Forest Condition in Europe

The 2021 Assessment

Online Supplementary Material

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

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Working Group on Effects of the Convention on Long-range Transboundary Air Pollution

CONTENTS

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

S1-1 Mean plot defoliation of main tree species in 2020

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 2020. 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 (*Pinus sylvestris*)	14.0	62.9	17.0	5.4	0.7	1 206
Norway spruce (*Picea abies*)	21.5	41.8	27.8	8.4	0.5	943
Austrian pine (*Pinus nigra*)	12.2	66.5	12.6	7.3	1.4	286
Mediterranean lowland pines	4.3	68.6	21.6	5.0	0.5	417
Common beech (*Fagus sylvatica*)	18.5	43.6	24.0	10.2	3.7	707
Deciduous temperate oaks	7.4	44.4	36.2	10.8	1.2	660
Dec. (sub-) Mediterranean oaks	16.2	53.9	21.7	7.4	0.8	489
Evergreen oaks	1.3	52.3	35.1	10.0	1.3	239

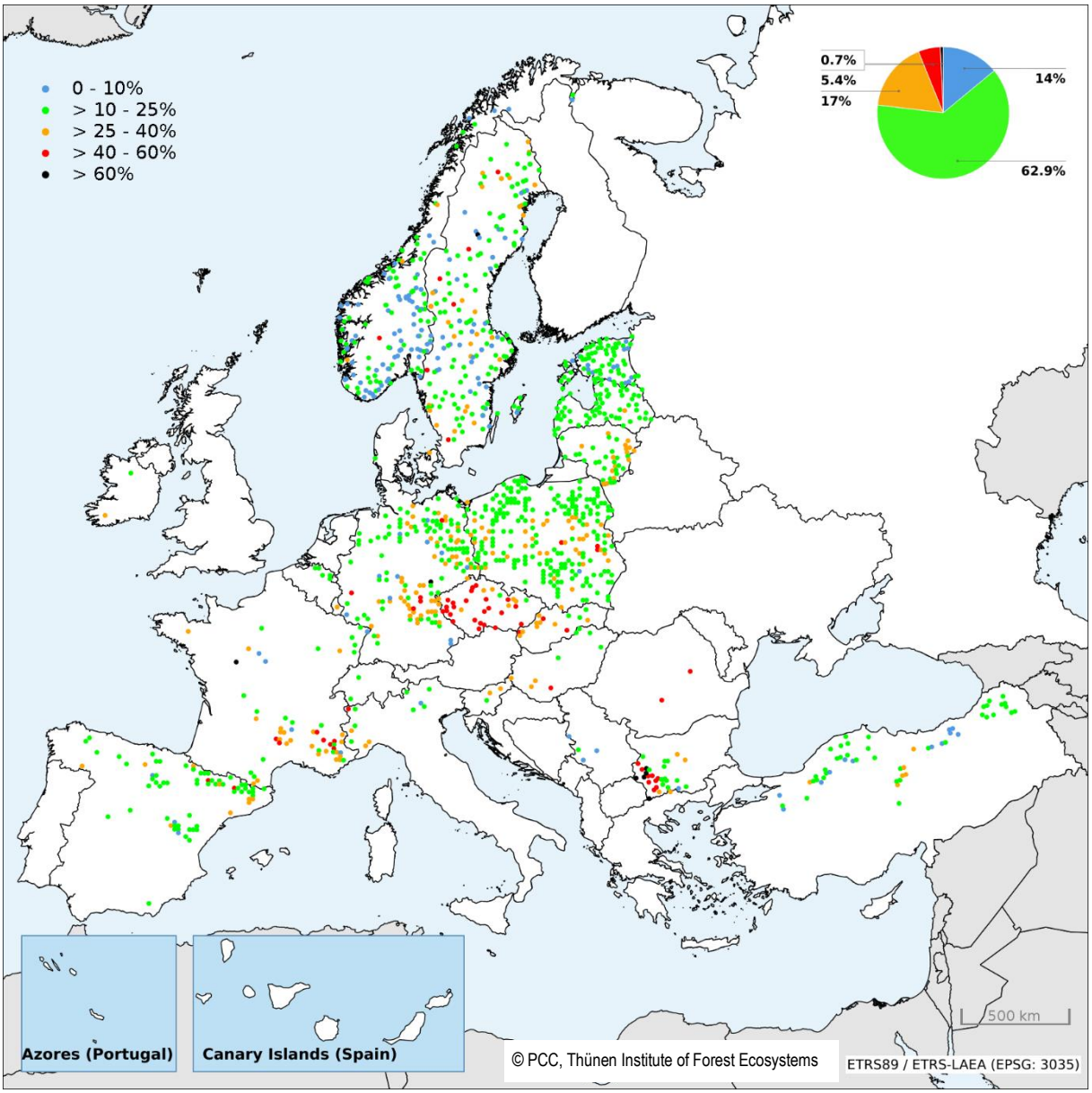

Figure S1-1: Mean plot defoliation of Scots pine (*Pinus sylvestris*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

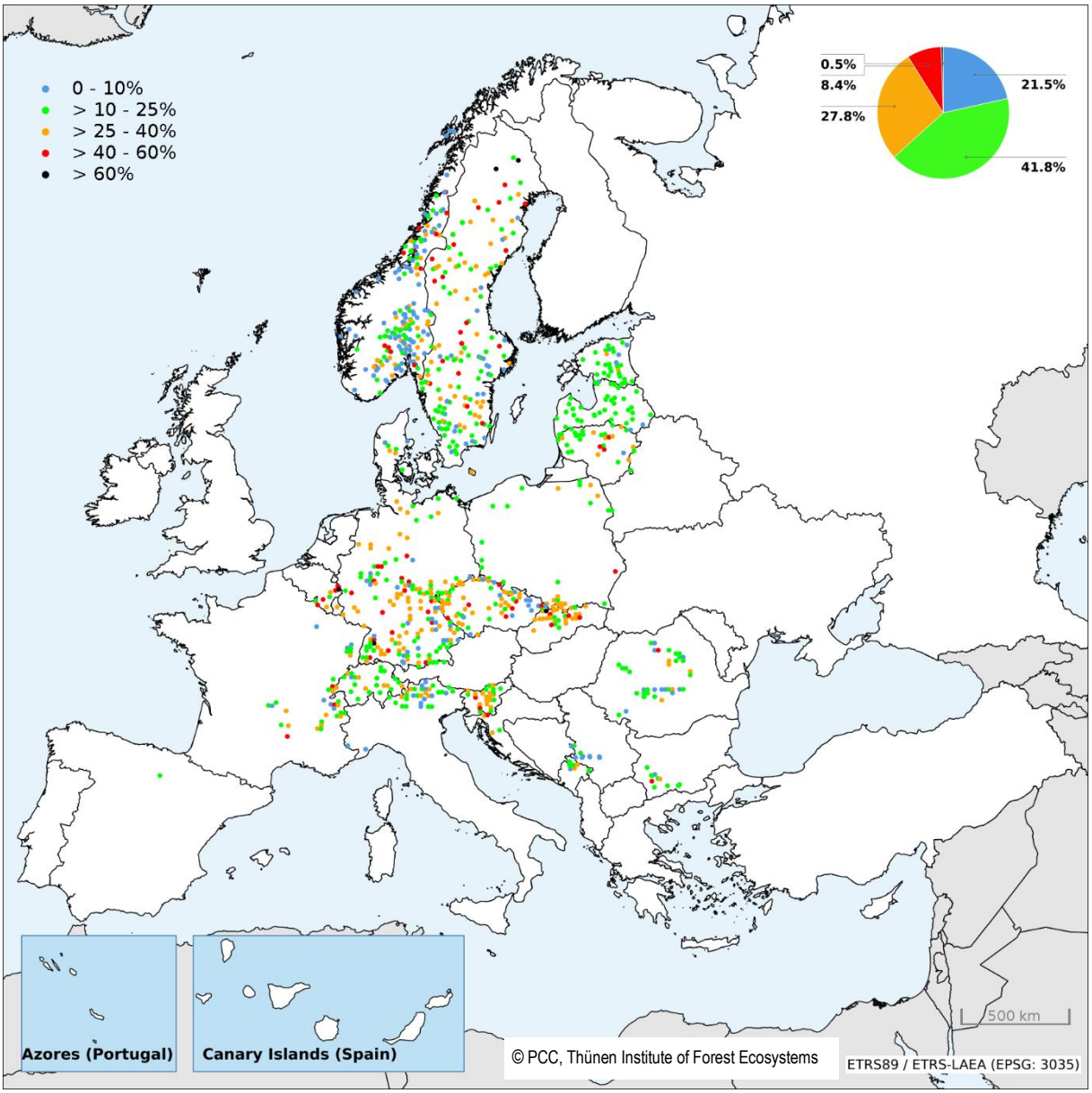

Figure S1-2: Mean plot defoliation of Norway spruce (*Picea abies*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

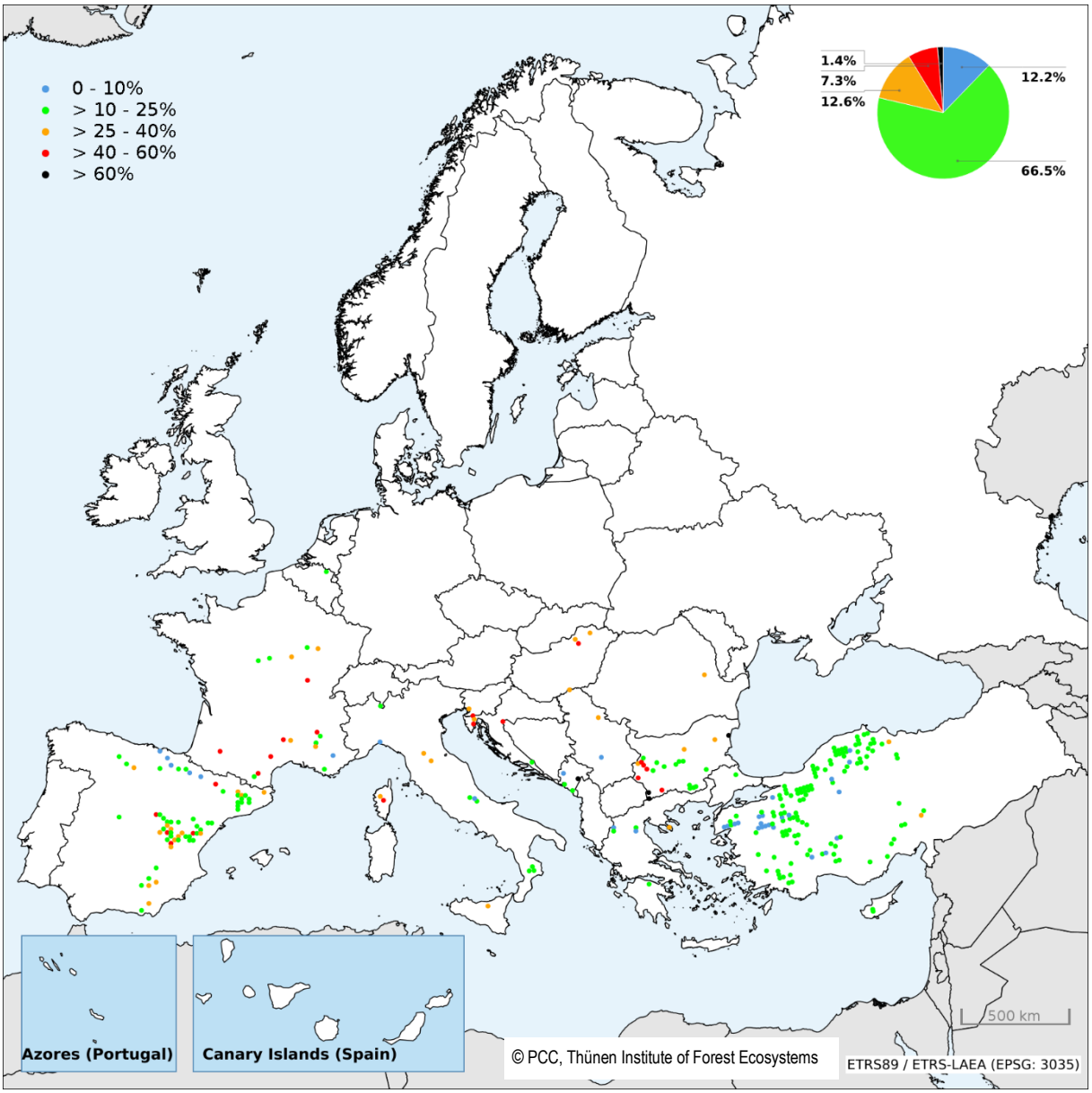

Figure S1-3: Mean plot defoliation of Austrian pine (*Pinus nigra*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

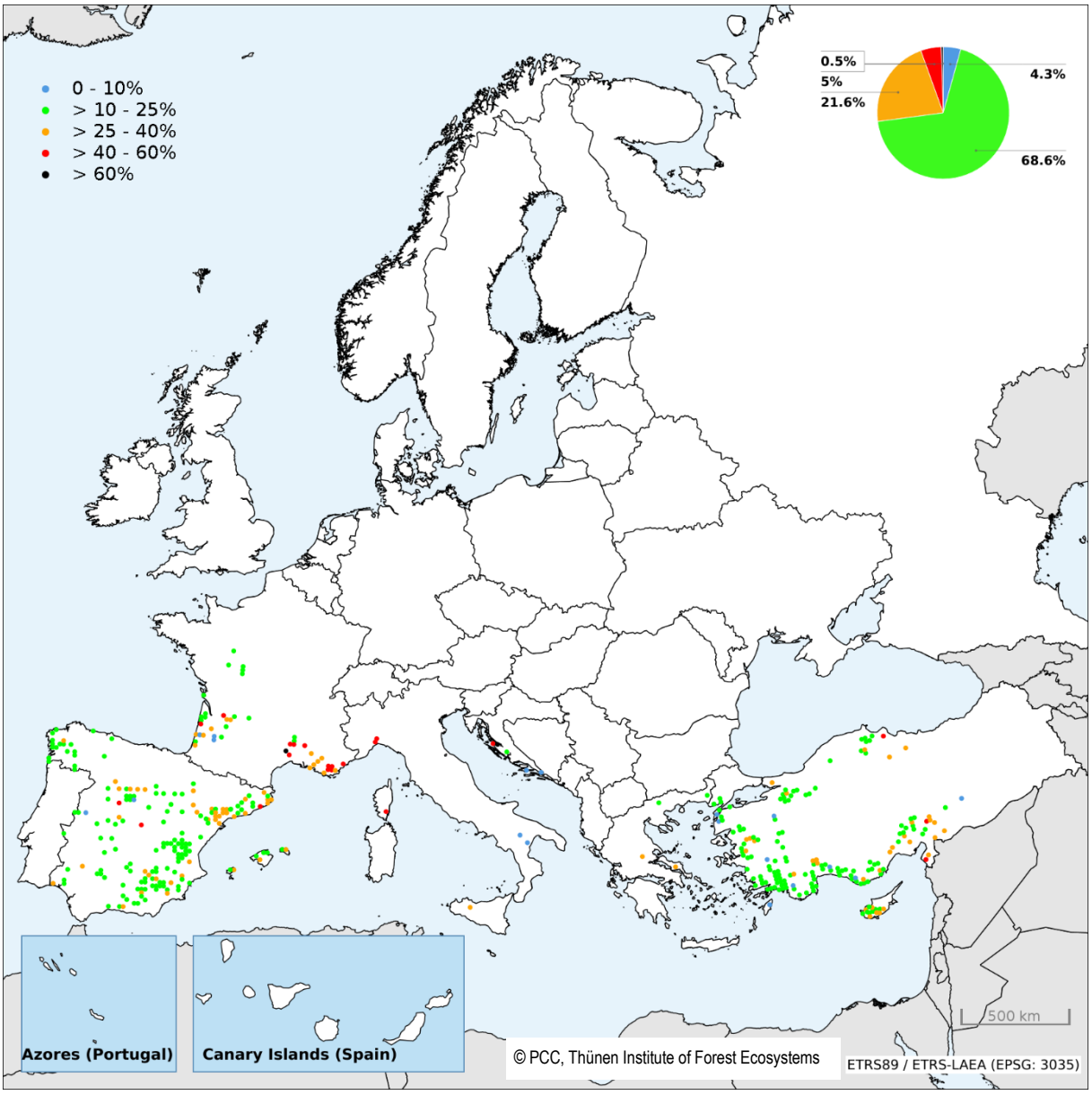

Figure S1-4: Mean plot defoliation of Mediterranean lowland pines (*Pinus halepensis, P. pinaster, P. pinea, P. brutia*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), 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.

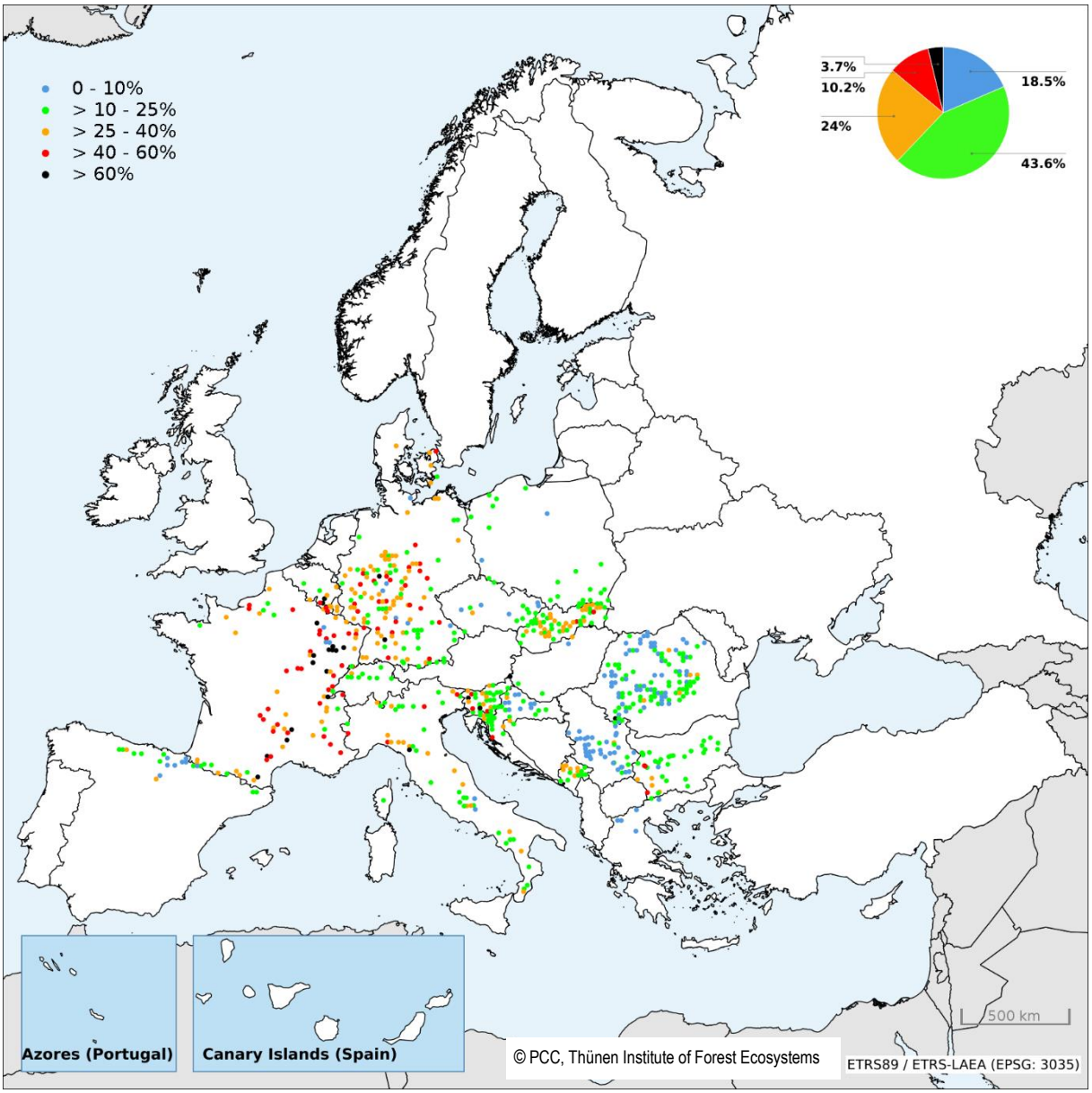

Figure S1-5: Mean plot defoliation of common beech (*Fagus sylvatica*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The percentages refer to the needle/leaf loss in the crown compared to a reference tree. The pie chart (top right) indicates the percentage of plots per defoliation class.

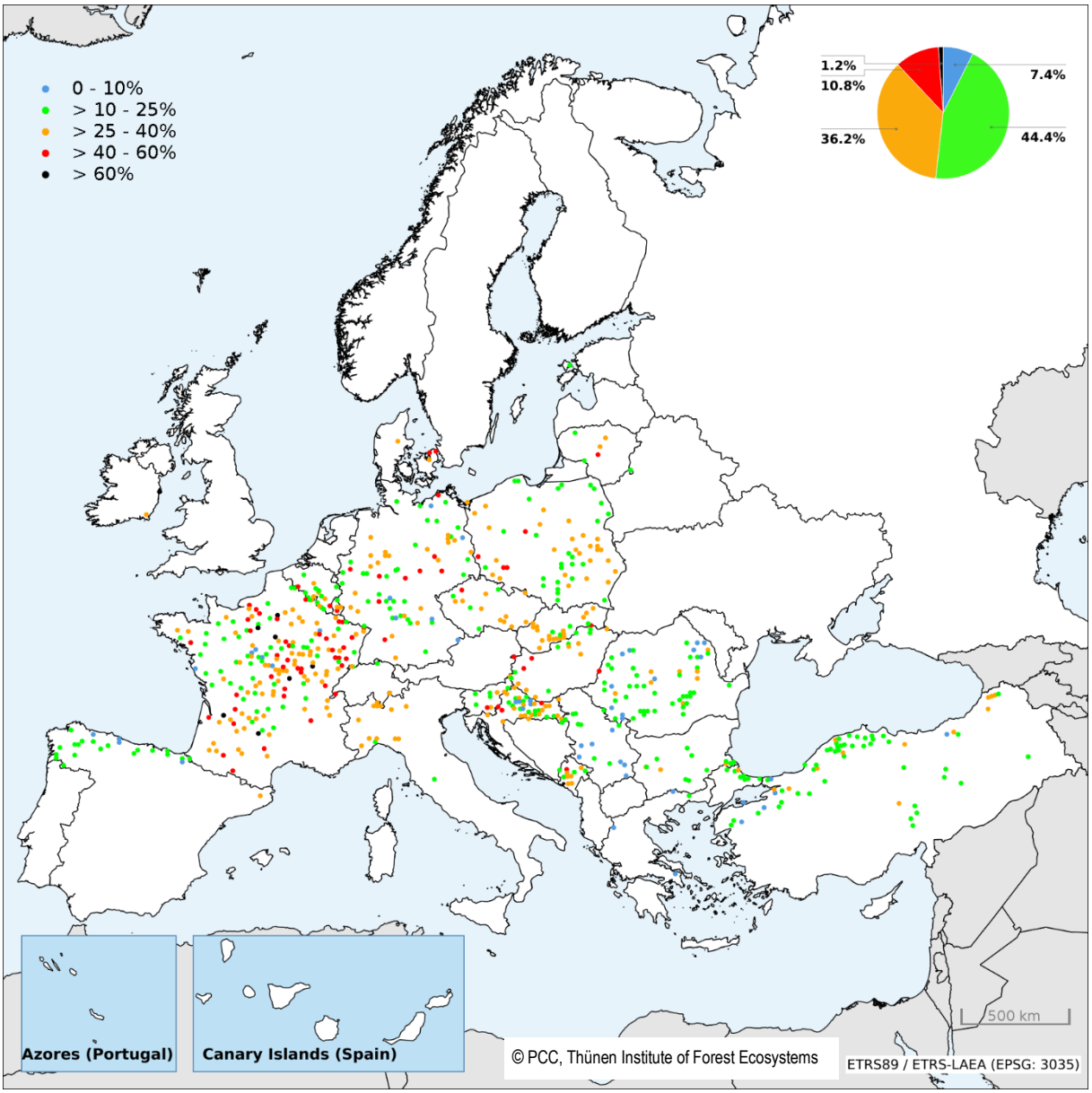

Figure S1-6: Mean plot defoliation of deciduous temperate oaks (*Quercus robur and Q. petraea*) in 2019. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (black). The 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.

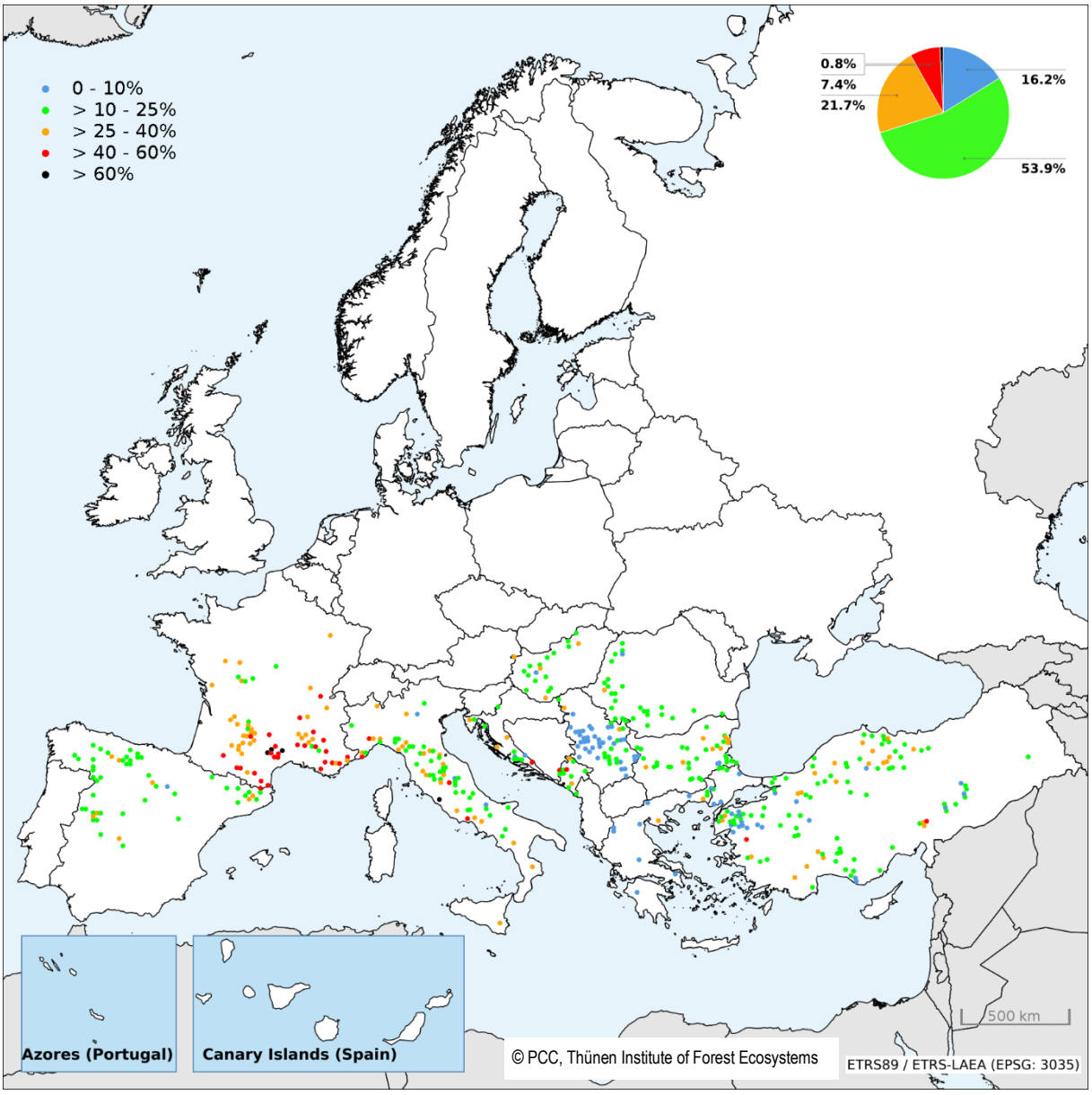

Figure S1-7: Mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris, Q. frainetto, Q. pubescens, Q. pyrenaica*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (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.

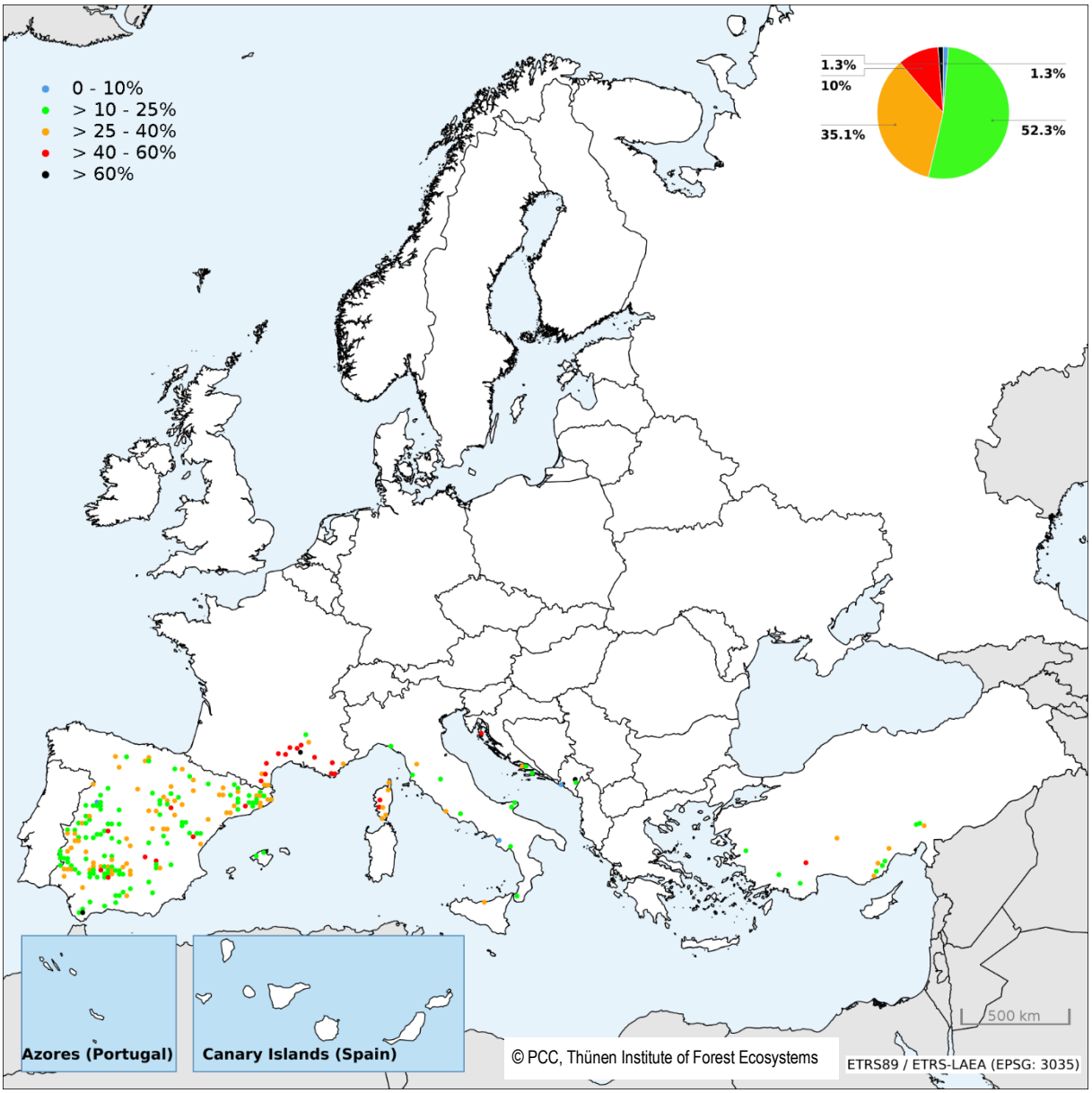

Figure S1-8: Mean plot defoliation of evergreen oaks (*Quercus coccifera, Q. ilex, Q. rotundifolia, Q. suber*) in 2020. Dead trees are not included. The legend (top left) indicates the degree of defoliation (defoliation class) ranging from none (blue), slight (green), moderate (orange and red), to severe (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 2011–2020

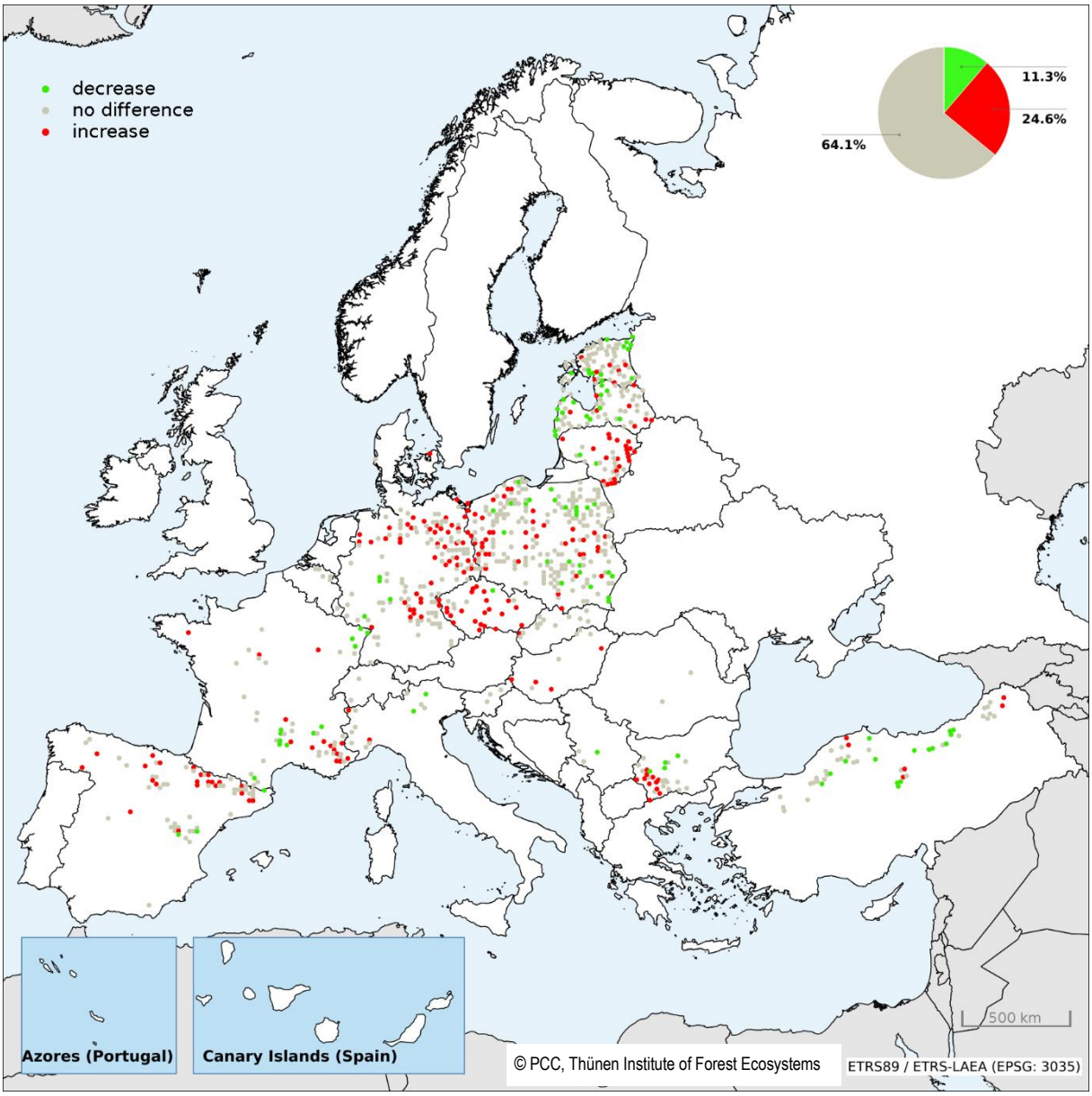

Figure S1-9: Trends in mean plot defoliation of Scots pine (*Pinus sylvestris*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

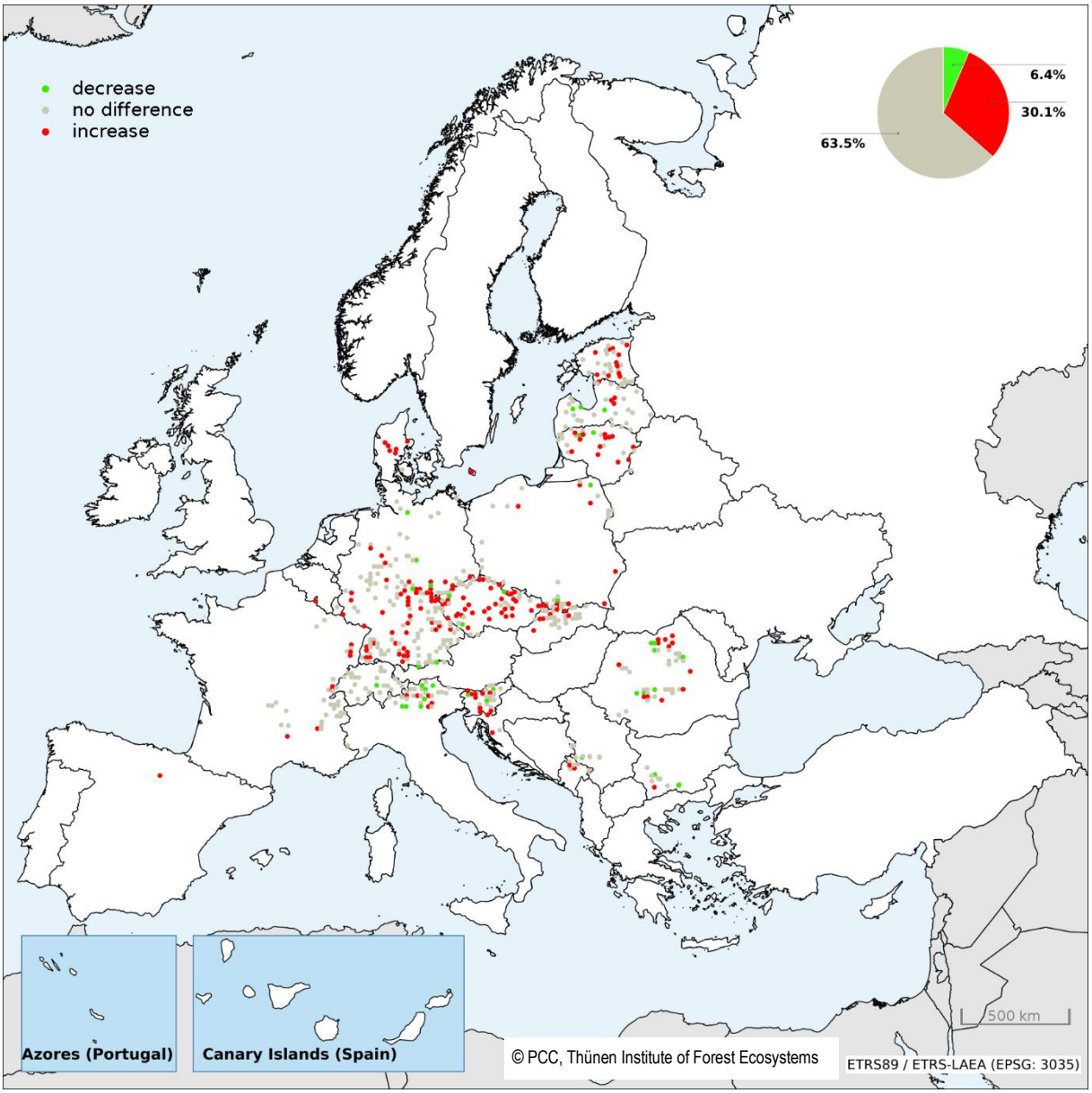

Figure S1-10: Trends in mean plot defoliation of Norway spruce (*Picea abies*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

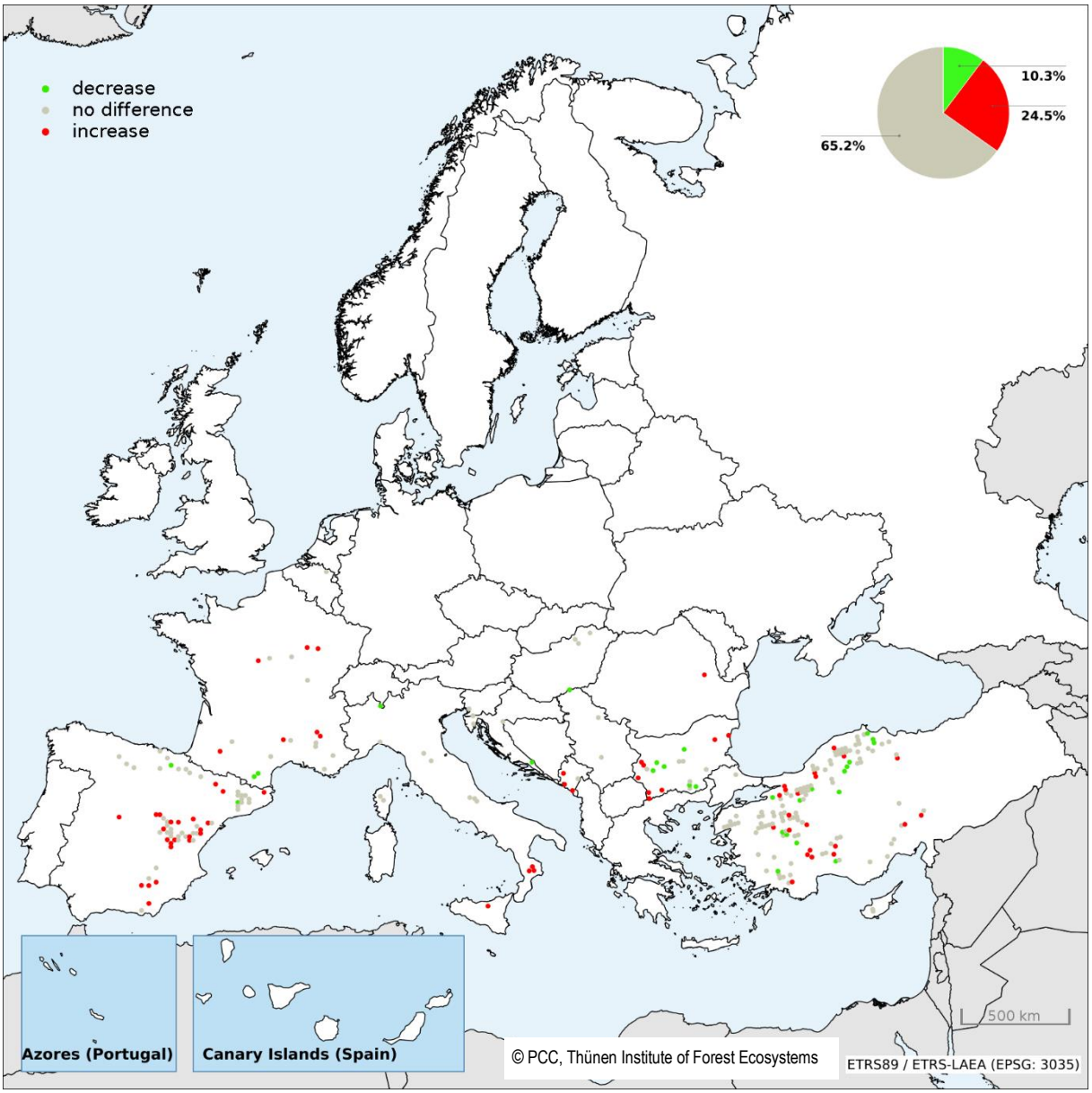

Figure S1-11: Trends in mean plot defoliation of Austrian pine (*Pinus nigra*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

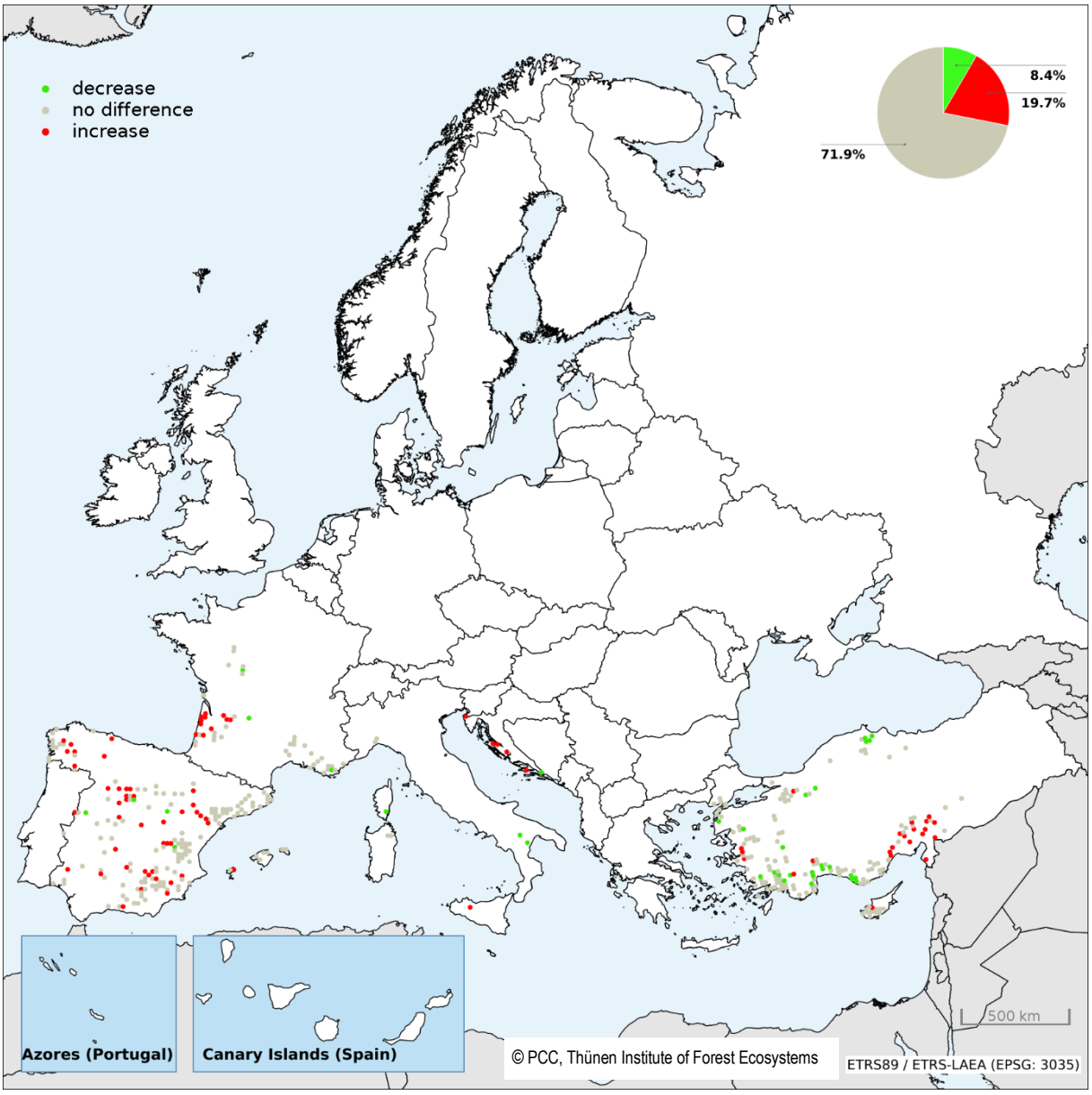

Figure S1-12: Trends in mean plot defoliation of Mediterranean lowland pines (*Pinus brutia*, *P. halepensis*, *P. pinaster*, *P. pinea*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation 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.

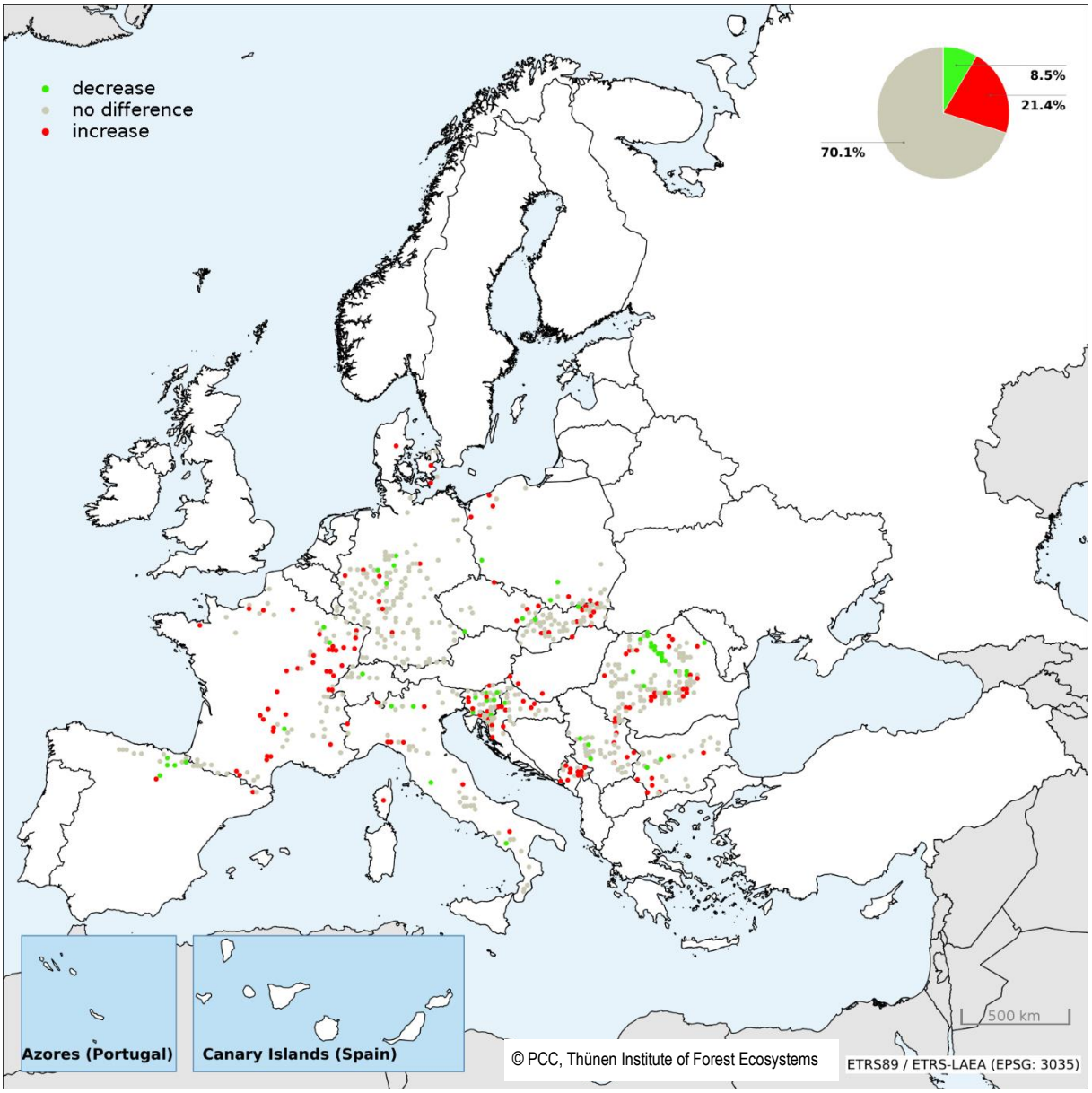

Figure S1-13: Trends in mean plot defoliation of common beech (*Fagus sylvatica*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

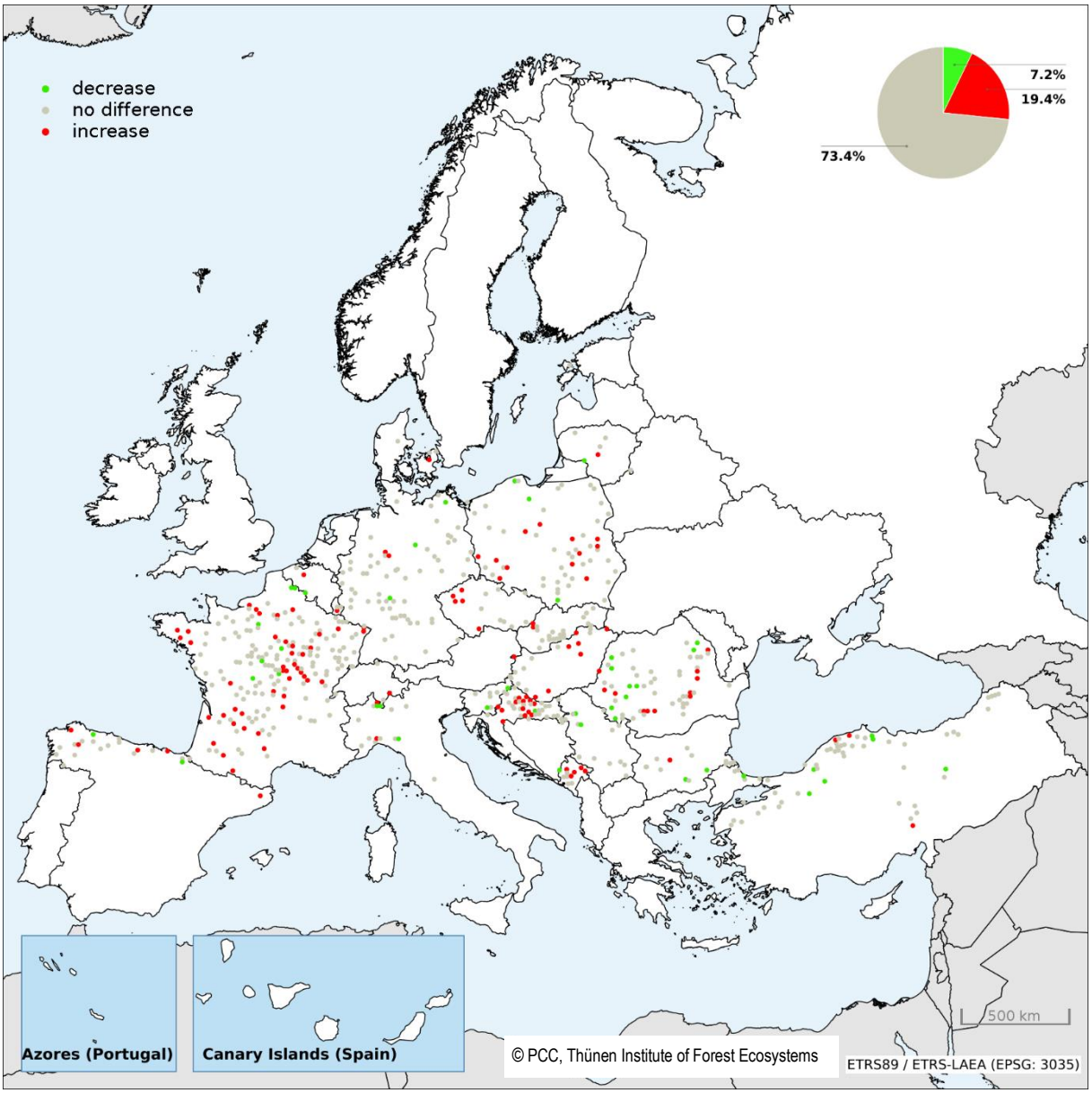

Figure S1-14: Trends in mean plot defoliation of deciduous temperate oaks (*Quercus robur* and *Q. petraea*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, stayed the same or increased within the given period. The pie chart (top right) indicates the respective percentage of plots per trend direction.

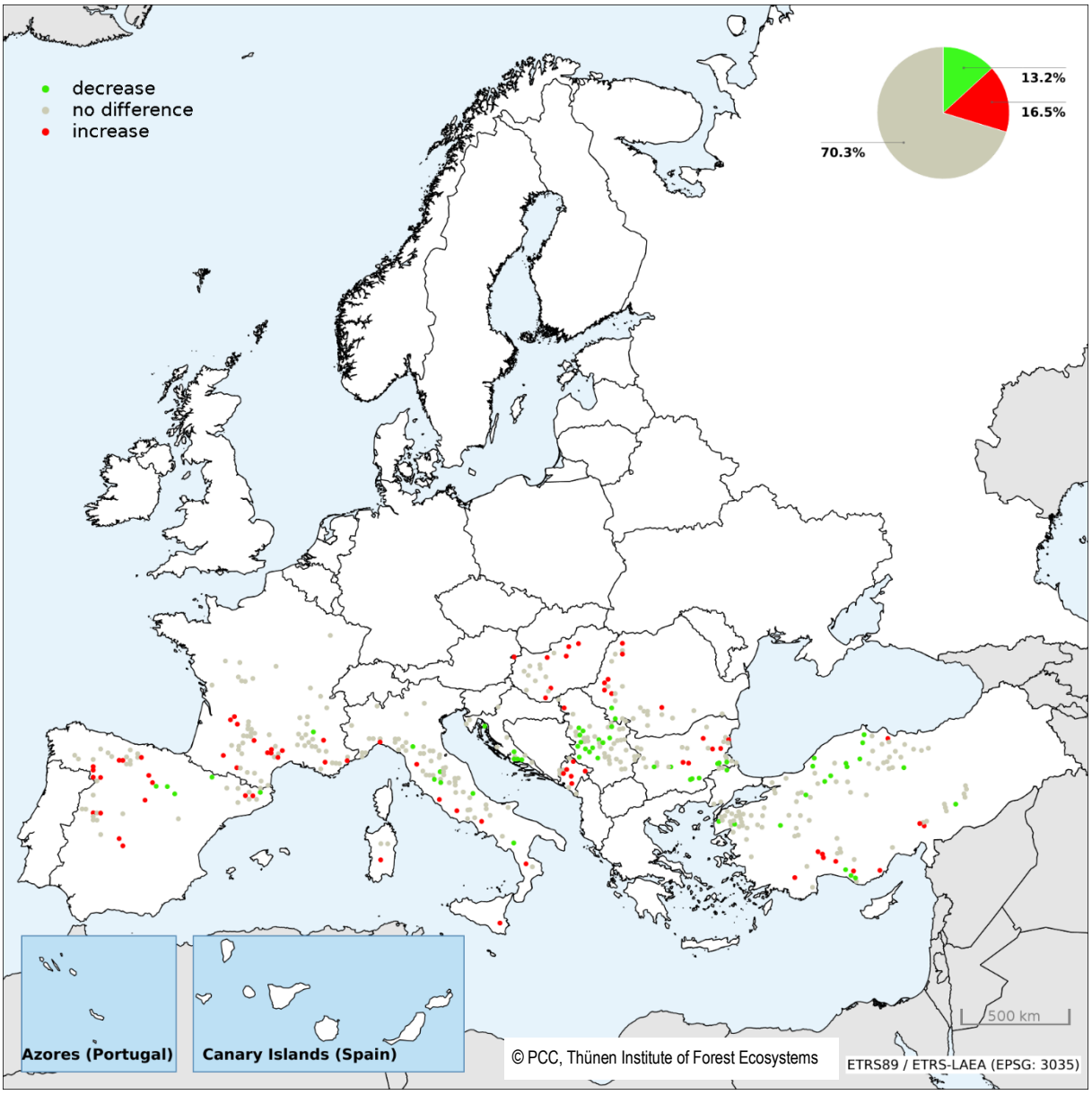

Figure S1-15: Trends in mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris, Q. frainetto, Q. pubescens, Q. pyrenaica*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot 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.

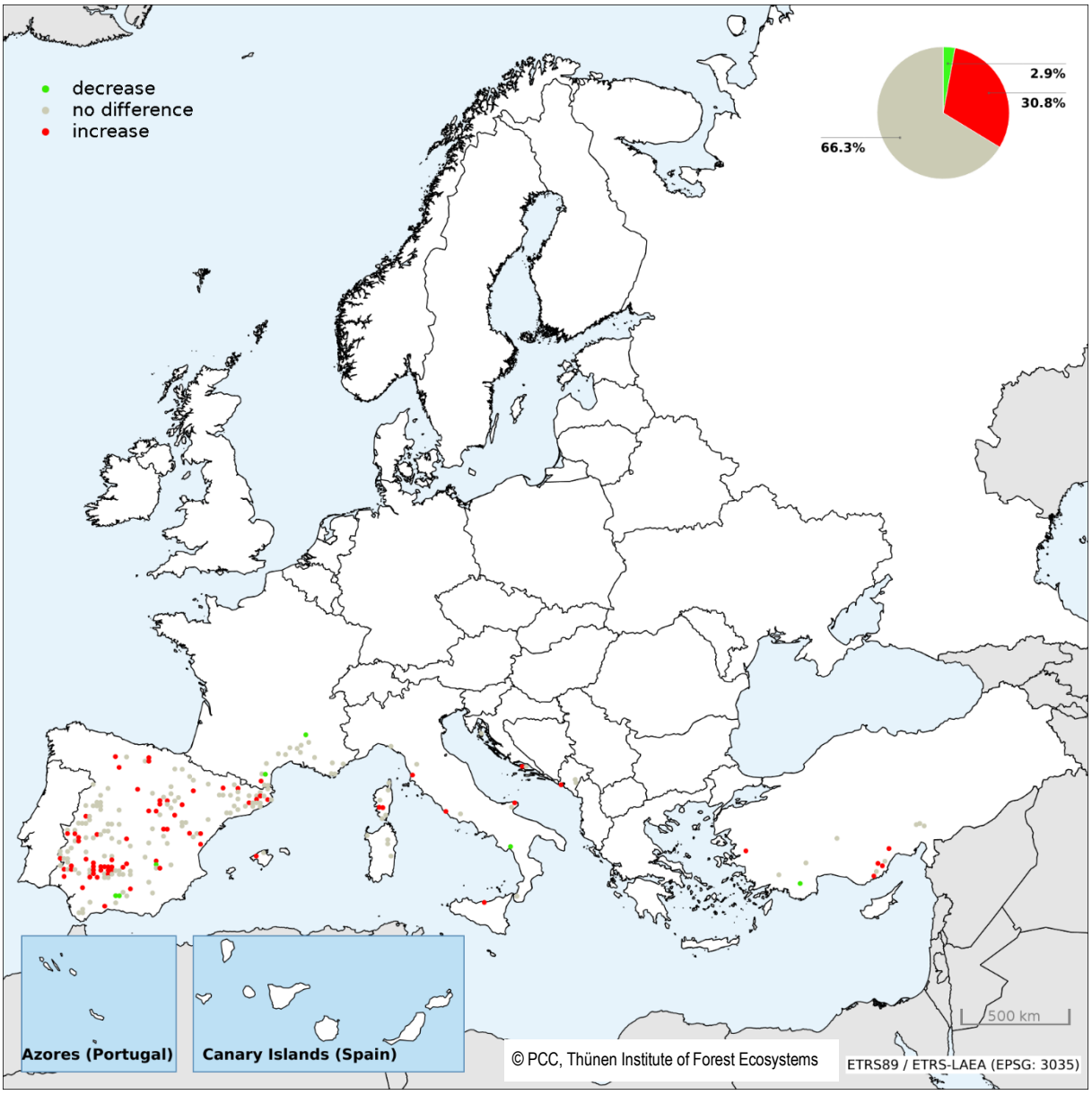

Figure S1-16: Trends in mean plot defoliation of evergreen oaks (*Quercus coccifera, Q ilex, Q. rotundifolia, Q. suber*) between 2011 and 2020. Plots were included if assessments were available for at least 80% of the period. The legend (top left) indicates whether mean plot defoliation overall decreased, 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 2020

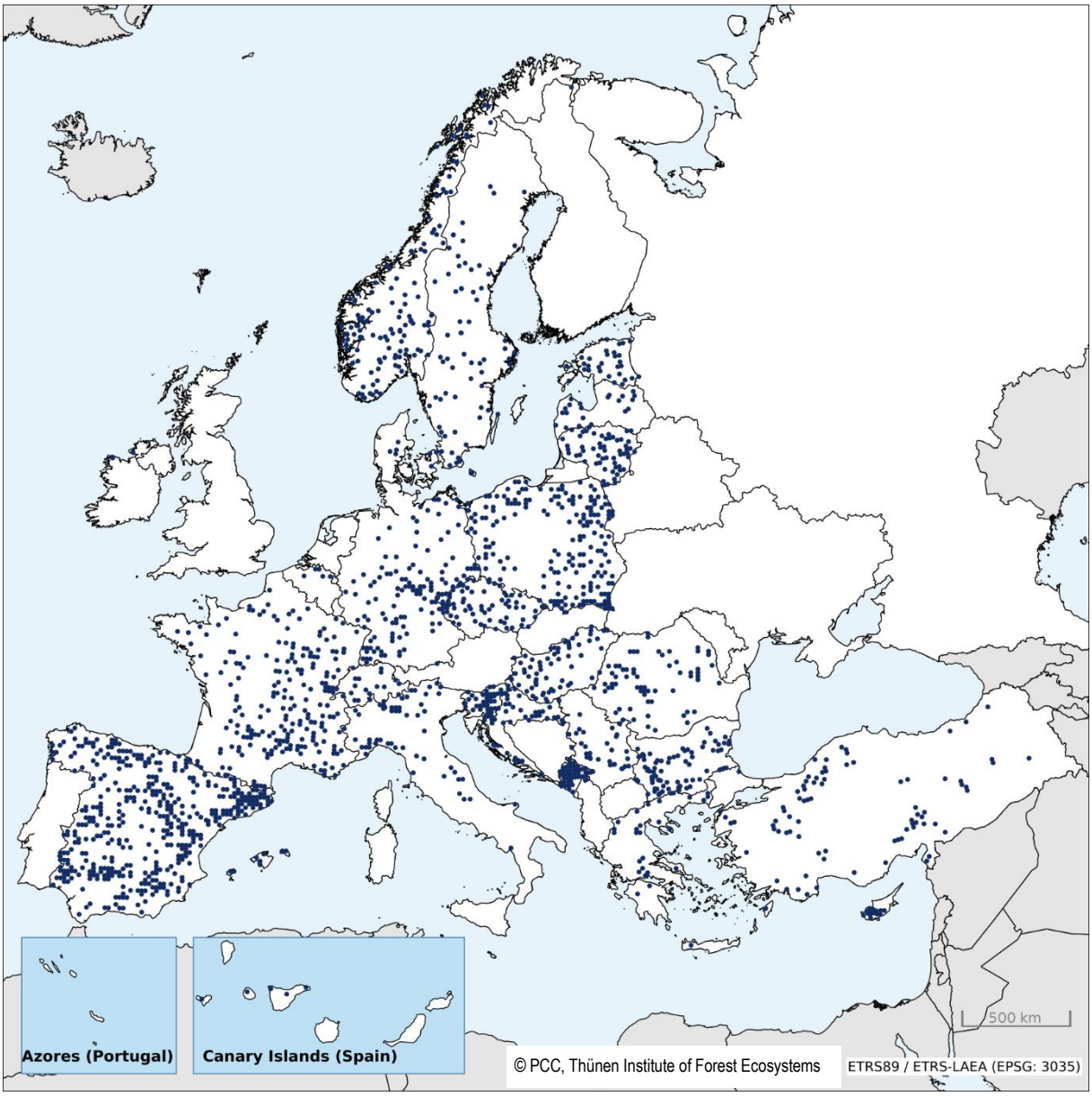

Figure S1-17: Damage from agent group Abiotic factors reported in 2020. Both fresh and old damage is shown.

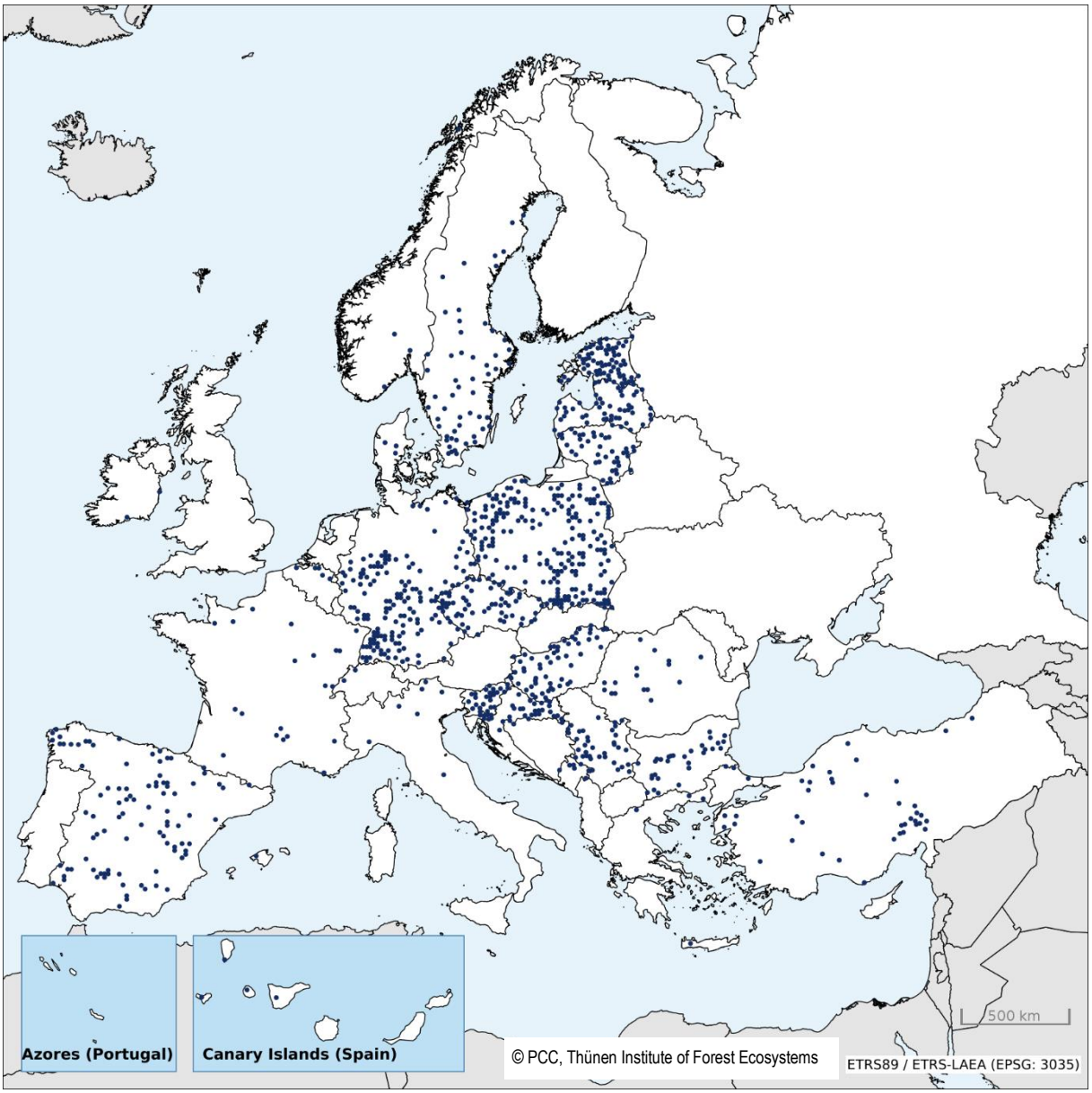

Figure S1-18: Damage from agent group Direct action of man reported in 2020. Both fresh and old damage is shown.

Figure S1-19: Damage from agent group Fire reported in 2020. Both fresh and old damage is shown.

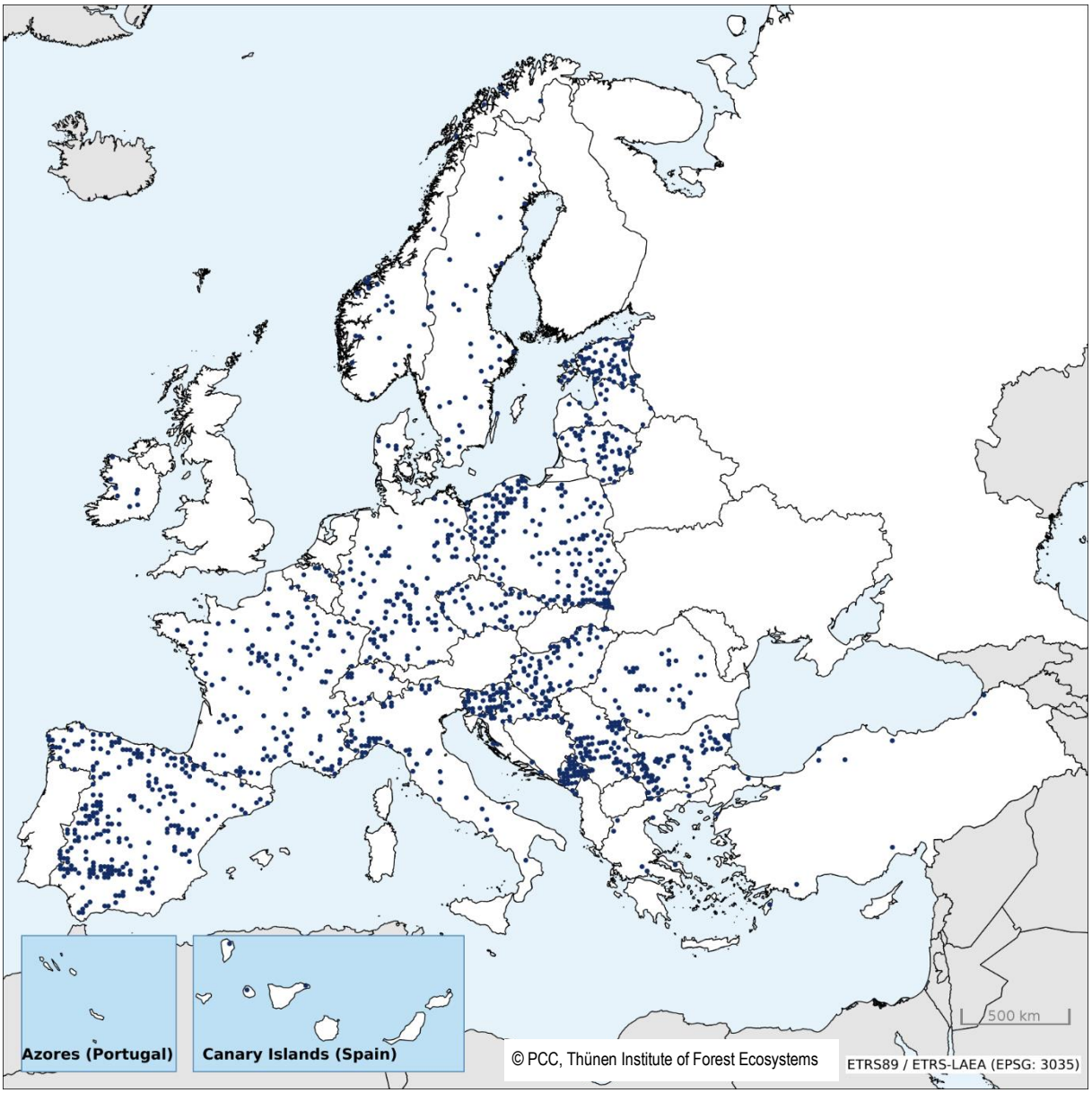

Figure S1-20: Damage from agent group Fungi reported in 2020. Both fresh and old damage is shown.

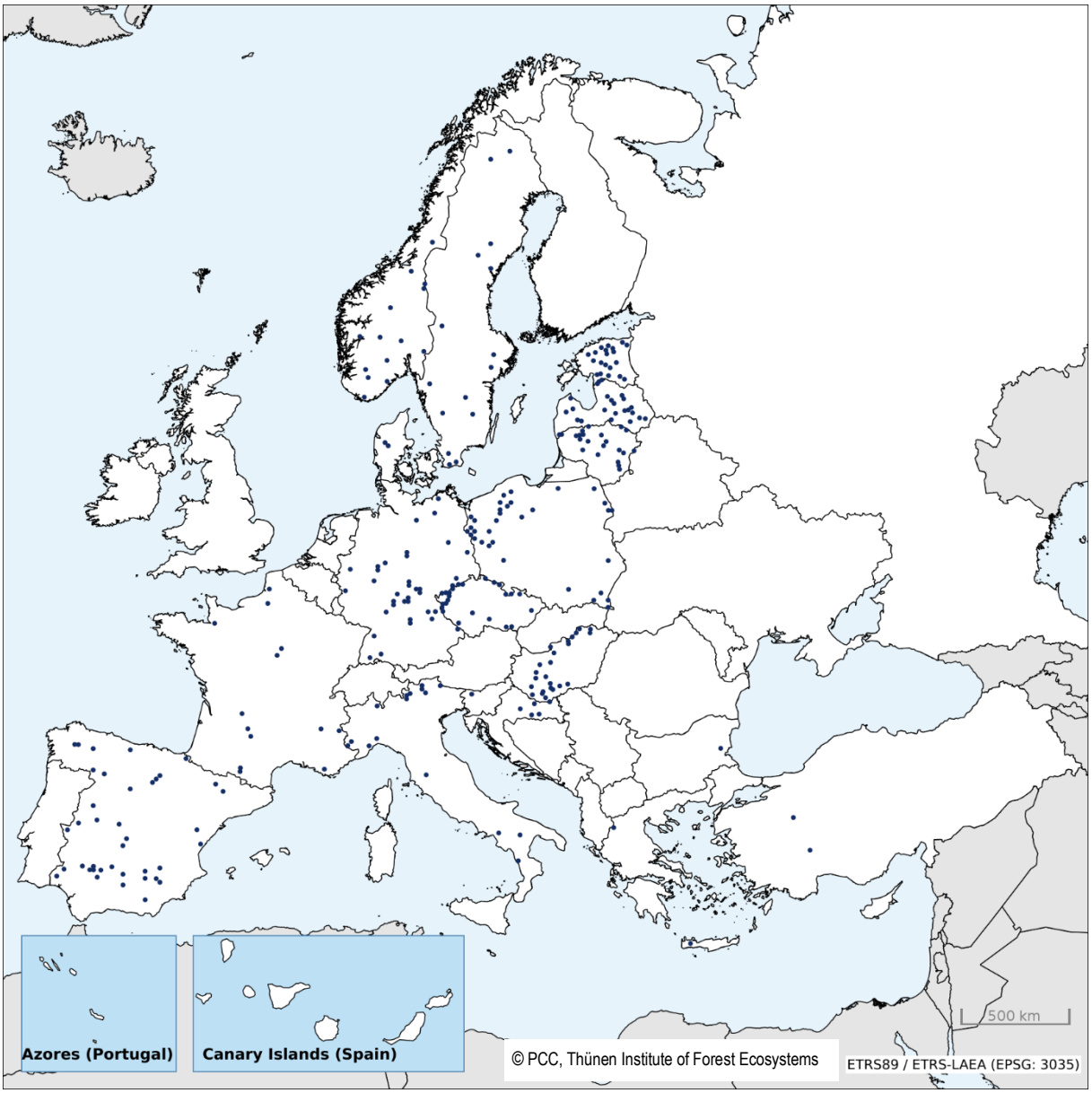

Figure S1-21: Damage from agent group Game and grazing reported in 2020. Both fresh and old damage is shown.

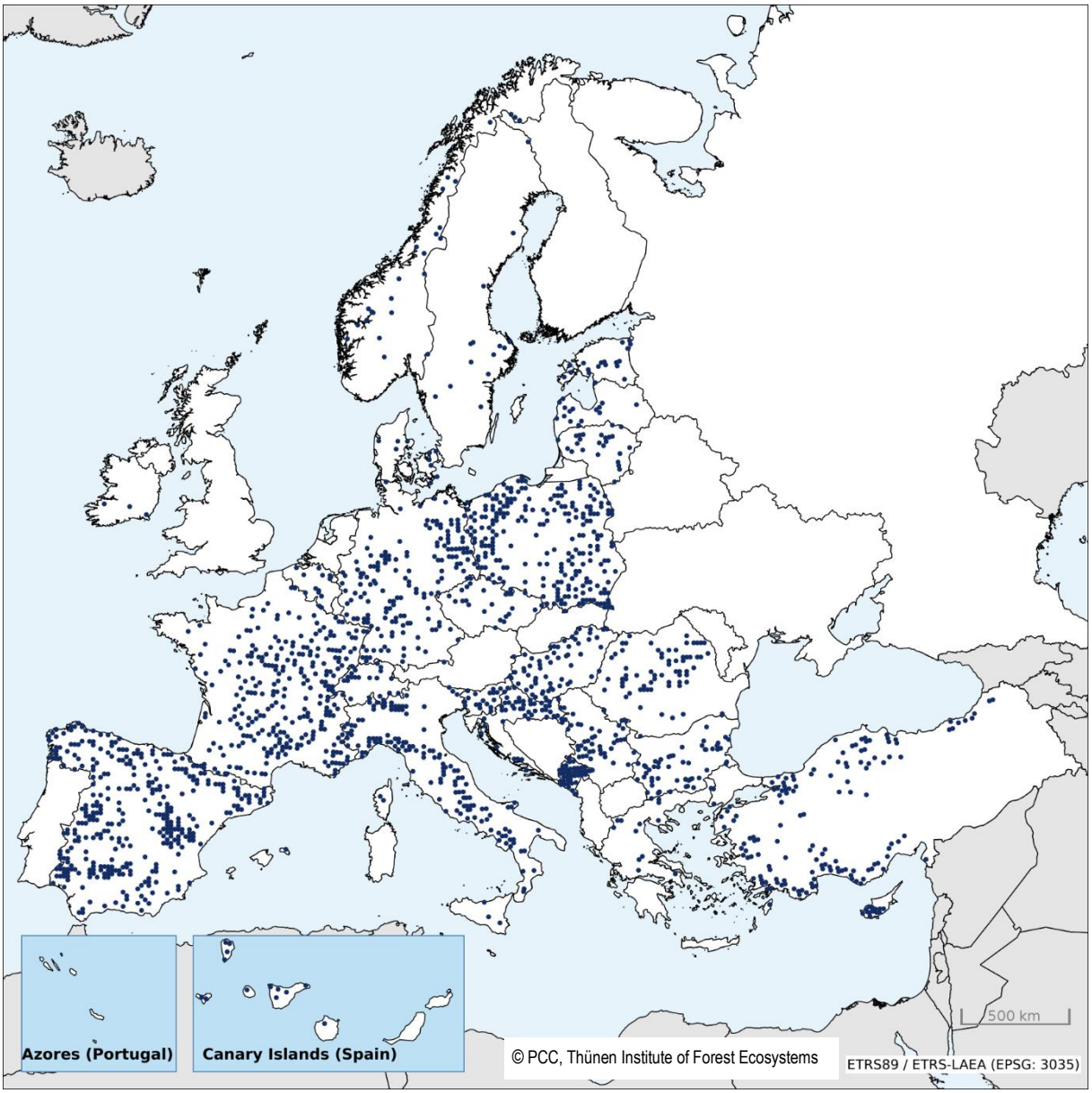

Figure S1-22: Damage from agent group Insects reported in 2020. Both fresh and old damage is shown.

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 2020

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 2020				
Andorra	47	18	4x4	12	288
Belarus	No information available for 2020				
Belgium-Flanders	1351	146	4x4	73	1474
Belgium-Wallonia	1684	555	varying	48	376
Bulgaria	11100	4264	4x4/16x16	160	5599
Croatia	5659	2759	16x16	94	2256
Cyprus	925	298	16x16	15	361
Czechia	7887	2673	16x16	127	4440
Denmark	4300	633	varying	344	2795
Estonia	4534	2333	16x16	95	2218
Finland	No information available for 2020				
France	54883	15840	16x16	523	10636
Germany	35721	11419	16x16	416	10076
Greece	13205	6513	16x16	38	886
Hungary	9300	1939	16x16	77	1845
Ireland	7000	770	16x16	35	535
Italy	30128	10345	16x16	246	4512
Latvia	6459	3223	16x16	115	1727
Lithuania	6529	2200	4x4/16x16	1036	6125
Luxembourg	259	86	4x4	49	1176
North Macedonia	No information available for 2020				
Rep. of Moldova	3385	374	3x3	566	13115
Montenegro	1381	827	16x16	49	1176
Norway	32381	12210	3x3	1830	9829
Poland	31268	9259	8x8	2050	41000
Portugal	No information available for 2020				
Romania	23839	6592	16x16	226	5424
Russian Fed.	No information available for 2020				
Serbia	8836	2360	4x4/16x16	130	2956
Slovakia	4904	2014	16x16	99	3637
Slovenia	2027	1238	16x16	44	1056
Spain	49880	18289	16x16	620	14880
Sweden	40765	28036	varying	3449	7795
Switzerland	4129	1279	16x16	47	976
Turkey	77846	22300	16x16	599	13721
Ukraine	No information available for 2020				
Total				**13 212**	**172 890**

S2-2 Tree defoliation (%) in different defoliation classes from national crown condition surveys in 2020

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
Andorra							
Broadleaves	6	0.0	83.3	16.7	0.0	0.0	16.7
Conifers	282	13.5	64.9	19.1	2.5	0.0	21.6
All trees	288	13.2	65.3	19.1	2.5	0.0	21.5
Belgium-Flanders							
Broadleaves	826	8.1	62.3	27.5	1.5	0.6	29.6
Conifers	648	6.0	74.2	18.8	0.2	0.8	19.8
All trees	1474	7.2	67.5	23.7	0.9	0.7	25.3
Belgium-Wallonia							
Broadleaves	198	14.7	34.3	38.4	12.1	0.5	51.0
Conifers	178	0.6	14.0	68.5	11.8	5.1	85.4
All trees	376	8.0	24.7	52.7	12.0	2.7	67.3
Bulgaria							
Broadleaves	3169	31.0	45.3	19.7	2.8	1.3	23.7
Conifers	2430	27.2	24.7	35.1	11.5	1.5	48.1
All trees	5599	29.4	36.4	26.4	6.6	1.4	34.3
Croatia							
Broadleaves	1919	35.5	38.6	23.1	2.5	0.4	26.0
Conifers	337	25.8	25.5	35.3	13.4	0.0	48.7
All trees	2256	34.1	36.6	24.9	4.1	0.4	29.4
Cyprus							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	361	8.3	65.7	24.1	1.7	0.3	26.0
All trees	361	8.3	65.7	24.1	1.7	0.3	26.0
Czechia							
Broadleaves	1197	20.6	43.1	32.7	3.0	0.6	36.3
Conifers	3243	11.9	23.9	57.6	5.2	1.4	64.2
All trees	4440	14.3	29.1	50.9	4.6	1.2	56.7
Denmark							
Broadleaves	1365	36.3	37.6	23.5	2.6	0.0	26.1
Conifers	1430	39.3	38.8	18.6	3.2	0.1	21.9
All trees	2795	37.8	38.2	21.0	2.9	0.1	24.0
Estonia							
Broadleaves	274	54.0	40.0	4.0	1.0	1.0	6.0
Conifers	1944	48.0	46.0	5.0	0.0	1.0	6.0
All trees	2218	48.7	45.3	4.9	0.1	1.0	6.0

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
France							
Broadleaves	6933	8.7	25.9	52.6	12.2	0.6	65.4
Conifers	3703	23.9	33.7	37.9	3.6	0.9	42.4
All trees	10636	14.0	28.6	47.5	9.2	0.7	57.4
Germany							
Broadleaves	4174	18.5	38.3	37.7	4.3	1.2	43.2
Conifers	5902	22.3	44.2	28.7	1.8	3.0	33.5
All trees	10076	20.7	41.8	32.4	2.8	2.3	37.5
Greece							
Broadleaves	498	73.7	13.5	12.1	0.4	0.4	12.9
Conifers	388	39.2	31.7	24.5	4.4	0.3	29.1
All trees	886	58.6	21.4	17.5	2.1	0.3	20.0
Hungary							
Broadleaves	1674	28.3	36.2	28.2	5.2	2.1	35.5
Conifers	171	18.0	34.0	39.3	5.9	2.9	48.0
All trees	1845	27.3	36.0	29.2	5.3	2.2	36.7
Ireland							
Broadleaves	135	20.0	26.6	30.4	23.0	0.0	53.4
Conifers	400	50.5	39.8	8.3	1.5	0.0	9.8
All trees	535	42.8	36.4	13.8	6.9	0.0	20.8
Italy							
Broadleaves	3303	18.3	42.1	35.1	3.8	0.7	39.6
Conifers	1209	38.2	34.9	22.3	2.2	2.4	26.9
All trees	4512	23.6	40.2	31.7	3.4	1.2	36.2
Latvia							
Broadleaves	471	6.6	89.6	3.8	0.0	0.0	3.8
Conifers	1256	11.3	85.4	2.9	0.2	0.2	3.3
All trees	1727	10.0	86.6	3.2	0.2	0.2	3.5
Lithuania							
Broadleaves	2285	19.3	65.3	13.0	1.1	1.3	15.4
Conifers	3840	12.4	66.6	19.8	0.6	0.6	21.0
All trees	6125	15.0	66.1	17.3	0.8	0.9	18.9
Luxembourg							
Broadleaves	790	5.4	31.9	55.1	6.1	1.5	62.8
Conifers	386	31.4	32.4	25.5	0.8	10.0	36.2
All trees	1176	13.9	32.1	45.4	4.4	4.3	54.0
Montenegro							
Broadleaves	888	10.1	52.5	34.6	2.8	0.0	37.4
Conifers	288	21.5	40.3	28.1	10.1	0.0	38.2
All trees	1176	12.9	49.5	33.0	4.6	0.0	37.6

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
Norway							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	9829	44.1	38.7	14.9	2.0	0.3	17.2
All trees	9829	44.1	38.7	14.9	2.0	0.3	17.2
Poland							
Broadleaves	15307	11.0	66.4	20.1	1.7	0.7	22.6
Conifers	25693	6.2	76.3	16.0	1.0	0.5	17.5
All trees	41000	8.0	72.6	17.6	1.3	0.6	19.4
Rep. of Moldova							
Broadleaves	13073	24.0	37.0	37.0	1.0	1.0	39.0
Conifers	42	28.0	55.0	7.0	0.0	10.0	17.0
All trees	13115	24.0	37.1	36.9	1.0	1.0	38.9
Romania							
Broadleaves	4593	50.9	37.0	11.1	0.9	0.1	12.1
Conifers	831	49.1	33.5	15.3	2.0	0.1	17.4
All trees	5424	50.6	36.5	11.7	1.1	0.1	12.9
Serbia							
Broadleaves	2598	82.1	11.0	5.4	1.5	0.0	6.9
Conifers	358	84.1	7.2	5.6	3.1	0.0	8.7
All trees	2956	82.3	10.5	5.4	1.7	0.0	7.1
Slovakia							
Broadleaves	2263	7.0	59.2	31.3	1.8	0.7	33.8
Conifers	1374	4.7	44.0	46.4	4.2	0.7	51.3
All trees	3637	6.1	53.5	37.0	2.7	0.7	40.4
Slovenia							
Broadleaves	713	15.4	48.0	28.5	8.0	0.1	36.6
Conifers	343	24.2	34.7	35.9	5.3	0.0	41.1
All trees	1056	18.3	43.7	30.9	7.1	0.1	38.1
Spain							
Broadleaves	7556	19.2	57.9	18.5	2.9	1.5	23.0
Conifers	7324	17.7	61.6	16.4	2.1	2.3	20.8
All trees	14880	18.4	59.7	17.5	2.5	1.9	21.9
Sweden							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	7795	50.5	31.7	14.8	2.6	0.4	17.5
All trees	7795	50.5	31.7	14.8	2.6	0.4	17.5
Switzerland							
Broadleaves	272	24.8	40.7	19.0	2.3	13.2	34.5
Conifers	704	23.0	53.7	15.6	0.2	7.5	23.3
All trees	976	23.5	50.1	16.6	0.8	9.1	26.4

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
Turkey							
Broadleaves	5377	39.9	47.9	11.1	0.9	0.2	12.2
Conifers	8344	35.8	52.6	11.0	0.5	0.1	11.7
All trees	13721	37.4	50.8	11.0	0.7	0.2	11.9

S2-3 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2011 and 2020 – All species

Participating countries	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change % points 2019/20
Albania			21.0							21.5	**N/A**
Andorra	8.3	5.6	3.4	5.3	4.5	3.4	7.0	5.6			**N/A**
Belarus	6.1										**N/A**
Belgium	23.5	28.2	27.6	27.5	26.4	26.1	26.6	27.7	31.7	33.9	**+2.2**
Bulgaria	21.6	32.3	33.5	26.0	26.2	29.9	27.7	31.9	31.2	34.3	**+3.1**
Croatia	25.2	28.5	29.1	31.5	29.7	28.5	25.6	30.8	30.3	29.4	**-0.9**
Cyprus	16.4	10.6	8.9	13.3	12.5	35.0	23.6	33.5	29.6	26.0	**-3.6**
Czechia	52.7	50.3	51.7		52.0	54.3	53.6	56.4	57.4	56.7	**-0.7**
Denmark	10.0	7.3	4.9	7.0	8.7	14.8	12.9	21.4	32.3	24.0	**-8.3**
Estonia	8.1	7.8	8.0	6.7	6.7	6.4	5.2	8.5	5.7	6.0	**+0.3**
Finland	10.6	14.3									**N/A**
France	39.9	41.4	40.1	42.8	43.4	48.6	48.8	52.2	55.1	57.4	**+2.3**
Germany	28.0	24.6	22.7	26.2	23.8	28.0	22.7	28.7	36.4	37.5	**+1.1**
Greece				24.8	20.2		20.2	18.4	20.7	20.0	**-0.7**
Hungary	18.9	20.2	22.4	24.2	24.0	34.6	41.0	47.3	35.1	36.7	**+1.6**
Ireland		1.0								20.8	**N/A**
Italy	31.3	35.7	33.7	30.8	29.8	34.7	39.0	39.0	36.0	36.2	**+0.2**
Latvia	14.0	9.2	6.4	5.1	4.4	5.7	5.3	5.1	5.5	3.5	**-2.0**
Lithuania	15.4	24.5	19.7	21.7	23.8	21.0	21.1	18.5	19.2	18.9	**-0.3**
Luxembourg			33.2		32.6	38.2	30.3	31.3	50.1	54.0	**+3.9**
Montenegro			22.7		25.4	27.3	26.6	33.6		37.6	**N/A**
Norway	20.9	18.8	17.7	15.9	16.5	15.5	19.0	15.5	16.5	17.2	**+0.7**
Poland	24.0	23.4	18.8	18.9	16.7	19.5	20.2	18.6	21.2	19.4	**-1.8**
Rep. of Moldova	18.4	25.6		19.9	26.1	26.5	28.7		28.0	38.9	**+10.9**
Romania	13.9	13.9	13.6	13.5	13.1	13.4	14.5	14.8	11.6	12.9	**+1.3**
Russian Fed.	8.3										**N/A**
Serbia	7.6	10.3	14.7	12.4	10.7	11.3	11.8	11.9	8.9	7.1	**-1.8**
Slovakia	34.7	37.9	43.4		34.5	40.3	32.6	42.7	38.8	40.4	**+1.6**
Slovenia	31.4	29.1	30.9	38.3	37.8	33.9	37.0	36.0	37.7	38.1	**+0.4**
Spain	11.8	17.5	16.6	14.9		21.9	27.8	22.7	26.9	21.9	**-5.0**
Sweden	18.9	15.9	19.9		19.8	16.4	18.2	17.6	17.1	17.8	**+0.7**
Switzerland	30.9	31.3	26.0	30.6	24.8	25.2	33.7	23.5	33.5	26.4	**-7.1**
Turkey	13.6	12.4	10.2	11.0	9.5	9.8	8.8	10.5	12.1	11.9	**-0.2**
Ukraine	6.8	7.5	7.1	6.0	7.1						**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.

S2-4 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2011 and 2020 – Conifers

Participating countries	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change % points 2018/19
Albania			21.0								**N/A**
Andorra	8.3	5.6	3.1	5.4	4.3	3.5	7.1	5.6		21.6	**N/A**
Belarus	5.8										**N/A**
Belgium	15.2	20.3	19.7	22.8	27.9	24.6	26.8	27.7	33.5	33.9	**+0.4**
Bulgaria	33.3	35.1	40.8	34.1	40.1	39.9	37.0	45.0	45.4	48.1	**+2.7**
Croatia	45.1	54.7	48.3	49.7	56.0	51.0	35.0	47.0	53.6	48.7	**-4.9**
Cyprus	16.4	10.6	8.9	13.3	12.5	35.0	23.6	33.5	29.6	26.0	**-3.6**
Czechia	58.9	56.9	59.2		57.8	60.3	60.3	63.0	64.3	64.2	**-0.1**
Denmark	5.7	4.6	2.8	5.3	7.4	11.3	11.8	15.2	22.0	21.9	**-0.1**
Estonia	8.7	6.6	8.5	6.9	6.5	6.7	5.5	9.3	5.8	6.0	**+0.2**
Finland	11.7	14.6									**N/A**
France	31.9	32.2	33.7	36.6	38.0	39.3	38.8	40.0	42.0	42.4	**+0.4**
Germany	20.3	19.3	18.1	19.7	20.3	22.3	19.5	22.8	31.2	33.5	**+2.3**
Greece				26.7	27.2		32.1	26.2	28.7	29.1	**+0.4**
Hungary	28.7	23.1	23.5	30.7	46.5	52.8	44.9	52.3	43.2	48.0	**+4.8**
Ireland		1.0								9.8	**N/A**
Italy	32.2	31.8	24.2	24.0	22.6	19.6	21.8	28.1	28.8	26.9	**-1.9**
Latvia	16.0	7.9	6.9	4.8	4.4	4.9	5.3	3.9	4.6	3.3	**-1.3**
Lithuania	16.3	26.9	23.1	21.1	25.0	21.7	23.5	21.1	21.7	21.0	**-0.7**
Luxembourg			17.5	93.3	18.7	17.4	17.7	16.2	35.5	36.2	**+0.7**
Montenegro			22.6		26.1	28.1	23.6	30.9		38.2	**N/A**
Norway	17.3	16.1	17.7	15.9	16.5	15.5	19.0	15.5	16.5	17.2	**+0.7**
Poland	24.2	22.3	17.8	17.2	15.7	17.1	18.4	17.2	19.6	17.5	**-2.1**
Rep. of Moldova	32.1	44.3		29.4		21.6	19.6		19.2	17.0	**-2.2**
Romania	15.9	14.9	13.9	13.7	8.0	10.4	10.7	10.3	13.7	17.4	**+3.7**
Russian Fed.	10.6										**N/A**
Serbia	11.1	11.0	13.0	14.6	14.5	13.5	12.0	10.2	9.8	8.7	**-1.1**
Slovakia	46.6	43.5	43.3		49.4	45.6	41.6	49.7	45.3	51.3	**+6.0**
Slovenia	33.6	31.3	31.3	38.1	41.0	38.6	40.6	40.3	42.7	41.1	**-1.6**
Spain	10.4	11.4	12.6	11.4		20.9	26.2	23.1	26.7	20.8	**-5.9**
Sweden	18.9	15.9	19.9	18.8	19.8	16.4	18.2	17.6	17.1	17.8	**+0.7**
Switzerland	31.5	30.6	23.3	31.7	24.0	24.9	33.4	22.1	33.6	23.3	**-10.3**
Turkey	11.6	9.9	6.9	7.2	8.6	9.1	8.2	10.2	11.4	11.7	**+0.3**
Ukraine	6.8	7.5	7.5	6.8	7.9						**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.

S2-5 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2011 and 2020 – Broadleaves

Participating country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change points 2018/19
Albania			19.0								**N/A**
Andorra			20.0	20.0	16.7	0.0	0.0	0.0		16.7	**N/A**
Belarus	6.4										**N/A**
Belgium	26.7	32.9	29.4	31.4	25.1	27.4	26.2	27.7	30.2	33.7	**+3.5**
Bulgaria	12.8	29.8	28.0	20.0	15.6	22.3	20.5	21.8	20.3	23.7	**+3.4**
Croatia	21.5	23.7	25.7	28.1	25.3	24.7	24.0	27.8	26.4	26.0	**-0.4**
Cyprus						N/A	N/A	N/A	N/A	N/A	**N/A**
Czechia	31.2	28.4	25.7		32.7	34.7	31.6	35.6	37.5	36.3	**-1.2**
Denmark	12.8	10.9	7.9	9.0	10.8	19.7	14.4	30.0	46.0	26.1	**-19.9**
Estonia	3.0	14.9	5.3	5.7	8.0	5.2	3.3	4.1	5.1	6.0	**+0.9**
Finland	6.0	12.8									**N/A**
France	44.3	45.9	43.6	46.1	47.0	53.5	54.2	58.8	62.2	65.4	**+3.2**
Germany	38.0	32.5	29.8	36.1	29.0	35.7	27.5	37.1	43.6	43.2	**-0.4**
Greece				16.7	11.3		14.6	14.4	15.5	12.9	**-2.6**
Hungary	17.3	19.9	22.3	23.3	21.4	32.5	40.6	46.8	34.3	35.5	**+1.2**
Ireland										53.4	**N/A**
Italy	32.7	37.2	37.1	33.4	32.1	39.5	45.0	43.4	38.1	39.6	**+1.5**
Latvia	8.8	12.9	4.4	6.1	4.2	8.3	5.2	8.8	8.1	3.8	**-4.3**
Lithuania	13.8	21.0	14.7	22.5	21.9	20.0	17.8	14.2	15.2	15.4	**+0.2**
Luxembourg			42.4	34.6	40.3	49.0	37.2	39.7	57.4	62.8	**+5.4**
Montenegro			22.8		25.2	27.1	27.6	34.8		37.4	**N/A**
Norway	32.3	27.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Poland	23.5	25.5	20.7	21.9	18.4	24.0	23.3	21.1	23.9	22.6	**-1.3**
Rep. of Moldova	18.4	25.6		19.9	26.1	26.5	28.7	N/A	28.0	39.0	**+11.0**
Romania	13.4	13.6	13.6	13.0	13.9	14.2	15.3	15.8	11.2	12.1	**+0.9**
Russian Fed.	4.3										**N/A**
Serbia	7.2	10.2	14.9	12.1	10.1	11.0	11.8	12.1	8.7	6.9	**-1.8**
Slovakia	26.4	33.9	43.5	43.5	24.3	36.5	26.7	38.4	34.8	33.8	**-1.0**
Slovenia	30.0	27.7	30.6	38.4	35.9	31.1	35.1	33.7	35.1	36.6	**+1.5**
Spain	13.2	23.6	20.7	18.4		22.7	29.3	22.4	27.0	23.0	**-4.0**
Sweden							N/A	N/A	N/A	N/A	**N/A**
Switzerland	29.6	33.3	31.5	28.0	26.4	25.9	34.7	26.6	33.2	34.5	**+1.3**
Turkey	17.2	16.8	15.7	17.2	10.8	11.0	9.8	11.0	13.1	12.2	**-0.9**
Ukraine	6.7	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 (1991–2020) 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 2021 Technical Report[1].

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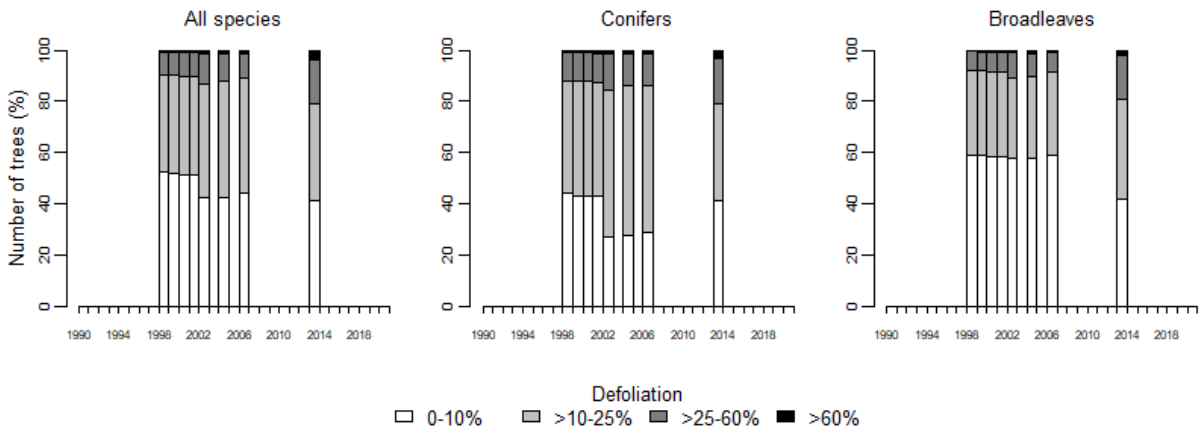
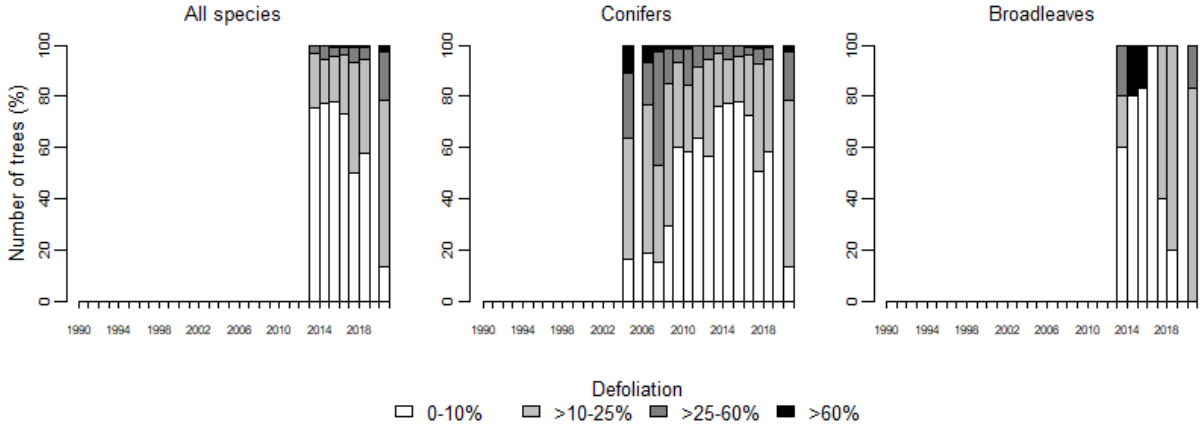
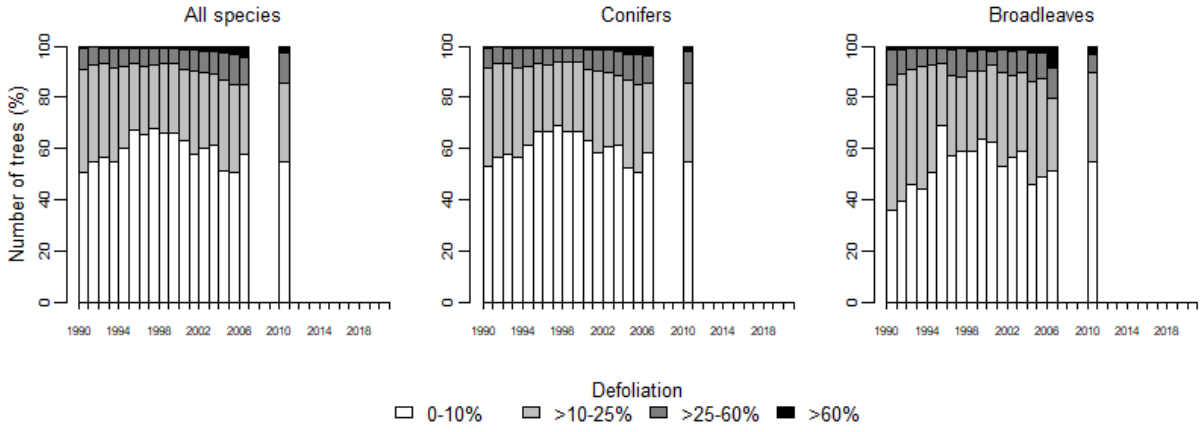


ANDORRA

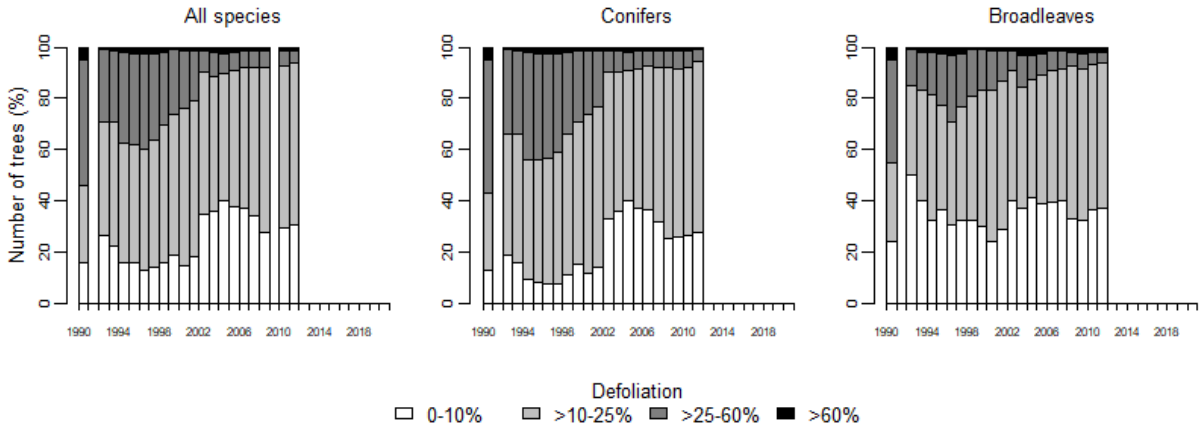


AUSTRIA

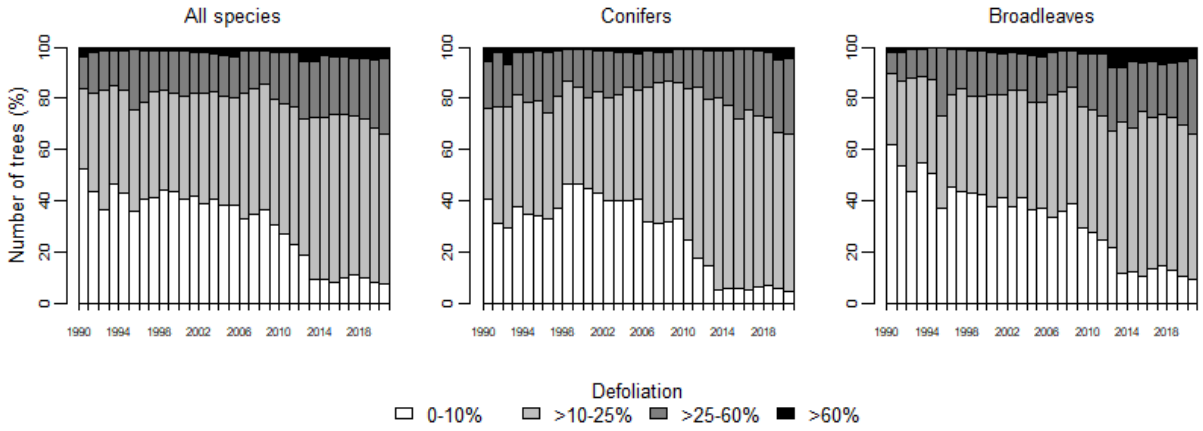


[1] http://icp-forests.net/page/icp-forests-technical-report

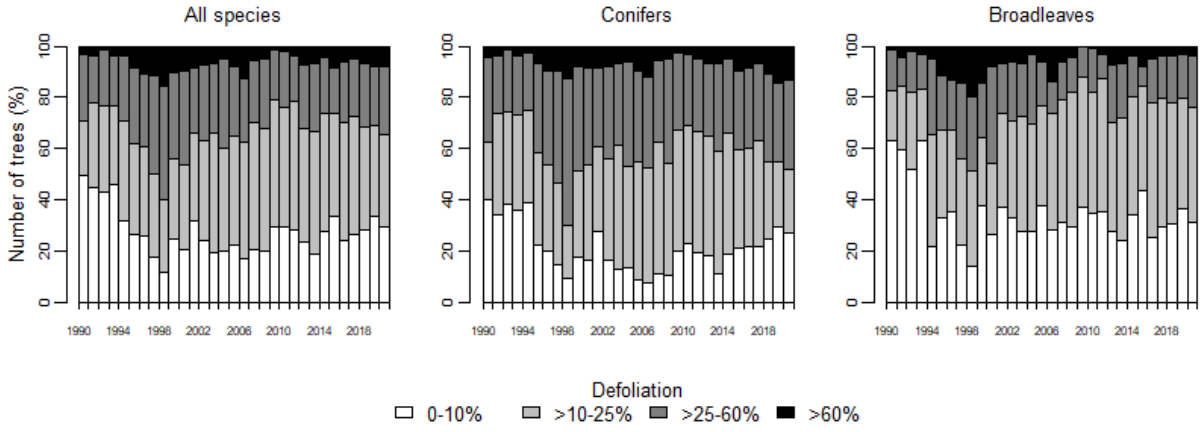
BELARUS



BELGIUM



BULGARIA



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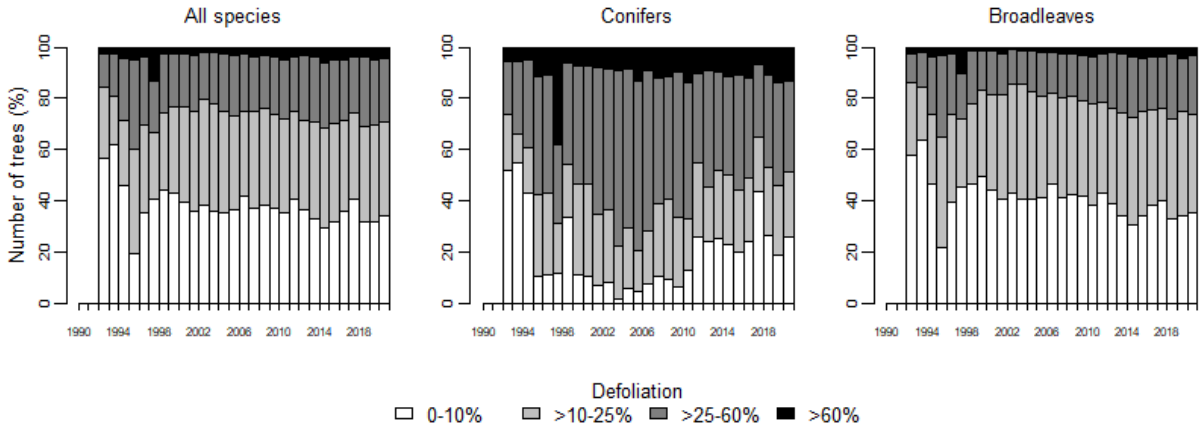

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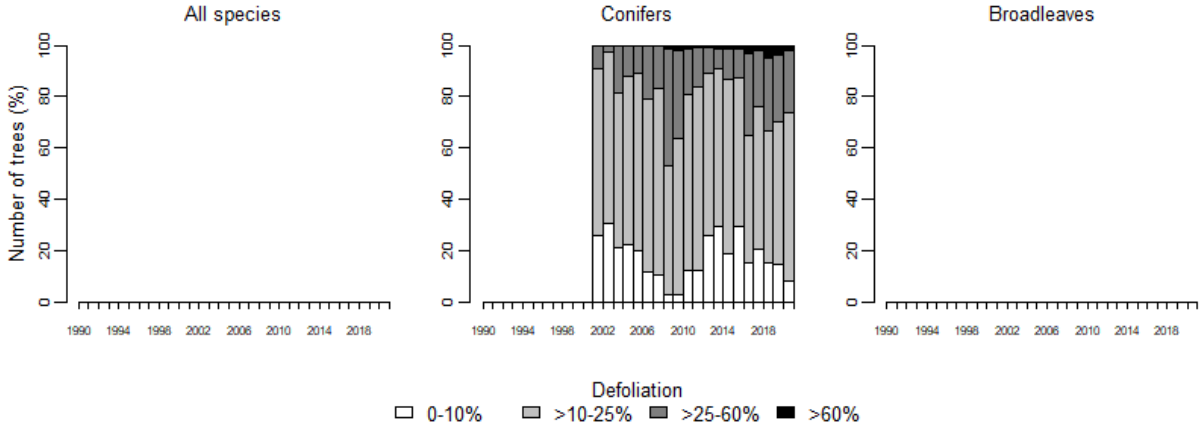

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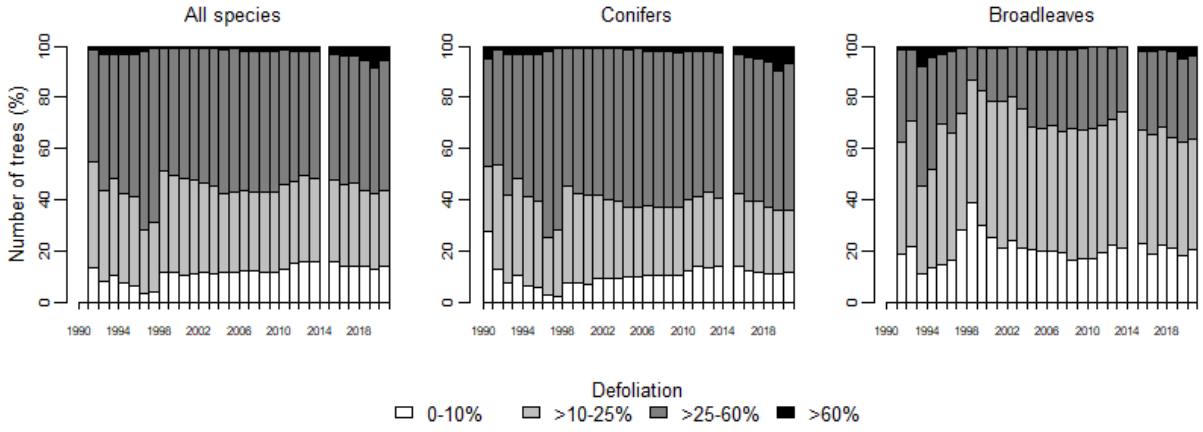

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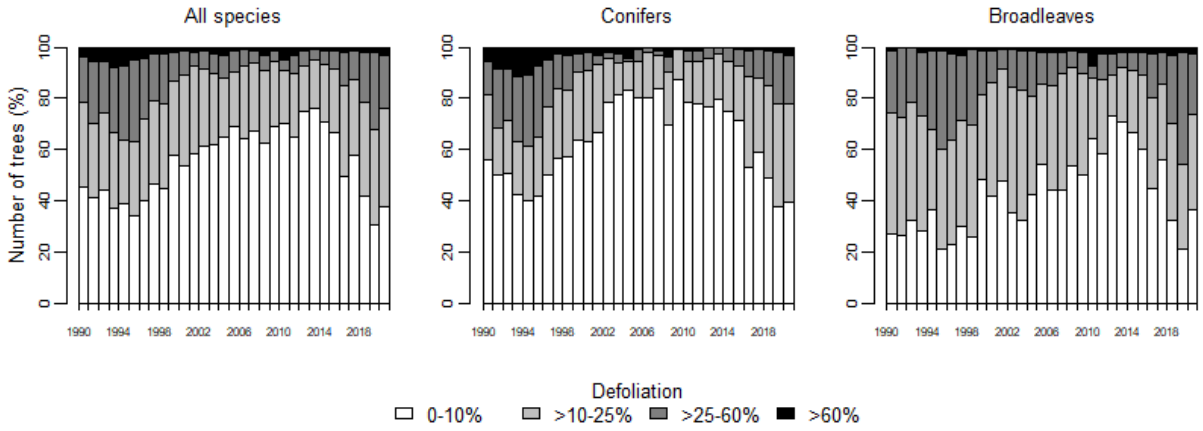

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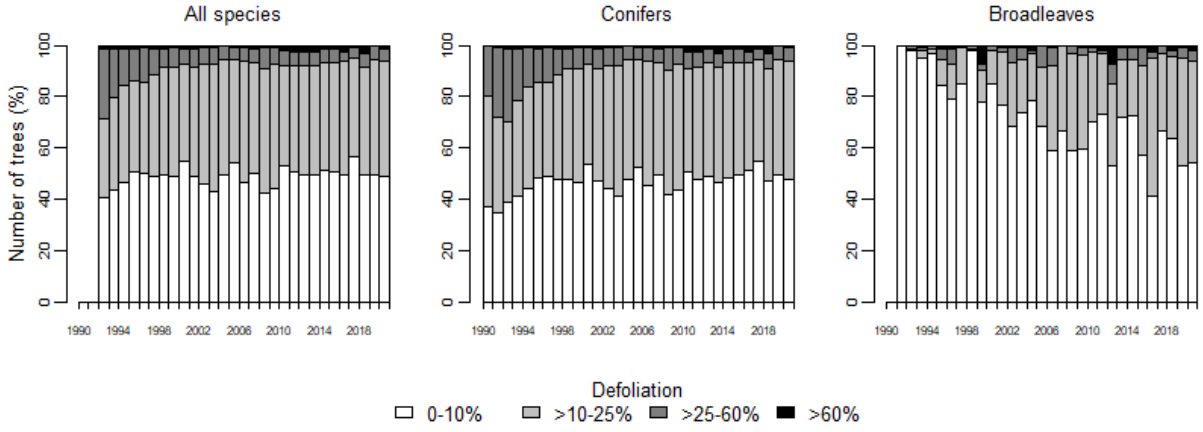

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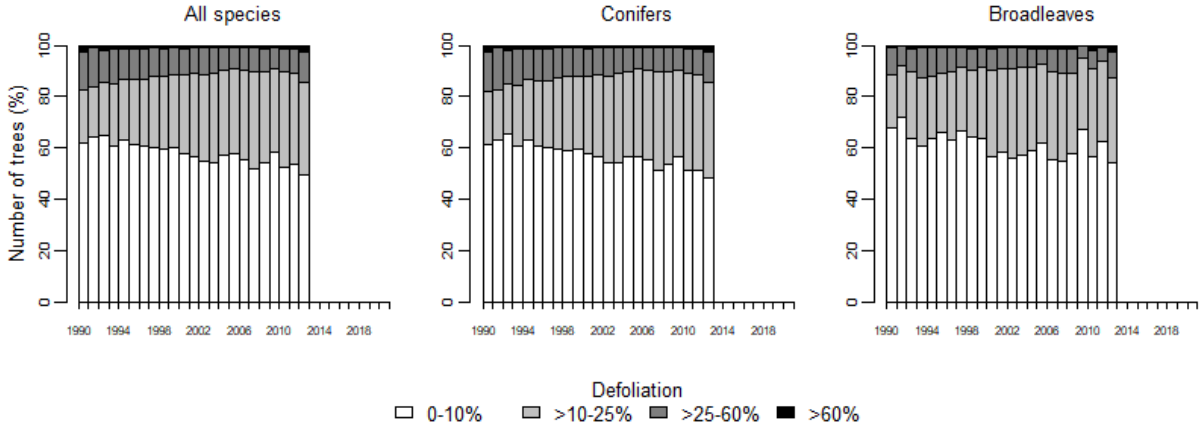

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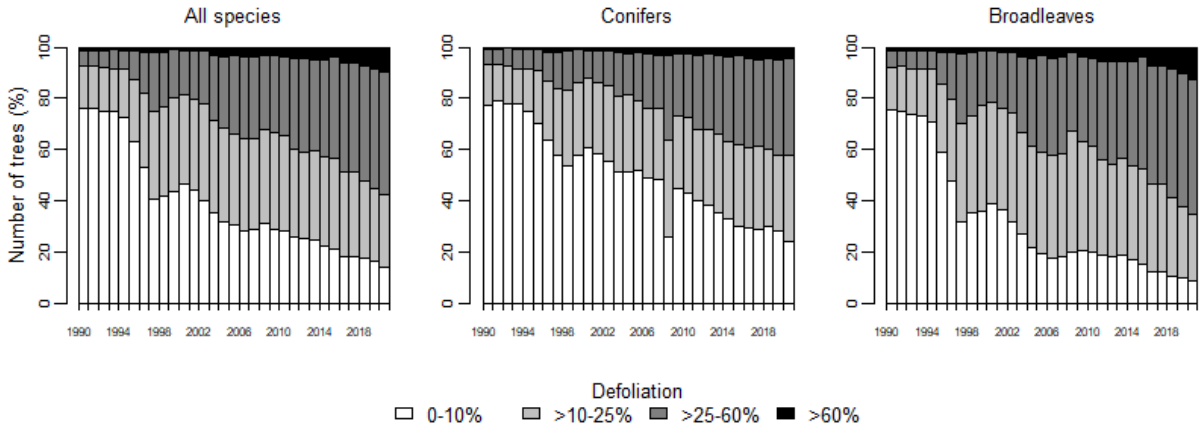
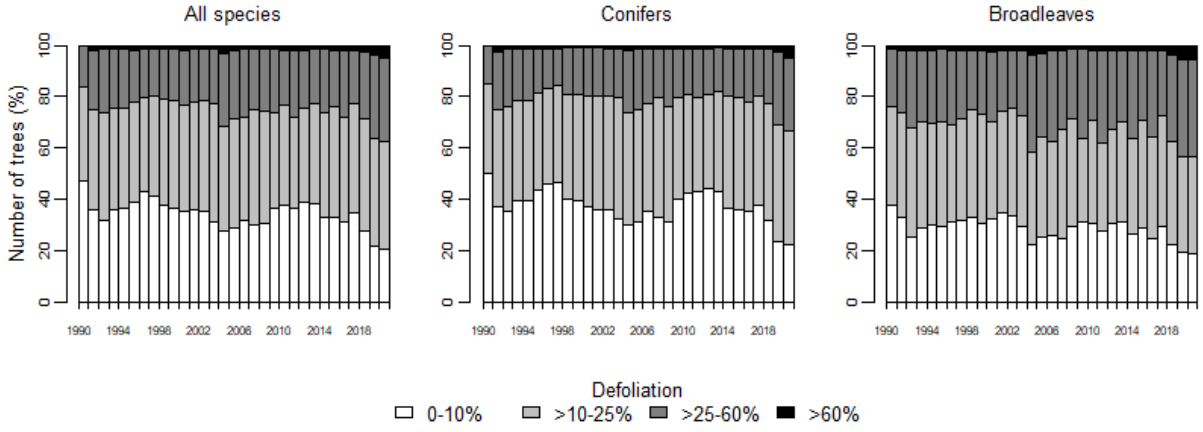


GERMANY



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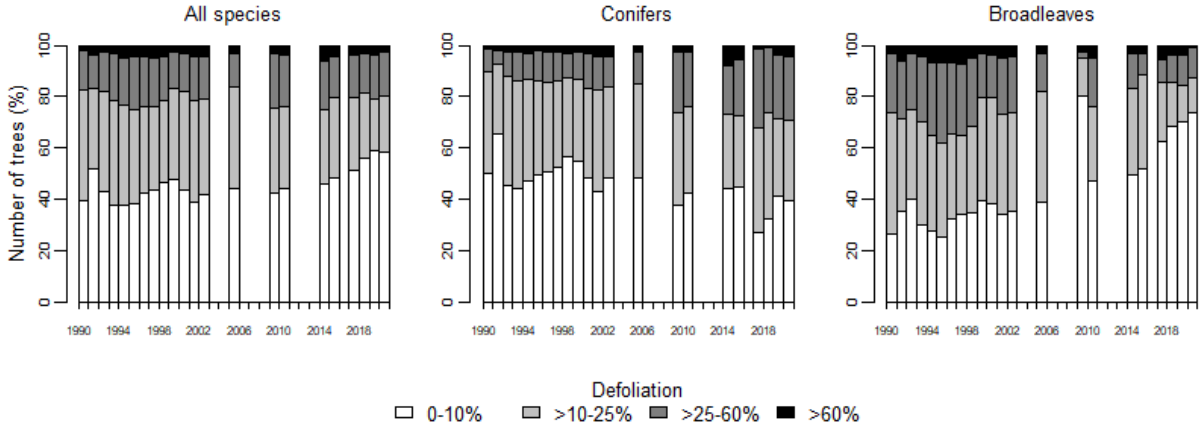

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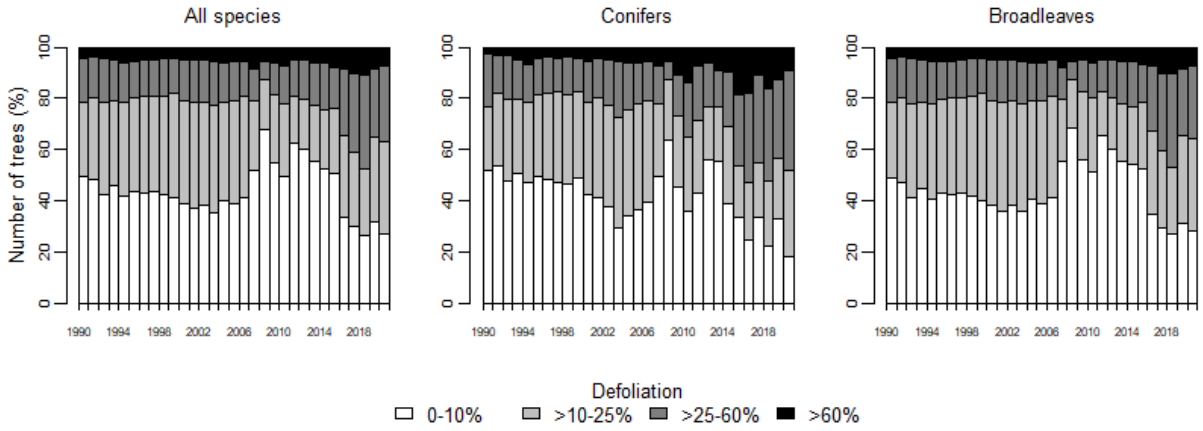

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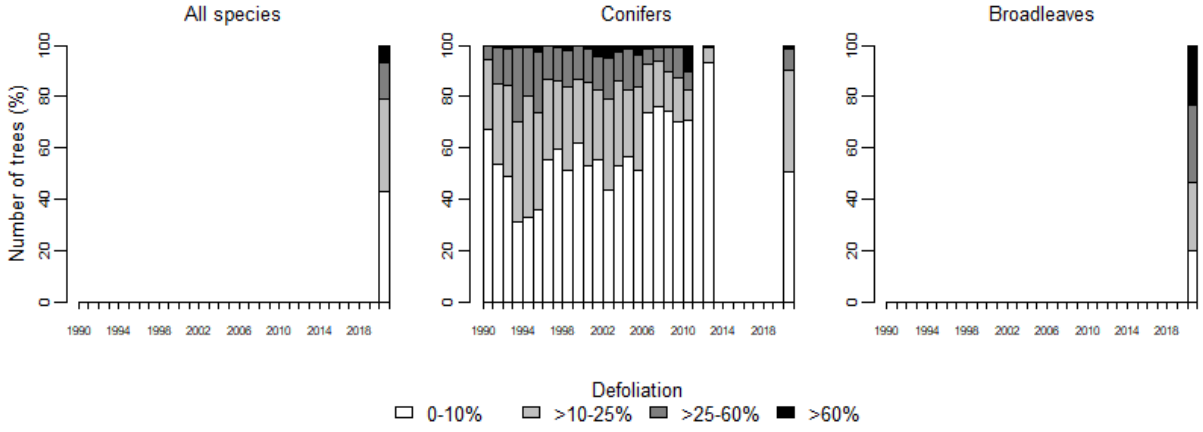

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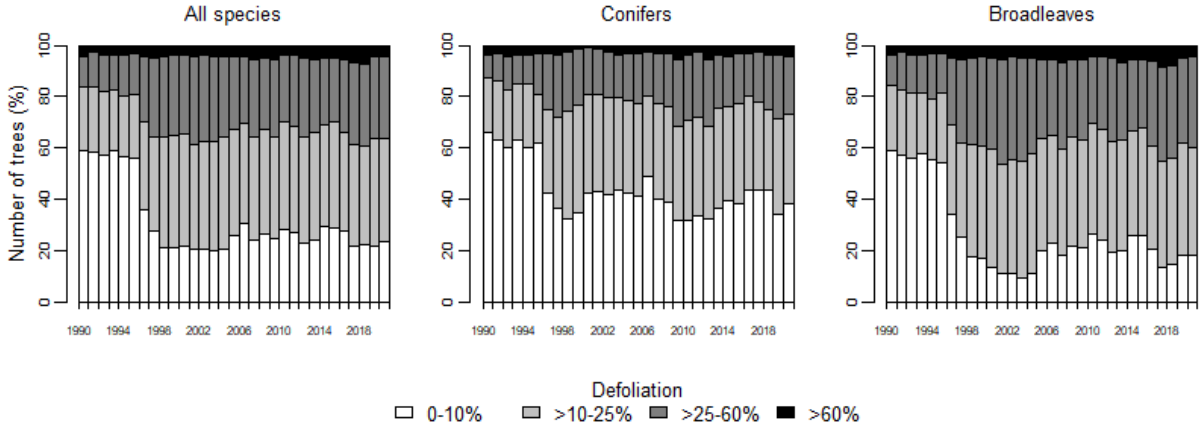

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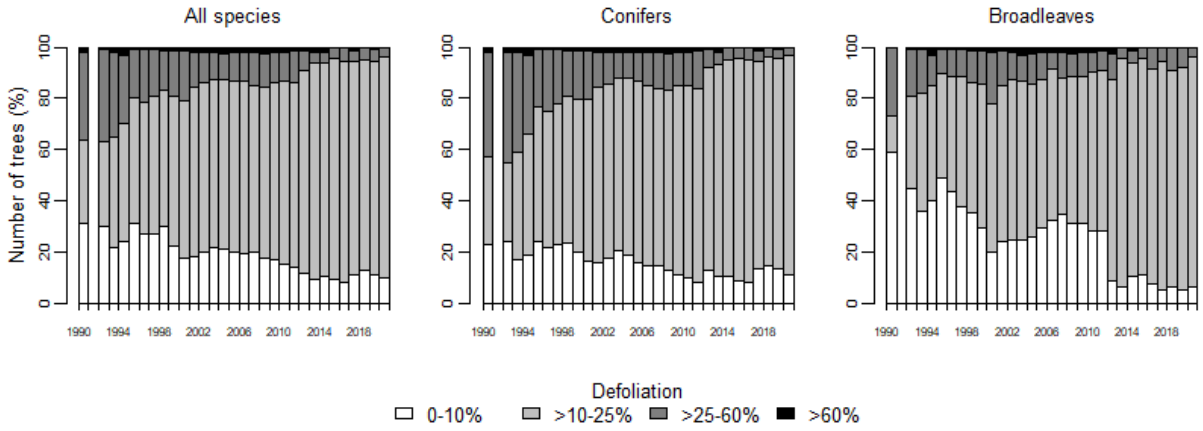

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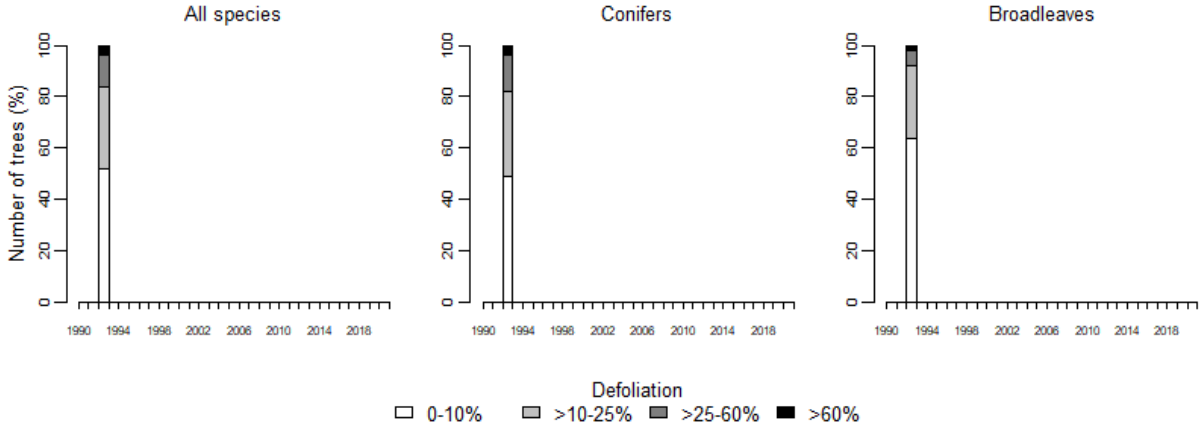

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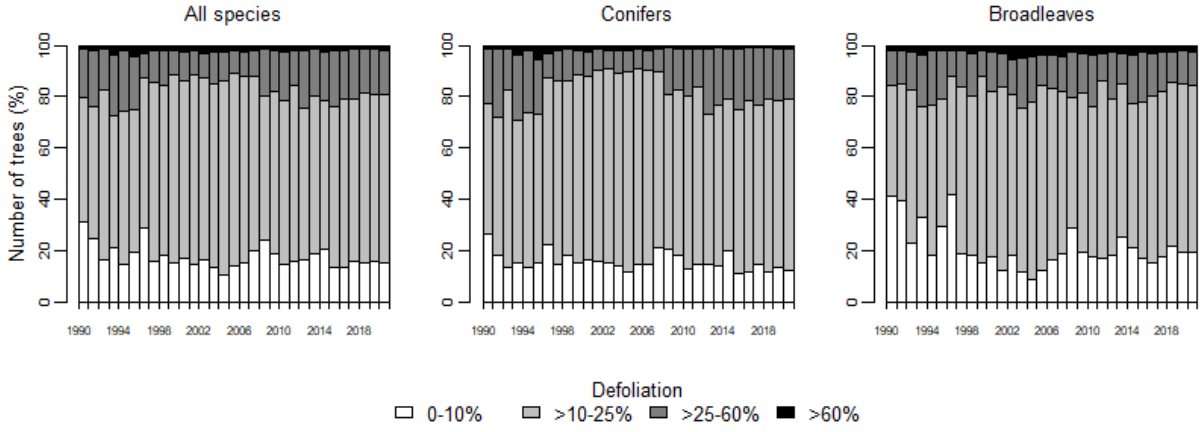

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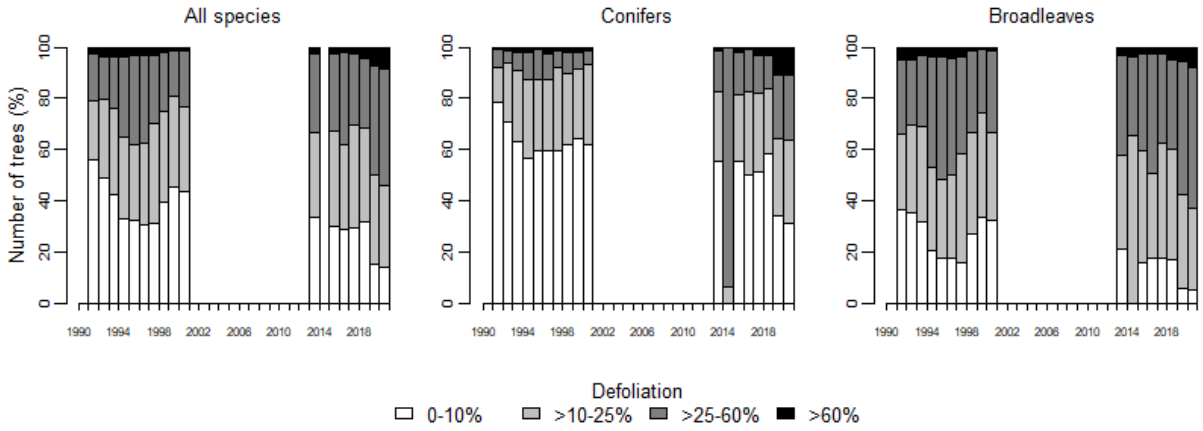

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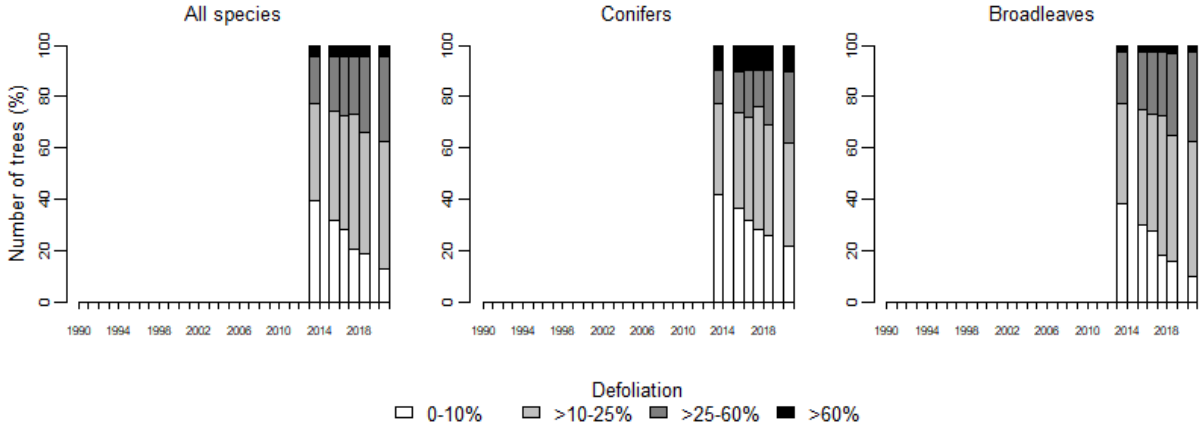

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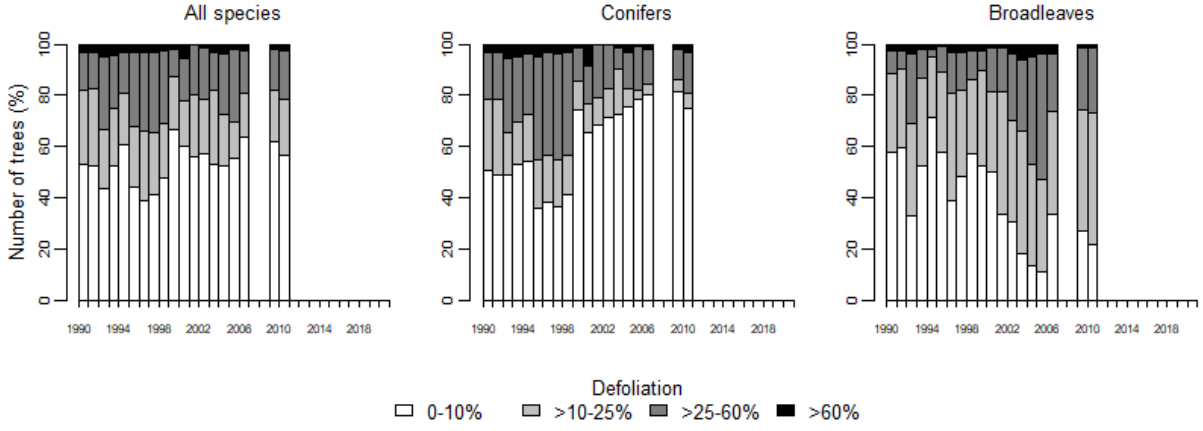

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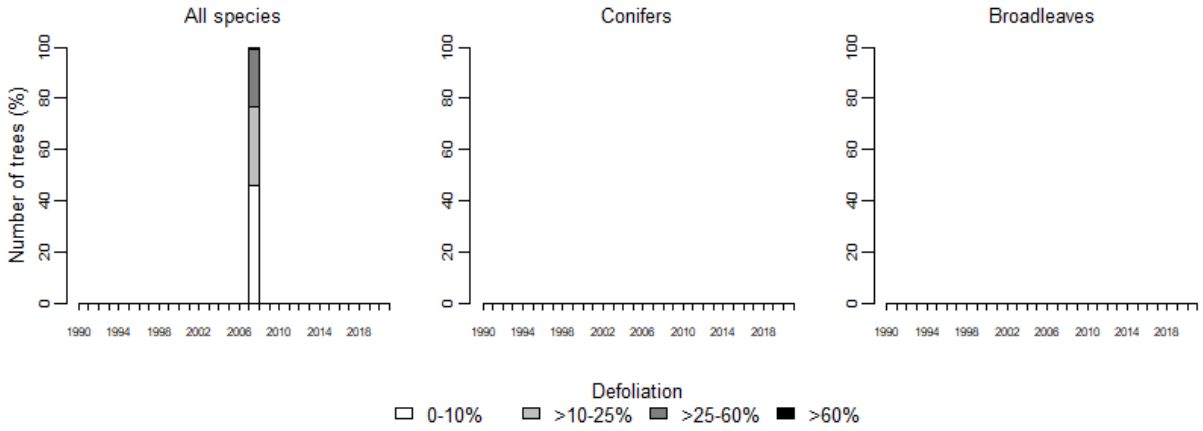

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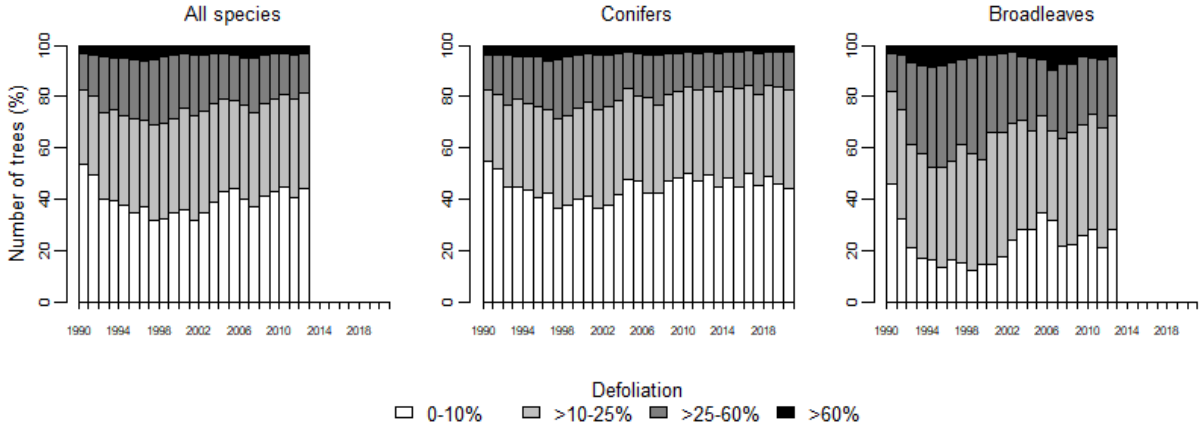

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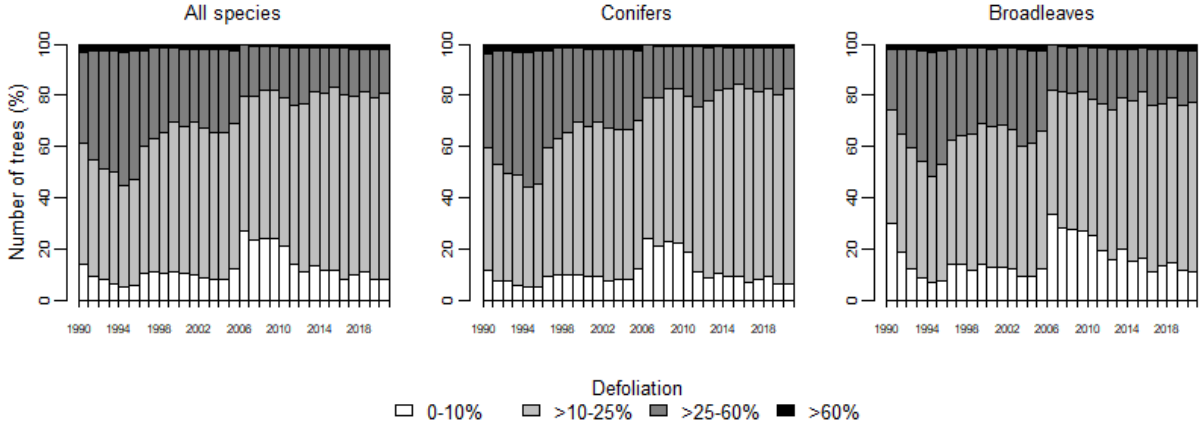

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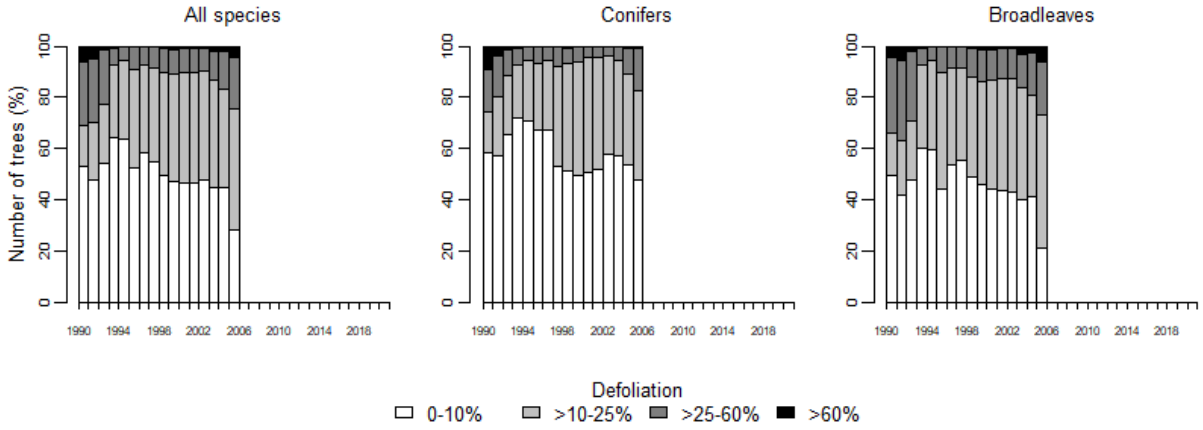

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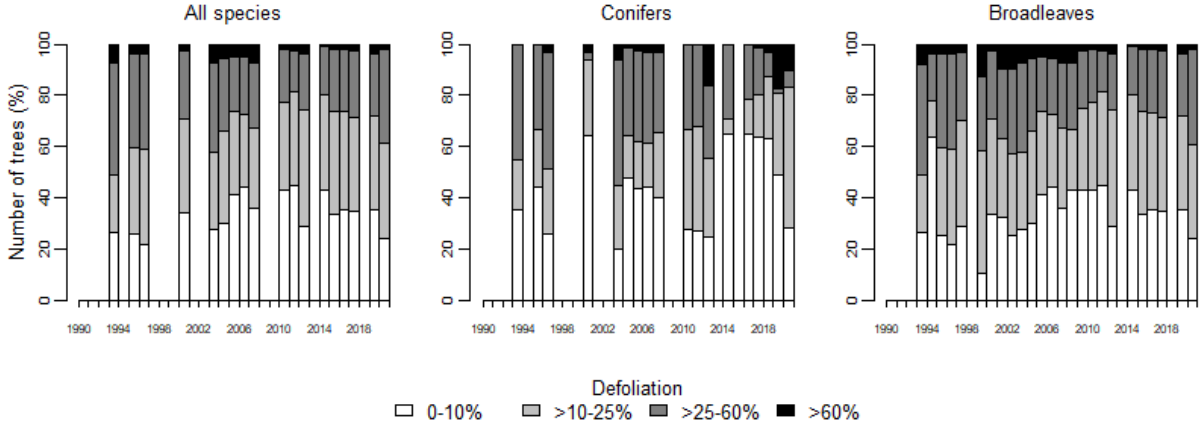

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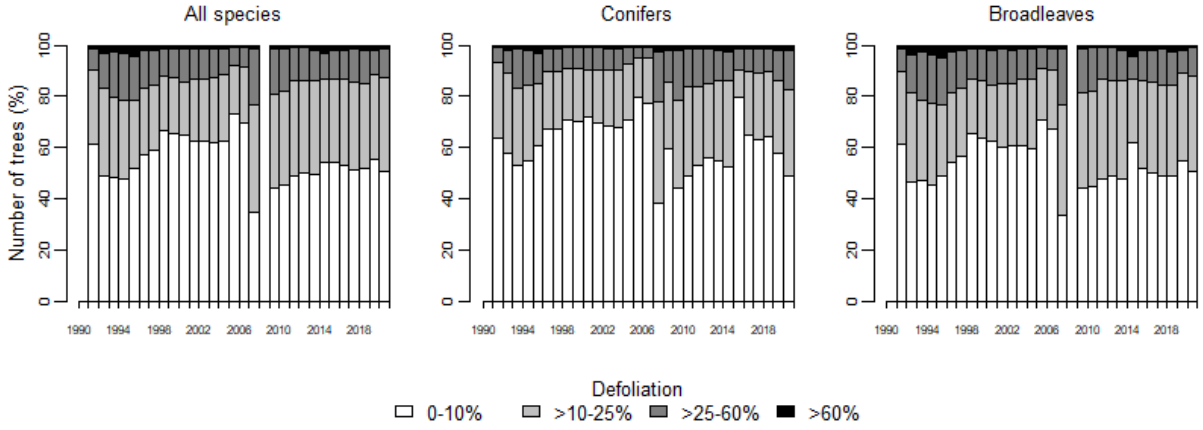
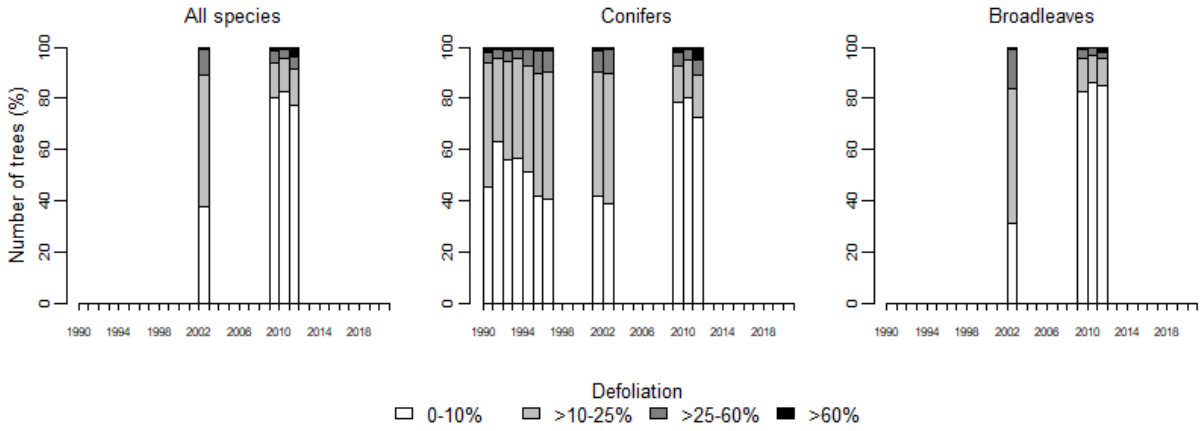


RUSSIAN FEDERATION



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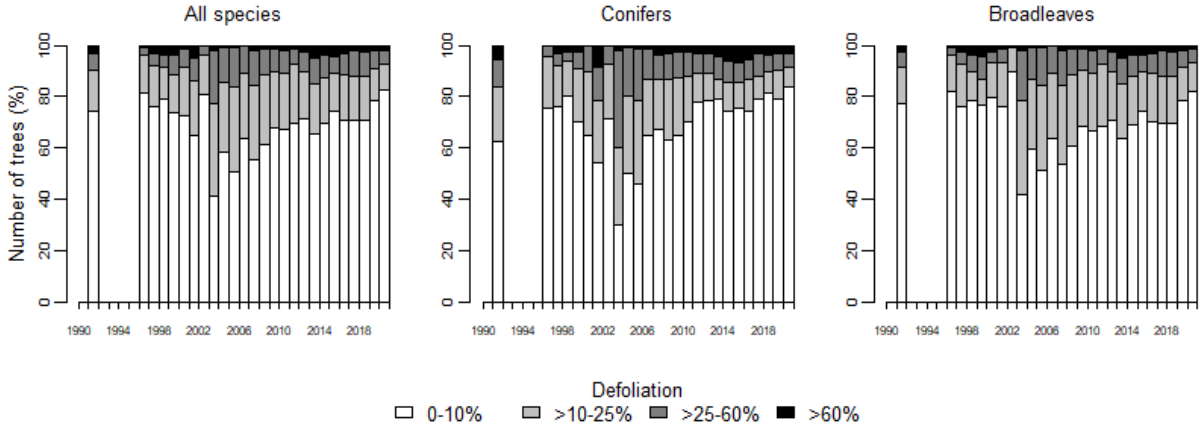

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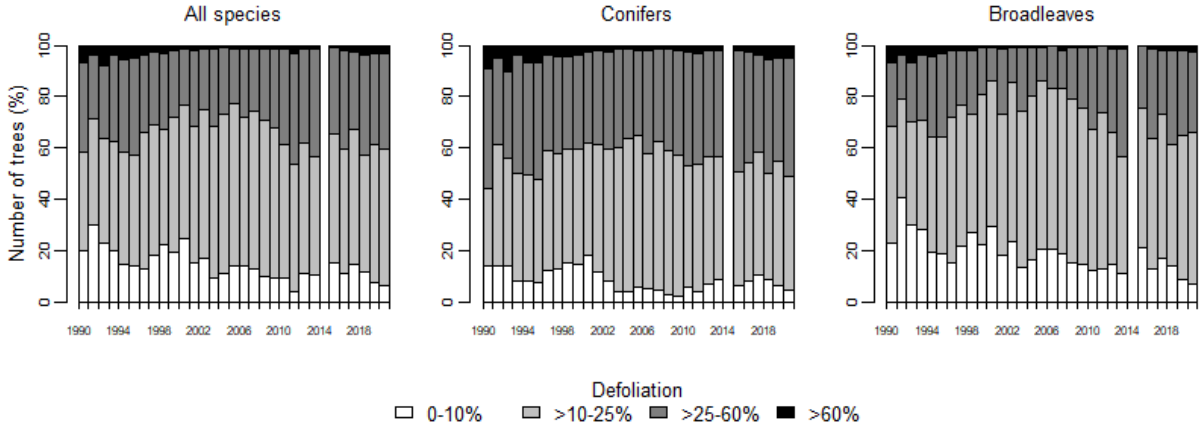

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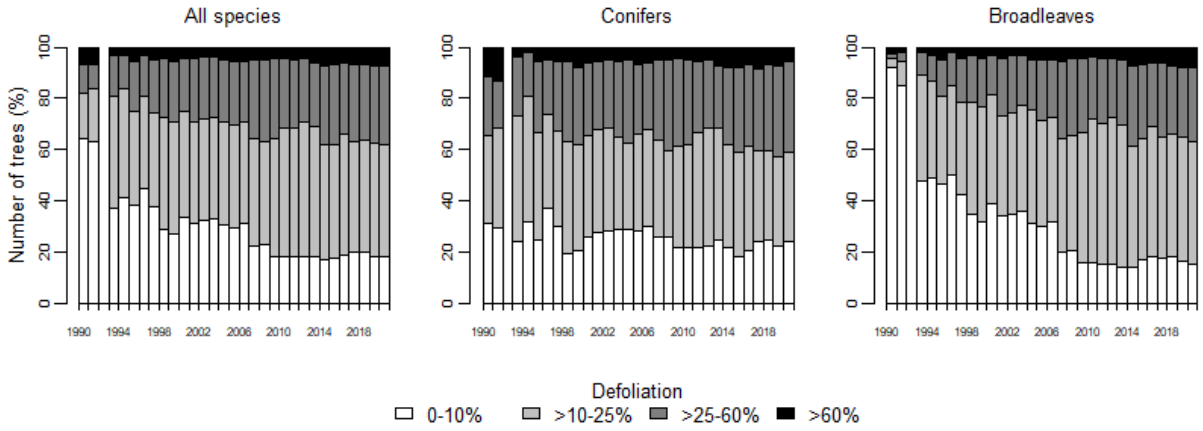

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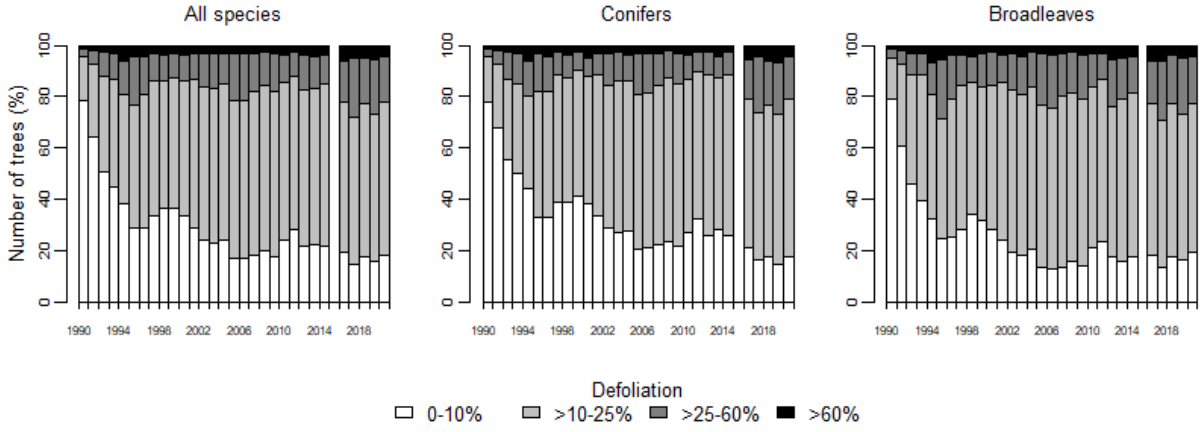

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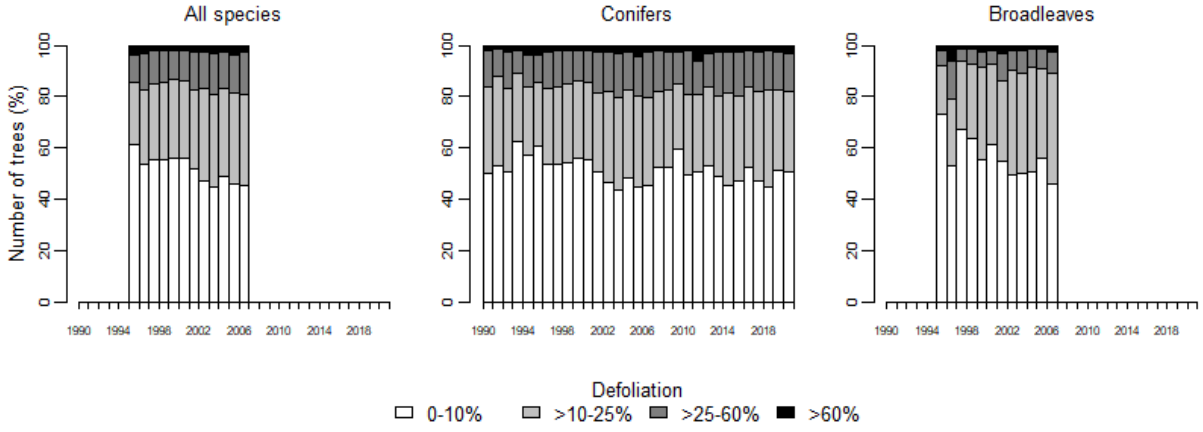
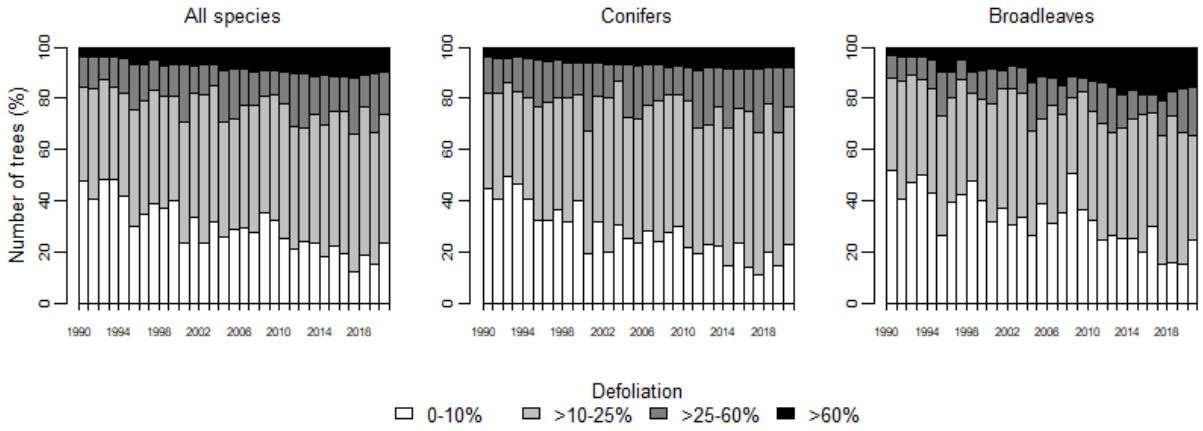


SWITZERLAND



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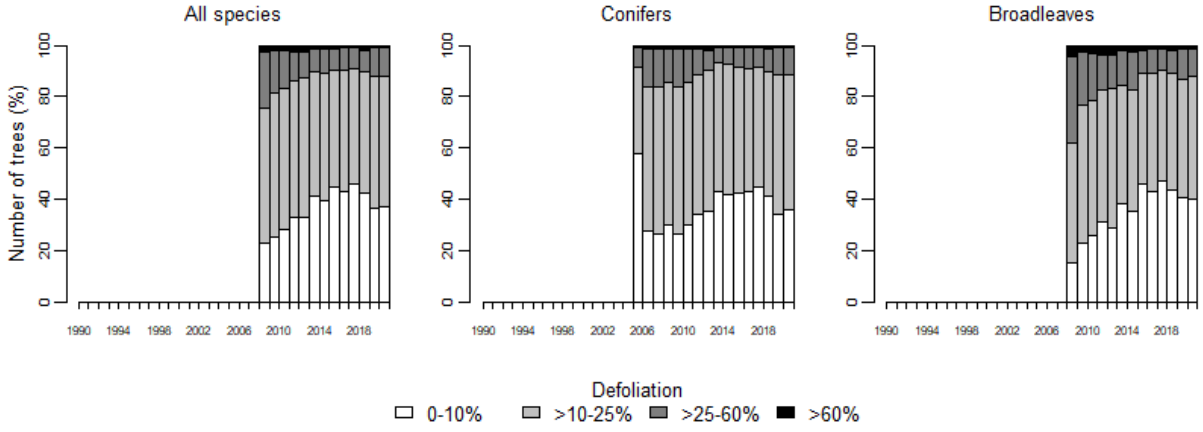

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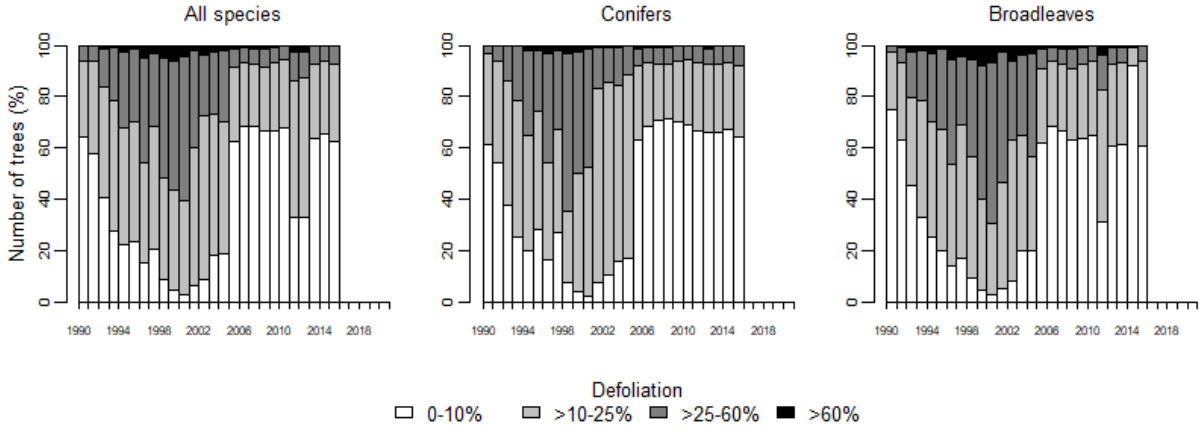

UNITED KINGDOM