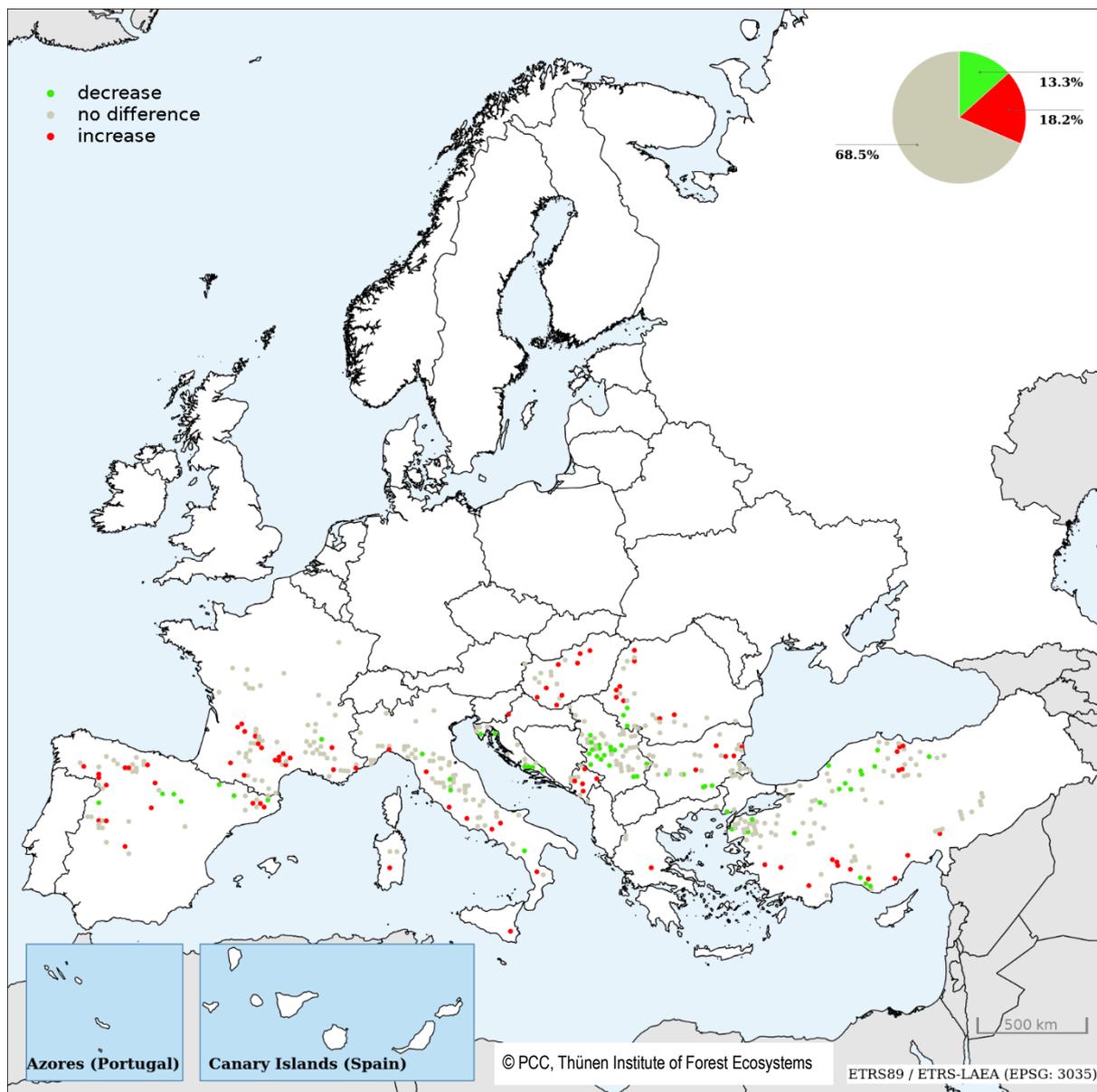
**Figure S1-12: Trends in mean plot defoliation of Mediterranean lowland pines (*Pinus brutia*, *P. halepensis*, *P. pinaster*, *P. pinea*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



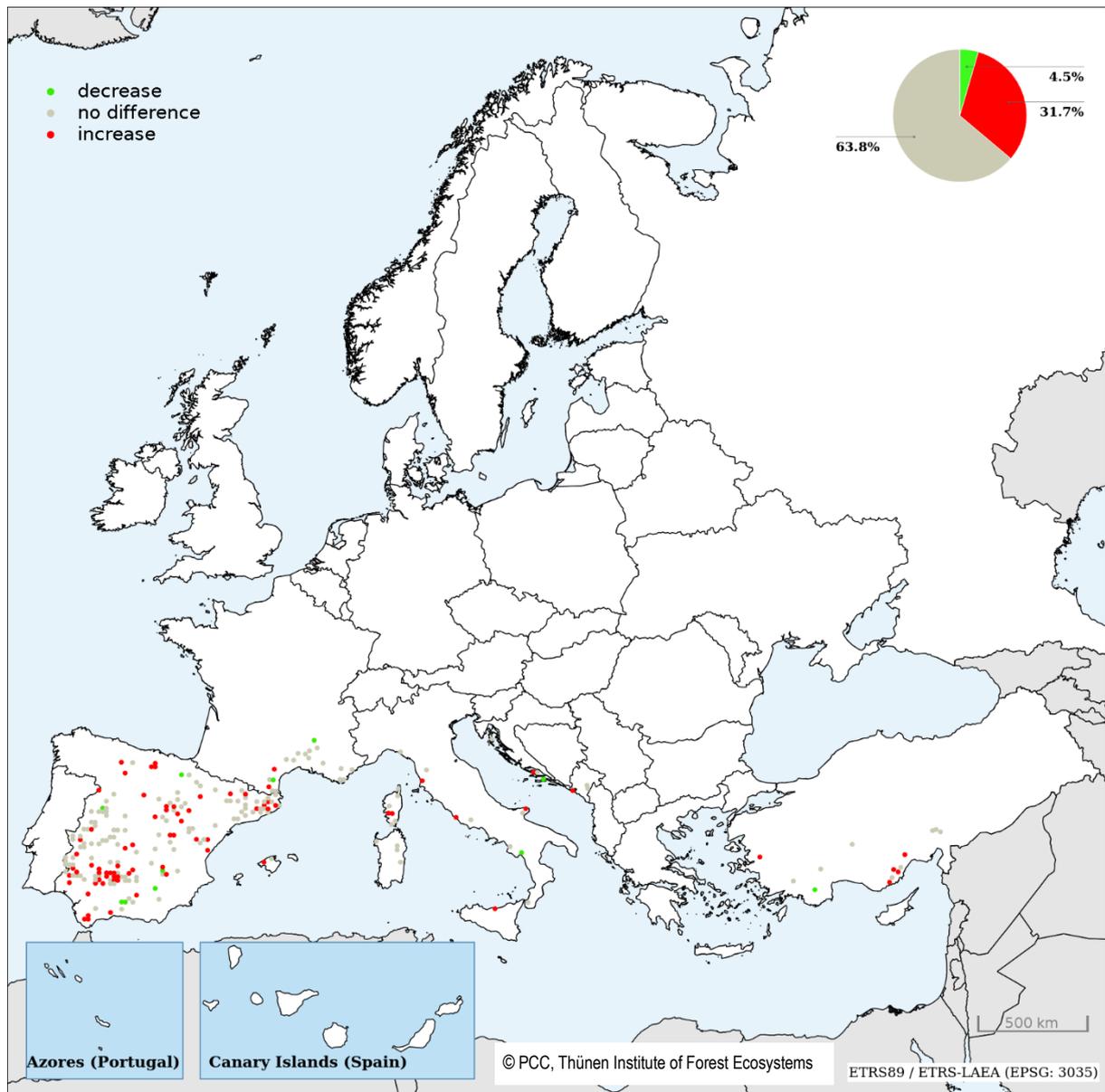
**Figure S1-13: Trends in mean plot defoliation of common beech (*Fagus sylvatica*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



**Figure S1-14: Trends in mean plot defoliation of deciduous temperate oaks (*Quercus robur* and *Q. petraea*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



**Figure S1-15: Trends in mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris*, *Q. frainetto*, *Q. pubescens*, *Q. pyrenaica*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.



**Figure S1-16: Trends in mean plot defoliation of evergreen oaks (*Quercus coccifera*, *Q ilex*, *Q. rotundifolia*, *Q. suber*) between 2011 and 2021.** Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

### S1-3 Damage from various damaging agent groups reported in 2021

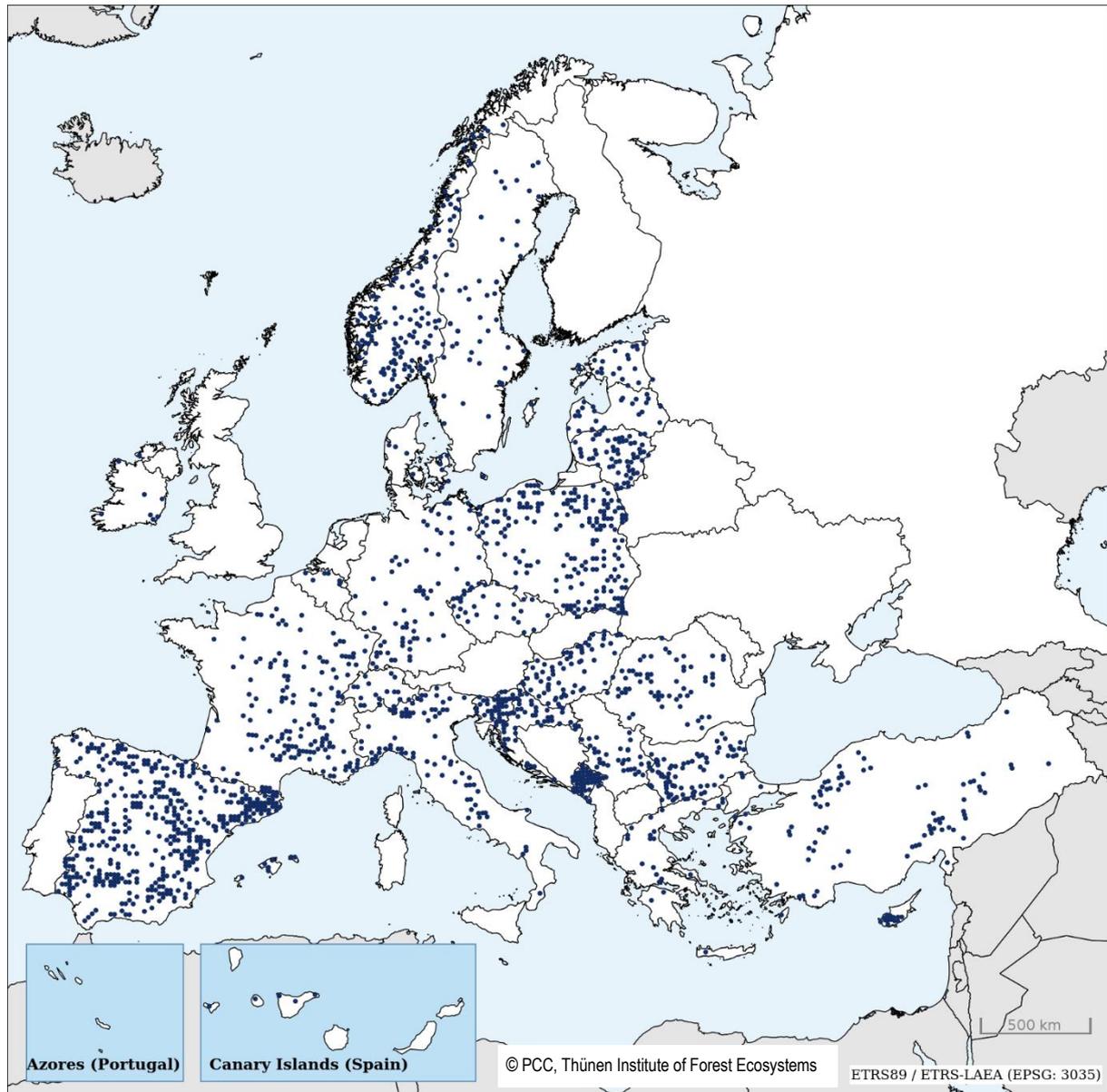


Figure S1-17: Damage from agent group **Abiotic factors** reported in 2021. Both fresh and old damage is shown.

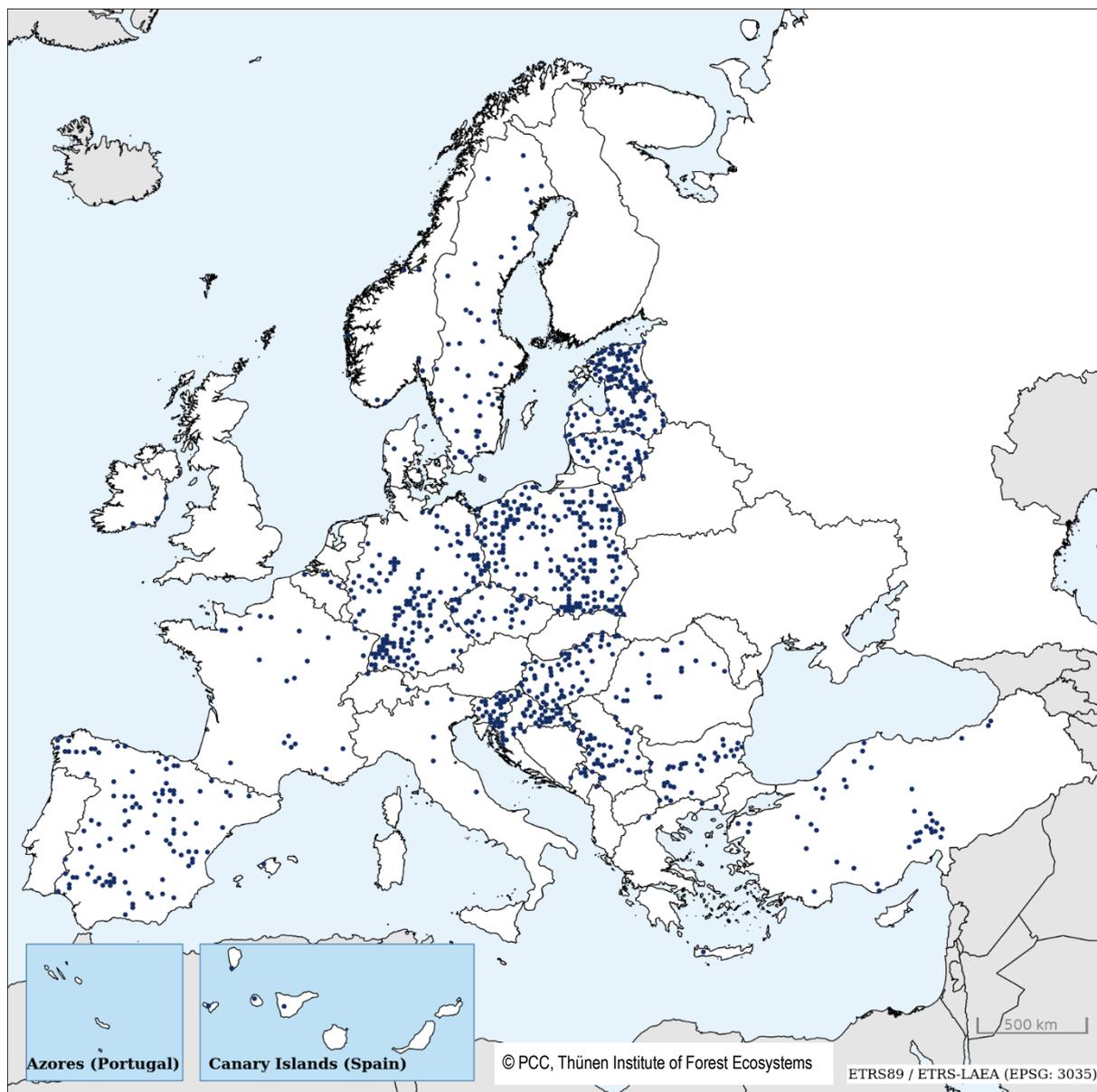


Figure S1-18: Damage from agent group **Direct action of man** reported in 2021. Both fresh and old damage is shown.



Figure S1-19: Damage from agent group **Fire** reported in 2021. Both fresh and old damage is shown.

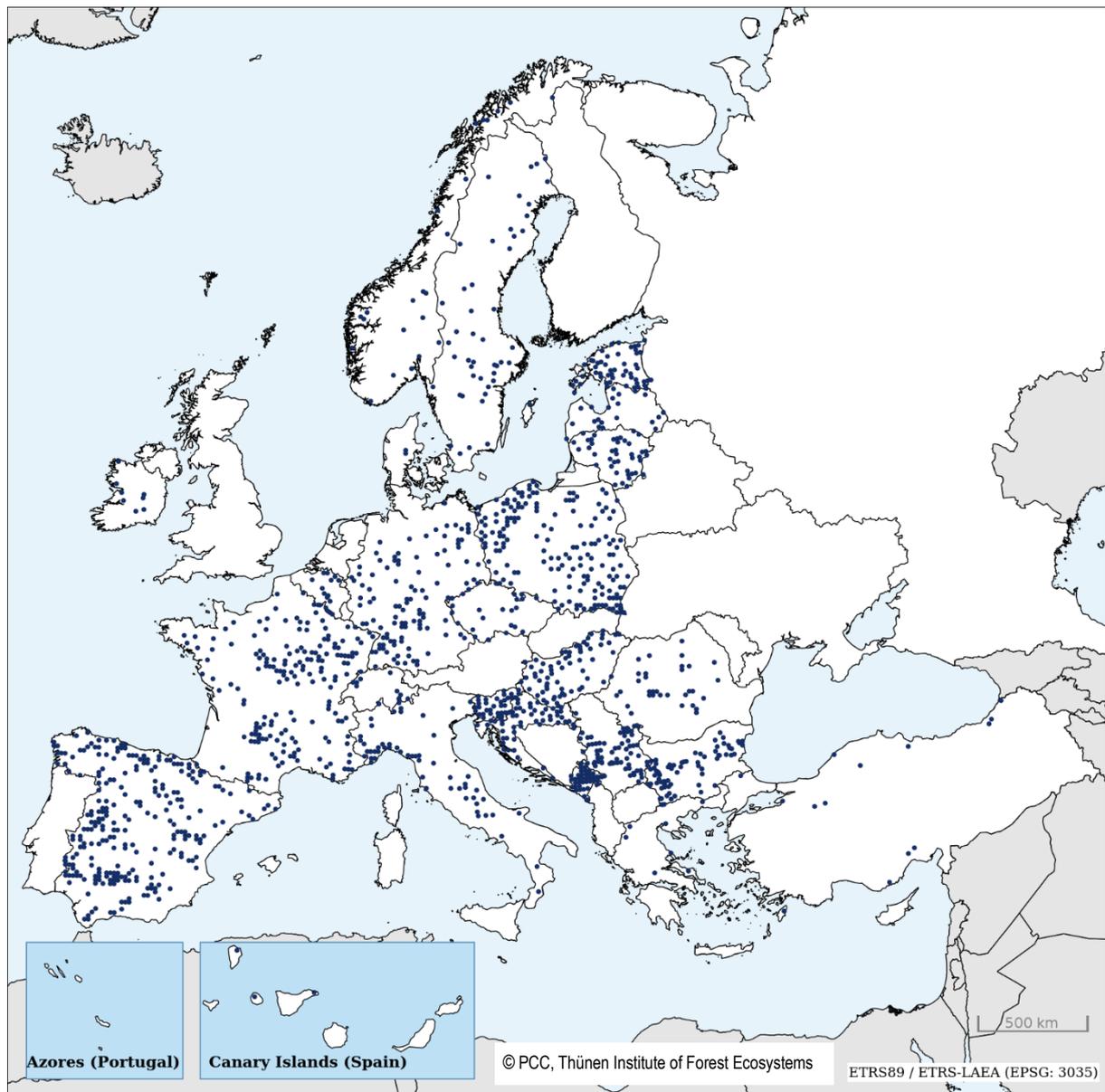


Figure S1-20: Damage from agent group **Fungi** reported in 2021. Both fresh and old damage is shown.

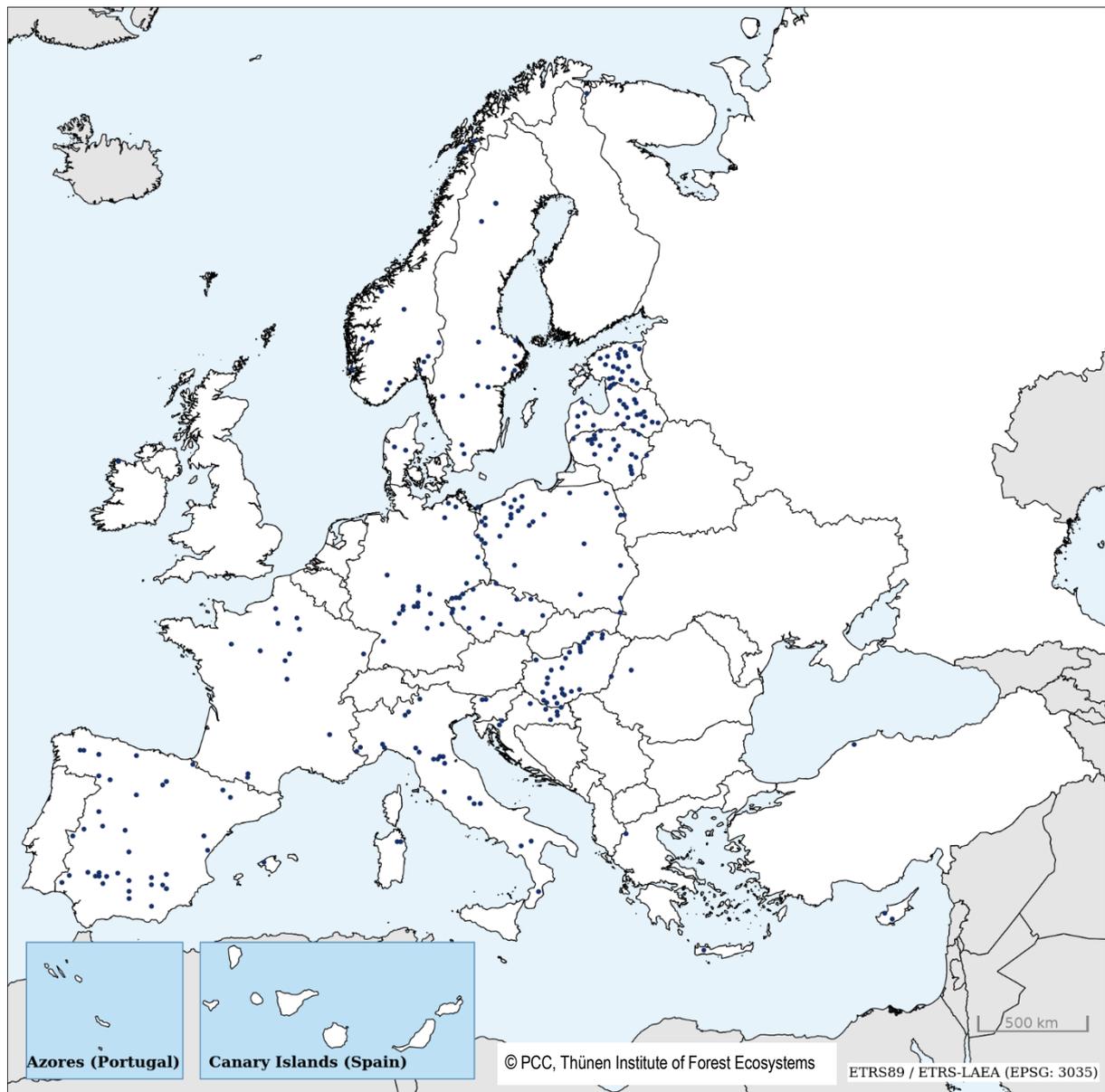


Figure S1-21: Damage from agent group **Game and grazing** reported in 2021. Both fresh and old damage is shown.

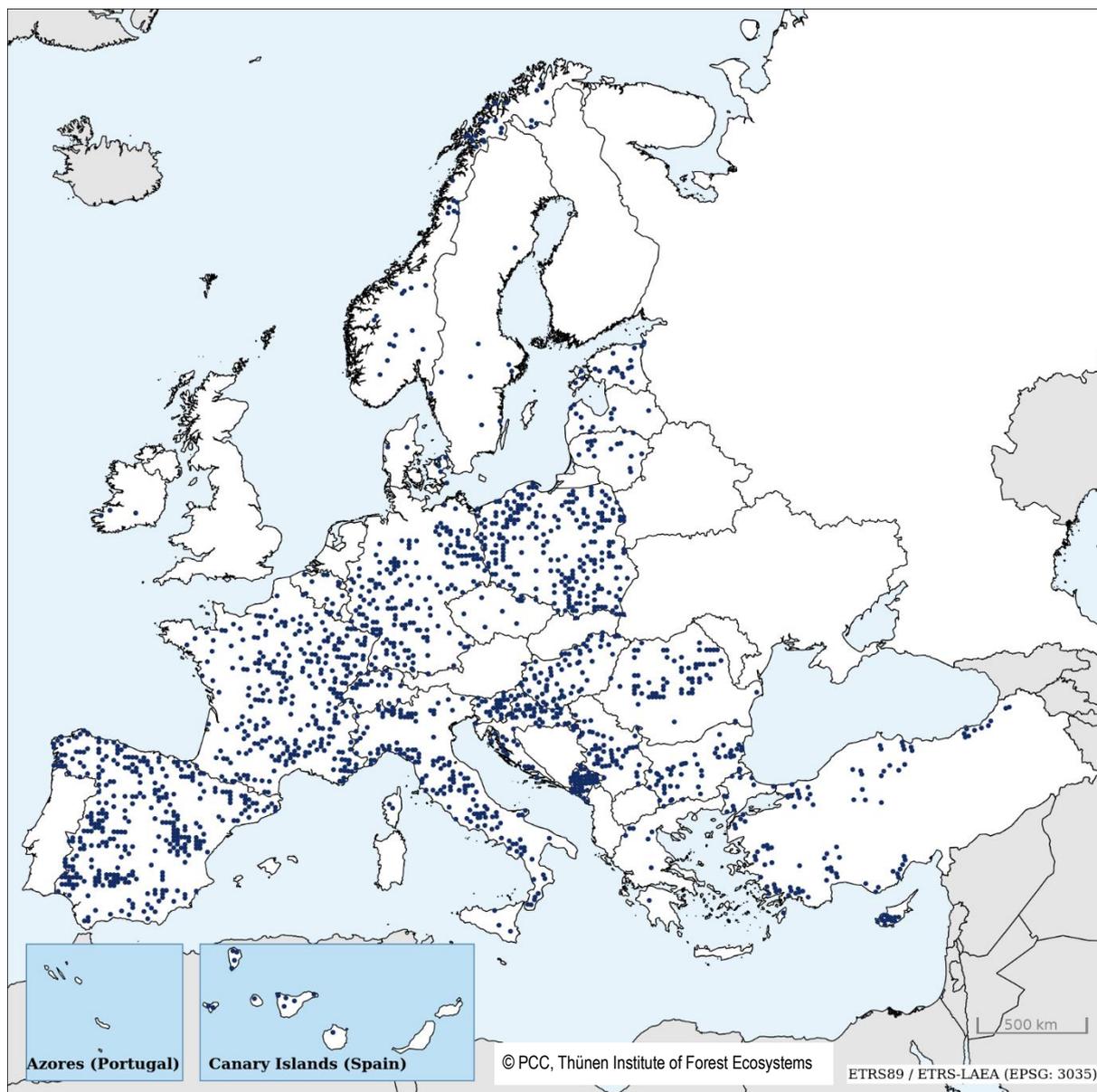


Figure S1-22: Damage from agent group **Insects** reported in 2021. Both fresh and old damage is shown.

## S2 RESULTS OF THE NATIONAL CROWN CONDITION SURVEYS

### S2-1 Information on the monitoring design for the national crown condition surveys in the participating countries in 2021

Country	Total area (1000 ha)	Forest area (1000 ha)	Grid size (km x km)	No. of sample plots	No. of sample trees
Albania	No information available for 2021				
Andorra	47	18	4x4	12	288
Belarus	No information available for 2021				
Belgium-Flanders	1351	146	4x4	75	1473
Belgium-Wallonia	1684	555	varying	48	359
Bulgaria	11100	3920	4x4/16x16	159	5570
Croatia	5659	2795	16x16	93	2232
Cyprus	925	298	16x16	15	361
Czechia	7887	2677	16x16	122	4254
Denmark	4300	633	varying	341	2758
Estonia	4534	2325	16x16	95	2155
Finland	No information available for 2021				
France	54883	15840	16x16	548	10587
Germany	35721	11419	16x16	421	9904
Greece	13205	6513	16x16	33	768
Hungary	9300	1942	16x16	78	1863
Ireland	7027	770	varying	35	575
Italy	30128	10967	16x16	256	4700
Latvia	6459	3223	16x16	115	1724
Lithuania	6529	2202	4x4/16x16	988	5652
Luxembourg	259	90	4x4	50	1200
Moldova, Rep. of	3385	419	3x3	618	13538
Montenegro	1381	827	16x16	49	1175
North Macedonia	No information available for 2021				
Norway	32381	12210	3x3	1904	10936
Poland	31268	9260	8x8	2068	41360
Portugal	No information available for 2021				
Romania	23840	7046	16x16	234	5616
Russian Fed.	No information available for 2021				
Serbia	8836	2360	4x4/16x16	130	2928
Slovakia	4904	2014	16x16	97	3502
Slovenia	2027	1197	16x16	44	1056
Spain	49880	18289	16x16	620	14880
Sweden	40655	27915	varying	3263	7642
Switzerland	4129	1279	16x16	47	986
Türkiye	77846	21900	16x16	580	13229
Ukraine	No information available for 2021				
<b>Total</b>				<b>13 138</b>	<b>173 271</b>

## S2-2 Tree defoliation (%) in different defoliation classes from national crown condition surveys in 2021

Participating country	No. of sample trees	Defoliation classes					
		0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
<b>Andorra</b>							
Broadleaves	5	0	80	20	0	0	20.0
Conifers	283	12.4	66.8	19.4	1.4	0.0	20.8
All trees	288	12.2	67.0	19.4	1.4	0.0	20.8
<b>Belgium-Flanders</b>							
Broadleaves	838	12.4	64.8	21.1	1.3	0.4	22.8
Conifers	635	7.9	75.9	14.6	0.3	1.3	16.2
All trees	1473	10.5	69.6	18.3	0.9	0.8	20.0
<b>Belgium-Wallonia</b>							
Broadleaves	196	3.1	25.5	53.6	16.3	1.5	71.4
Conifers	163	3.7	17.8	65.6	12.9	0.0	78.5
All trees	359	3.3	22.0	59.1	14.8	0.8	74.7
<b>Bulgaria</b>							
Broadleaves	3140	32.6	44.2	20.9	1.9	0.5	23.2
Conifers	2430	28.8	24.4	33.4	10.1	3.3	46.8
All trees	5570	30.9	35.5	26.3	5.5	1.7	33.5
<b>Croatia</b>							
Broadleaves	1906	29.4	40.2	27.0	2.6	0.8	30.4
Conifers	326	27.9	26.1	40.2	5.5	0.3	46.0
All trees	2232	29.2	38.2	28.9	3.0	0.7	32.7
<b>Cyprus</b>							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	361	4.4	65.7	28.0	1.7	0.3	29.9
All trees	361	4.4	65.7	28.0	1.7	0.3	29.9
<b>Czechia</b>							
Broadleaves	1170	22.6	41.9	32.1	2.7	0.8	35.6
Conifers	3243	11.9	23.9	57.6	5.2	1.4	64.2
All trees	4254	14.4	28.4	52.1	4.4	0.7	57.2
<b>Denmark</b>							
Broadleaves	1087	47.3	37.5	14.4	0.6	0.2	15.2
Conifers	1671	53.0	34.0	11.7	1.0	0.3	13.0
All trees	2758	50.8	35.4	12.8	0.8	0.3	13.9
<b>Estonia</b>							
Broadleaves	259	52.0	39.0	7.0	2.0	0.0	9.0
Conifers	1896	47.0	45.0	7.0	0.0	1.0	8.0
All trees	2155	47.6	44.3	7.0	0.2	0.9	8.1

Participating country	No. of sample trees	Defoliation classes					
		0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
<b>France</b>							
Broadleaves	6859	8.1	23.7	53.7	13.9	0.6	68.2
Conifers	3728	23.3	33.3	38.2	4.2	1.0	43.4
All trees	10587	13.5	27.1	48.2	10.5	0.7	59.5
<b>Germany</b>							
Broadleaves	4210	22.8	40.2	31.2	4.1	1.7	37.0
Conifers	5694	20.2	46.7	28.3	1.4	3.4	33.1
All trees	9904	21.3	43.9	29.5	2.6	2.7	34.8
<b>Greece</b>							
Broadleaves	454	70.9	16.1	11.0	0.4	1.5	13.0
Conifers	314	42.4	35.7	21.0	0.6	0.3	22.0
All trees	768	59.3	24.1	15.1	0.5	1.0	16.7
<b>Hungary</b>							
Broadleaves	1694	22.6	29.9	37.4	8.6	1.6	47.5
Conifers	169	25.3	27.3	33.2	10.7	3.6	47.4
All trees	1863	22.8	29.6	37.0	8.8	1.8	47.5
<b>Ireland</b>							
Broadleaves	150	19.0	29.0	27.0	25.0	0.0	52.0
Conifers	425	53.0	34.0	11.0	2.0	0.0	13.0
All trees	575	44.1	32.7	15.2	8.0	0.0	23.2
<b>Italy</b>							
Broadleaves	3458	17.1	41.3	36.7	4.0	0.9	41.6
Conifers	1242	24.8	32.0	36.8	3.9	2.5	43.2
All trees	4700	19.1	38.8	36.7	4.0	1.3	42.0
<b>Latvia</b>							
Broadleaves	456	9.2	89.7	1.1	0.0	0.0	1.1
Conifers	1268	13.3	81.7	4.7	0.1	0.2	5.0
All trees	1724	12.2	83.8	3.8	0.1	0.2	4.0
<b>Lithuania</b>							
Broadleaves	2127	18.9	65.2	13.4	1.1	1.4	15.9
Conifers	3525	11.8	65.9	21.0	0.6	0.7	22.3
All trees	5652	14.5	65.6	18.1	0.8	1.0	19.9
<b>Luxembourg</b>							
Broadleaves	834	5.4	32.0	55.4	5.7	1.5	62.6
Conifers	366	31.4	32.4	25.5	0.8	9.9	36.2
All trees	1200	13.3	32.1	46.3	4.2	4.1	54.6
<b>Moldova, Rep. of</b>							
Broadleaves	13496	38.1	32.8	26.3	1.0	1.8	29.1
Conifers	42	45.2	40.5	4.8	0.0	9.5	14.3
All trees	13538	38.1	32.8	26.2	1.0	1.8	29.1

Participating country	No. of sample trees	Defoliation classes					
		0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
<b>Montenegro</b>							
Broadleaves	887	17.6	50.3	29.4	2.7	0.0	32.1
Conifers	288	22.6	44.1	22.9	10.4	0.0	33.3
All trees	1175	18.8	48.8	27.8	4.6	0.0	32.4
<b>Norway</b>							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	10936	47.6	37.5	12.3	2.3	0.3	14.9
All trees	10936	47.6	37.5	12.3	2.3	0.3	14.9
<b>Poland</b>							
Broadleaves	15695	14.3	67.8	15.9	1.4	0.6	17.9
Conifers	25665	6.8	76.5	15.3	0.9	0.4	16.6
All trees	41360	9.7	73.2	15.6	1.1	0.5	17.1
<b>Romania</b>							
Broadleaves	4693	51.9	36.9	9.5	1.1	0.6	11.2
Conifers	923	52.0	31.6	14.7	1.0	0.7	16.4
All trees	5616	51.9	36.0	10.4	1.1	0.6	12.1
<b>Serbia</b>							
Broadleaves	2569	84.1	10.1	4.2	1.6	0.0	5.8
Conifers	359	86.4	5.0	5.8	2.8	0.0	8.6
All trees	2928	84.4	9.5	4.4	1.7	0.0	6.1
<b>Slovakia</b>							
Broadleaves	2200	9.7	62.2	25.9	1.5	0.7	28.1
Conifers	1302	3.5	42.5	49.8	3.8	0.4	54.0
All trees	3502	7.4	54.9	34.8	2.4	0.6	3502
<b>Slovenia</b>							
Broadleaves	709	12.4	46.3	30.3	9.9	1.1	41.3
Conifers	347	21.9	34.0	36.0	5.5	2.6	44.1
All trees	1056	15.5	42.2	32.2	8.4	1.6	42.2
<b>Spain</b>							
Broadleaves	7559	19.4	56.6	18.0	2.9	3.1	24.0
Conifers	7321	18.9	62.8	15.0	2.0	1.4	18.3
All trees	14880	19.1	59.6	16.5	2.5	2.3	21.2
<b>Sweden</b>							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	7642	47.9	34.6	15.0	2.1	0.4	17.5
All trees	7642	47.9	34.6	15.0	2.1	0.4	17.5
<b>Switzerland</b>							
Broadleaves	278	29.3	46.0	9.9	2.7	12.1	24.7
Conifers	708	19.7	52.6	18.6	1.1	8.0	27.7
All trees	986	22.4	50.7	16.2	1.6	9.2	26.9

Participating country	No. of sample trees	Defoliation classes					
		0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
<b>Türkiye</b>							
Broadleaves	5369	38.5	48.0	12.4	0.8	0.2	13.5
Conifers	7860	32.7	53.2	12.8	0.6	0.7	14.1
All trees	13229	35.1	51.1	12.7	0.7	0.5	13.9

## S2-3 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – All species

Participating countries	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change % points 2020/21
<b>Albania</b>		21.0									<b>N/A</b>
<b>Andorra</b>	5.6	3.4	5.3	4.5	3.4	7.0	5.6		21.6	20.8	<b>-0.8</b>
<b>Belgium</b>	28.2	27.6	27.5	26.4	26.1	26.6	27.7	31.7	33.9	30.7	<b>-3.2</b>
<b>Bulgaria</b>	32.3	33.5	26.0	26.2	29.9	27.7	31.9	31.2	34.3	33.5	<b>-0.8</b>
<b>Croatia</b>	28.5	29.1	31.5	29.7	28.5	25.6	30.8	30.3	29.4	32.7	<b>+3.3</b>
<b>Cyprus</b>	10.6	8.9	13.3	12.5	35.0	23.6	33.5	29.6	26.0	29.9	<b>+3.9</b>
<b>Czechia</b>	50.3	51.7		52.0	54.3	53.6	56.4	57.4	56.7	57.2	<b>+0.5</b>
<b>Denmark</b>	7.3	4.9	7.0	8.7	14.8	12.9	21.4	32.3	24.0	13.9	<b>-10.1</b>
<b>Estonia</b>	7.8	8.0	6.7	6.7	6.4	5.2	8.5	5.7	6.0	8.1	<b>+2.1</b>
<b>Finland</b>	14.3										<b>N/A</b>
<b>France</b>	41.4	40.1	42.8	43.4	48.6	48.8	52.2	55.1	57.4	59.5	<b>+2.1</b>
<b>Germany</b>	24.6	22.7	26.2	23.8	28.0	22.7	28.7	36.4	37.5	34.8	<b>-2.7</b>
<b>Greece</b>			24.8	20.2		20.2	18.4	20.7	20.0	16.7	<b>-3.3</b>
<b>Hungary</b>	20.2	22.4	24.2	24.0	34.6	41.0	47.3	35.1	36.7	47.5	<b>+10.8</b>
<b>Ireland</b>	1.0								20.8	23.2	<b>+2.4</b>
<b>Italy</b>	35.7	33.7	30.8	29.8	34.7	39.0	39.0	36.0	36.2	42.0	<b>+3.8</b>
<b>Latvia</b>	9.2	6.4	5.1	4.4	5.7	5.3	5.1	5.5	3.5	4.0	<b>+0.5</b>
<b>Lithuania</b>	24.5	19.7	21.7	23.8	21.0	21.1	18.5	19.2	18.9	19.9	<b>+1.0</b>
<b>Luxembourg</b>		33.2		32.6	38.2	30.3	31.3	50.1	54.0	54.6	<b>+0.6</b>
<b>Moldova, Rep. of</b>	25.6		19.9	26.1	26.5	28.7		28.0	38.9	29.1	<b>-9.8</b>
<b>Montenegro</b>		22.7		25.4	27.3	26.6	33.6		37.6	32.4	<b>-5.2</b>
<b>Norway</b>	18.8	17.7	15.9	16.5	15.5	19.0	15.5	16.5	17.2	14.9	<b>-2.3</b>
<b>Poland</b>	23.4	18.8	18.9	16.7	19.5	20.2	18.6	21.2	19.4	17.1	<b>-2.3</b>
<b>Romania</b>	13.9	13.6	13.5	13.1	13.4	14.5	14.8	11.6	12.9	12.1	<b>-0.8</b>
<b>Serbia</b>	10.3	14.7	12.4	10.7	11.3	11.8	11.9	8.9	7.1	6.1	<b>-1.0</b>
<b>Slovakia</b>	37.9	43.4		34.5	40.3	32.6	42.7	38.8	40.4	37.7	<b>-2.7</b>
<b>Slovenia</b>	29.1	30.9	38.3	37.8	33.9	37.0	36.0	37.7	38.1	42.2	<b>+4.1</b>
<b>Spain</b>	17.5	16.6	14.9		21.9	27.8	22.7	26.9	21.9	21.2	<b>-0.7</b>
<b>Sweden</b>	15.9	19.9		19.8	16.4	18.2	17.6	17.1	17.8	21.1	<b>+3.3</b>
<b>Switzerland</b>	31.3	26.0	30.6	24.8	25.2	33.7	23.5	33.5	26.4	26.9	<b>+0.5</b>
<b>Türkiye</b>	12.4	10.2	11.0	9.5	9.8	8.8	10.5	12.1	11.9	13.9	<b>+2.0</b>
<b>Ukraine</b>	7.5	7.1	6.0	7.1							<b>N/A</b>

Please note that some differences in the level of defoliation between participating countries may be at least partly due to differences in standards used. This restriction, however, does not affect the reliability of the trends over time. In some countries there has been a change in the monitoring design at different points in time.

## S2-4 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – Conifers

Participating countries	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change % points 2019/20
<b>Albania</b>		21.0									<b>N/A</b>
<b>Andorra</b>	5.6	3.1	5.4	4.3	3.5	7.1	5.6		21.6	20.8	<b>-0.8</b>
<b>Belgium</b>	20.3	19.7	22.8	27.9	24.6	26.8	27.7	33.5	33.9	28.9	<b>-5.0</b>
<b>Bulgaria</b>	35.1	40.8	34.1	40.1	39.9	37.0	45.0	45.4	48.1	46.8	<b>-1.3</b>
<b>Croatia</b>	54.7	48.3	49.7	56.0	51.0	35.0	47.0	53.6	48.7	46.0	<b>-2.7</b>
<b>Cyprus</b>	10.6	8.9	13.3	12.5	35.0	23.6	33.5	29.6	26.0	29.9	<b>+3.9</b>
<b>Czechia</b>	56.9	59.2		57.8	60.3	60.3	63.0	64.3	64.2	65.4	<b>+1.2</b>
<b>Denmark</b>	4.6	2.8	5.3	7.4	11.3	11.8	15.2	22.0	21.9	13.0	<b>-8.9</b>
<b>Estonia</b>	6.6	8.5	6.9	6.5	6.7	5.5	9.3	5.8	6.0	8.0	<b>+2.0</b>
<b>Finland</b>	14.6										
<b>France</b>	32.2	33.7	36.6	38.0	39.3	38.8	40.0	42.0	42.4	43.4	<b>+1.0</b>
<b>Germany</b>	19.3	18.1	19.7	20.3	22.3	19.5	22.8	31.2	33.5	33.1	<b>-0.4</b>
<b>Greece</b>			26.7	27.2		32.1	26.2	28.7	29.1	22.0	<b>-7.1</b>
<b>Hungary</b>	23.1	23.5	30.7	46.5	52.8	44.9	52.3	43.2	48.0	47.4	<b>-0.6</b>
<b>Ireland</b>	1.0								9.8	13.0	<b>+3.2</b>
<b>Italy</b>	31.8	24.2	24.0	22.6	19.6	21.8	28.1	28.8	26.9	43.2	<b>+16.3</b>
<b>Latvia</b>	7.9	6.9	4.8	4.4	4.9	5.3	3.9	4.6	3.3	5.0	<b>+1.7</b>
<b>Lithuania</b>	26.9	23.1	21.1	25.0	21.7	23.5	21.1	21.7	21.0	22.3	<b>+1.3</b>
<b>Luxembourg</b>		17.5	93.3	18.7	17.4	17.7	16.2	35.5	36.2	36.2	<b>0.0</b>
<b>Moldova, Rep. of</b>	44.3		29.4		21.6	19.6		19.2	17.0	14.3	<b>-2.7</b>
<b>Montenegro</b>		22.6		26.1	28.1	23.6	30.9		38.2	33.3	<b>-4.9</b>
<b>Norway</b>	16.1	17.7	15.9	16.5	15.5	19.0	15.5	16.5	17.2	14.9	<b>-2.3</b>
<b>Poland</b>	22.3	17.8	17.2	15.7	17.1	18.4	17.2	19.6	17.5	16.6	<b>-0.9</b>
<b>Romania</b>	14.9	13.9	13.7	8.0	10.4	10.7	10.3	13.7	17.4	16.4	<b>-1.0</b>
<b>Serbia</b>	11.0	13.0	14.6	14.5	13.5	12.0	10.2	9.8	8.7	8.6	<b>-0.1</b>
<b>Slovakia</b>	43.5	43.3		49.4	45.6	41.6	49.7	45.3	51.3	54.0	<b>+2.7</b>
<b>Slovenia</b>	31.3	31.3	38.1	41.0	38.6	40.6	40.3	42.7	41.1	44.1	<b>+3.0</b>
<b>Spain</b>	11.4	12.6	11.4		20.9	26.2	23.1	26.7	20.8	18.3	<b>-2.5</b>
<b>Sweden</b>	15.9	19.9	18.8	19.8	16.4	18.2	17.6	17.1	17.8	17.5	<b>-0.3</b>
<b>Switzerland</b>	30.6	23.3	31.7	24.0	24.9	33.4	22.1	33.6	23.3	27.7	<b>+4.4</b>
<b>Türkiye</b>	9.9	6.9	7.2	8.6	9.1	8.2	10.2	11.4	11.7	14.1	<b>+2.4</b>
<b>Ukraine</b>	7.5	7.5	6.8	7.9							<b>N/A</b>

Please note that some differences in the level of defoliation between participating countries may be at least partly due to differences in standards used. This restriction, however, does not affect the reliability of the trends over time. In some countries there has been a change in the monitoring design at different points in time.

## S2-5 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2012 and 2021 – Broadleaves

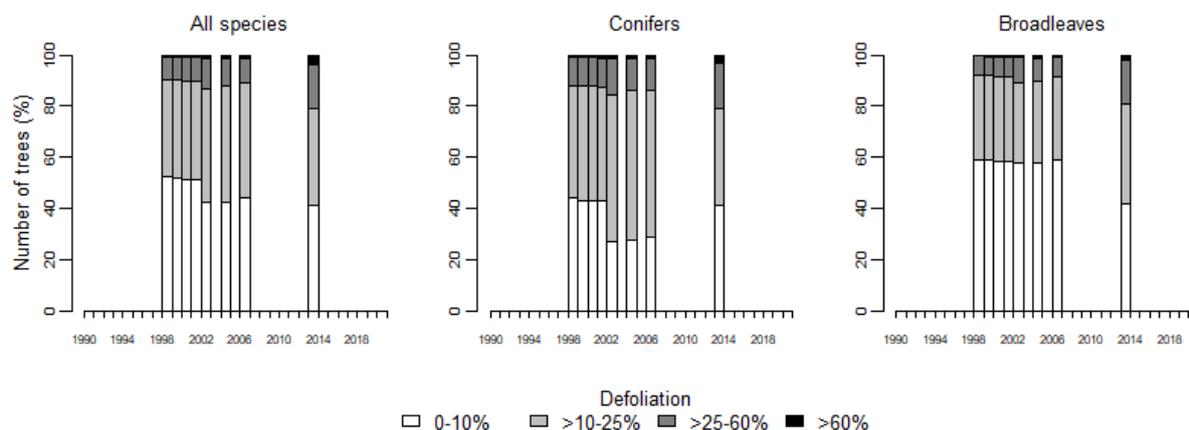
Participating country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change % points 2019/20
Albania		19.0									N/A
Andorra		20.0	20.0	16.7	0.0	0.0	0.0		16.7	20.0	+3.3
Belgium	32.9	29.4	31.4	25.1	27.4	26.2	27.7	30.2	33.7	32.0	-1.7
Bulgaria	29.8	28.0	20.0	15.6	22.3	20.5	21.8	20.3	23.7	23.2	-0.5
Croatia	23.7	25.7	28.1	25.3	24.7	24.0	27.8	26.4	26.0	30.4	+4.4
Cyprus					N/A						
Czechia	28.4	25.7		32.7	34.7	31.6	35.6	37.5	36.3	35.6	-0.7
Denmark	10.9	7.9	9.0	10.8	19.7	14.4	30.0	46.0	26.1	15.2	-10.9
Estonia	14.9	5.3	5.7	8.0	5.2	3.3	4.1	5.1	6.0	9.0	+3.0
Finland	12.8										
France	45.9	43.6	46.1	47.0	53.5	54.2	58.8	62.2	65.4	68.2	+2.8
Germany	32.5	29.8	36.1	29.0	35.7	27.5	37.1	43.6	43.2	37.0	-6.2
Greece			16.7	11.3		14.6	14.4	15.5	12.9	13.0	+0.1
Hungary	19.9	22.3	23.3	21.4	32.5	40.6	46.8	34.3	35.5	47.5	+12.0
Ireland									53.4	52.0	-1.4
Italy	37.2	37.1	33.4	32.1	39.5	45.0	43.4	38.1	39.6	41.6	+2.0
Latvia	12.9	4.4	6.1	4.2	8.3	5.2	8.8	8.1	3.8	1.1	-2.7
Lithuania	21.0	14.7	22.5	21.9	20.0	17.8	14.2	15.2	15.4	15.9	+0.5
Luxembourg		42.4	34.6	40.3	49.0	37.2	39.7	57.4	62.8	62.6	-0.2
Moldova, Rep. of	25.6		19.9	26.1	26.5	28.7	N/A	28.0	39.0	29.1	-9.9
Montenegro		22.8		25.2	27.1	27.6	34.8		37.4	32.1	-5.3
Norway	27.3	N/A									
Poland	25.5	20.7	21.9	18.4	24.0	23.3	21.1	23.9	22.6	17.9	-4.7
Romania	13.6	13.6	13.0	13.9	14.2	15.3	15.8	11.2	12.1	11.2	-0.9
Serbia	10.2	14.9	12.1	10.1	11.0	11.8	12.1	8.7	6.9	5.8	-1.1
Slovakia	33.9	43.5	43.5	24.3	36.5	26.7	38.4	34.8	33.8	28.1	-5.7
Slovenia	27.7	30.6	38.4	35.9	31.1	35.1	33.7	35.1	36.6	41.3	+4.7
Spain	23.6	20.7	18.4		22.7	29.3	22.4	27.0	23.0	24.0	+1.0
Sweden						N/A	N/A	N/A	N/A	N/A	N/A
Switzerland	33.3	31.5	28.0	26.4	25.9	34.7	26.6	33.2	34.5	24.7	-9.8
Türkiye	16.8	15.7	17.2	10.8	11.0	9.8	11.0	13.1	12.2	13.5	+1.3
Ukraine	7.5	7.0	5.5	6.3							N/A

Please note that some differences in the level of defoliation between participating countries may be at least partly due to differences in standards used. This restriction, however, does not affect the reliability of the trends over time. In some countries there has been a change in the monitoring design at different points in time.

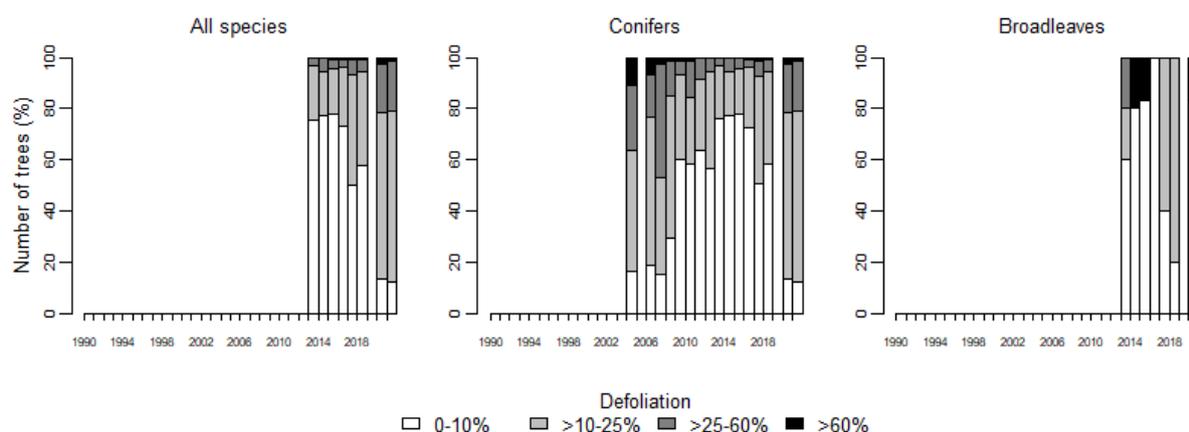
## S2-6 Change of tree defoliation over time (1992–2021) per country

Please note that some countries have changed their monitoring design at different points in time which may explain sudden strong increases or decreases in the number of trees per defoliation category in the figures below. For detailed information, please contact the respective NFCs. Their contact information is given in the Annex of the ICP Forests 2022 Technical Report<sup>1</sup>.

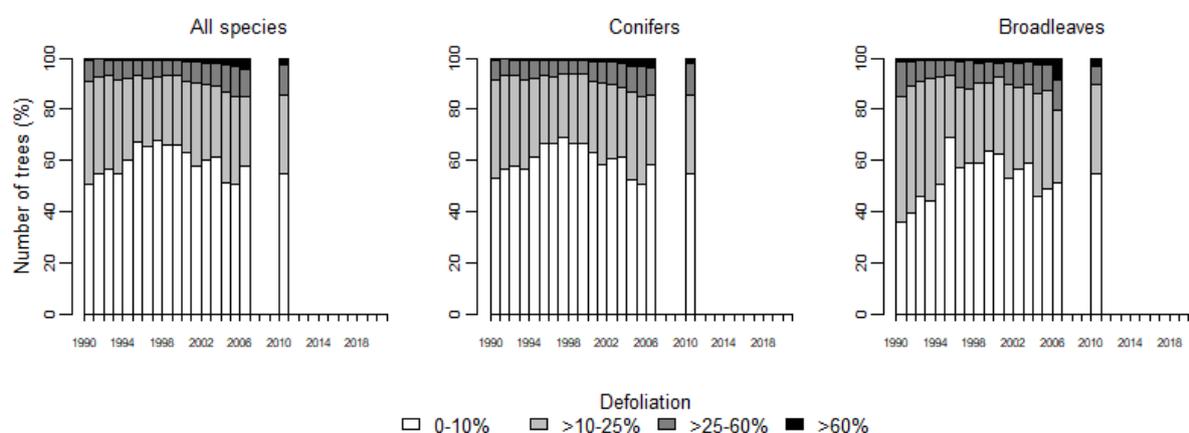
### ALBANIA



### ANDORRA

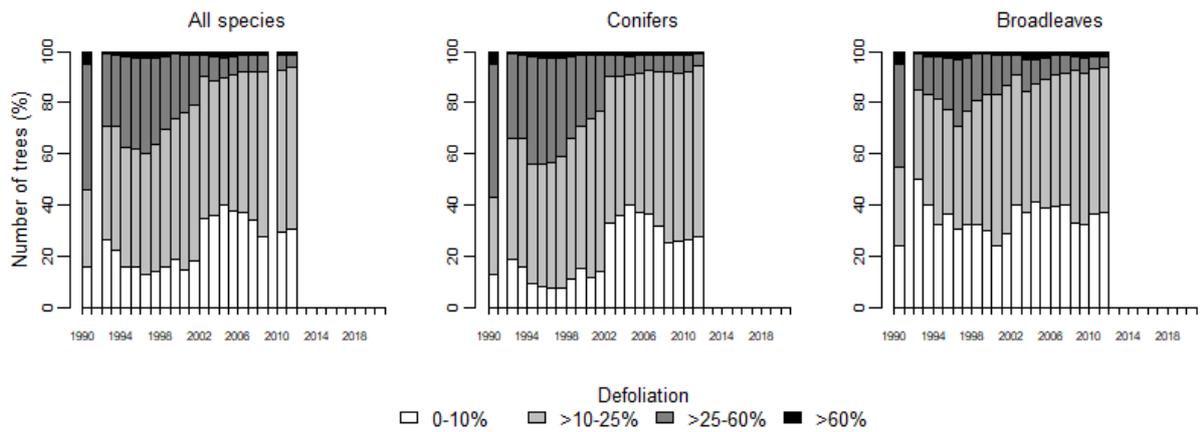


### AUSTRIA

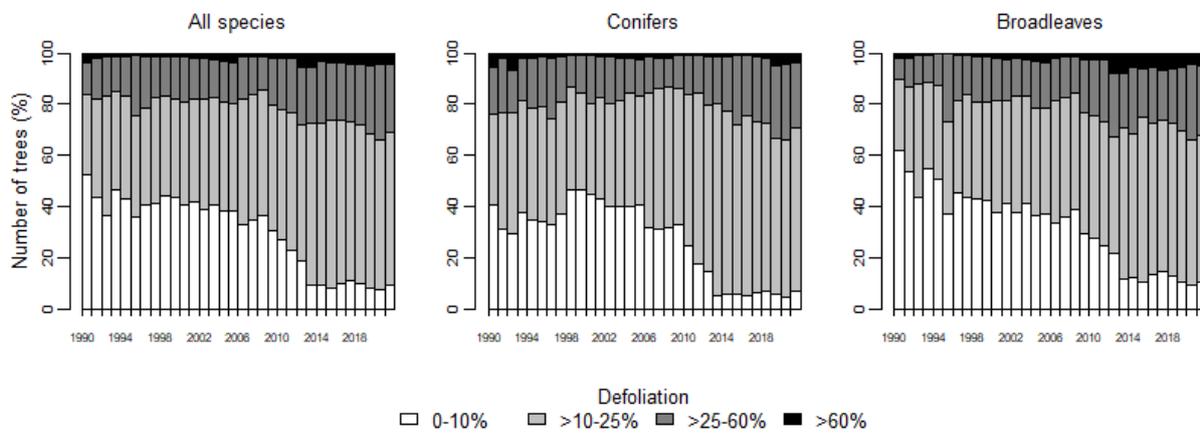


<sup>1</sup> <http://icp-forests.net/page/icp-forests-technical-report>

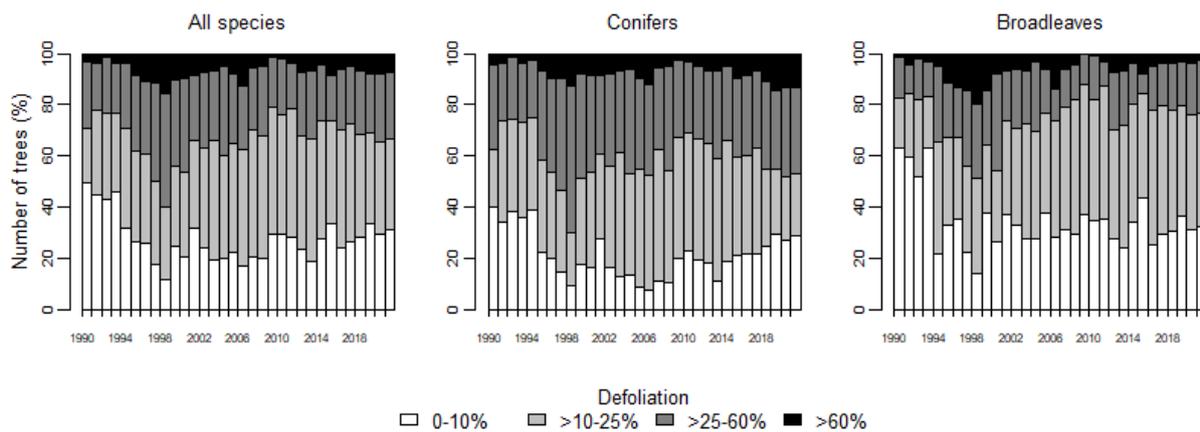
## BELARUS



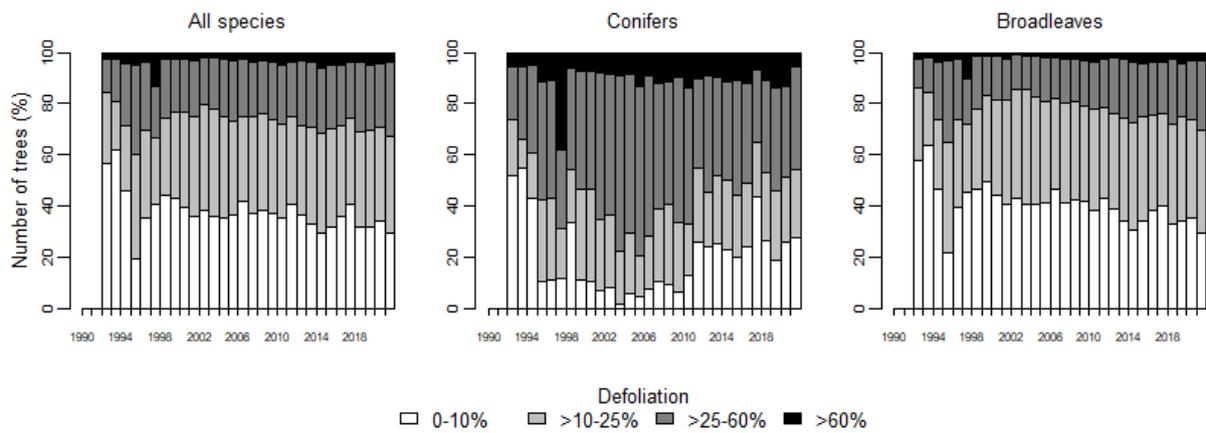
## BELGIUM



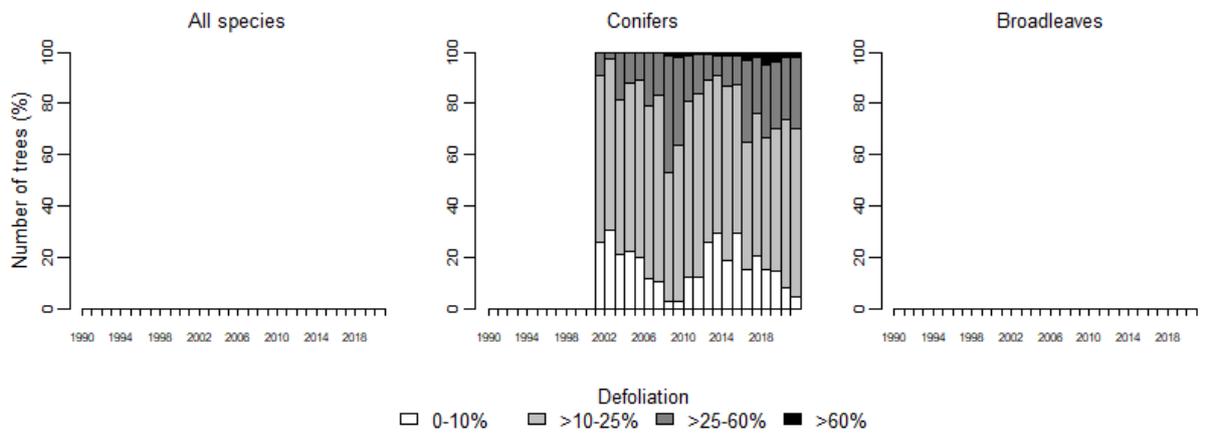
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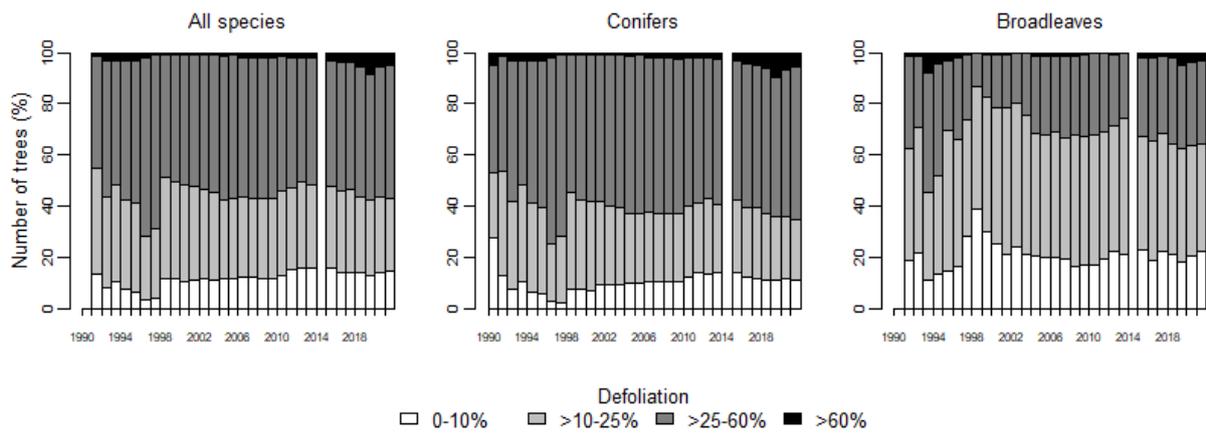
## CROATIA



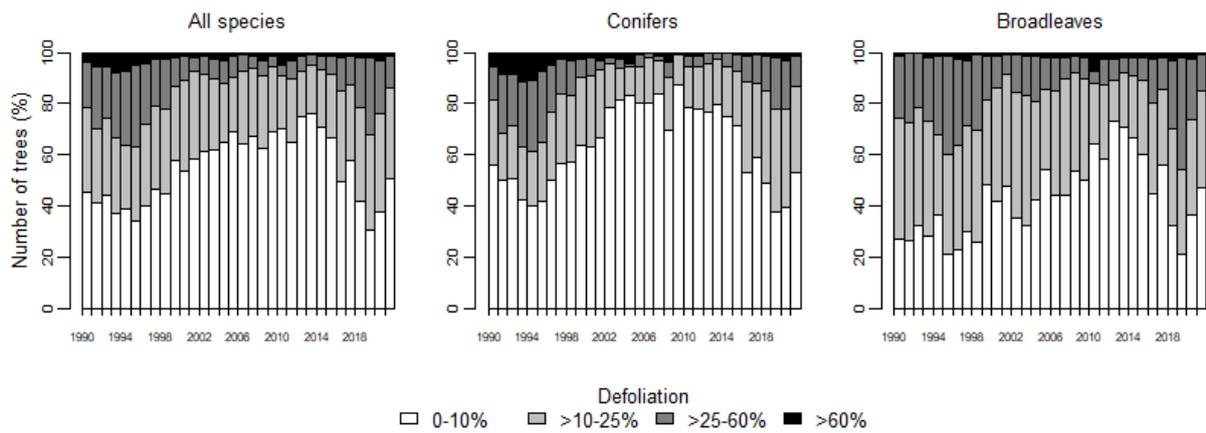
## CYPRUS



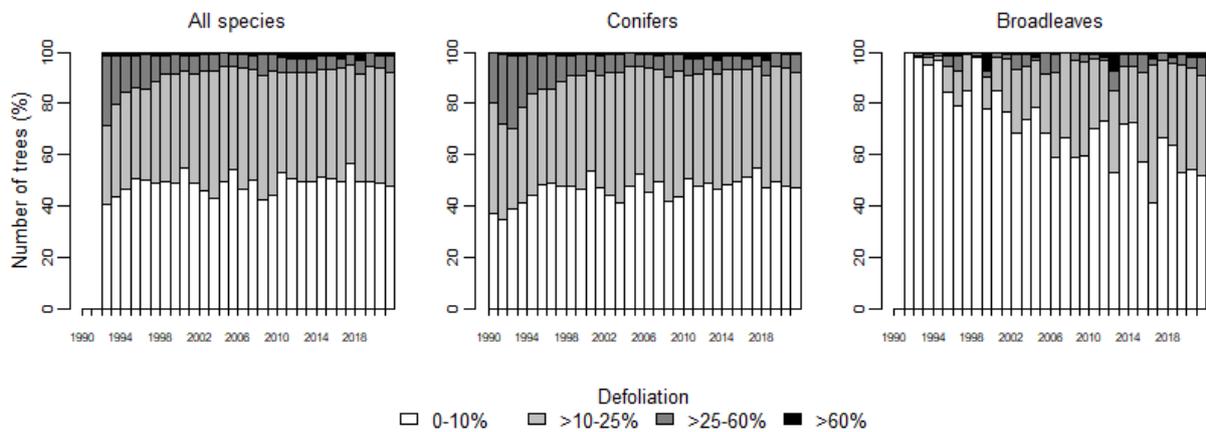
## CZECHIA



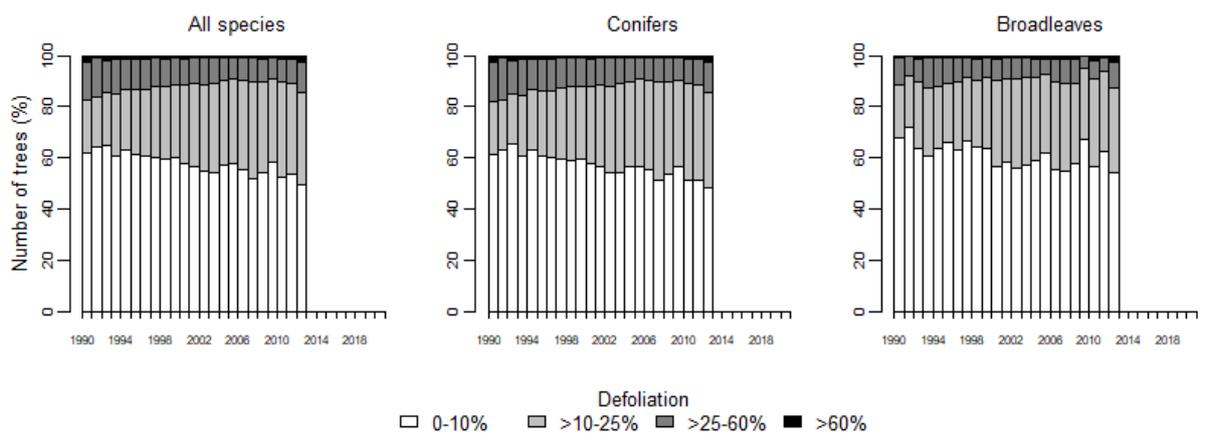
## DENMARK



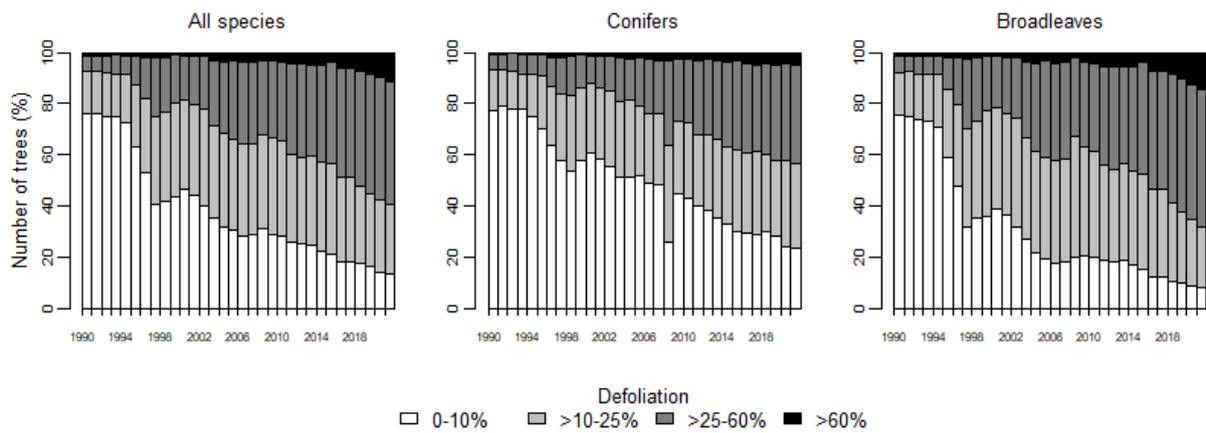
## ESTONIA



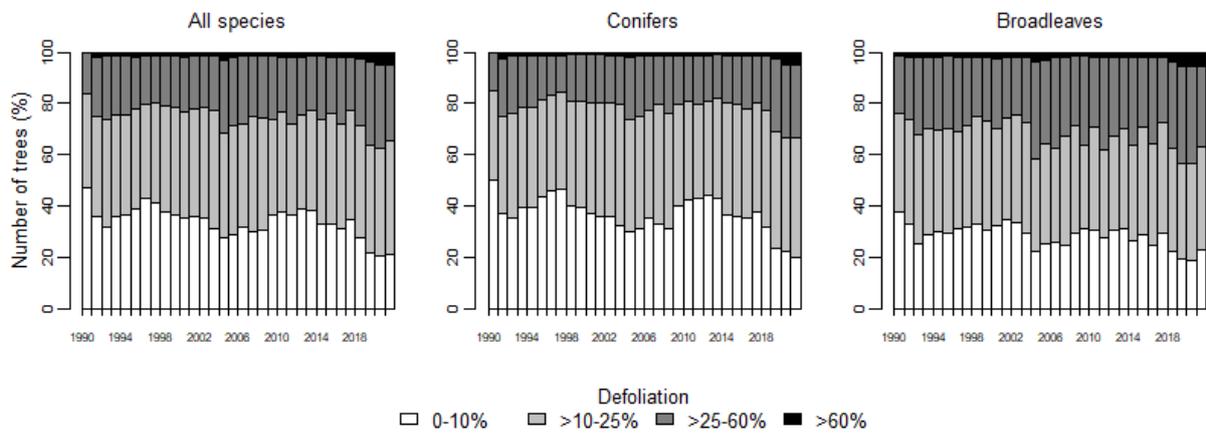
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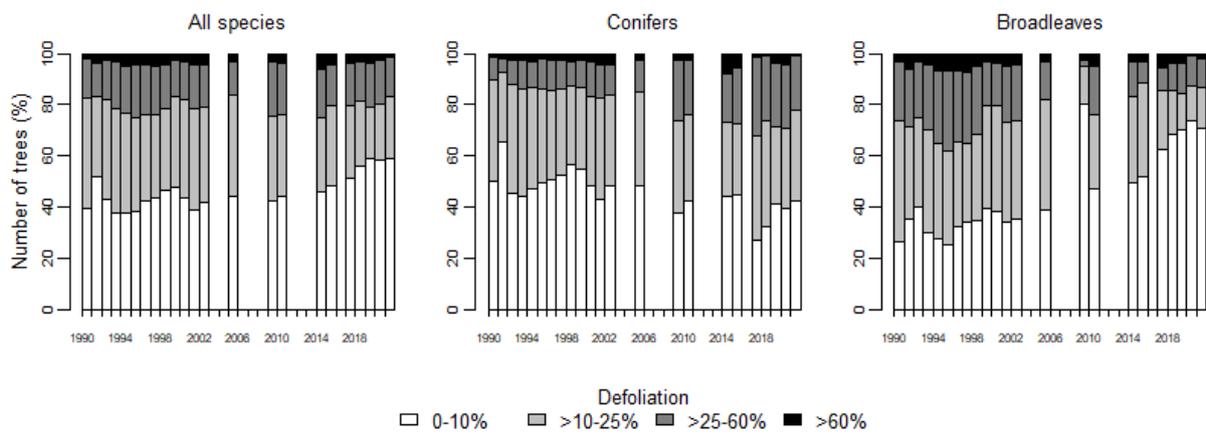
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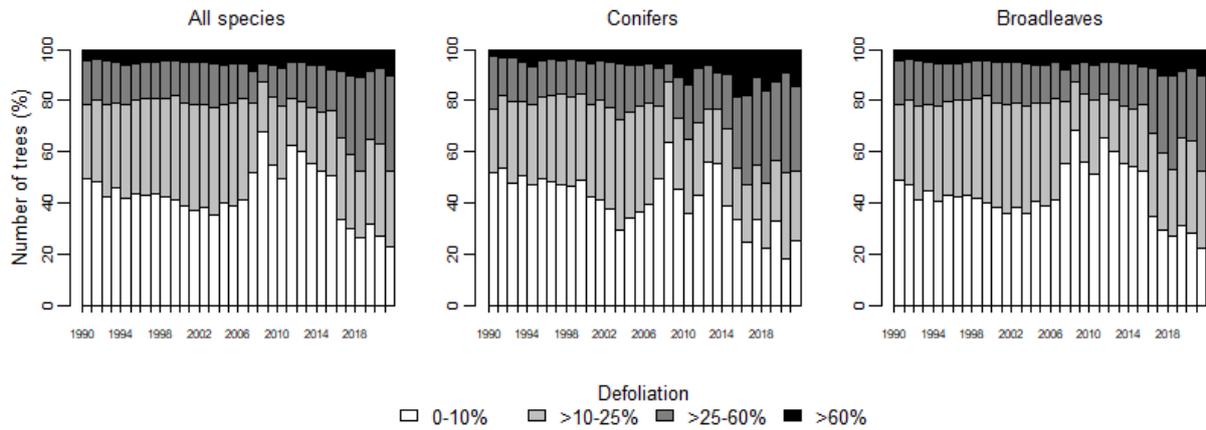
## GERMANY



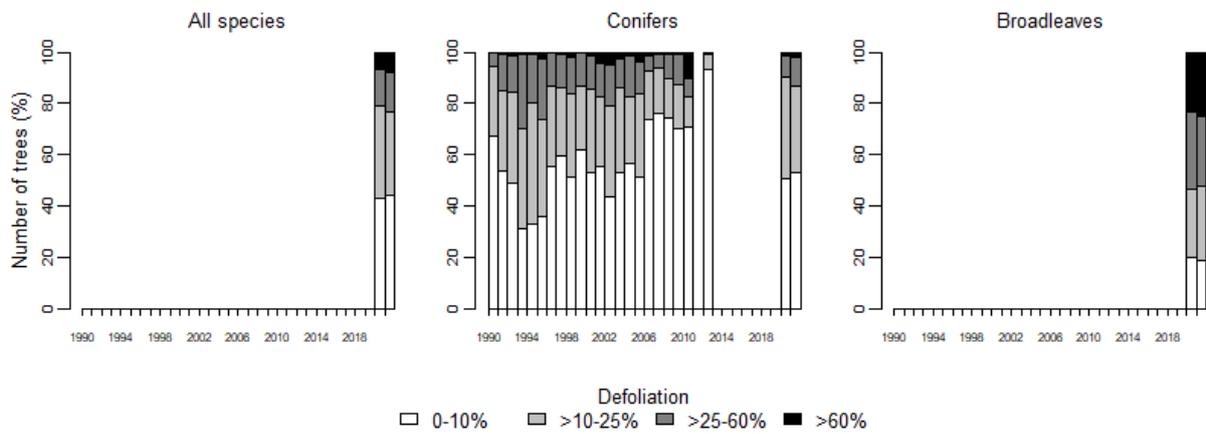
## GREECE



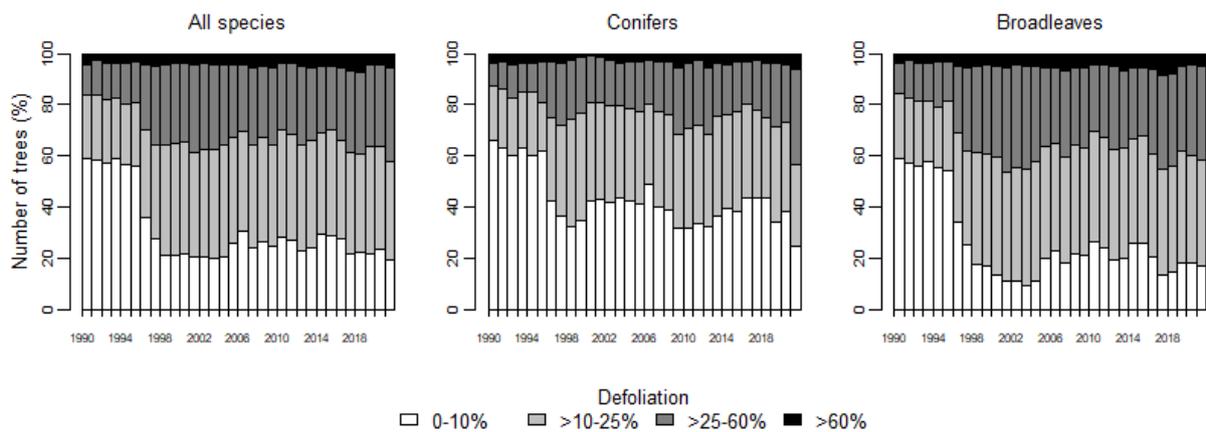
## HUNGARY



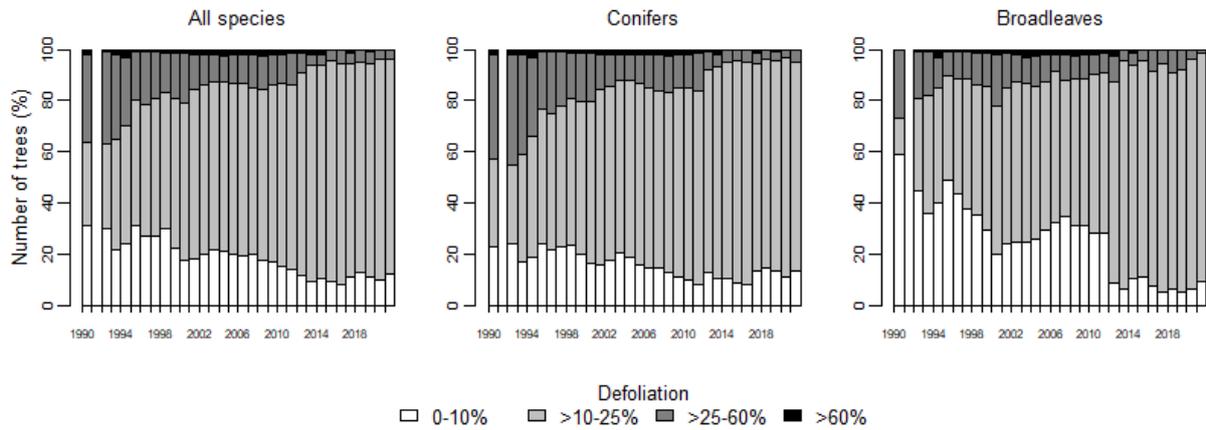
## IRELAND



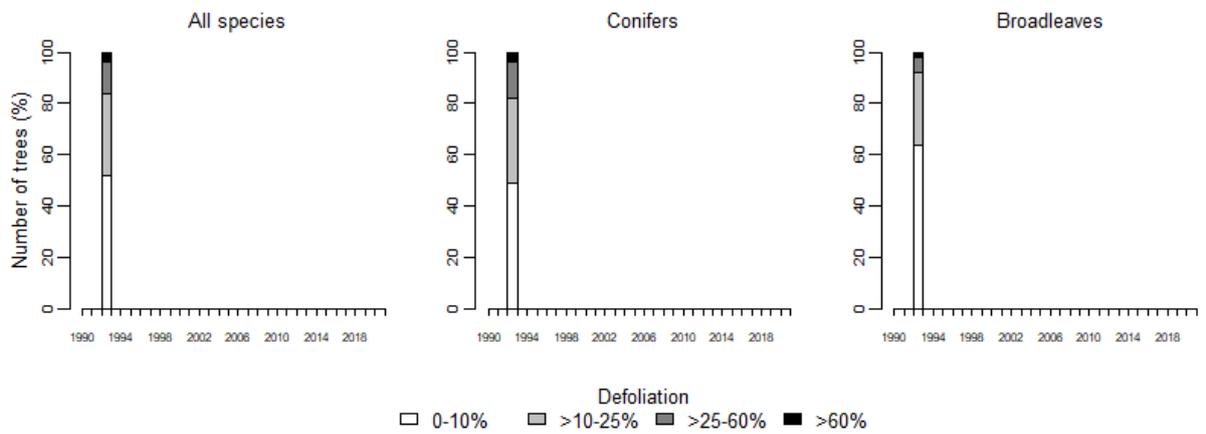
## ITALY



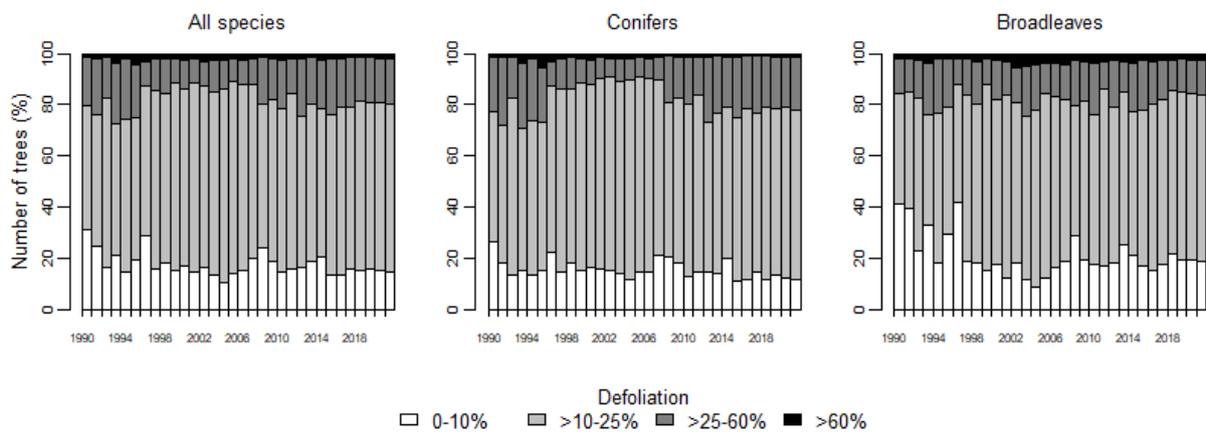
## LATVIA



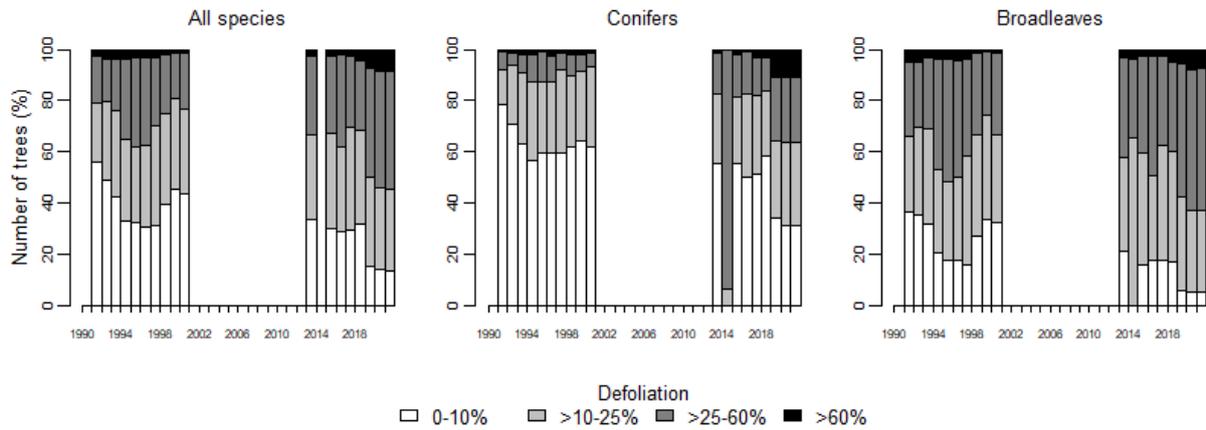
## LIECHTENSTEIN



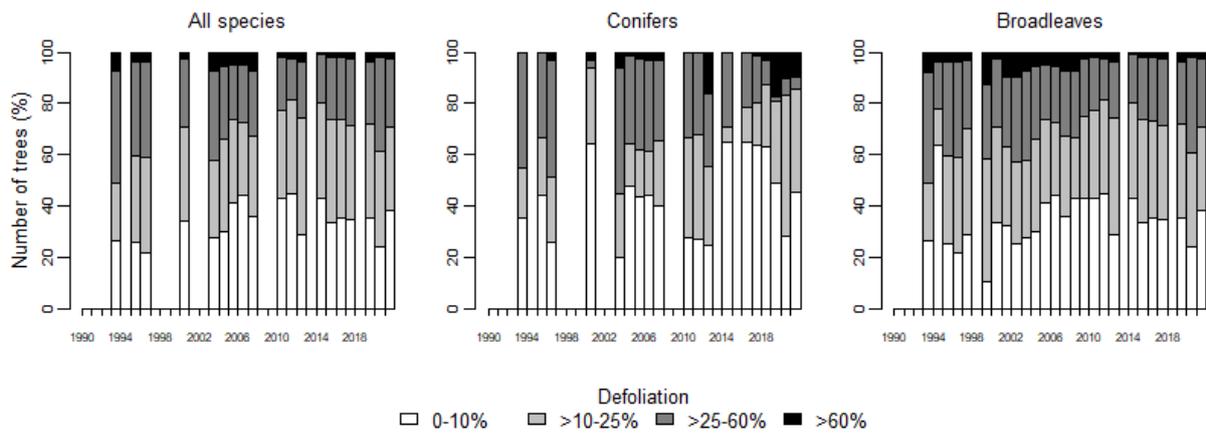
## LITHUANIA



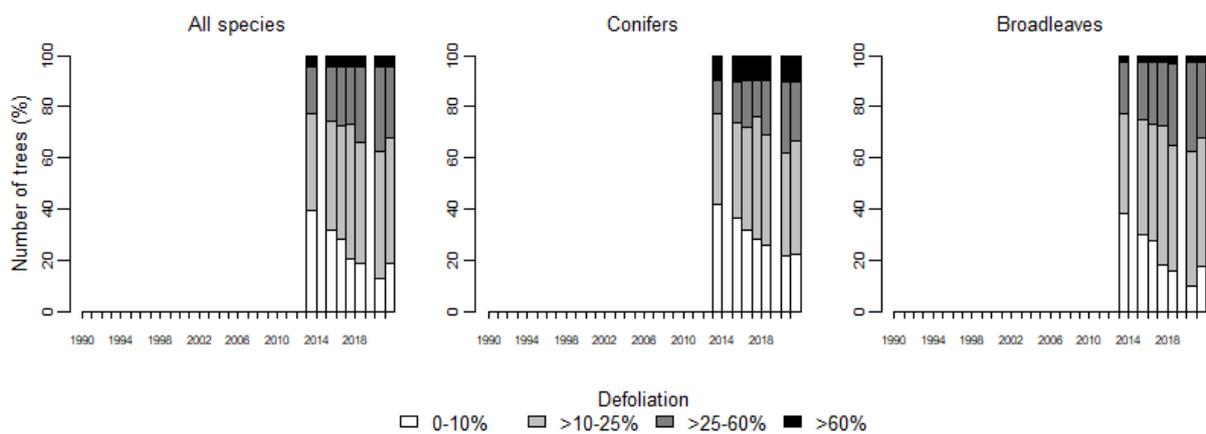
## LUXEMBOURG



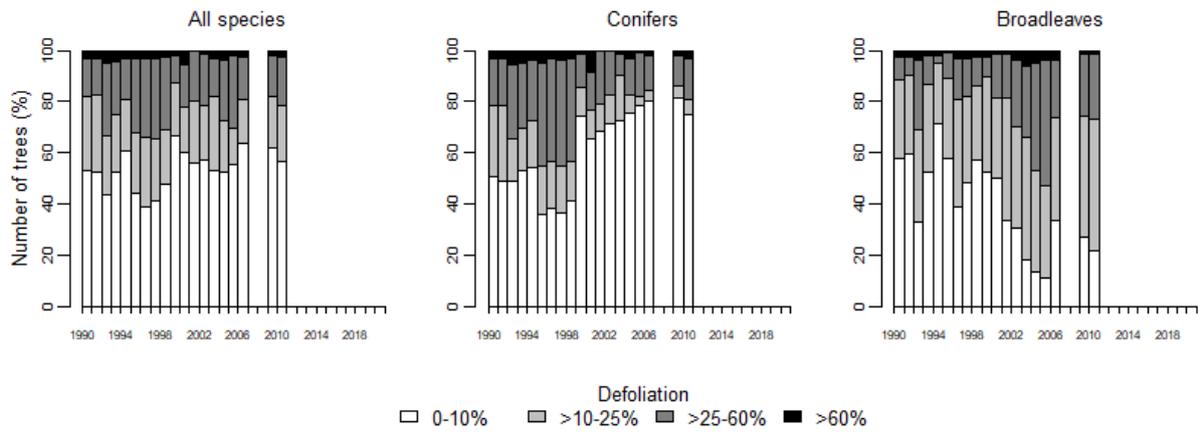
## MOLDOVA, REPUBLIC OF



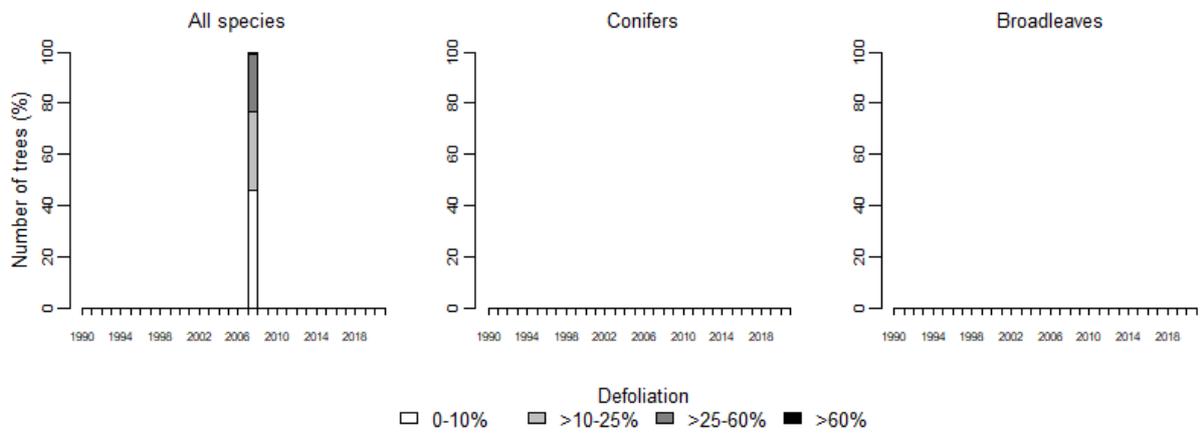
## MONTENEGRO



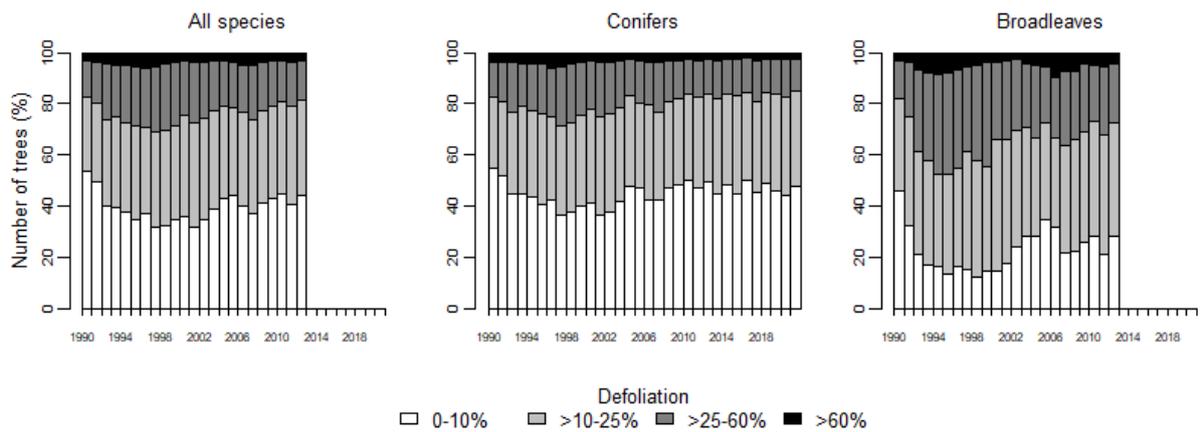
## NETHERLANDS



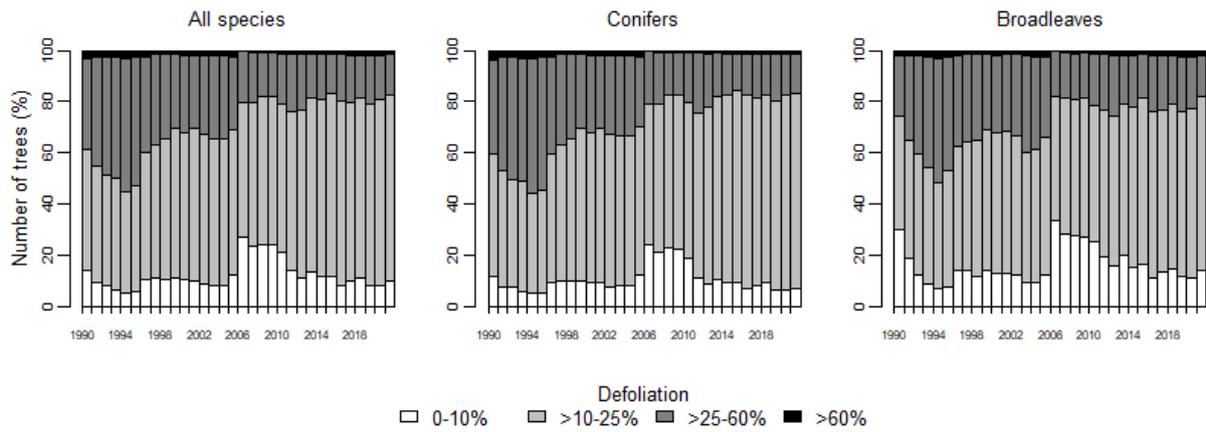
## NORTH MACEDONIA



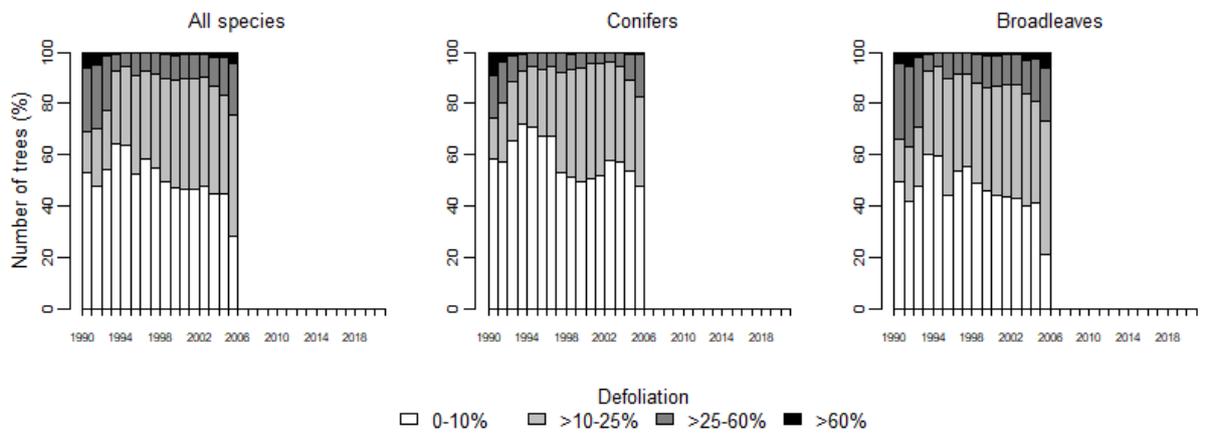
## NORWAY



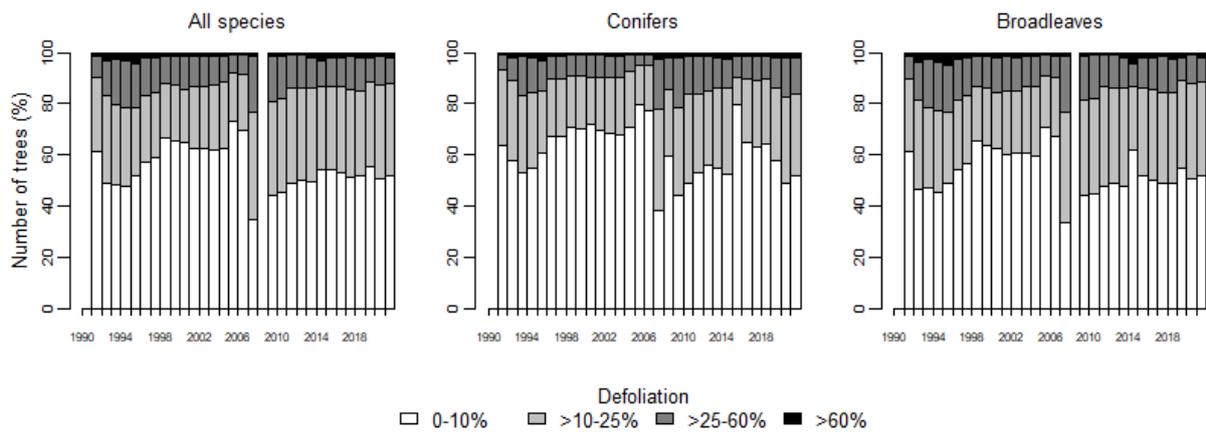
## POLAND



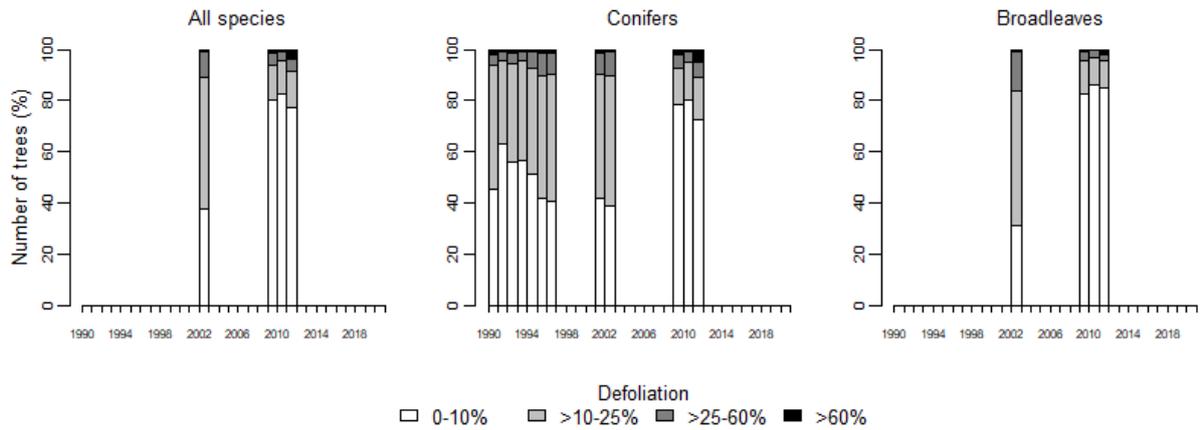
## PORTUGAL



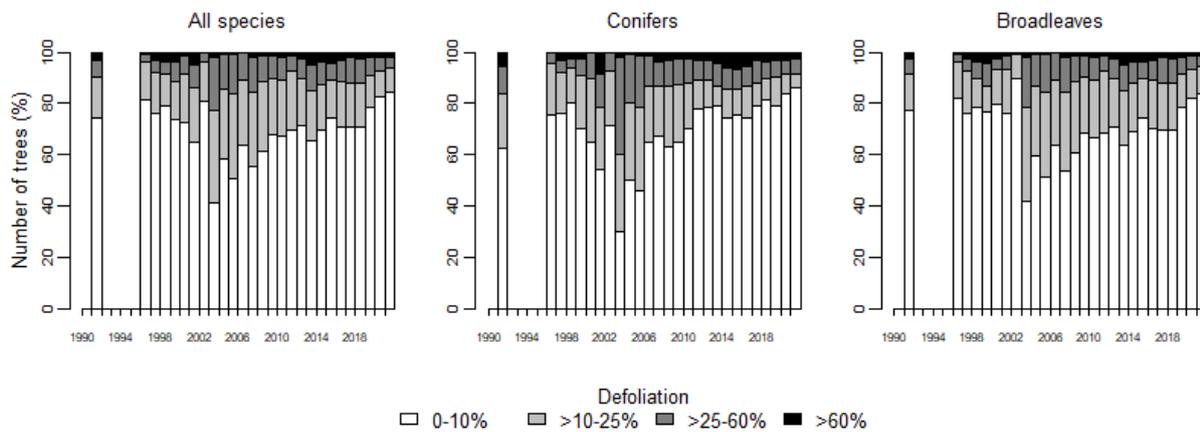
## ROMANIA



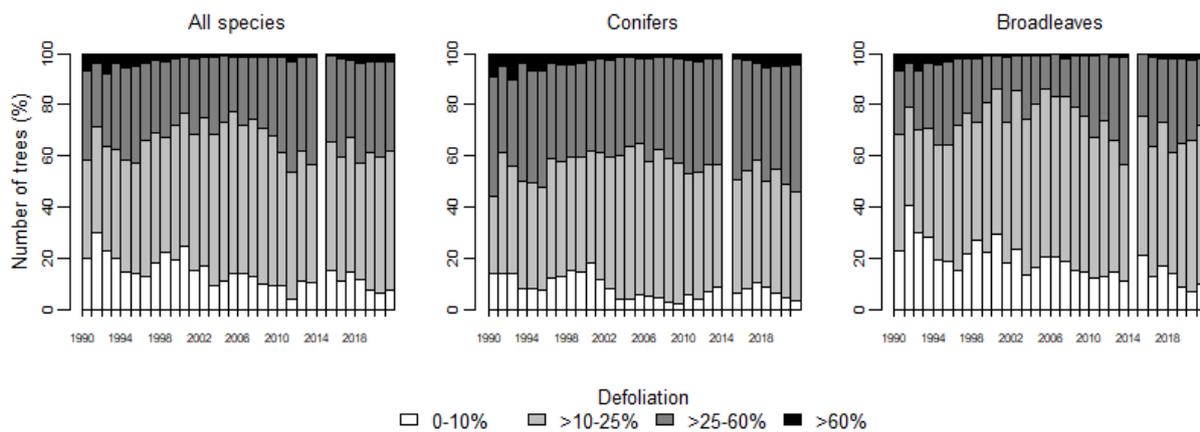
## RUSSIAN FEDERATION



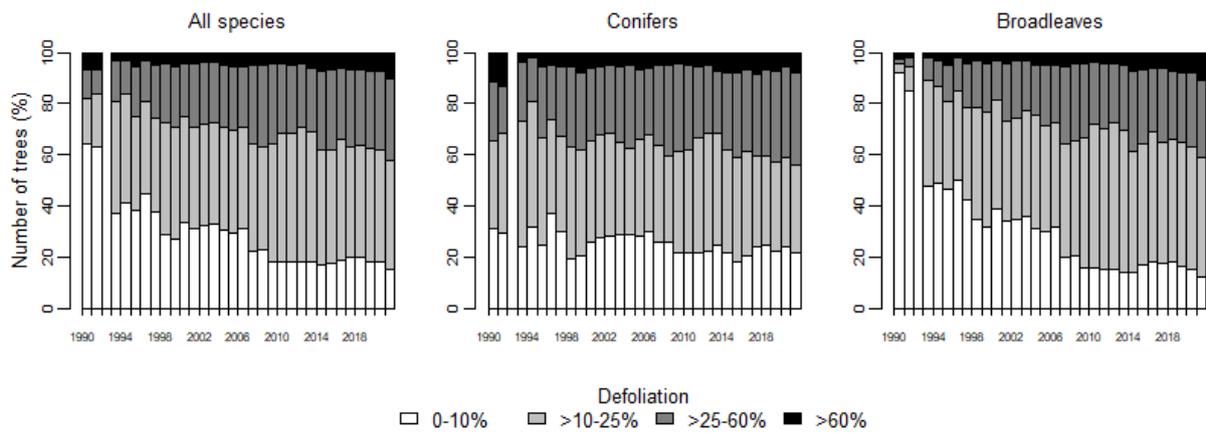
## SERBIA



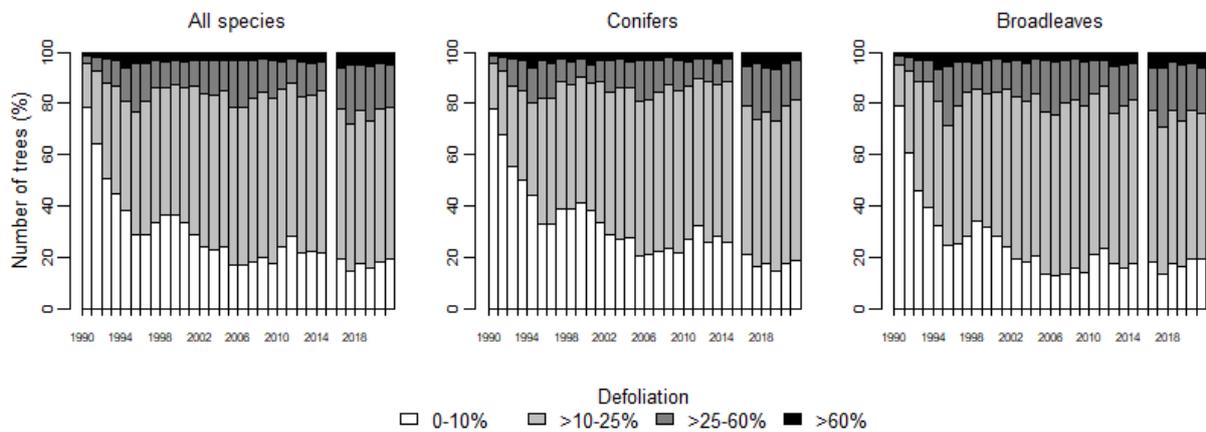
## SLOVAKIA



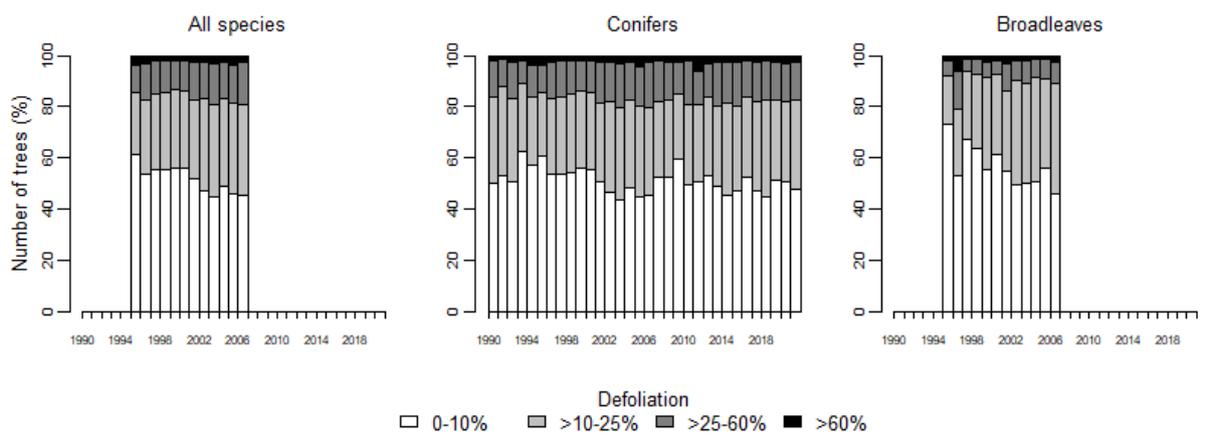
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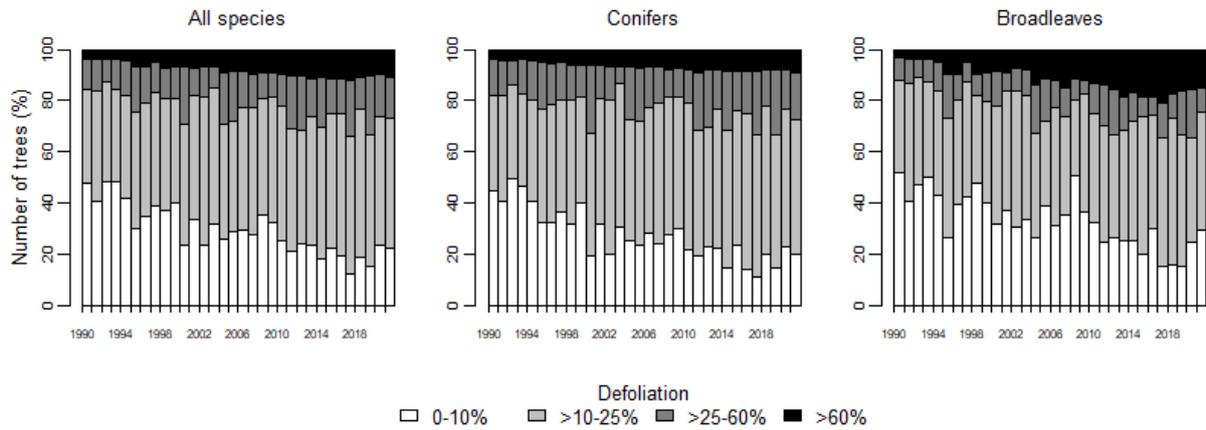
## SPAIN



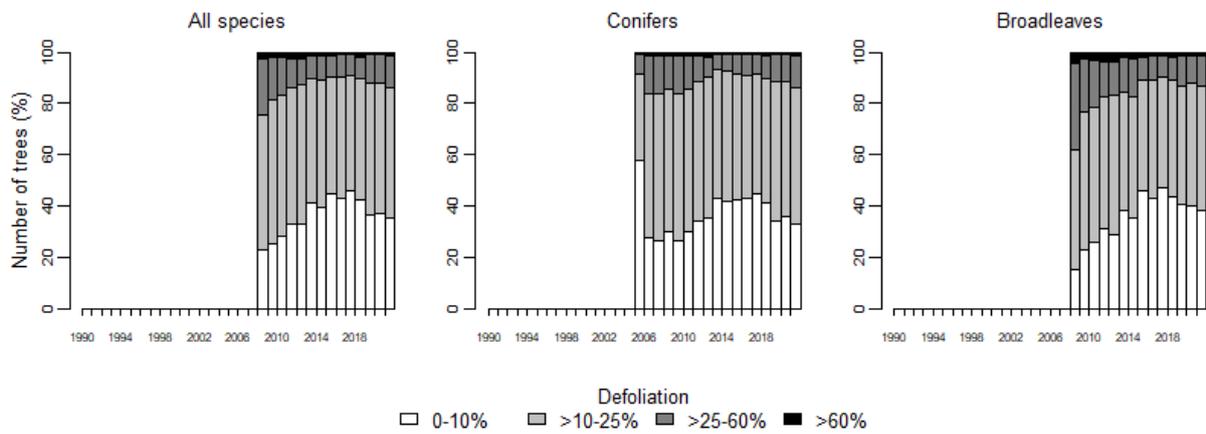
## SWEDEN



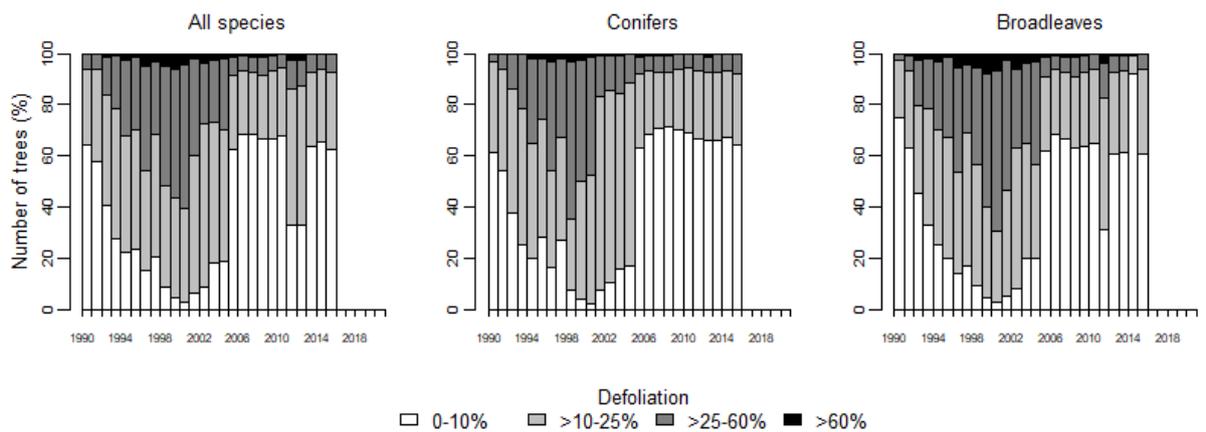
## SWITZERLAND



## TÜRKIYE



## UKRAINE



## UNITED KINGDOM

