Forest Condition in Europe

2019 Technical Report of ICP Forests

Online Supplementary Material

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

Alexa Michel, Anne-Katrin Prescher, and Kai Schwärzel (editors)

Contact

Programme Co-ordinating Centre of ICP Forests
Kai Schwärzel, Head
Thünen Institute of Forest Ecosystems
Alfred-Möller-Str. 1, Haus 41/42
16225 Eberswalde, Germany
Email: pcc-icpforests@thuenen.de

Recommended citation

Michel A, Prescher A-K, Schwärzel K, editors (2019) Forest Condition in Europe: 2019 Technical Report of ICP Forests. Report under the UNECE Convention on Long-range Transboundary Air Pollution (Air Convention). Online supplementary material, 45 p. 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, formerly CLRTAP)
International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)

http://icp-forests.net

LRTAP Long-range Transboundary Air Pollution

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

ICP Forests

CONTENTS

S1 TREE CROWN CONDITION AND DAMAGE CAUSES – ADDITIONAL MAPS 3

S1-1 Mean plot defoliation of main tree species in 2018 3

S1-2 Trends in mean plot defoliation of the main tree species 2011–2018 11

S1-3 Occurrence of various damaging agent groups in 2018 19

S2 RESULTS OF THE NATIONAL CROWN CONDITION SURVEYS 25

S2-1 Tree defoliation (%) in different defoliation classes from national crown condition surveys in 2018 25

S2-2 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – All species 29

S2-3 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – Conifers 30

S2-4 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – Broadleaves 31

S2-5 Change of tree defoliation over time (1990–2018) per country 32

S1 TREE CROWN CONDITION AND DAMAGE CAUSES – ADDITIONAL MAPS

S1-1 Mean plot defoliation of main tree species in 2018

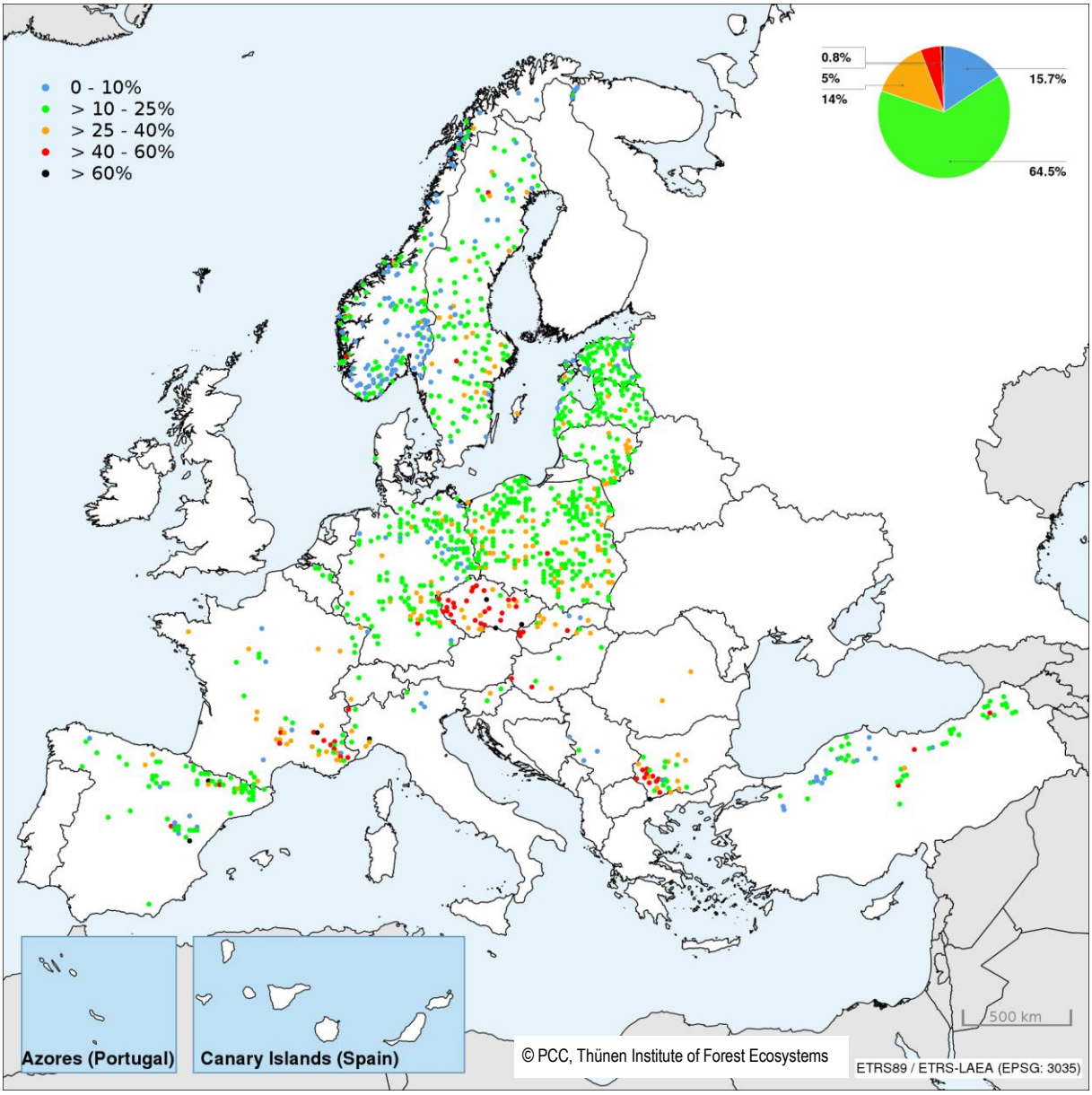


Figure S1-1: Mean plot defoliation of Scots pine (*Pinus sylvestris*) in 2018

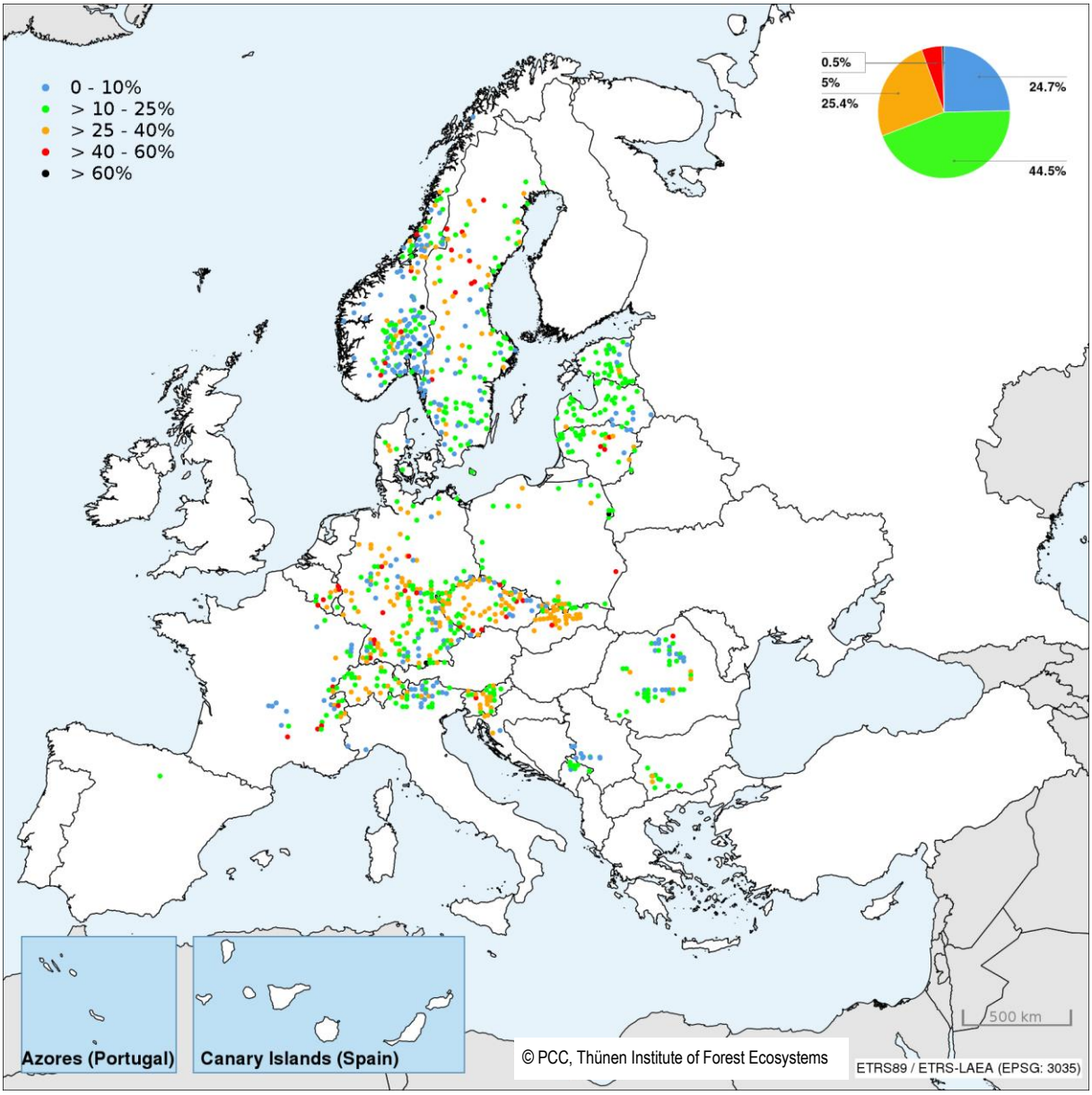


Figure S1-2: Mean plot defoliation of Norway spruce (*Picea abies*) in 2018

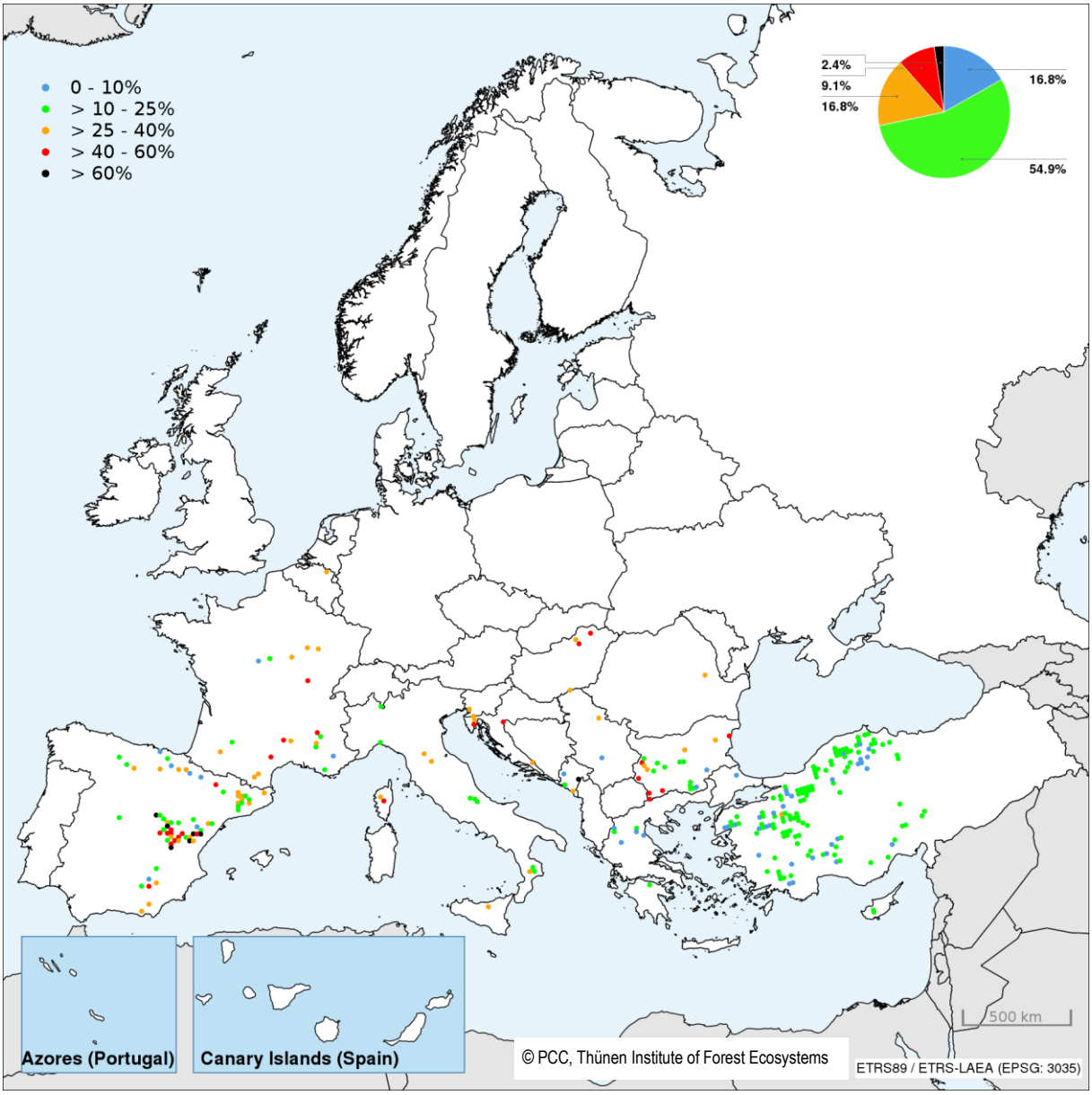


Figure S1-3: Mean plot defoliation of Austrian pine (*Pinus nigra*) in 2018

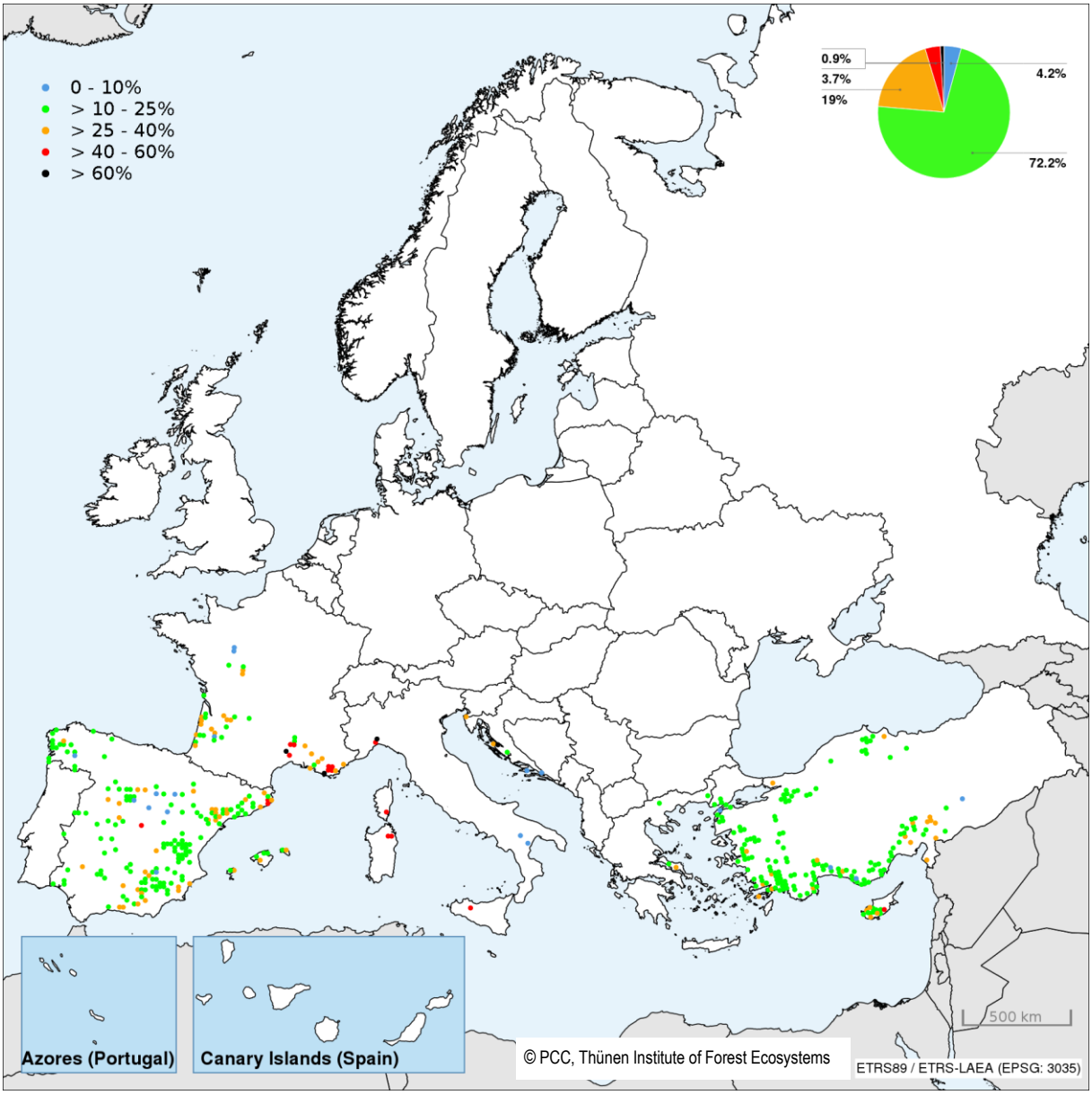


Figure S1-4: Mean plot defoliation of Mediterranean lowland pines (*Pinus halepensis*, *P. pinaster*, *P. pinea*, *P. brutia*) in 2018

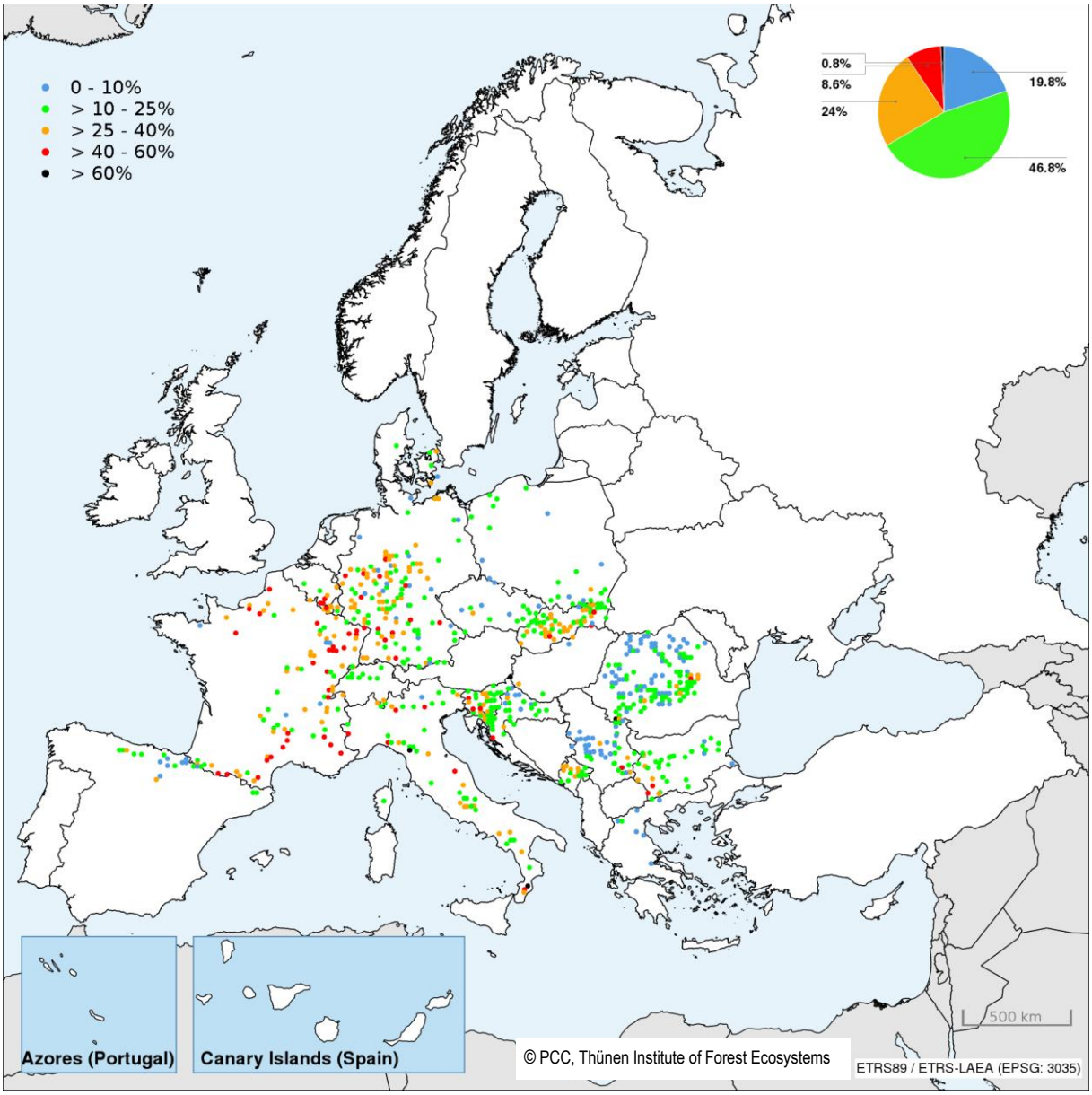


Figure S1-5: Mean plot defoliation of common beech (*Fagus sylvatica*) in 2018

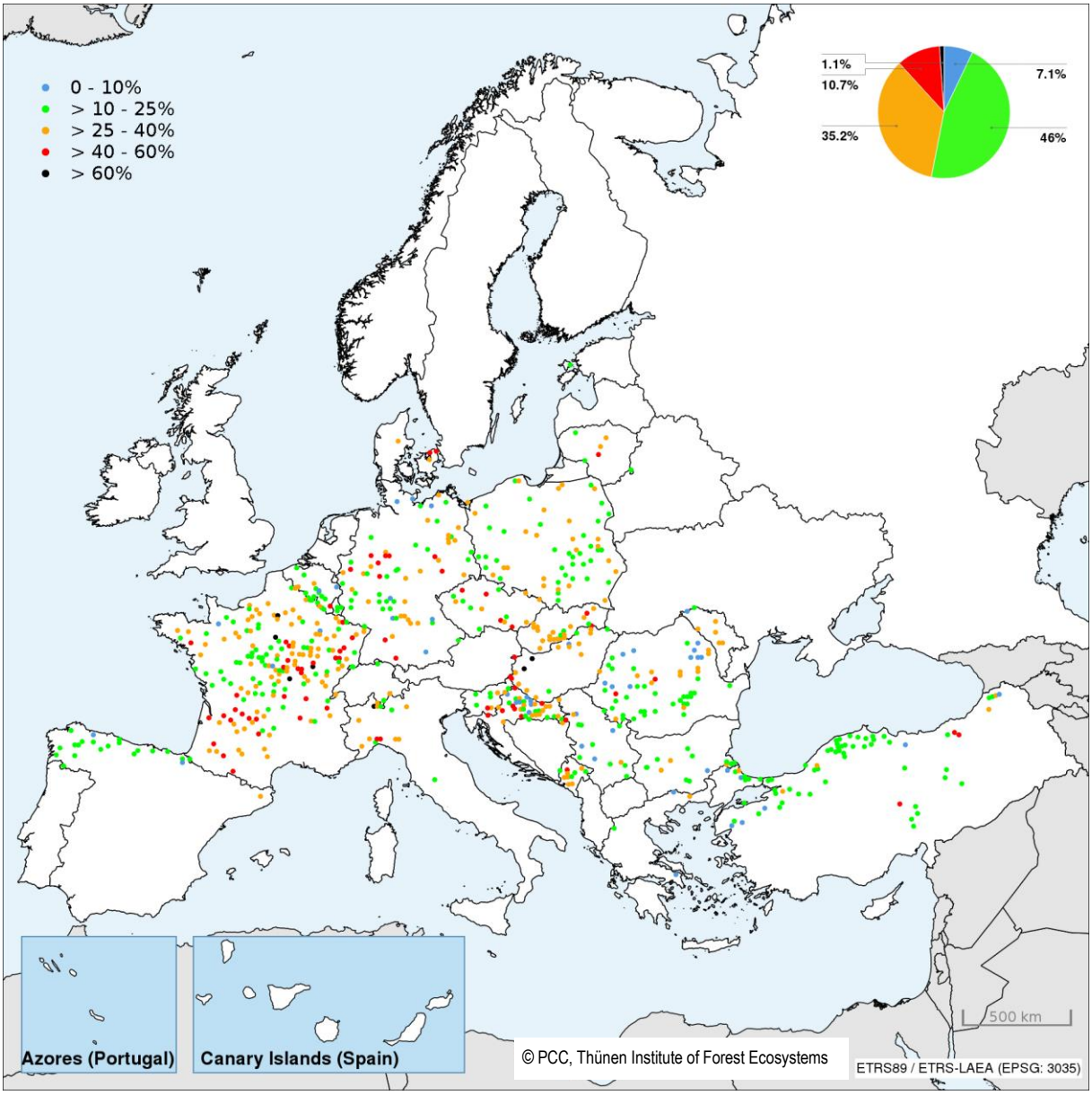


Figure S1-6: Mean plot defoliation of deciduous temperate oaks (*Quercus robur* and *Q. petraea*) in 2018

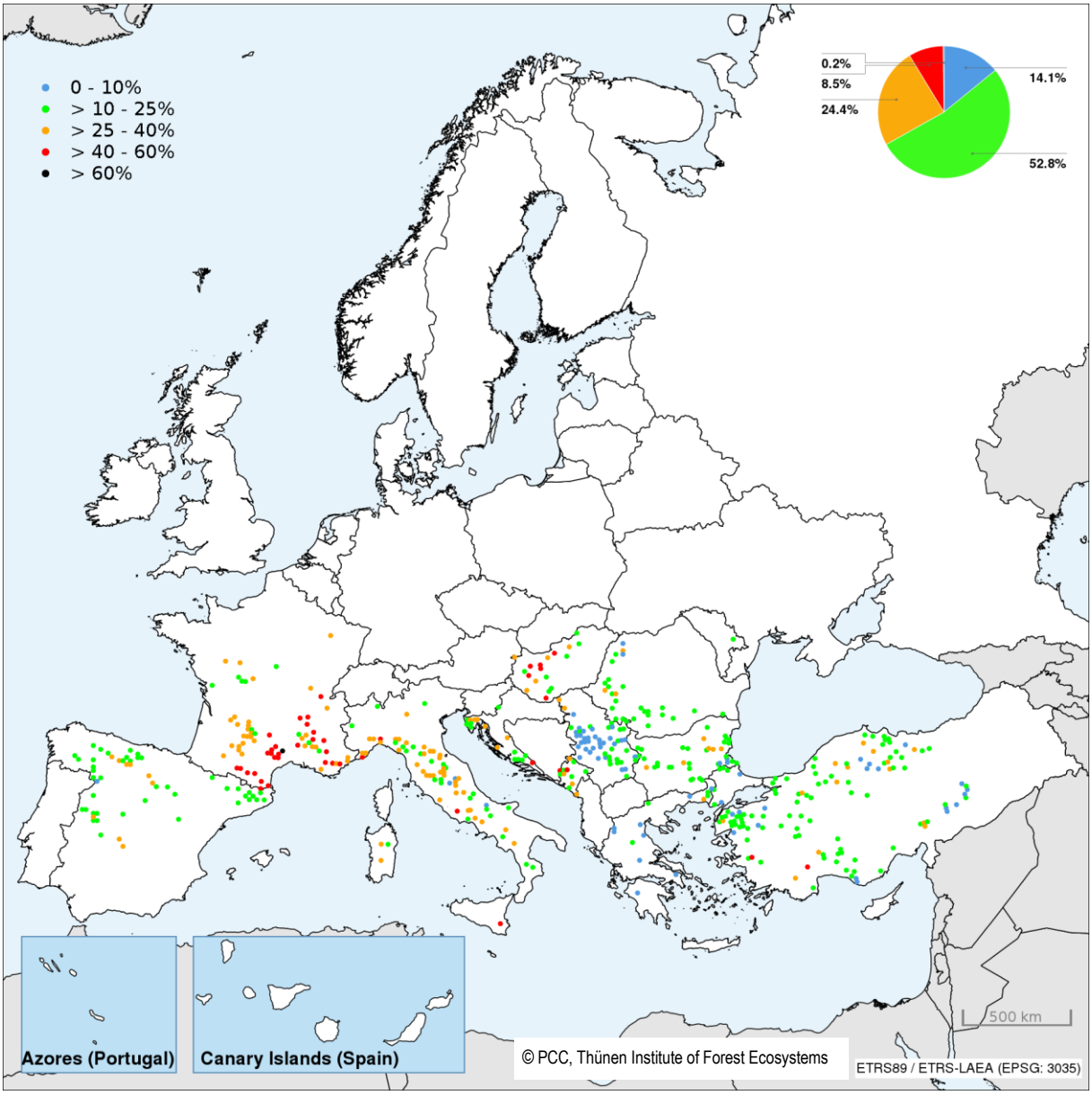


Figure S1-7: Mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris*, *Q. frainetto*, *Q. pubescens*, *Q. pyrenaica*) in 2018

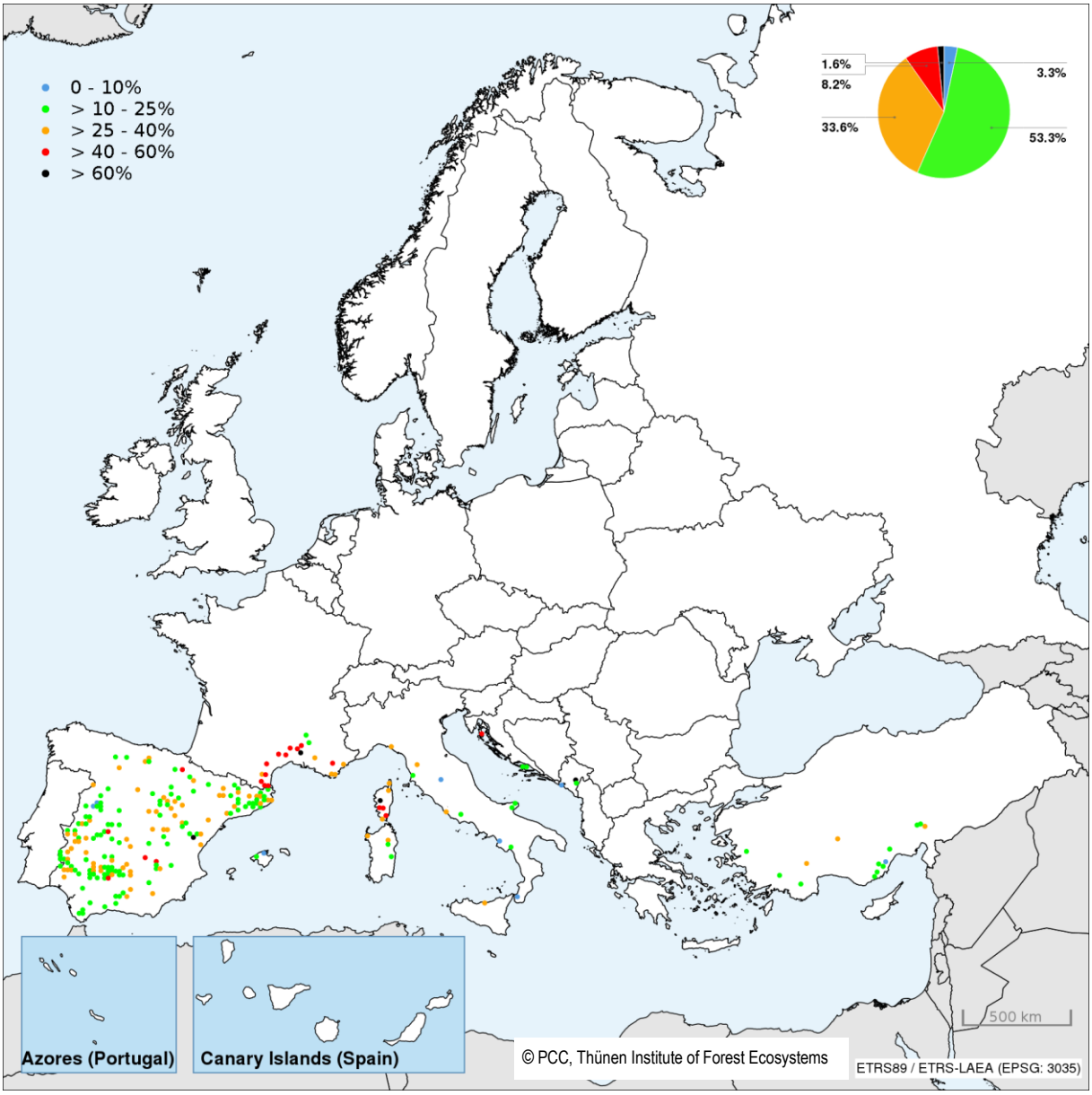


Figure S1-8: Mean plot defoliation of evergreen oaks (*Quercus coccifera*, *Q. ilex*, *Q. rotundifolia*, *Q. suber*) in 2018

S1-2 Trends in mean plot defoliation of the main tree species 2011–2018

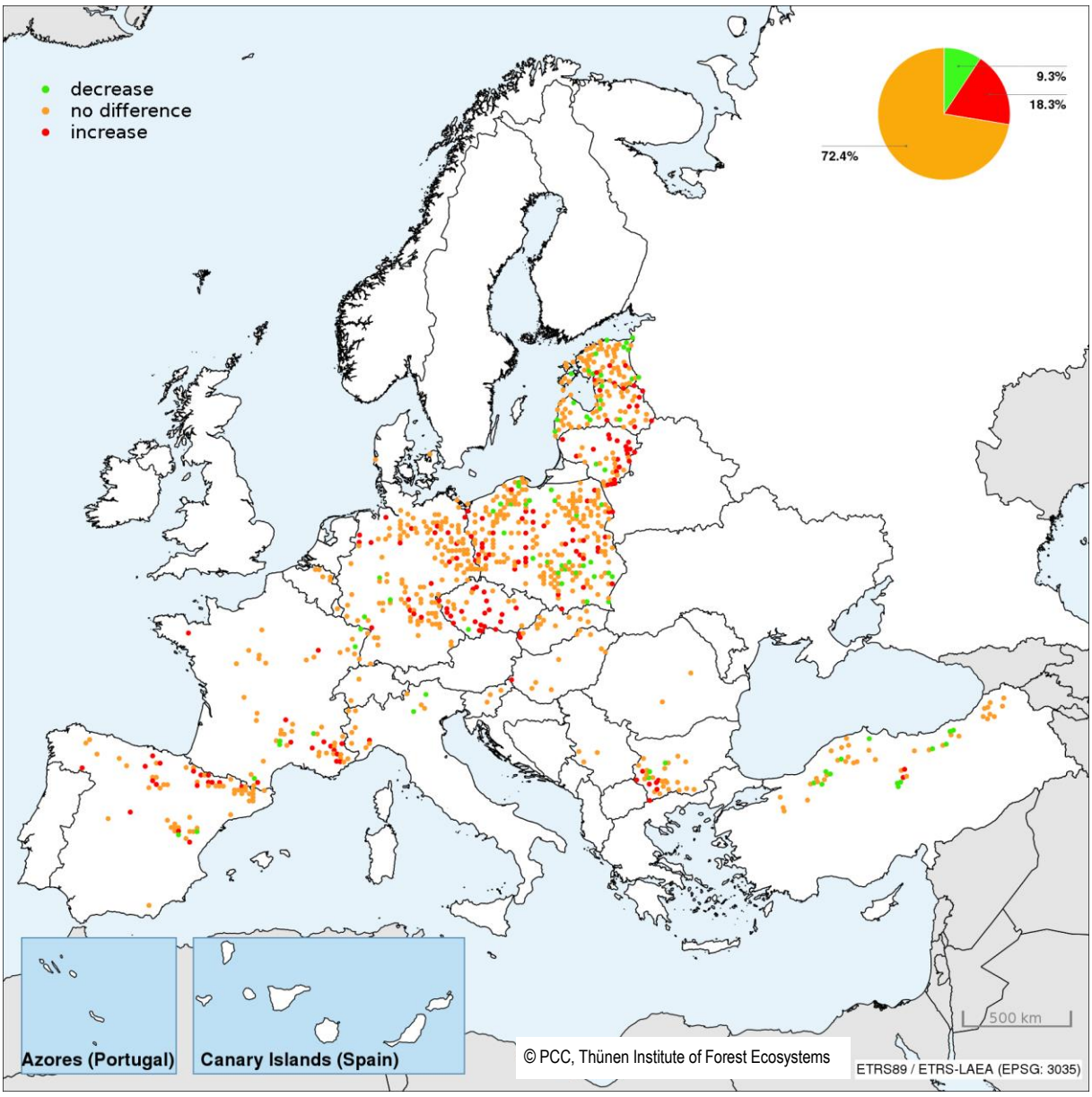


Figure S1-9: Trends in mean plot defoliation of Scots pine (*Pinus sylvestris*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

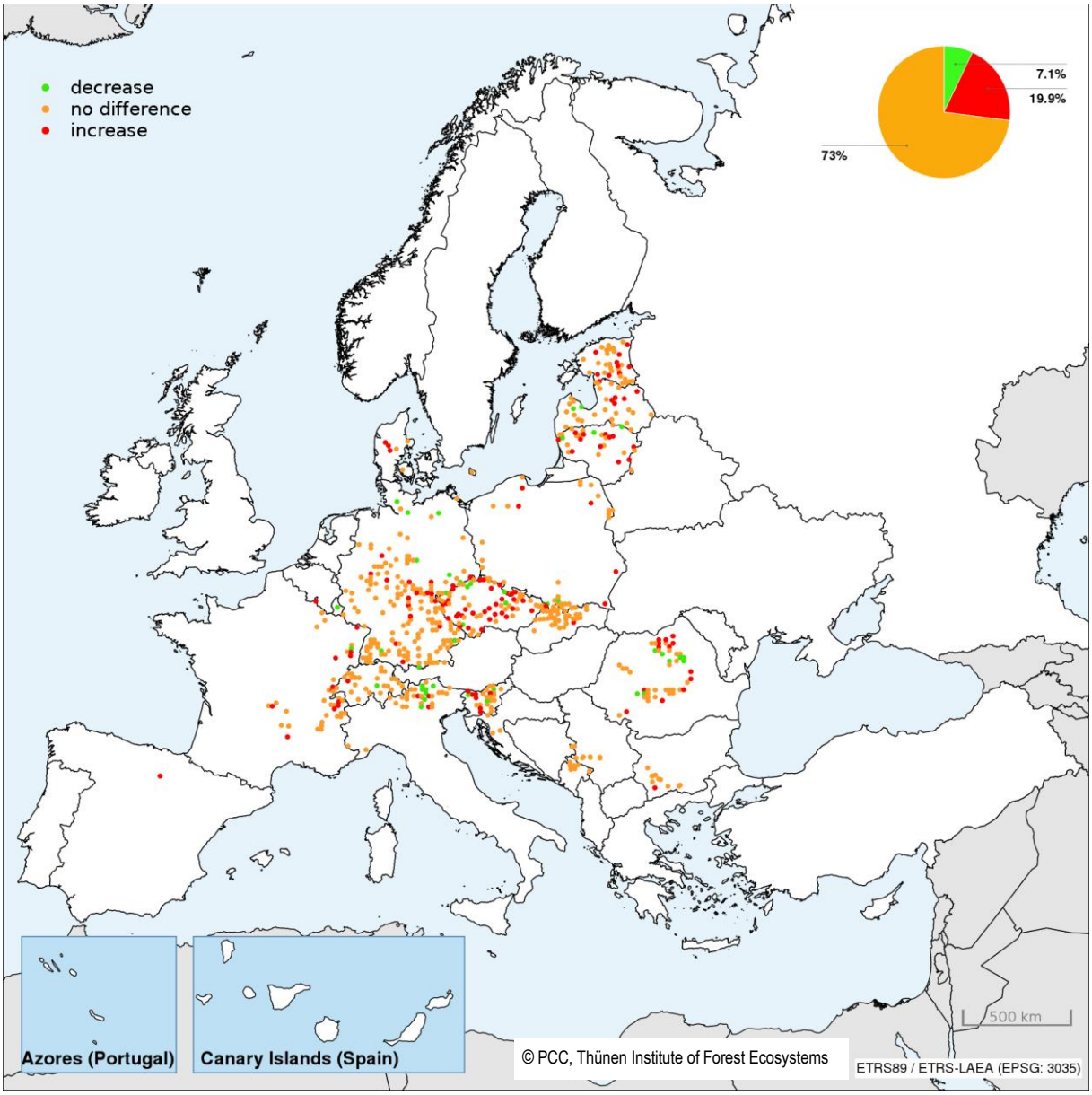


Figure S1-10: Trends in mean plot defoliation of Norway spruce (*Picea abies*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

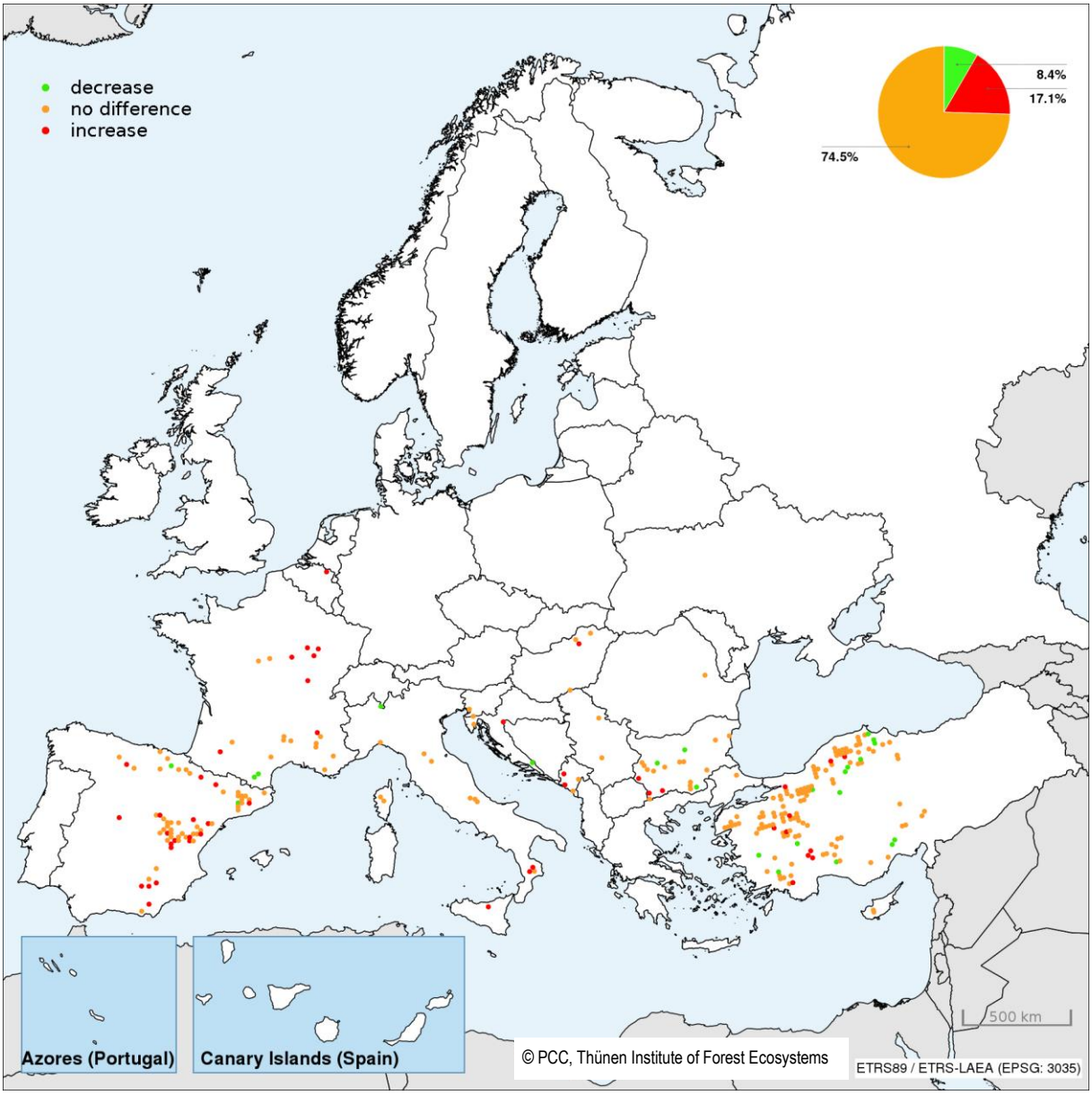


Figure S1-11: Trends in mean plot defoliation of Austrian pine (*Pinus nigra*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

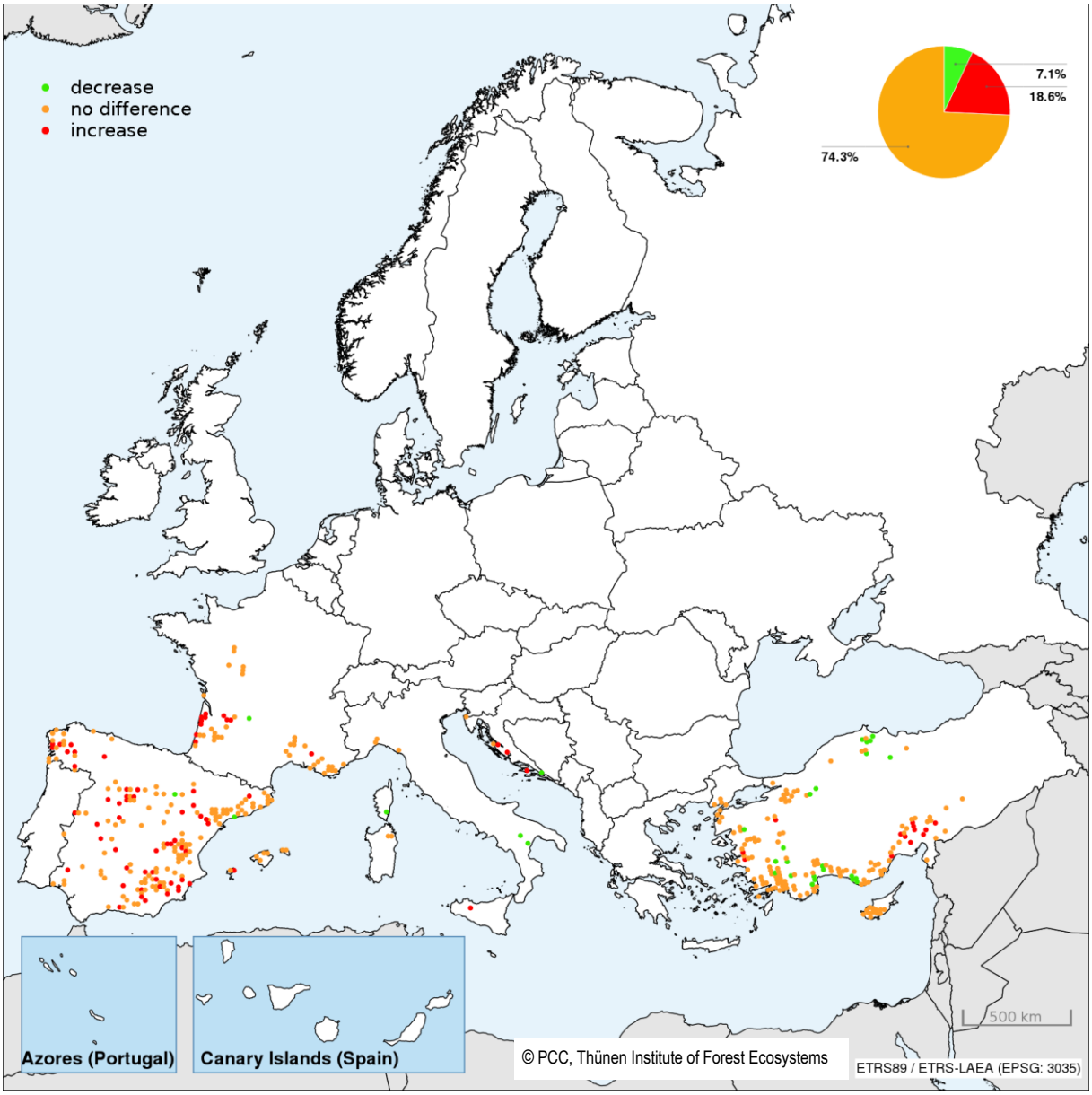


Figure S1-12: Trends in mean plot defoliation of Mediterranean lowland pines (*Pinus brutia*, *P. halepensis*, *P. pinaster*, *P. pinea*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

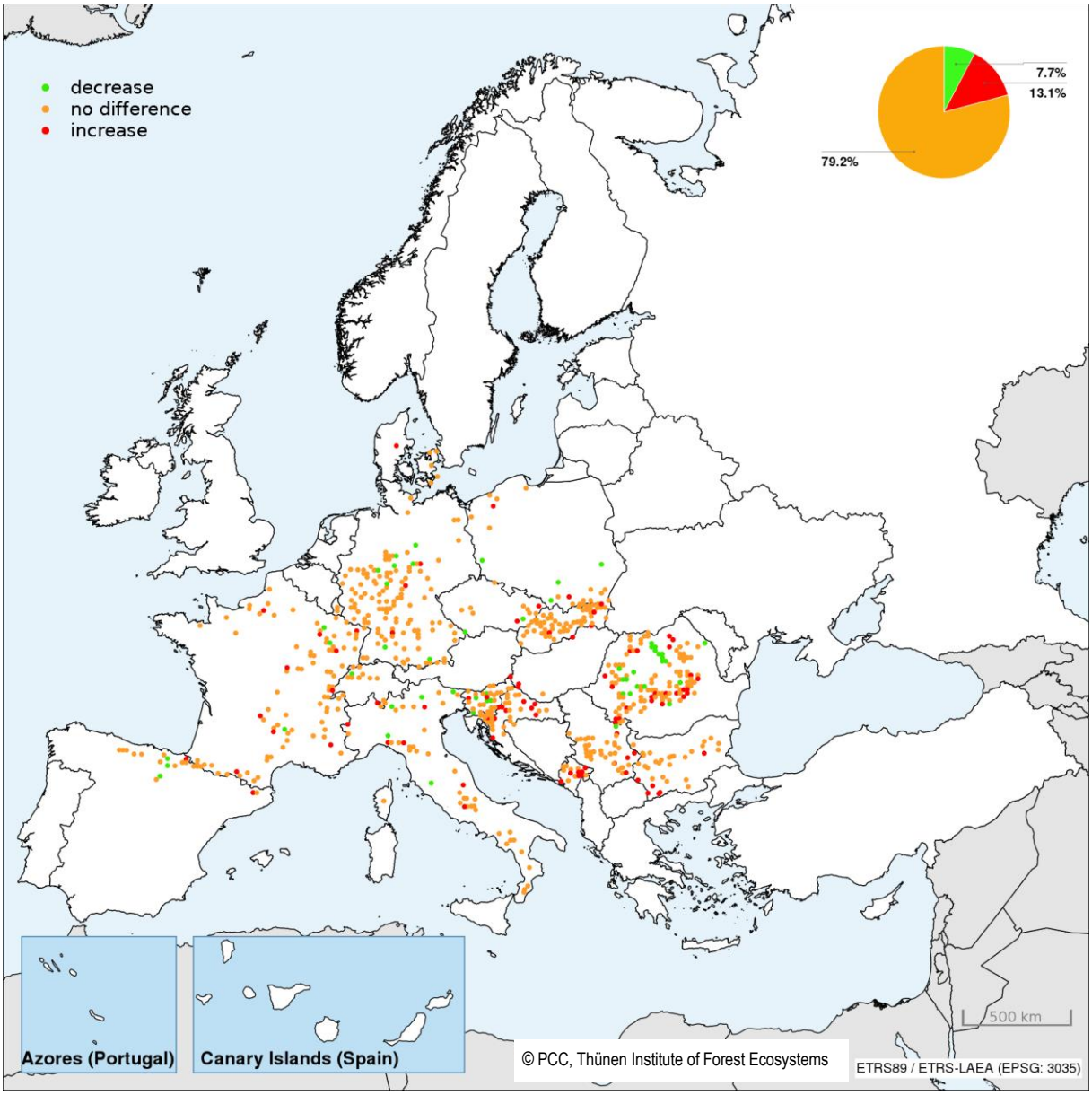


Figure S1-13: Trends in mean plot defoliation of common beech (*Fagus sylvatica*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

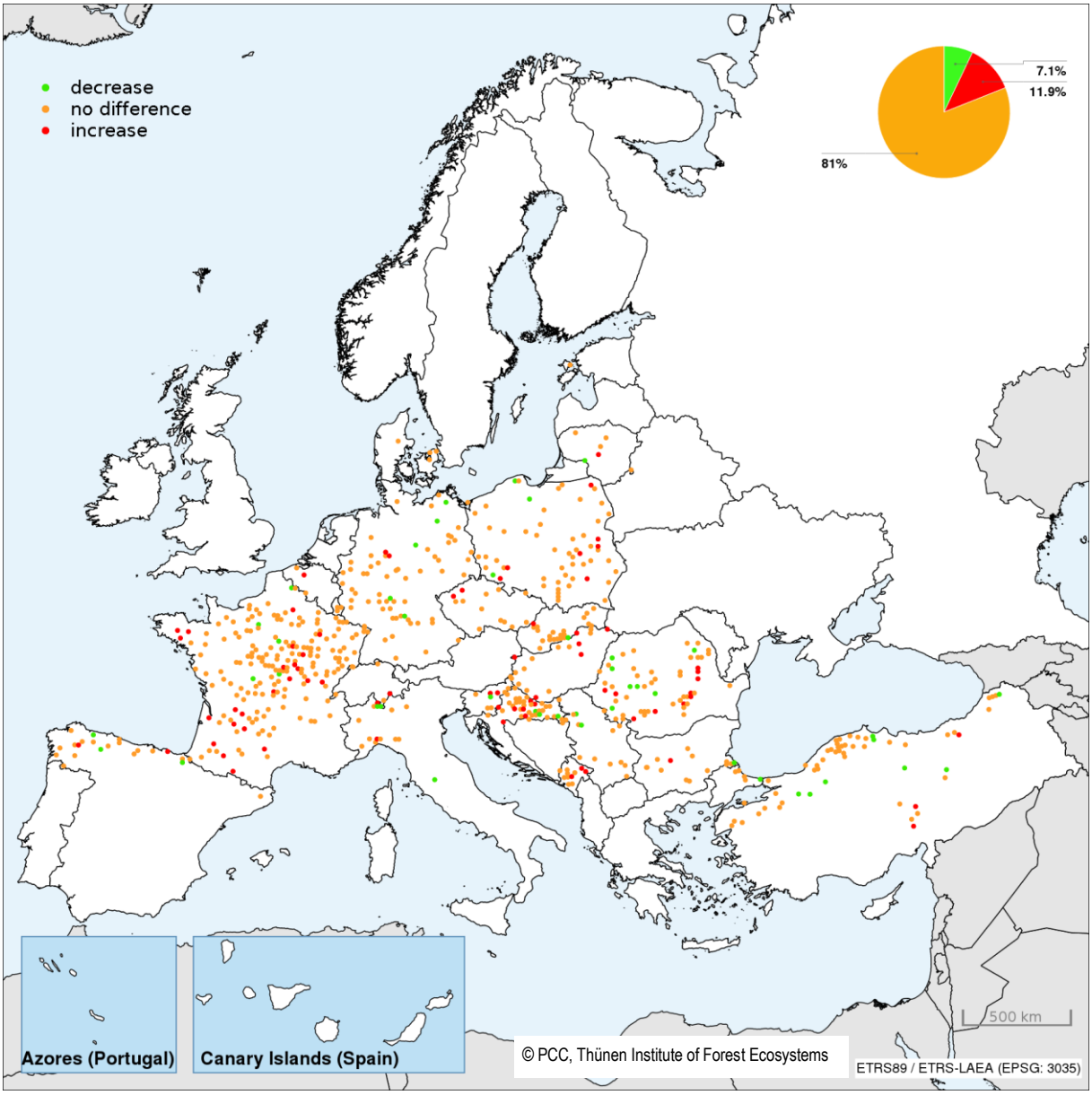


Figure S1-14: Trends in mean plot defoliation of deciduous temperate oaks (*Quercus robur* and *Q. petraea*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

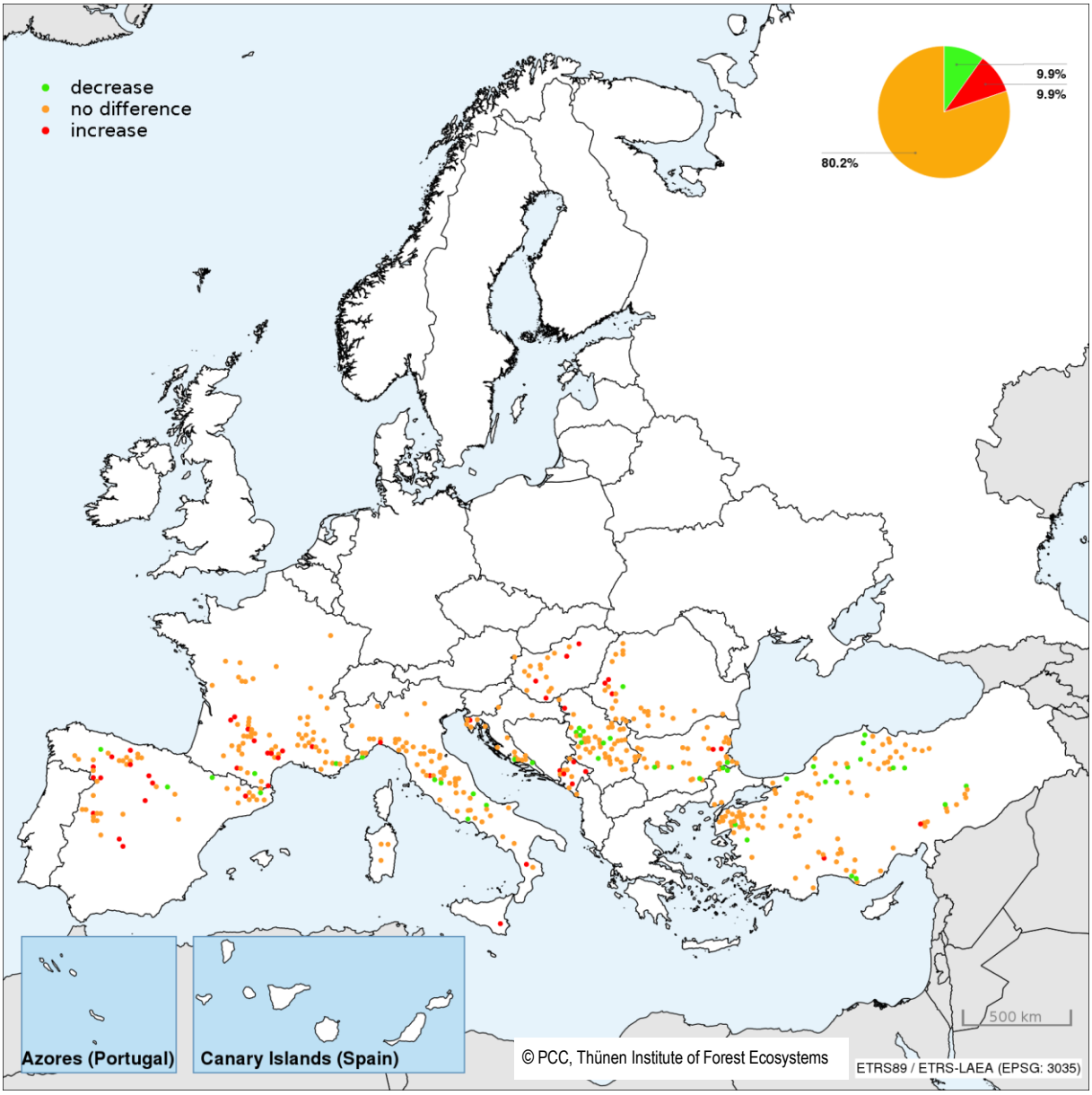


Figure S1-15: Trends in mean plot defoliation of deciduous (sub-) Mediterranean oaks (*Quercus cerris*, *Q. frainetto*, *Q. pubescens*, *Q. pyrenaica*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

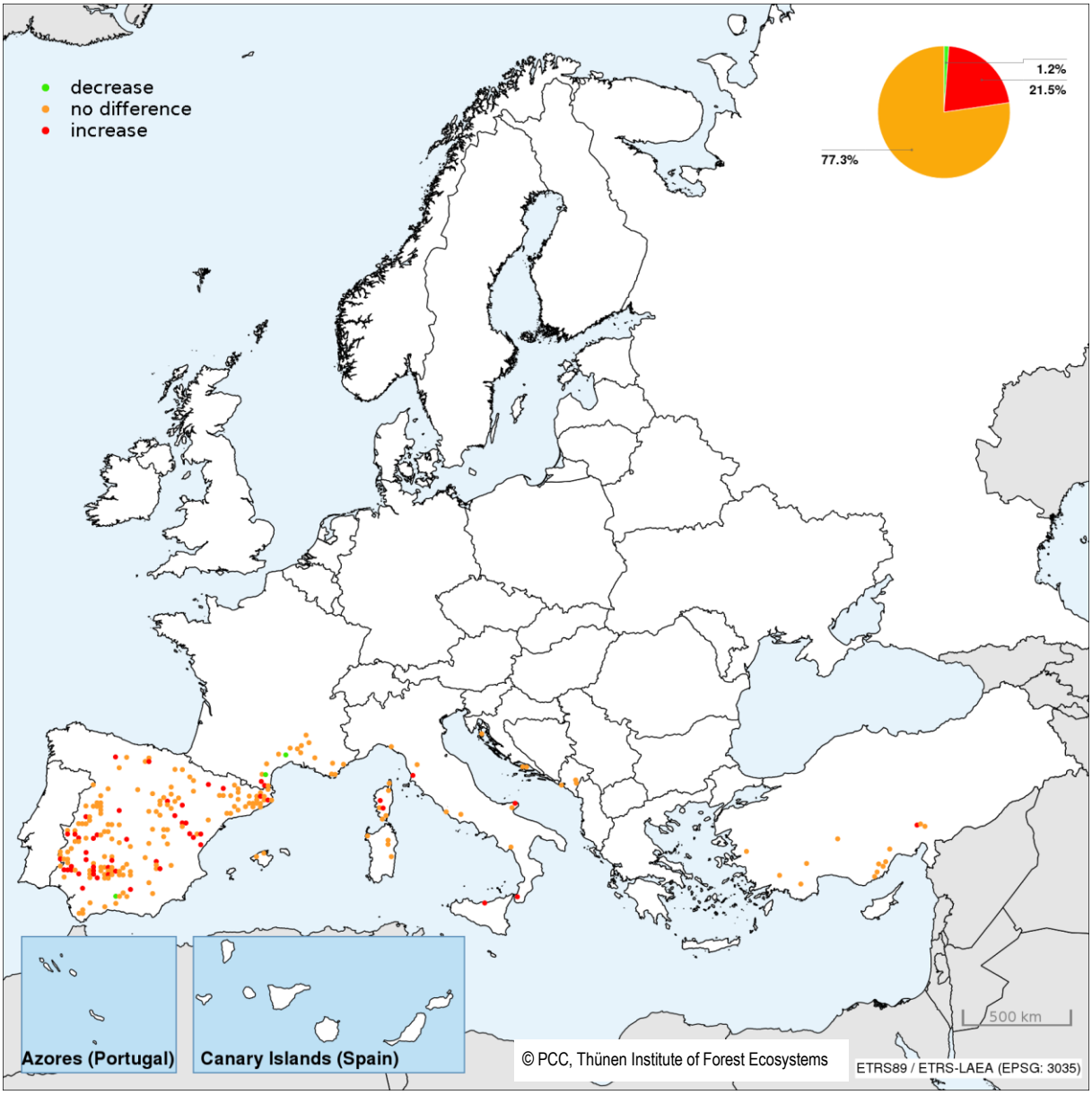


Figure S1-16: Trends in mean plot defoliation of evergreen oaks (*Quercus coccifera*, *Q ilex, Q. rotundifolia*, *Q. suber*) between 2011 and 2018. Plots were included if assessments were available for at least 80% of the period.

S1-3 Occurrence of various damaging agent groups in 2018

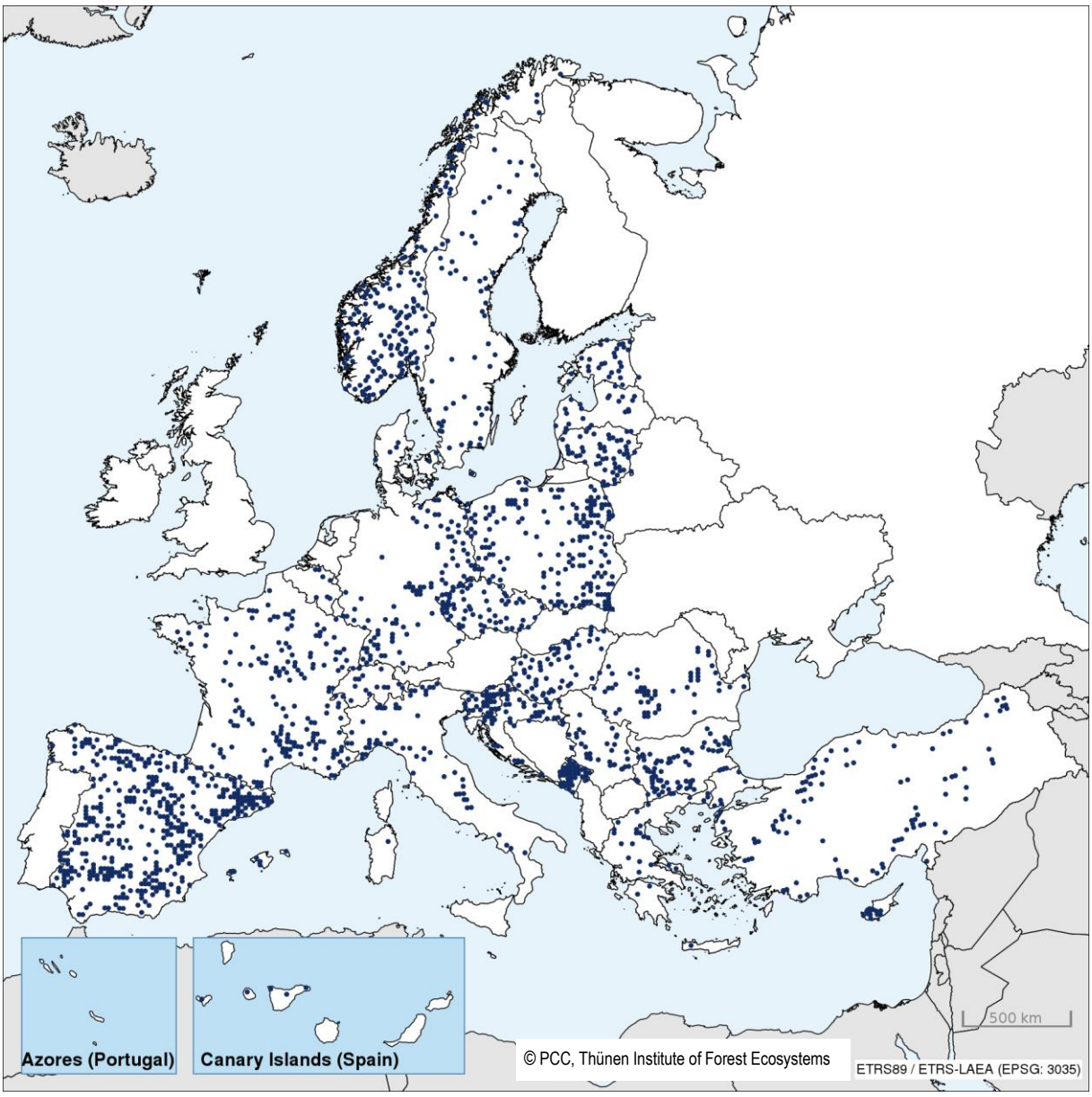


Figure S1-17: Occurrence of damaging agent group Abiotic factors in 2018

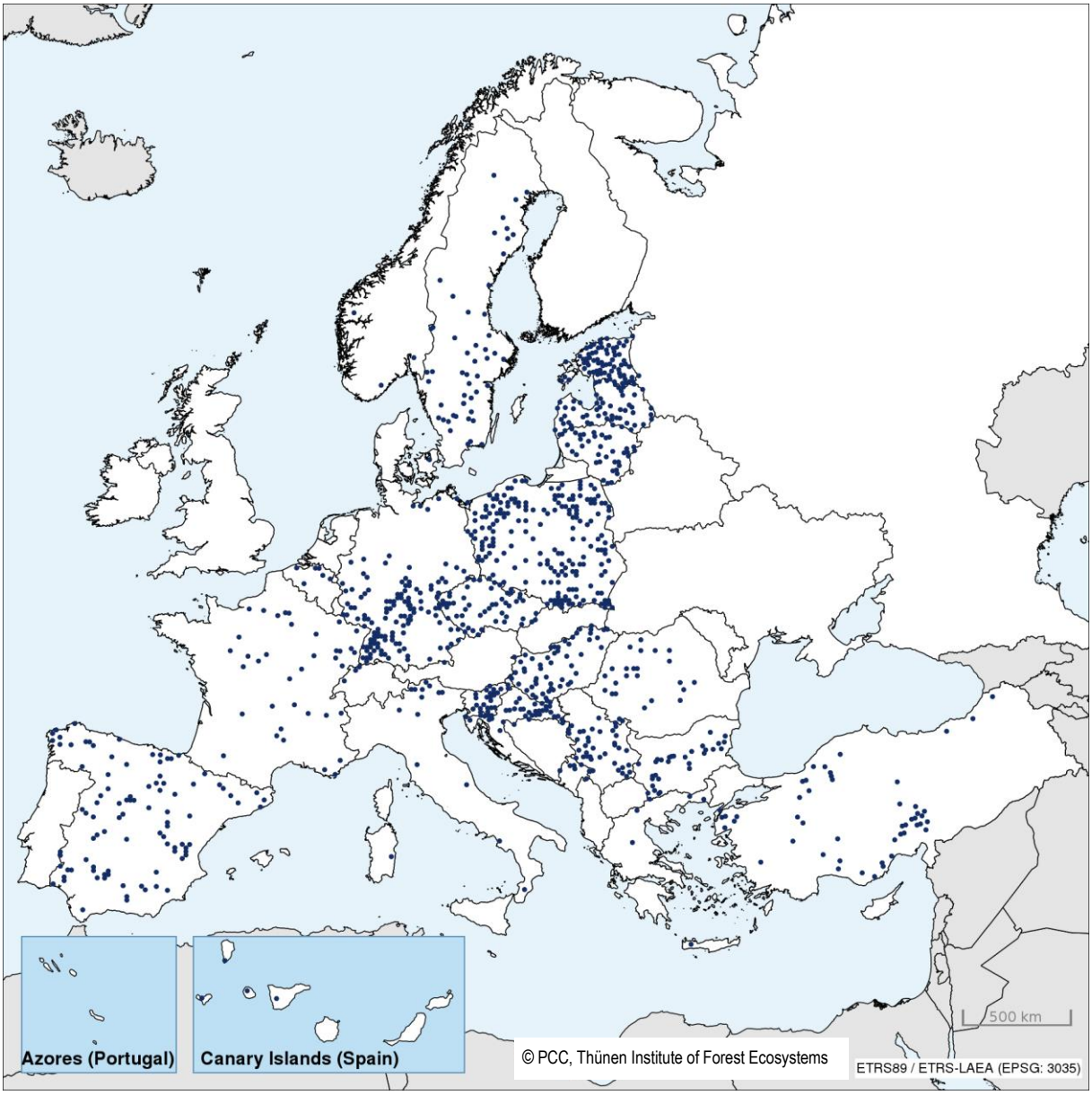


Figure S1-18: Occurrence of damaging agent group Direct action of man in 2018

Figure S1-19: Occurrence of damaging agent group Fire in 2018

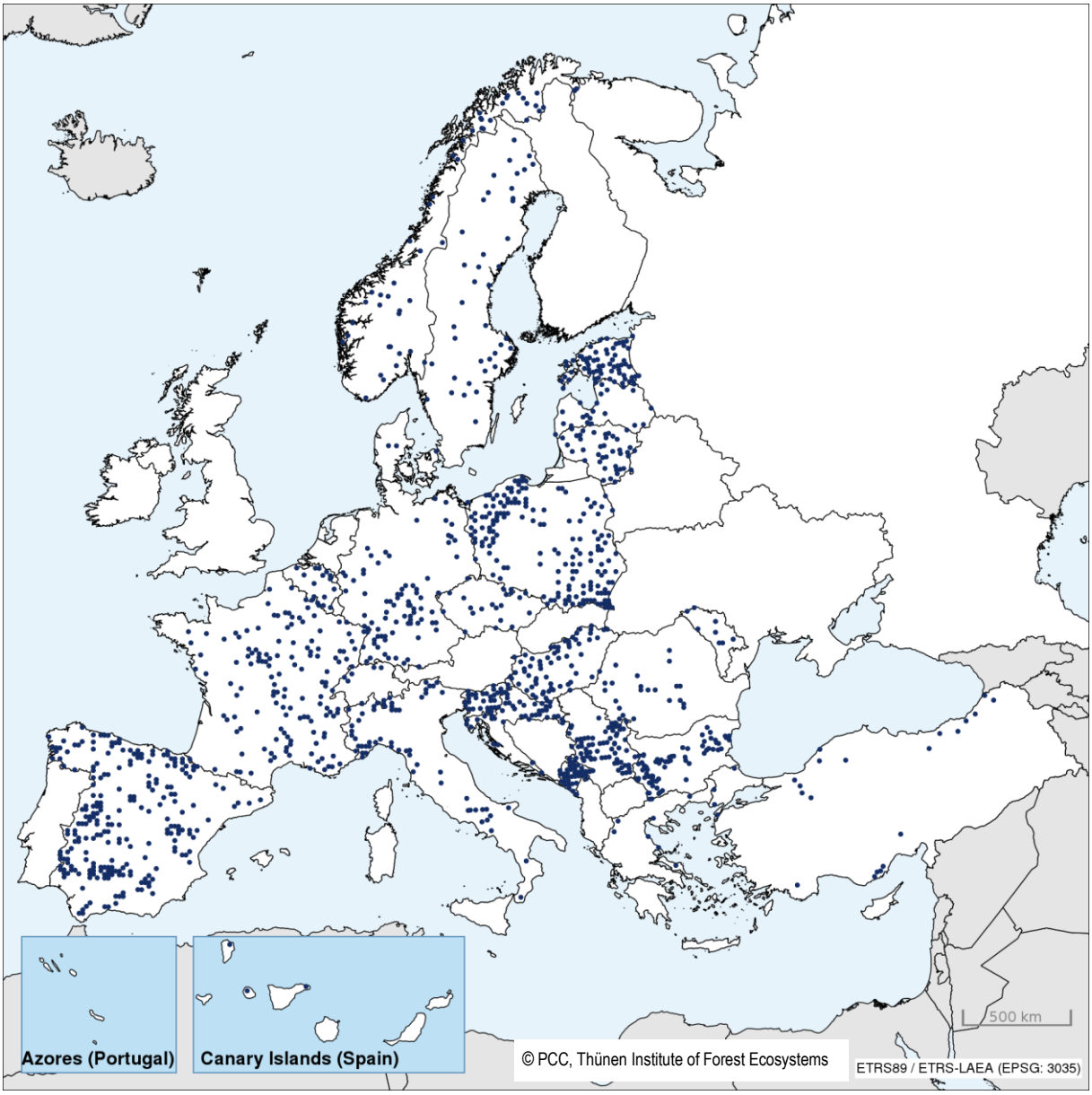


Figure S1-20: Occurrence of damaging agent group Fungi in 2018

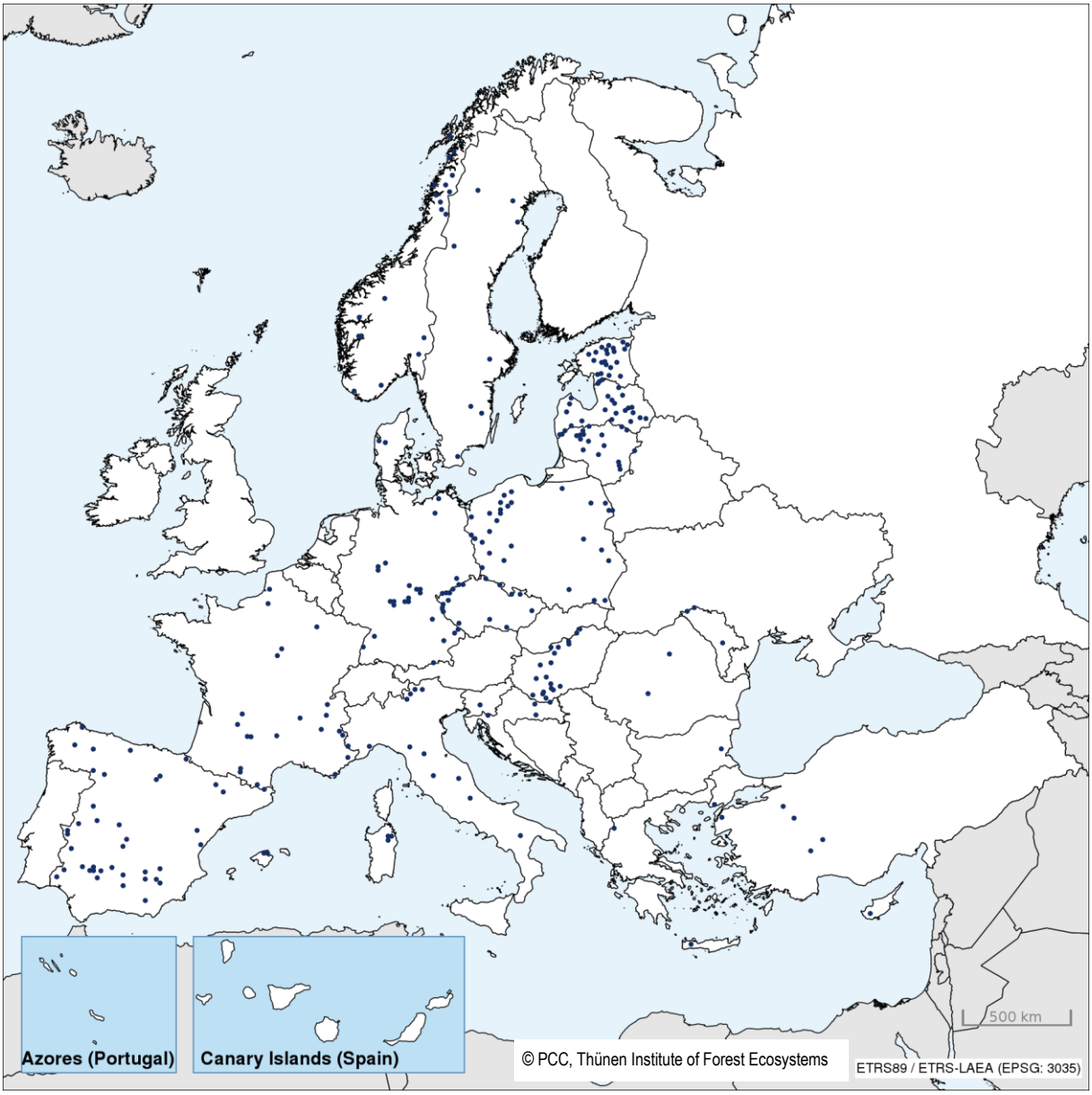


Figure S1-21: Occurrence of damaging agent group Game and grazing in 2018

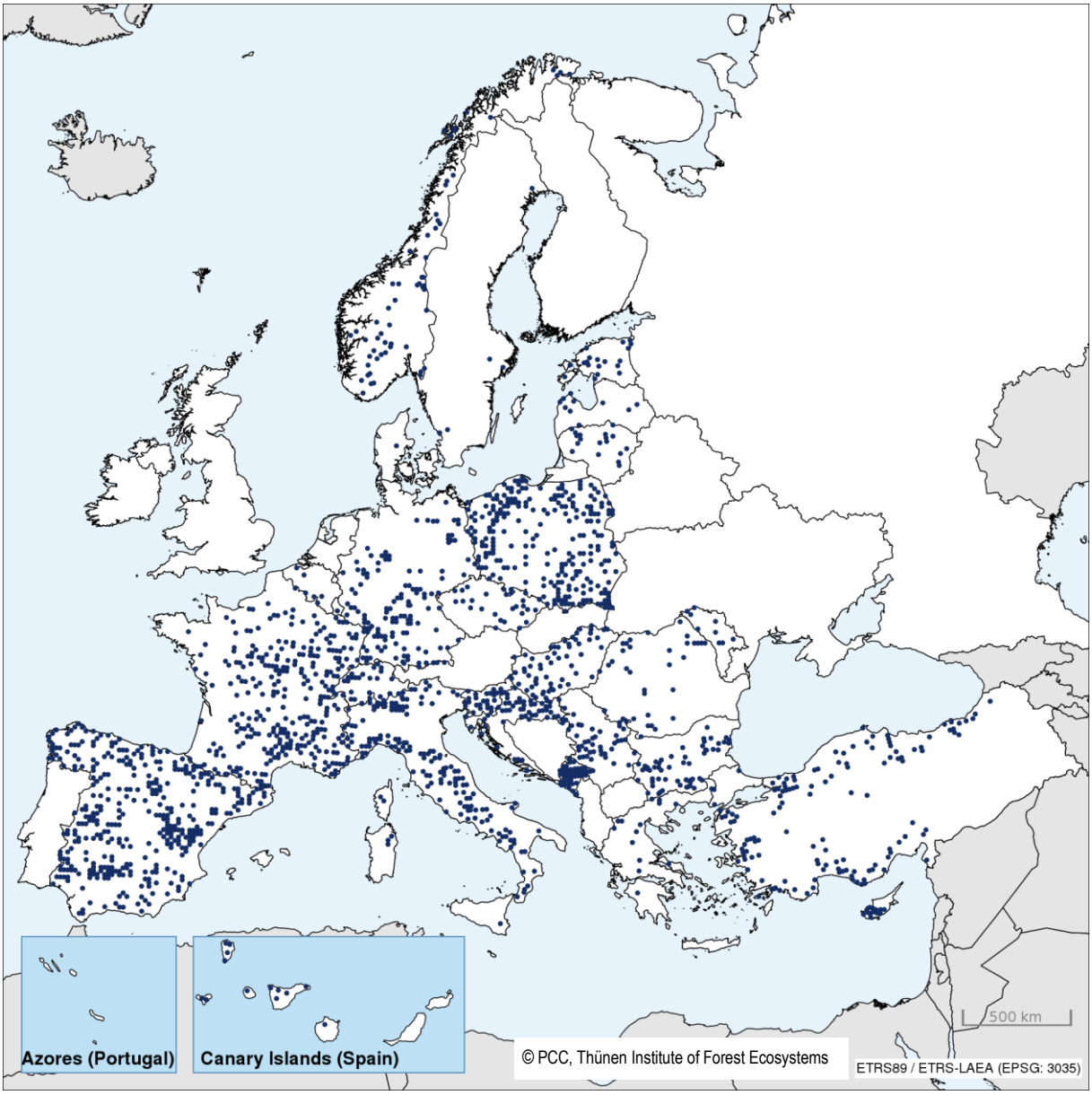


Figure S1-22: Occurrence of damaging agent group Insects in 2018

S2 RESULTS OF THE NATIONAL CROWN CONDITION SURVEYS

S2-1 Tree defoliation (%) in different defoliation classes from national crown condition surveys in 2018

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
Andorra							
Broadleaves	5	20.0	80.0	0.0	0.0	0.0	0.0
Conifers	284	58.5	35.9	4.9	0.4	0.4	5.6
All trees	289	57.8	36.7	4.8	0.4	0.4	5.6
Belgium-Flanders							
Broadleaves	804	9.0	65.4	20.6	3.5	1.5	25.6
Conifers	677	6.2	74.3	18.1	0.6	0.8	19.5
All trees	1481	7.7	69.5	19.5	2.2	1.2	22.9
Belgium-Wallonia							
Broadleaves	201	27.0	37.2	25.2	10.7	0.0	35.8
Conifers	165	9.6	29.0	56.4	5.0	0.0	61.4
All trees	366	19.2	33.5	39.3	8.1	0.0	47.3
Bulgaria							
Broadleaves	3169	30.8	47.4	18.2	2.2	1.4	21.8
Conifers	2427	24.6	30.3	34.2	6.6	4.2	45.0
All trees	5596	28.1	40.0	25.1	4.1	2.6	31.9
Croatia							
Broadleaves	2014	32.8	39.4	25.2	2.1	0.5	27.8
Conifers	362	26.2	26.8	36.2	10.8	0.0	47.0
All trees	2376	31.8	37.5	26.9	3.5	0.4	30.8
Cyprus							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	367	15.5	51.0	28.6	3.0	1.9	33.5
All trees	367	15.5	51.0	28.6	3.0	1.9	33.5
Czechia							
Broadleaves	1183	21.4	43.0	33.5	2.0	0.2	35.6
Conifers	3731	11.4	25.6	56.7	6.1	0.2	63.0
All trees	4914	13.8	29.8	51.1	5.1	0.2	56.4
Denmark							
Broadleaves	867	32.3	37.7	27.0	3.0	0.0	30.0
Conifers	1184	48.7	36.1	13.6	1.5	0.1	15.2
All trees	2051	41.7	36.8	19.3	2.1	0.1	21.4

Participating country	No. of sample trees	Defoliation classes 0 none (%)	1 slight (%)	2 moderate (%)	3 severe (%)	4 dead (%)	2-4 mod.-dead (%)
Estonia							
Broadleaves	342	63.8	32.1	2.0	0.4	1.7	4.1
Conifers	2062	47.1	43.7	5.9	0.8	2.6	9.3
All trees	2404	49.4	42.0	5.3	0.8	2.5	8.5
France							
Broadleaves	6942	10.6	30.5	50.2	8.3	0.3	58.8
Conifers	3802	29.9	30.0	35.4	4.2	0.4	40.0
All trees	10744	17.4	30.4	45.0	6.9	0.3	52.2
Germany							
Broadleaves	4027	22.4	40.5	33.3	3.2	0.7	37.1
Conifers	5840	31.6	45.6	21.3	1.1	0.4	22.8
All trees	9867	27.8	43.5	26.2	2.0	0.5	28.7
Greece							
Broadleaves	618	68.6	17.0	10.5	2.0	2.0	14.4
Conifers	317	32.2	41.7	25.2	0.9	0.0	26.2
All trees	935	56.3	25.3	15.5	1.6	1.3	18.4
Hungary							
Broadleaves	1693	27.0	26.3	36.5	8.6	1.7	46.8
Conifers	176	22.2	25.6	36.4	10.8	5.1	52.3
All trees	1869	26.5	26.2	36.5	8.8	2.0	47.3
Italy							
Broadleaves	3335	14.7	41.1	35.5	5.8	2.1	43.4
Conifers	1147	43.6	31.2	21.4	2.6	1.1	28.1
All trees	4482	22.1	38.6	31.9	5.0	2.1	39.0
Latvia							
Broadleaves	410	6.1	85.1	8.3	0.5	0.0	8.8
Conifers	1316	14.8	81.3	3.6	0.1	0.2	3.9
All trees	1726	12.8	82.2	4.7	0.2	0.2	5.1
Lithuania							
Broadleaves	2467	21.8	64.0	11.5	1.5	1.2	14.2
Conifers	4138	11.7	67.2	20.2	0.5	0.4	21.1
All trees	6605	15.5	66.0	17.0	0.9	0.7	18.5
Luxembourg							
Broadleaves	774	17.1	43.2	34.8	4.3	0.7	39.7
Conifers	426	58.5	25.4	13.4	1.2	1.7	16.2
All trees	1200	31.8	36.9	27.2	3.2	1.0	31.3
Montenegro							
Broadleaves	888	16.1	49.1	31.9	2.9	0.0	34.8
Conifers	288	25.7	43.4	21.2	9.7	0.0	30.9
All trees	1176	18.5	47.7	29.2	4.6	0.0	33.6

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	10271	48.8	35.7	12.9	2.4	0.3	15.5
All trees	10271	48.8	35.7	12.9	2.4	0.3	15.5
Poland							
Broadleaves	14850	14.8	64.1	19.2	1.1	0.8	21.1
Conifers	25610	9.3	73.5	15.6	1.0	0.6	17.2
All trees	40460	11.3	70.0	16.9	1.1	0.7	18.6
Rep. of Moldova							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	62	62.9	24.2	9.7	0.0	3.2	12.9
All trees	62	62.9	24.2	9.7	0.0	3.2	12.9
Romania							
Broadleaves	4807	48.9	35.3	13.5	1.7	0.6	15.8
Conifers	1093	64.1	25.6	9.0	1.3	0.0	10.3
All trees	5900	51.7	33.5	12.6	1.7	0.5	14.8
Serbia							
Broadleaves	2614	69.6	18.3	9.5	2.5	0.1	12.1
Conifers	354	81.6	8.2	6.2	4.0	0.0	10.2
All trees	2968	71.0	17.1	9.1	2.7	0.1	11.9
Slovakia							
Broadleaves	2275	14.0	47.6	36.2	1.8	0.4	38.4
Conifers	1426	8.7	41.7	44.2	4.7	0.8	49.7
All trees	3701	12.0	45.3	39.3	2.9	0.6	42.7
Slovenia							
Broadleaves	694	17.9	48.3	26.5	6.3	0.9	33.7
Conifers	362	24.6	35.1	33.7	3.3	3.3	40.3
All trees	1056	20.2	43.8	29.0	5.3	1.7	36.0
Spain							
Broadleaves	7472	17.5	60.1	18.5	2.2	1.7	22.4
Conifers	7408	17.6	59.4	16.7	3.7	2.7	23.1
All trees	14880	17.5	59.7	17.6	3.0	2.2	22.7
Sweden							
Broadleaves	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conifers	7306	44.7	37.8	15.4	2.0	0.2	17.6
All trees	7306	44.7	37.8	15.4	2.0	0.2	17.6
Switzerland							
Broadleaves	285	16.1	57.3	9.2	1.7	15.7	26.6
Conifers	754	19.7	58.2	14.0	0.3	7.8	22.1
All trees	1039	18.6	57.9	12.5	0.8	10.2	23.5

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	43.8	45.2	9.1	0.9	1.0	11.0
Conifers	8580	41.2	48.6	8.6	0.6	1.0	10.2
All trees	13957	42.2	47.3	8.8	0.7	1.0	10.5

S2-2 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – All species

Participating countries	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change % points 2017/18
Albania					21.0						**N/A**
Andorra	6.8	15.3	8.3	5.6	3.4	5.3	4.5	3.4	7.0	5.6	**-1.4**
Austria		14.2									**N/A**
Belarus	8.4	7.4	6.1								**N/A**
Belgium	20.2	22.1	23.5	28.2	27.6	27.5	26.4	26.1	26.6	27.7	**+1.1**
Bulgaria	21.1	23.8	21.6	32.3	33.5	26.0	26.2	29.9	27.7	31.9	**+3.4**
Croatia	26.3	27.9	25.2	28.5	29.1	31.5	29.7	28.5	25.6	30.8	**+5.2**
Cyprus	36.2	19.2	16.4	10.6	8.9	13.3	12.5	35.0	23.6	33.5	**+9.9**
Czechia	56.8	54.2	52.7	50.3	51.7		52.0	54.3	53.6	56.4	**+2.8**
Denmark	5.5	9.3	10.0	7.3	4.9	7.0	8.7	14.8	12.9	21.4	**+8.5**
Estonia	7.2	8.1	8.1	7.8	8.0	6.7	6.7	6.4	5.2	8.5	**+3.3**
Finland	9.1	10.5	10.6	14.3							**N/A**
France	33.5	34.6	39.9	41.4	40.1	42.8	43.4	48.6	48.8	52.2	**+3.4**
Germany	26.5	23.2	28.0	24.6	22.7	26.2	23.8	28.0	22.7	28.7	**+6.0**
Greece	24.3	23.8				24.8	20.2		20.2	18.4	**-1.8**
Hungary	18.4	21.8	18.9	20.2	22.4	24.2	24.0	34.6	41.0	47.3	**+6.3**
Ireland	12.5	17.5		1.0							**N/A**
Italy	35.8	29.8	31.3	35.7	33.7	30.8	29.8	34.7	39.0	39.0	**+/-0.0**
Latvia	13.8	13.4	14.0	9.2	6.4	5.1	4.4	5.7	5.3	5.1	**-0.2**
Lithuania	17.7	21.3	15.4	24.5	19.7	21.7	23.8	21.0	21.1	18.5	**-2.6**
Luxembourg					33.2		32.6	38.2	30.3	31.3	**+1.0**
Montenegro					22.7		25.4	27.3	26.6	33.6	**+7.0**
Netherlands	18.2	21.6									
Norway	21.0	18.9	20.9	18.8	17.7	15.9	16.5	15.5	19.0	15.5	**-4.5**
Poland	17.7	20.7	24.0	23.4	18.8	18.9	16.7	19.5	20.2	18.6	**-1.6**
Rep. of Moldova	25.2	22.5	18.4	25.6		19.9	26.1	26.5	28.7		**N/A**
Romania	18.9	17.8	13.9	13.9	13.6	13.5	13.1	13.4	14.5	14.8	**+0.3**
Russian Fed.	6.2	4.4	8.3								**N/A**
Serbia	10.3	10.8	7.6	10.3	14.7	12.4	10.7	11.3	11.8	11.9	**+0.1**
Slovakia	32.1	38.6	34.7	37.9	43.4		34.5	40.3	32.6	42.7	**+10.1**
Slovenia	35.5	31.8	31.4	29.1	30.9	38.3	37.8	33.9	37.0	36.0	**-1.0**
Spain	17.7	14.6	11.8	17.5	16.6	14.9		21.9	27.8	22.7	**-5.1**
Sweden	15.1	19.2	18.9	15.9	19.9		19.8	16.4	18.2	17.6	**-0.6**
Switzerland	18.3	22.2	30.9	31.3	26.0	30.6	24.8	25.2	33.7	23.5	**-10.2**
Turkey	18.7	16.8	13.6	12.4	10.2	11.0	9.5	9.8	8.8	10.5	**+1.7**
Ukraine	6.8	5.8	6.8	7.5	7.1	6.0	7.1				**N/A**
United Kingdom		48.5									**N/A**

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.

S2-3 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – Conifers

Participating countries	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change % points 2017/18
Albania					21.0						**N/A**
Andorra	6.8	15.3	8.3	5.6	3.1	5.4	4.3	3.5	7.1	5.6	**-1.5**
Austria		14.5									**N/A**
Belarus	8.3	7.7	5.8								**N/A**
Belgium	13.6	16.2	15.2	20.3	19.7	22.8	27.9	24.6	26.8	27.7	**+0.9**
Bulgaria	33.0	31.1	33.3	35.1	40.8	34.1	40.1	39.9	37.0	45.0	**+8.0**
Croatia	66.5	56.9	45.1	54.7	48.3	49.7	56.0	51.0	35.0	47.0	**+12.0**
Cyprus	36.2	19.2	16.4	10.6	8.9	13.3	12.5	35.0	23.6	33.5	**+9.9**
Czechia	63.1	60.1	58.9	56.9	59.2		57.8	60.3	60.3	63.0	**+2.7**
Denmark	1.0	5.4	5.7	4.6	2.8	5.3	7.4	11.3	11.8	15.2	**+3.4**
Estonia	7.5	9.0	8.7	6.6	8.5	6.9	6.5	6.7	5.5	9.3	**+3.8**
Finland	9.9	10.6	11.7	14.6							**N/A**
France	26.8	27.4	31.9	32.2	33.7	36.6	38.0	39.3	38.8	40.0	**+1.2**
Germany	20.3	19.2	20.3	19.3	18.1	19.7	20.3	22.3	19.5	22.8	**+3.3**
Greece	26.3	23.7				26.7	27.2		32.1	26.2	**-5.9**
Hungary	27.1	35.1	28.7	23.1	23.5	30.7	46.5	52.8	44.9	52.3	**+7.4**
Ireland	12.5	17.5		1.0							**N/A**
Italy	31.6	29.1	32.2	31.8	24.2	24.0	22.6	19.6	21.8	28.1	**+6.3**
Latvia	14.8	15.0	16.0	7.9	6.9	4.8	4.4	4.9	5.3	3.9	**-1.4**
Lithuania	17.4	19.8	16.3	26.9	23.1	21.1	25.0	21.7	23.5	21.1	**-2.4**
Luxembourg					17.5	93.3	18.7	17.4	17.7	16.2	**-1.5**
Montenegro					22.6		26.1	28.1	23.6	30.9	**+7.3**
Netherlands	14.1	18.9									**N/A**
Norway	17.9	16.4	17.3	16.1	17.7	15.9	16.5	15.5	19.0	15.5	**-3.5**
Poland	17.2	20.3	24.2	22.3	17.8	17.2	15.7	17.1	18.4	17.2	**-1.2**
Rep. of Moldova		33.3	32.1	44.3		29.4		21.6	19.6		**N/A**
Romania	21.7	16.1	15.9	14.9	13.9	13.7	8.0	10.4	10.7	10.3	**-0.4**
Russian Fed.	7.3	5.1	10.6								**N/A**
Serbia	12.6	12.0	11.1	11.0	13.0	14.6	14.5	13.5	12.0	10.2	**-1.8**
Slovakia	42.7	46.8	46.6	43.5	43.3		49.4	45.6	41.6	49.7	**+8.1**
Slovenia	38.8	37.8	33.6	31.3	31.3	38.1	41.0	38.6	40.6	40.3	**-0.3**
Spain	14.9	13.1	10.4	11.4	12.6	11.4		20.9	26.2	23.1	**-3.1**
Sweden	15.1	19.2	18.9	15.9	19.9	18.8	19.8	16.4	18.2	17.6	**-0.6**
Switzerland	18.8	20.9	31.5	30.6	23.3	31.7	24.0	24.9	33.4	22.1	**-11.3**
Turkey	16.0	14.5	11.6	9.9	6.9	7.2	8.6	9.1	8.2	10.2	**+2.0**
Ukraine	6.3	5.6	6.8	7.5	7.5	6.8	7.9				**N/A**
United Kingdom		38.6									**N/A**

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.

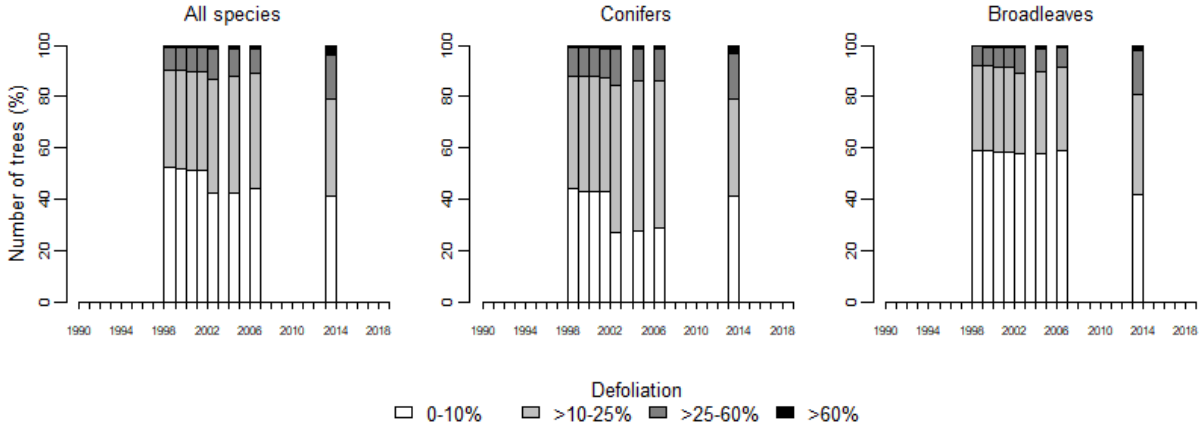
S2-4 Percentage of moderately to severely defoliated trees (defoliation classes 2–4) between 2009 and 2018 – Broadleaves

Participating country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change points 2017/18
Albania					19.0						**N/A**
Andorra					20.0	20.0	16.7	0.0	0.0	0.0	**+/-0.0**
Austria		10.5									**N/A**
Belarus	8.7	6.9	6.4								**N/A**
Belgium	23.4	24.6	26.7	32.9	29.4	31.4	25.1	27.4	26.2	27.7	**+1.5**
Bulgaria	12.2	18.2	12.8	29.8	28.0	20.0	15.6	22.3	20.5	21.8	**+1.3**
Croatia	20.7	21.9	21.5	23.7	25.7	28.1	25.3	24.7	24.0	27.8	**+3.8**
Cyprus								N/A	N/A	N/A	**N/A**
Czechia	32.9	32.2	31.2	28.4	25.7		32.7	34.7	31.6	35.6	**+4.0**
Denmark	10.0	12.1	12.8	10.9	7.9	9.0	10.8	19.7	14.4	30.0	**+15.6**
Estonia	3.5	2.5	3.0	14.9	5.3	5.7	8.0	5.2	3.3	4.1	**+0.8**
Finland	4.7	9.2	6.0	12.8							**N/A**
France	37.1	38.7	44.3	45.9	43.6	46.1	47.0	53.5	54.2	58.8	**+4.6**
Germany	36.1	29.4	38.0	32.5	29.8	36.1	29.0	35.7	27.5	37.1	**+9.6**
Greece	5.2	23.9				16.7	11.3		14.6	14.4	**-0.2**
Hungary	17.1	19.7	17.3	19.9	22.3	23.3	21.4	32.5	40.6	46.8	**+6.2**
Ireland											**N/A**
Italy	36.8	30.1	32.7	37.2	37.1	33.4	32.1	39.5	45.0	43.4	**-1.6**
Latvia	11.6	9.4	8.8	12.9	4.4	6.1	4.2	8.3	5.2	8.8	**+3.6**
Lithuania	18.4	23.7	13.8	21.0	14.7	22.5	21.9	20.0	17.8	14.2	**-3.6**
Luxembourg					42.4	34.6	40.3	49.0	37.2	39.7	**+2.5**
Montenegro					22.8		25.2	27.1	27.6	34.8	**+7.2**
Netherlands	25.6	26.6									**N/A**
Norway	31.0	26.8	32.3	27.3	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Poland	18.5	21.5	23.5	25.5	20.7	21.9	18.4	24.0	23.3	21.1	**-2.2**
Rep. of Moldova	25.2	22.4	18.4	25.6		19.9	26.1	26.5	28.7	N/A	**N/A**
Romania	18.3	18.0	13.4	13.6	13.6	13.0	13.9	14.2	15.3	15.8	**+0.5**
Russian Fed.	4.4	3.2	4.3								**N/A**
Serbia	9.9	10.7	7.2	10.2	14.9	12.1	10.1	11.0	11.8	12.1	**+0.3**
Slovakia	24.5	32.9	26.4	33.9	43.5	43.5	24.3	36.5	26.7	38.4	**+11.7**
Slovenia	33.3	28.1	30.0	27.7	30.6	38.4	35.9	31.1	35.1	33.7	**-1.4**
Spain	20.7	16.1	13.2	23.6	20.7	18.4		22.7	29.3	22.4	**-6.9**
Sweden									N/A	N/A	**N/A**
Switzerland	17.4	25.2	29.6	33.3	31.5	28.0	26.4	25.9	34.7	26.6	**-8.1**
Turkey	23.4	21.2	17.2	16.8	15.7	17.2	10.8	11.0	9.8	11.0	**+1.2**
Ukraine	7.2	6.4	6.7	7.5	7.0	5.5	6.3				**N/A**
United Kingdom		56.1									**N/A**

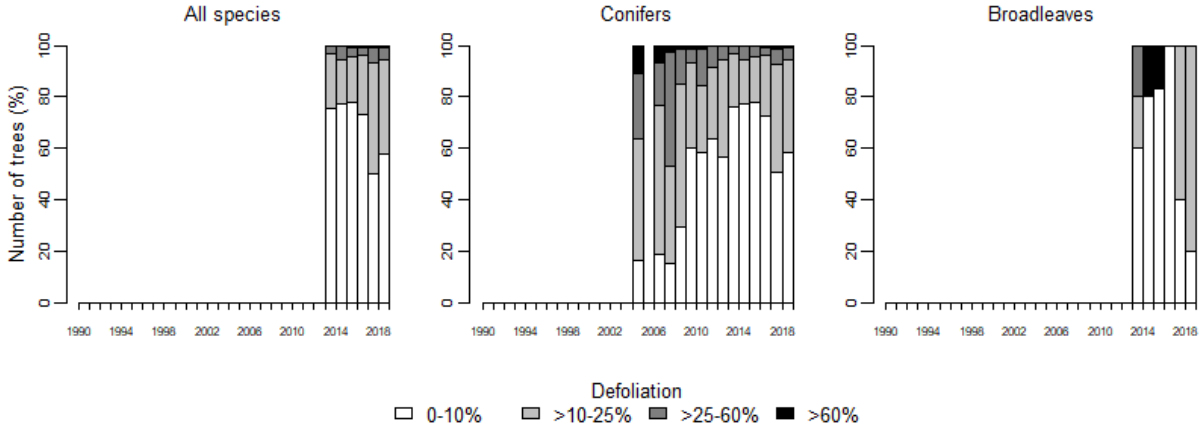
Note that some differences in the level of defoliation between participating countries may be at least partly due to differences in standards used. This restriction, however, does not affect the reliability of the trends over time. In some countries there has been a change in the monitoring design at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

S2-5 Change of tree defoliation over time (1990–2018) per country

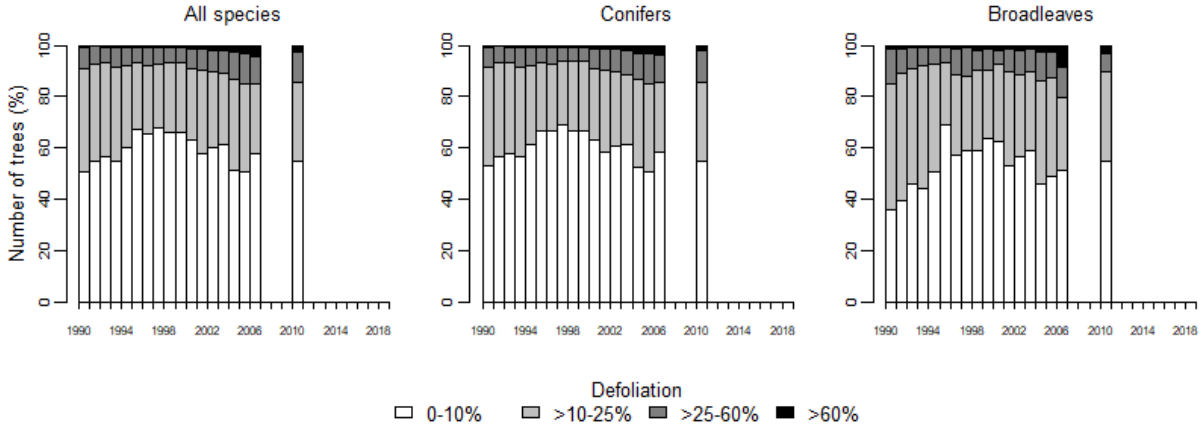
ALBANIA



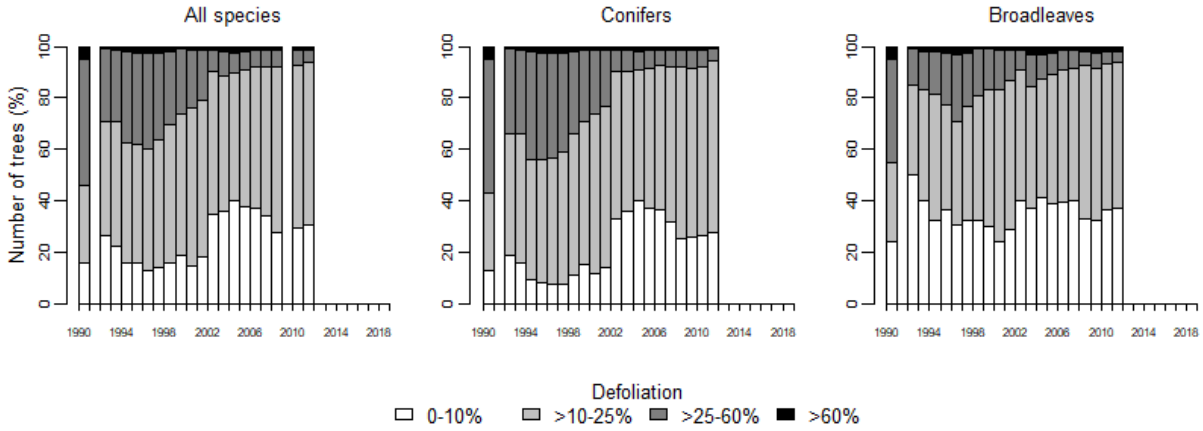
ANDORRA



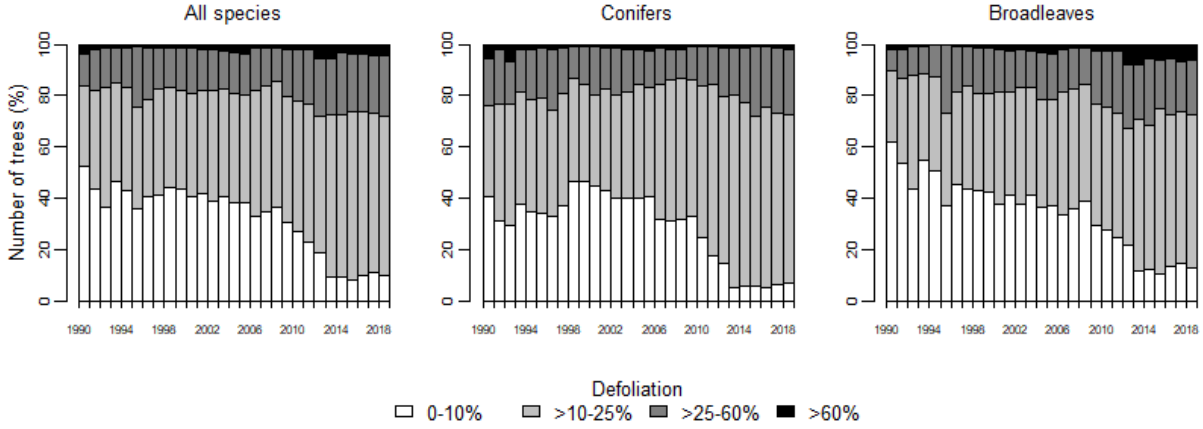
AUSTRIA



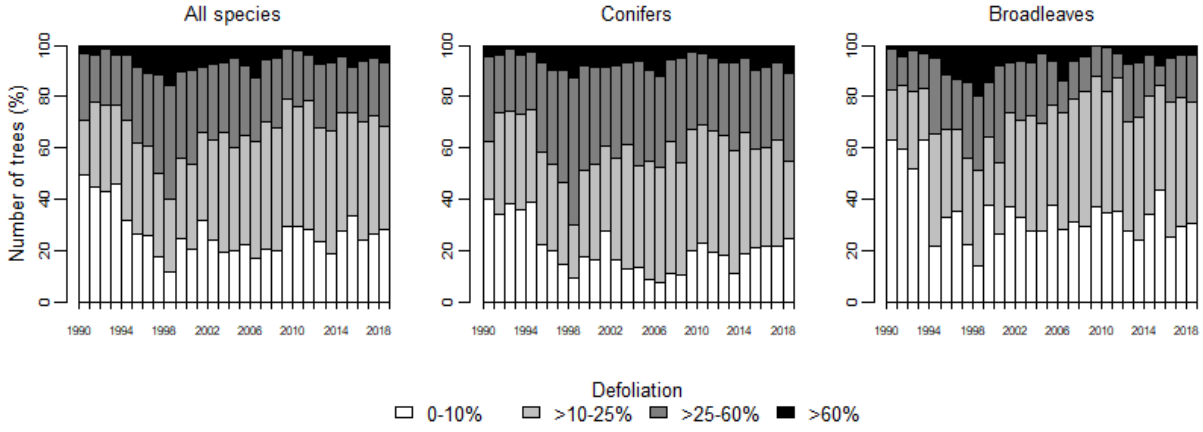
BELARUS



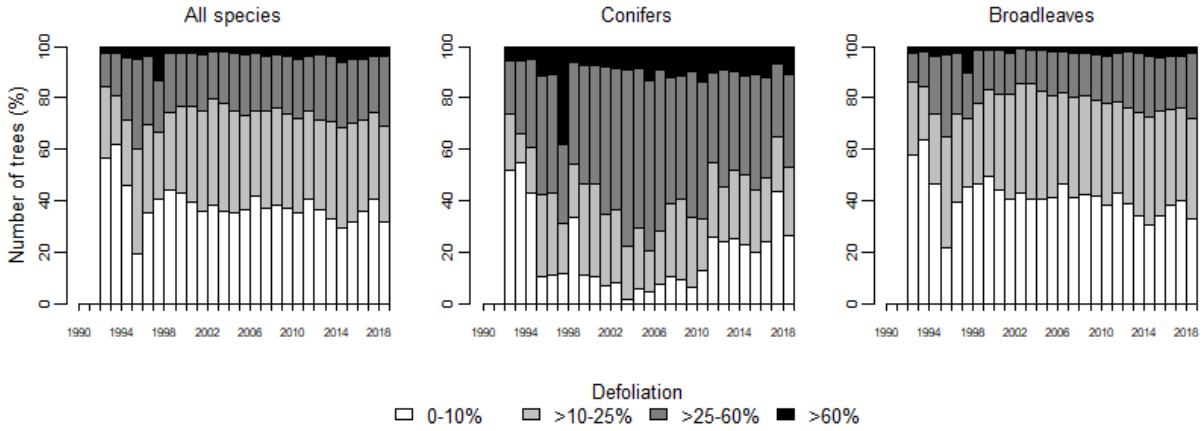
BELGIUM



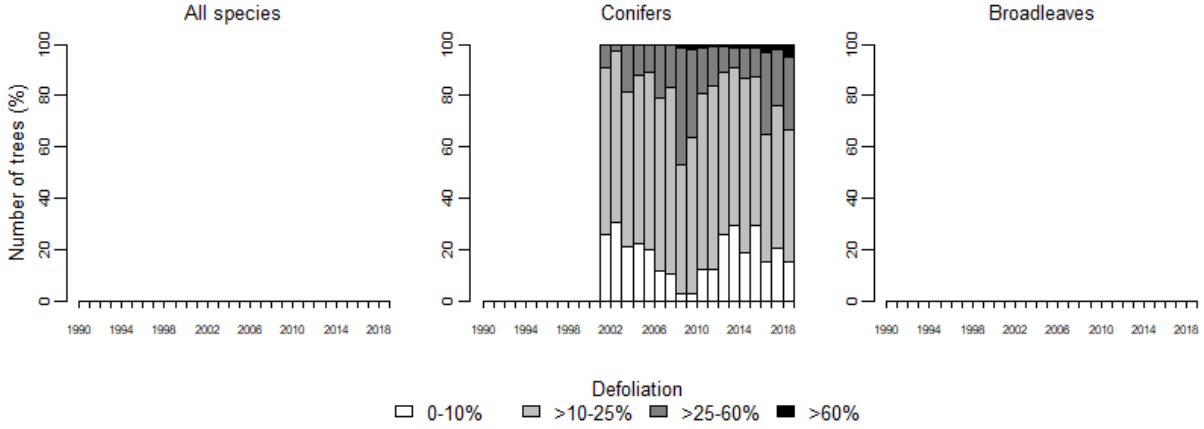
BULGARIA



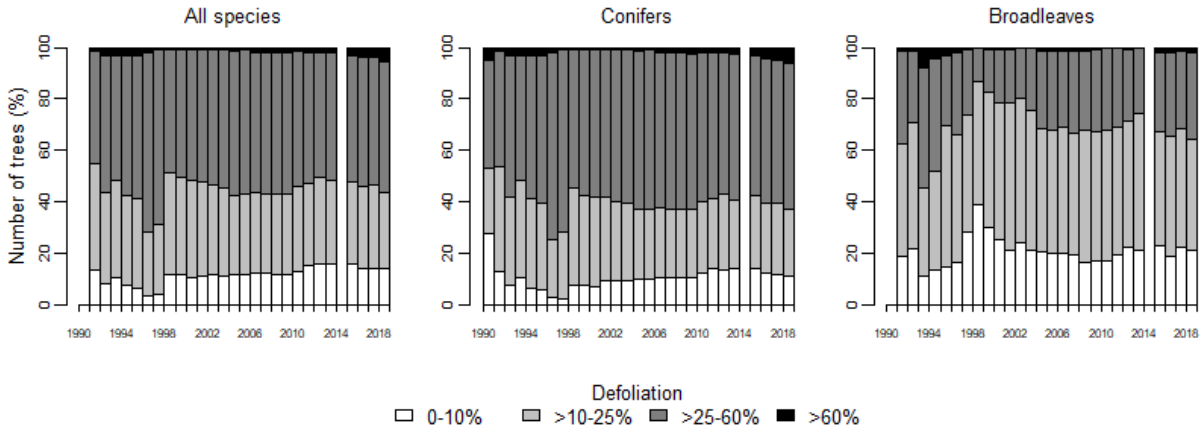
CROATIA



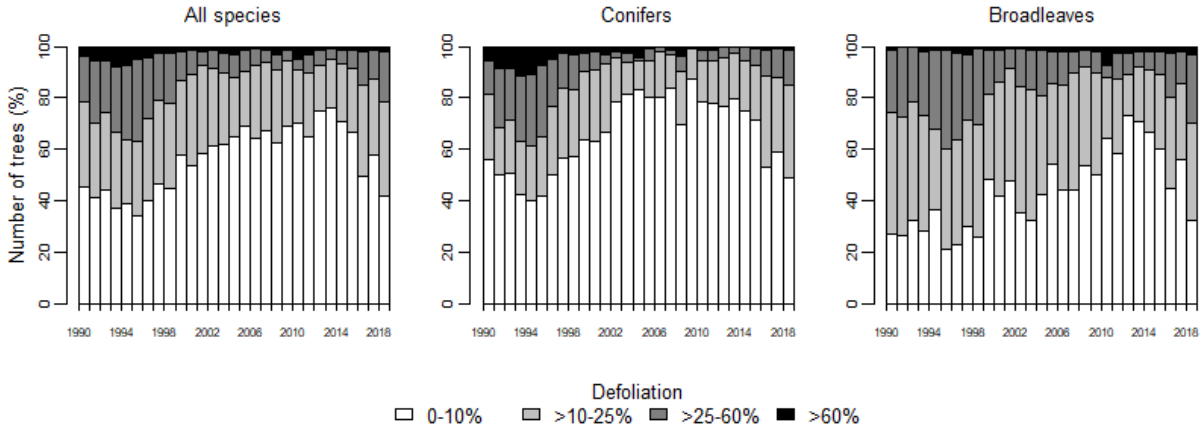
CYPRUS



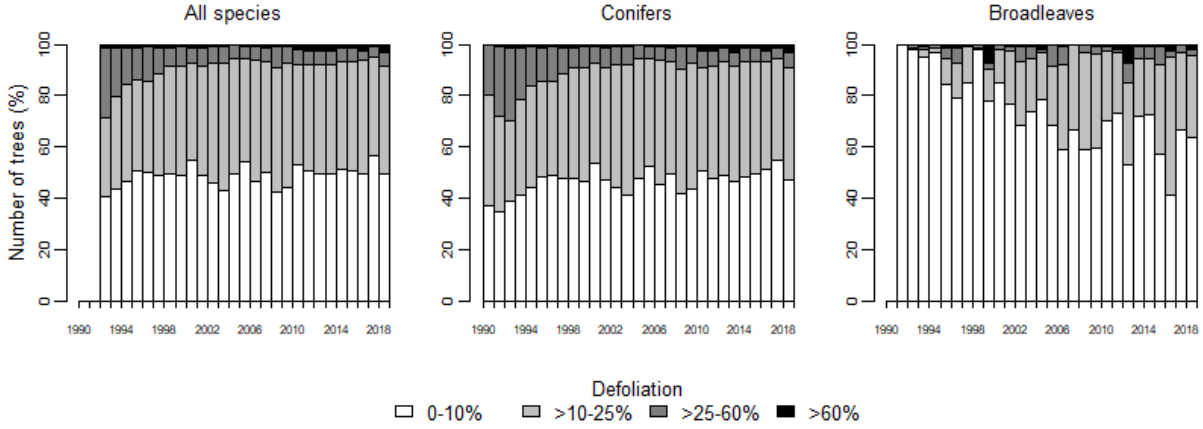
CZECHIA



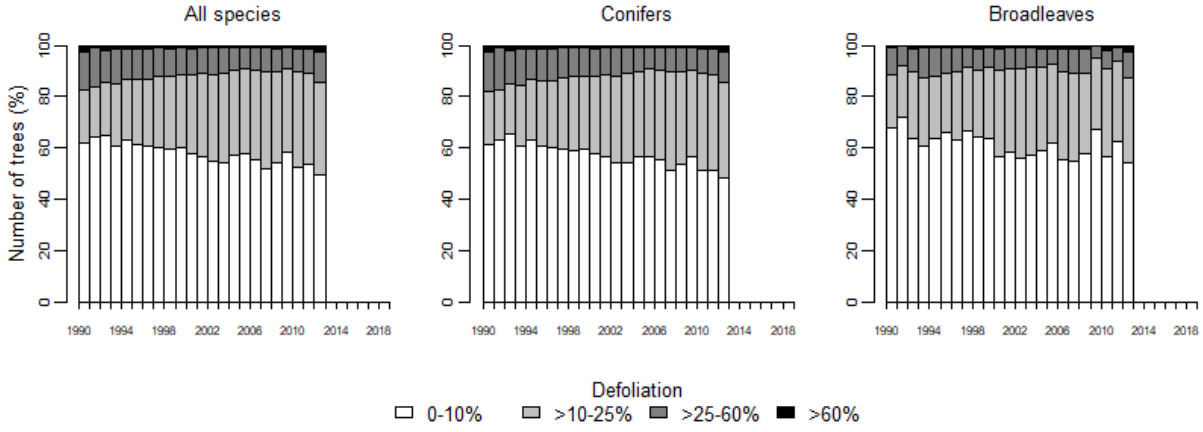
DENMARK



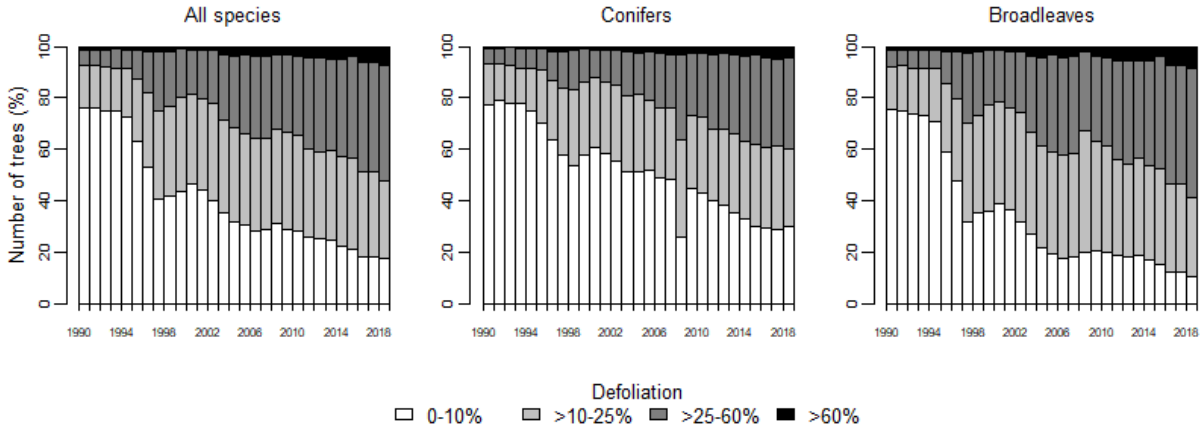
ESTONIA



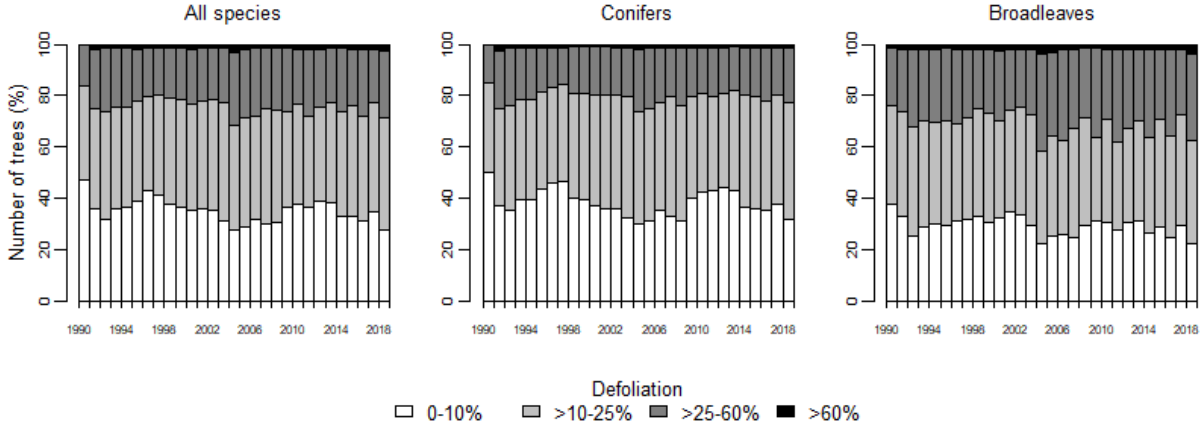
FINLAND



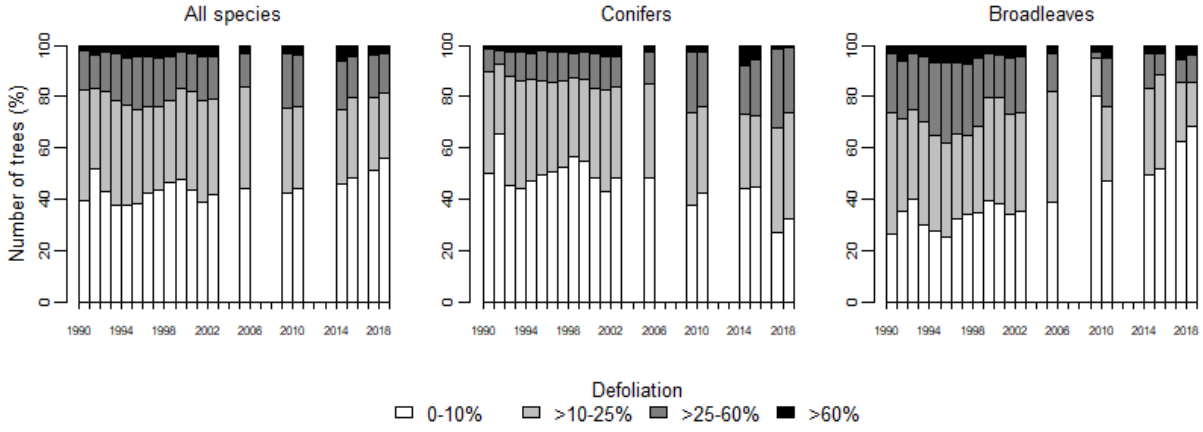
FRANCE



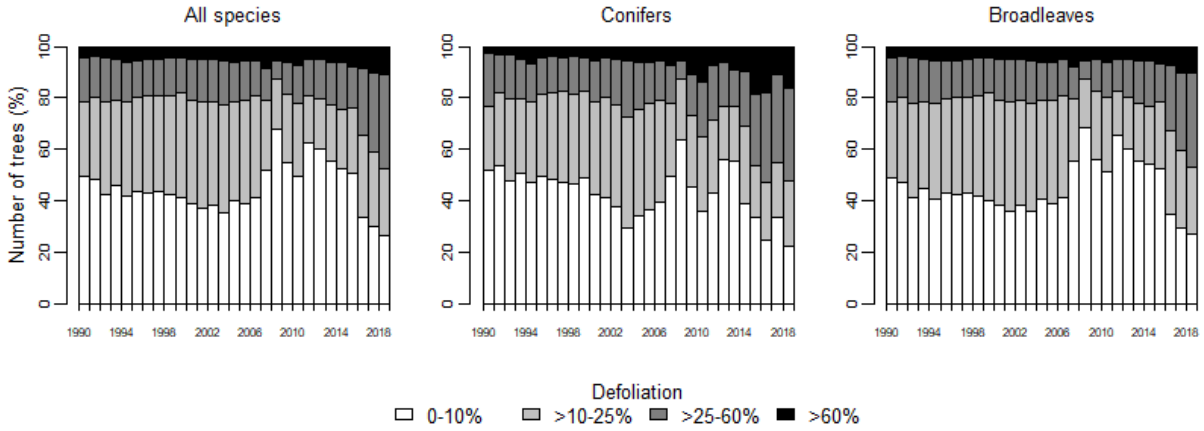
GERMANY



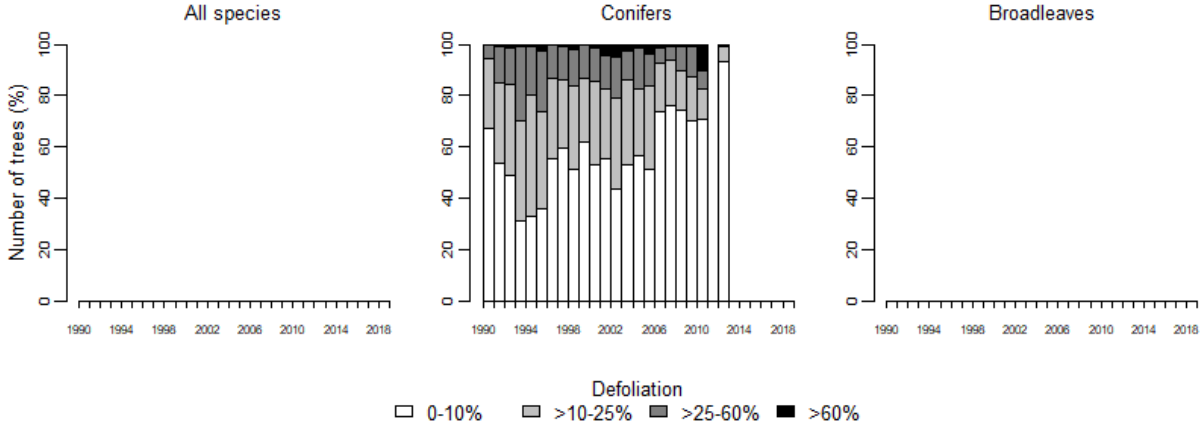
GREECE



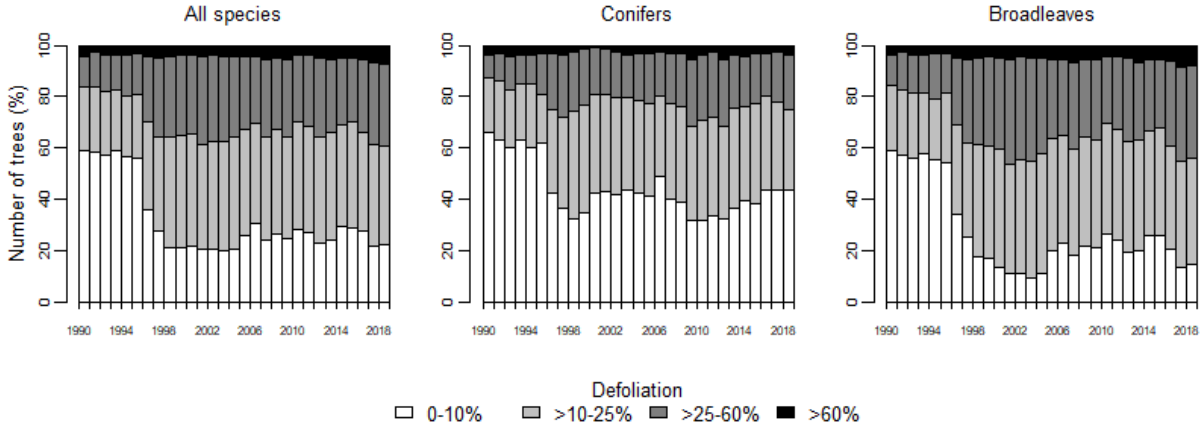
HUNGARY



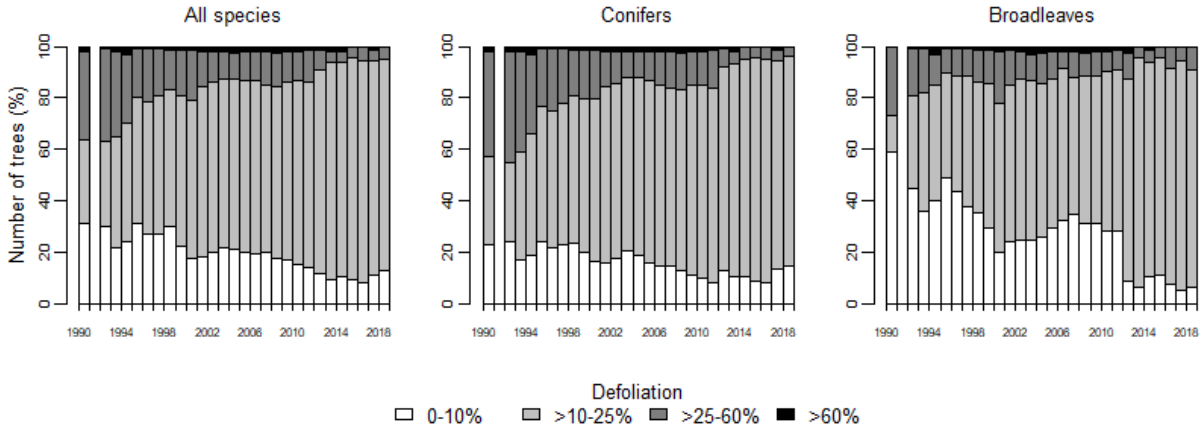
IRELAND



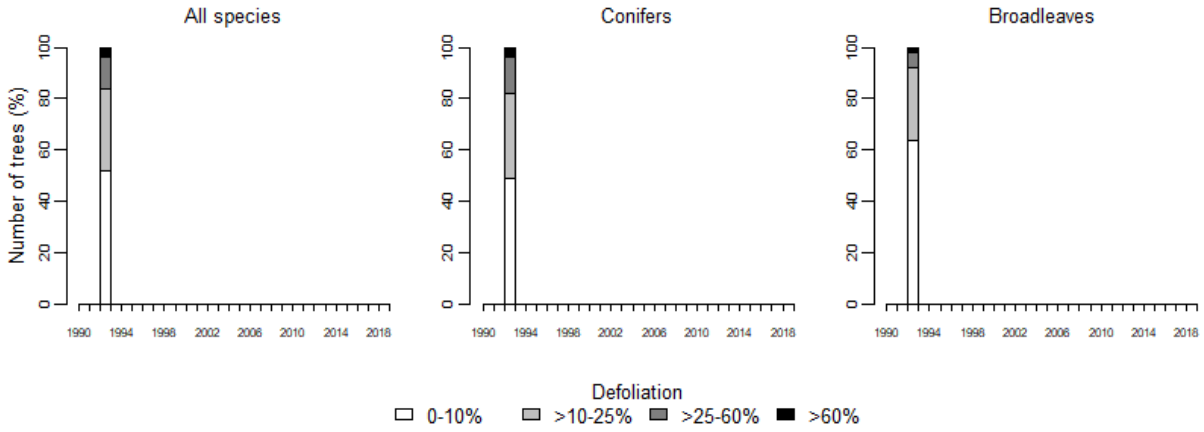
ITALY



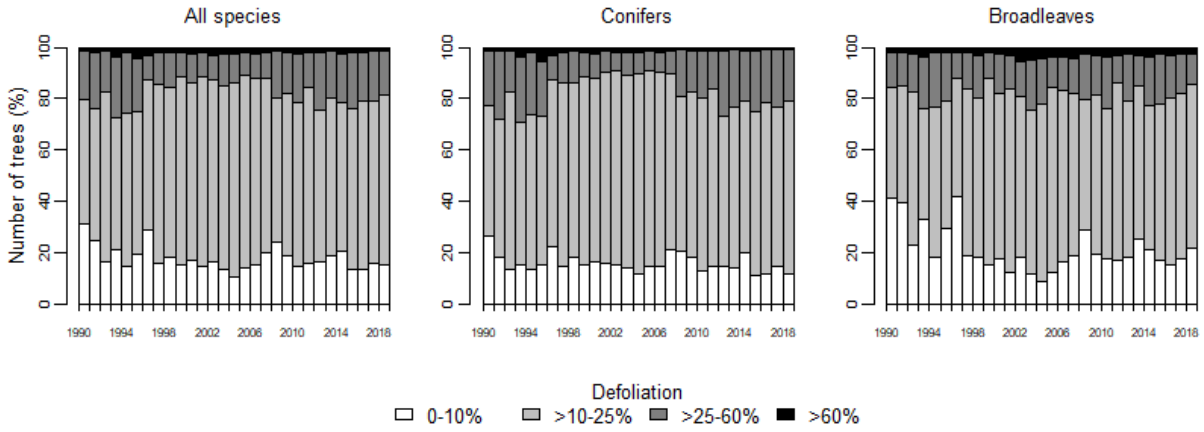
LATVIA



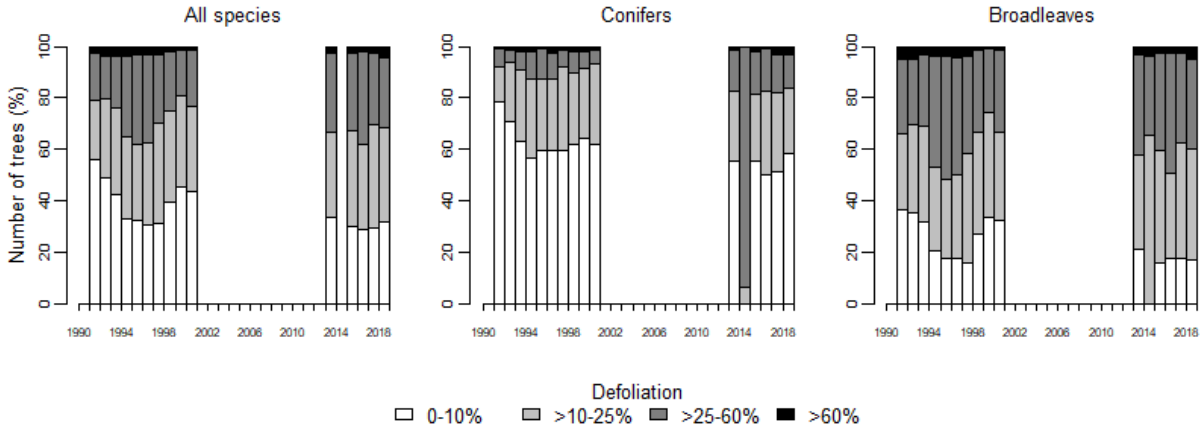
LIECHTENSTEIN



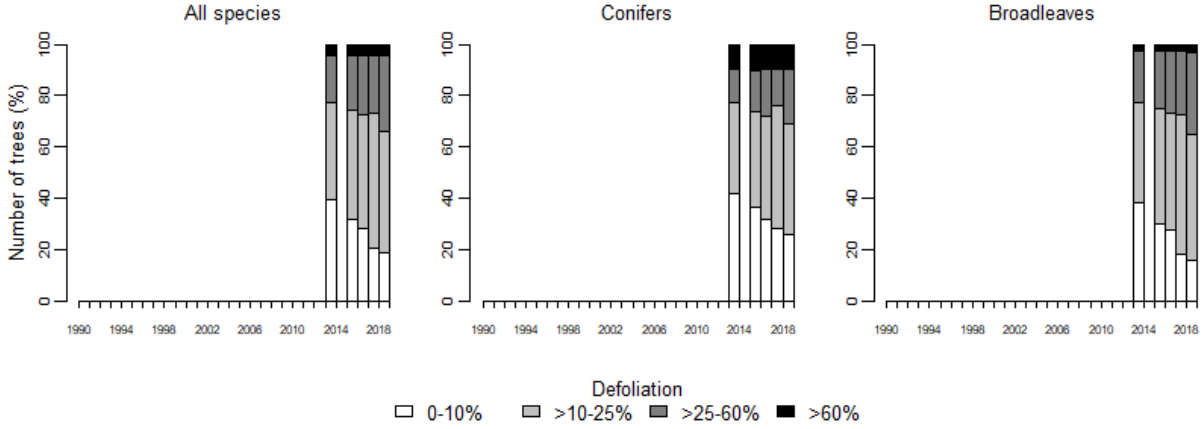
LITHUANIA



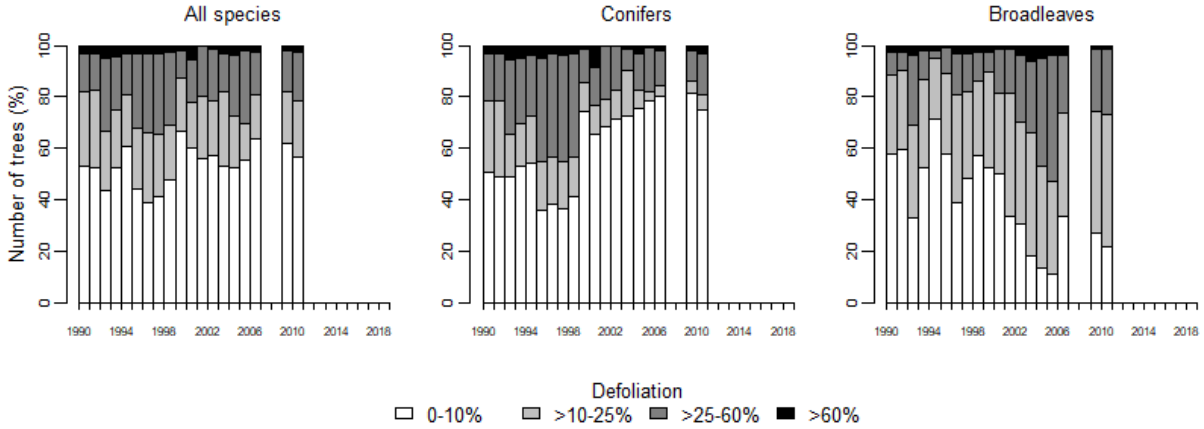
LUXEMBOURG



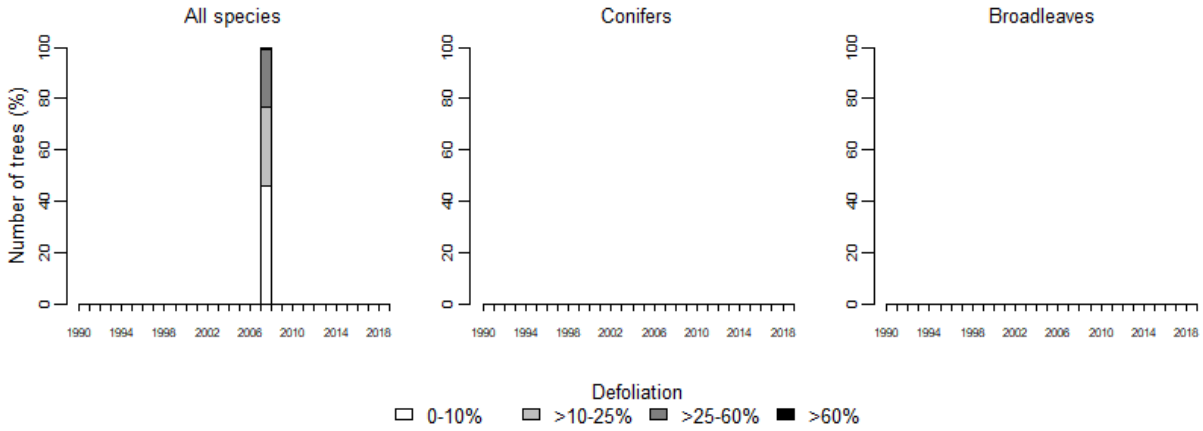
MONTENEGRO



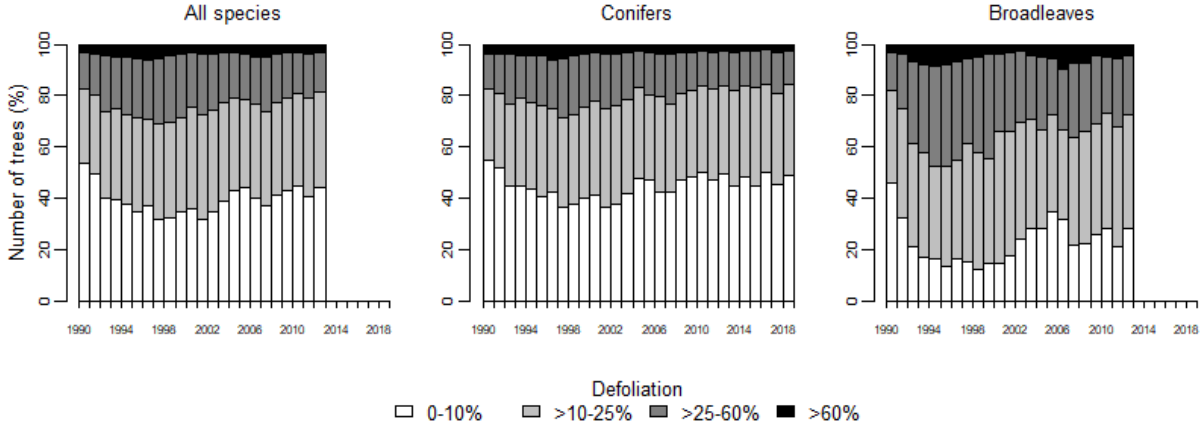
NETHERLANDS



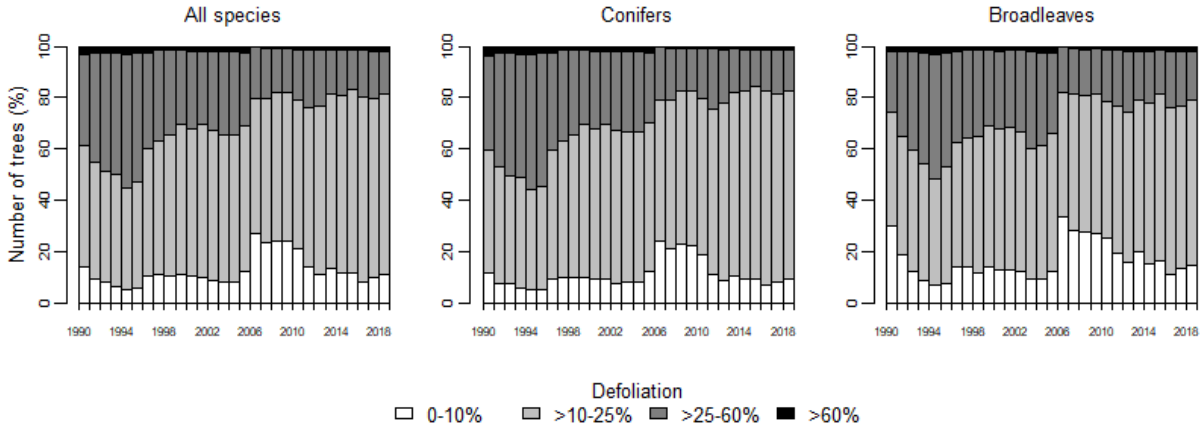
NORTH MACEDONIA



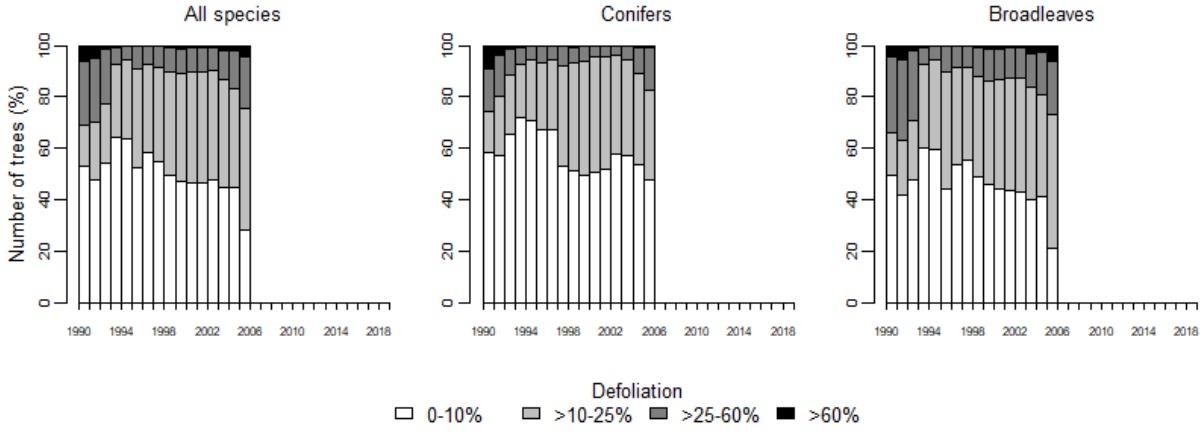
NORWAY



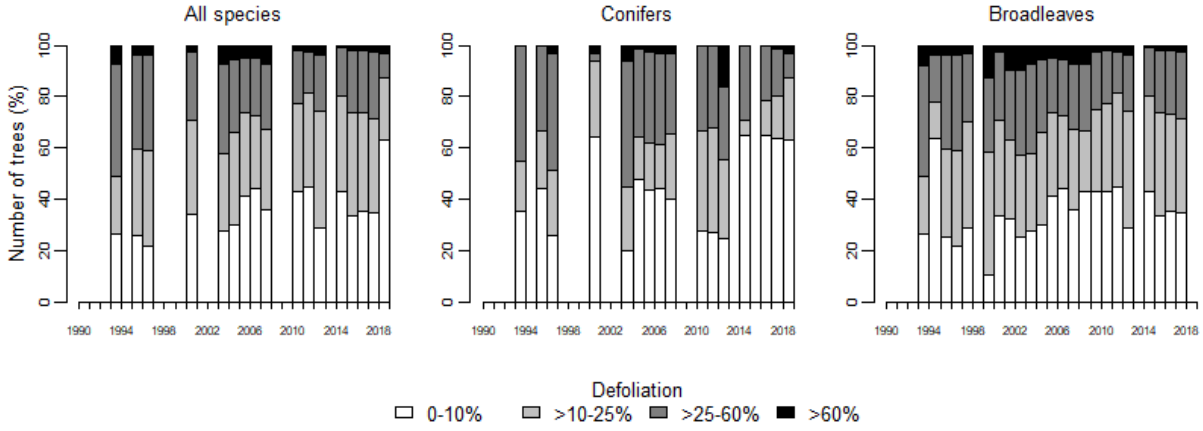
POLAND



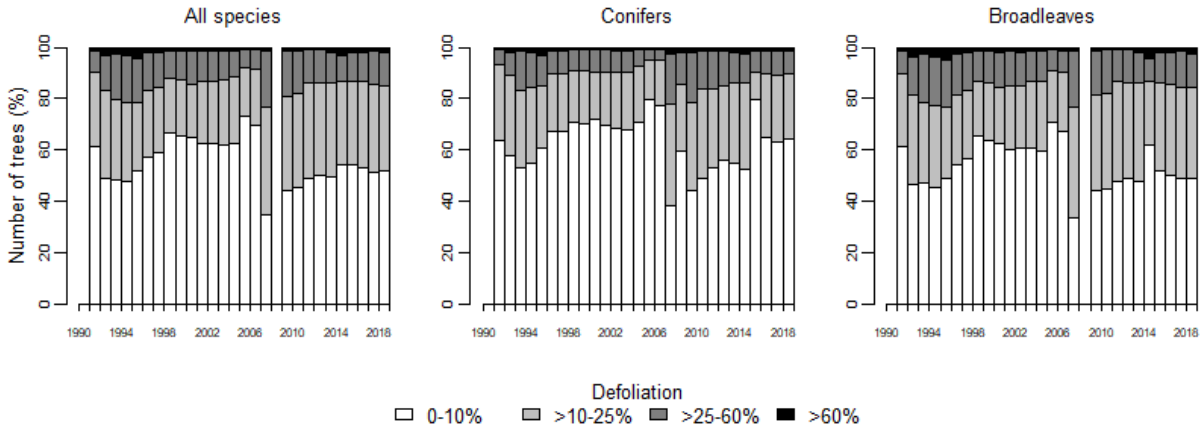
PORTUGAL



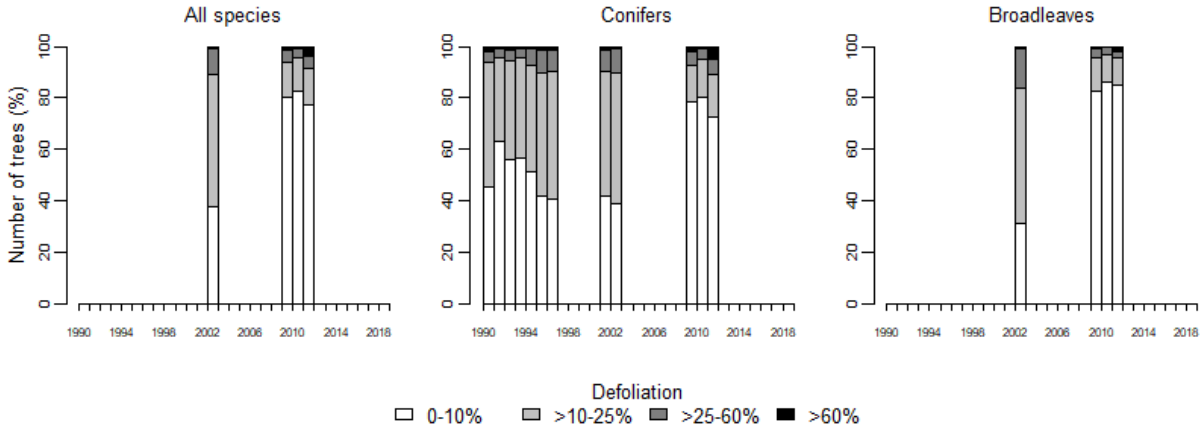
REPUBLIC OF MOLDOVA



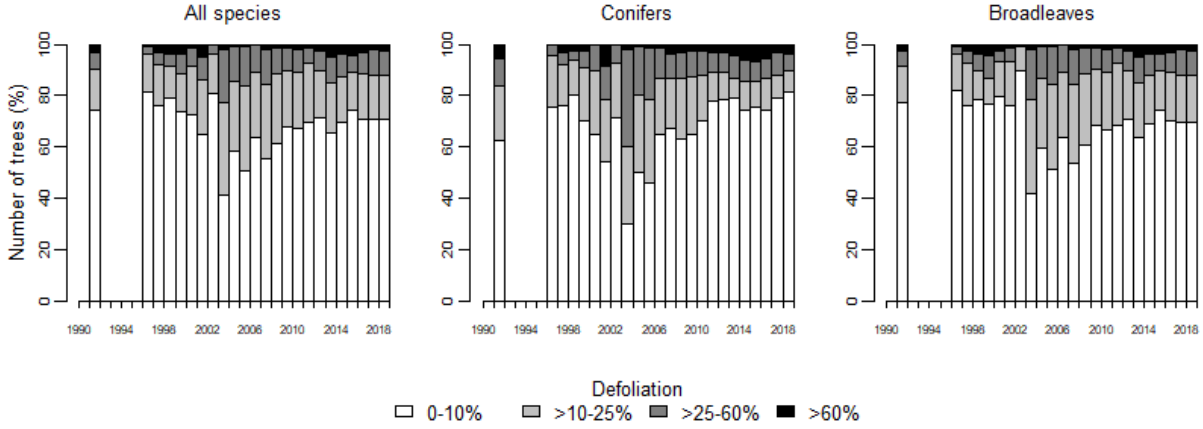
ROMANIA



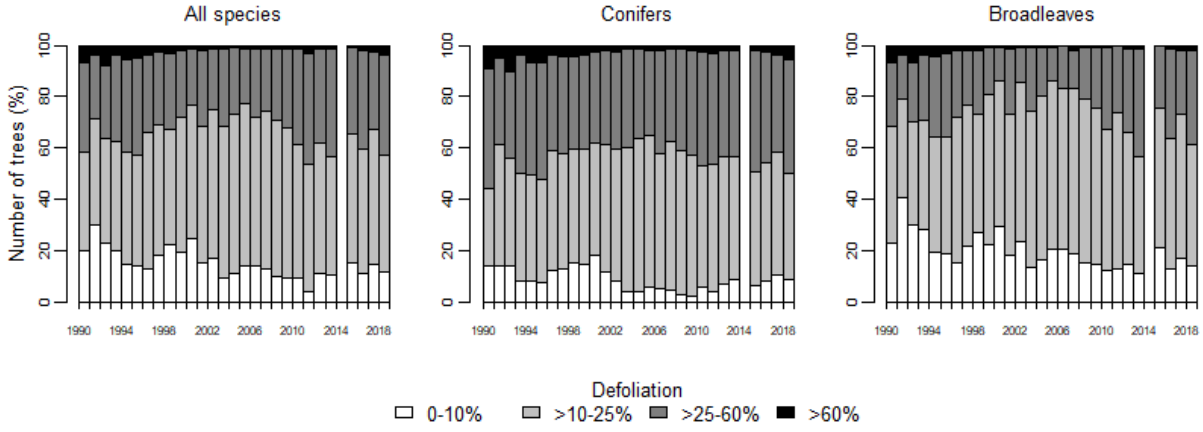
RUSSIAN FEDERATION



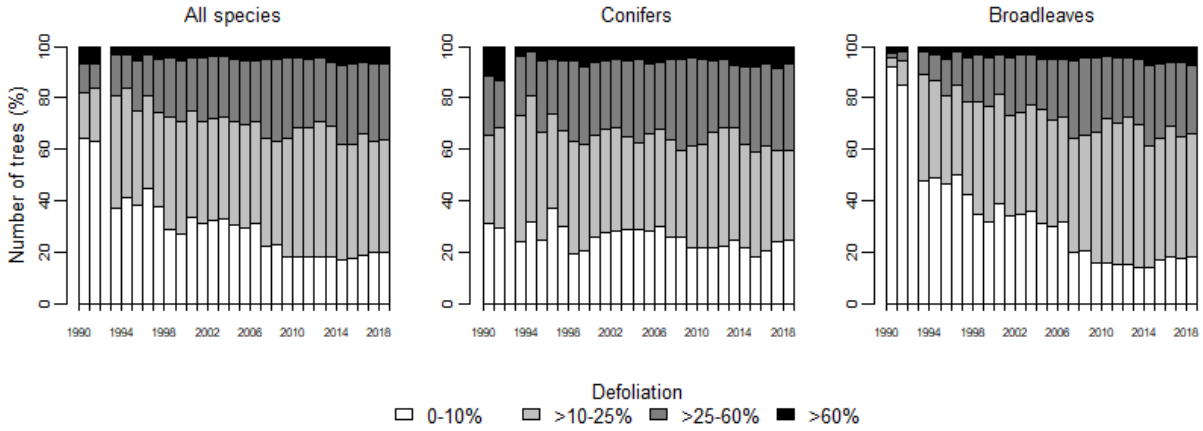
SERBIA



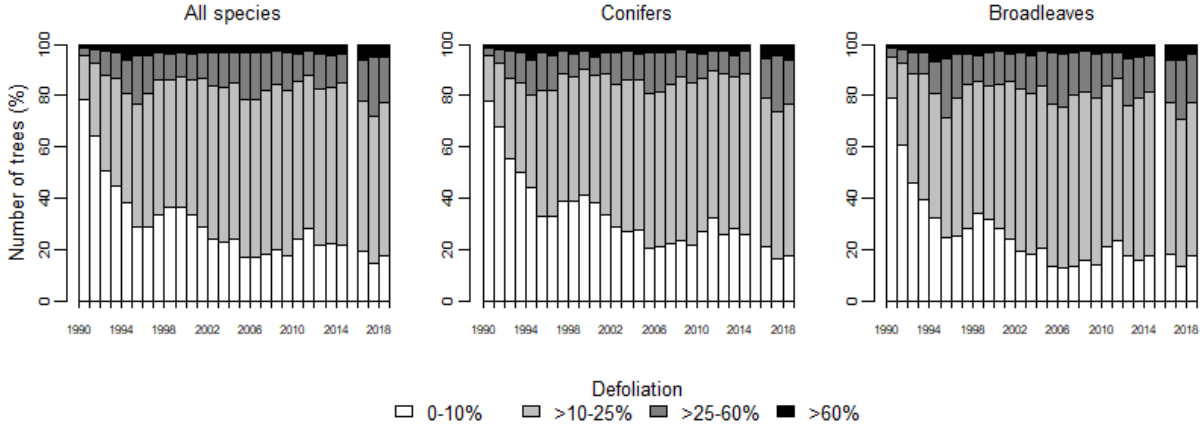
SLOVAKIA



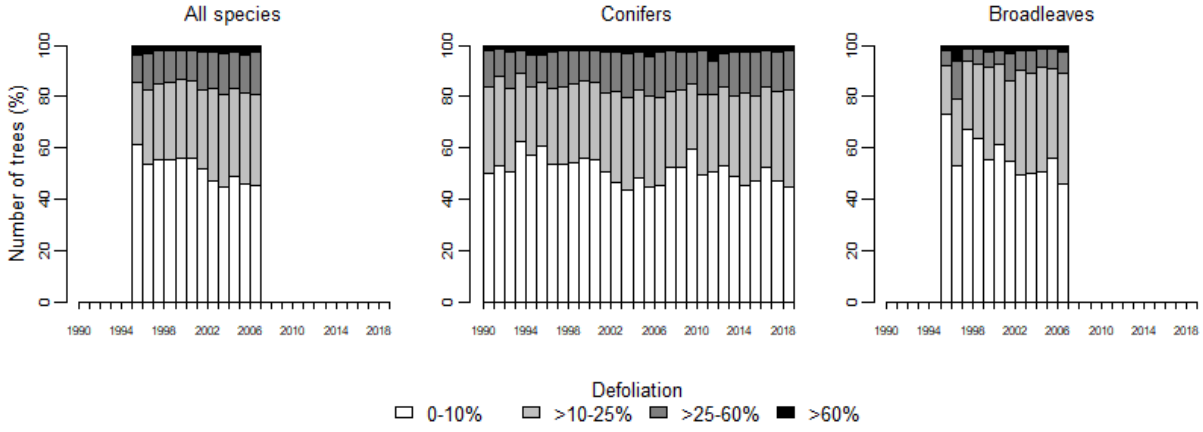
SLOVENIA



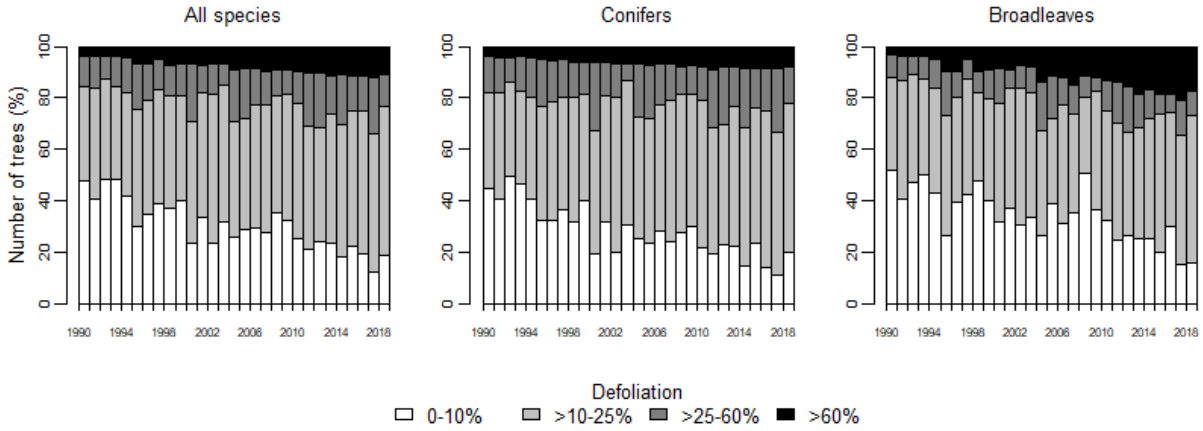
SPAIN



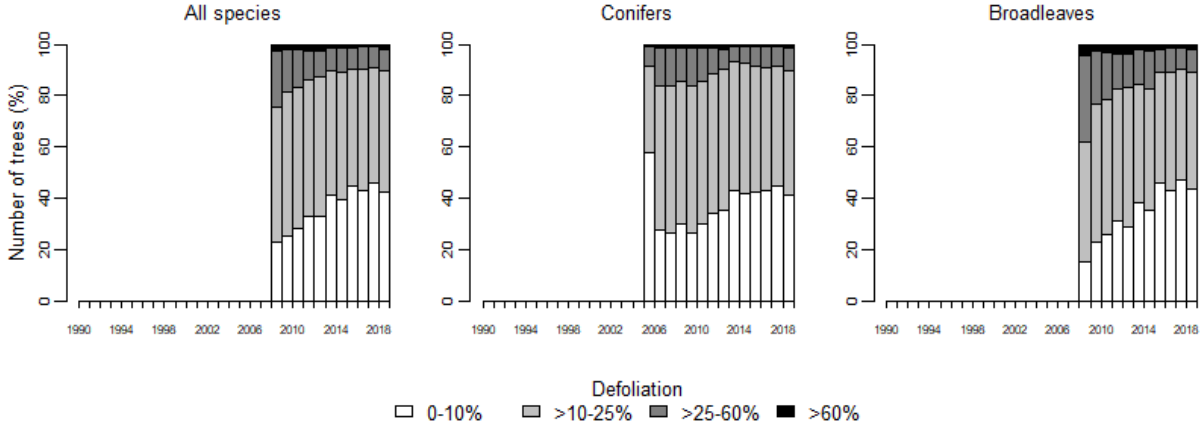
SWEDEN



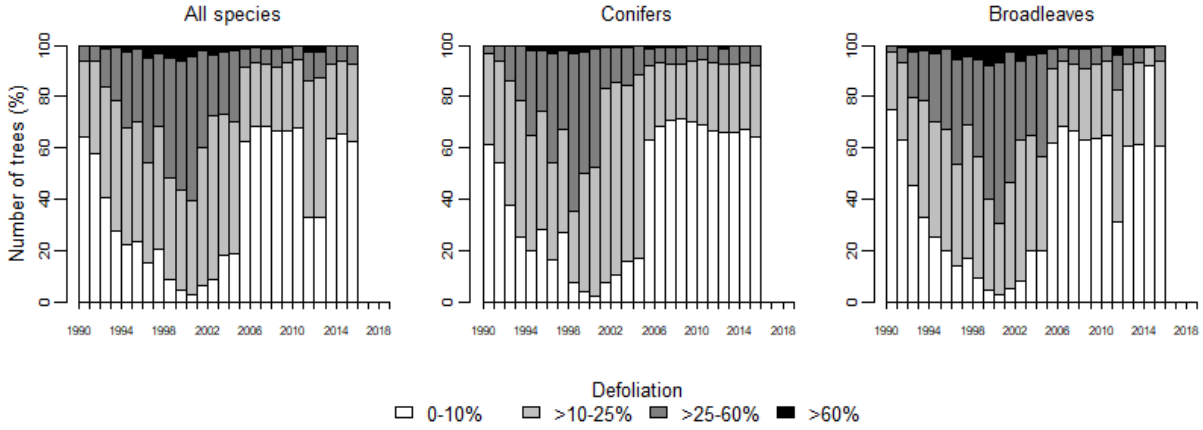
SWITZERLAND



TURKEY



UKRAINE



UNITED KINGDOM